Part 1 - Introduction and background

Introduction

The objective of the Economic and Employment Lands Strategy (EELS) is to facilitate a more proactive approach to industrial land use planning and provide an ongoing supply of industrial land to cater for anticipated economic growth in Western Australia over the next 20 years and beyond. The Strategy represents the State Government's position with respect to future industrial land use planning for the Perth and Peel regions, and factors stemming from large-scale resource projects, particularly in the State's North-West. With an anticipated economic boom potentially larger than that experienced in the early 2000s, it is vital the State is positioned to adequately and capably respond to and support this economic growth.

Key agencies involved in its preparation include the Department of Planning, Department of State Development, Department of Environment and Conservation and LandCorp, the latter being the State Government's appointed developer.

Corresponding with a number of other significant State planning documents, such as *Directions 2031 and Beyond: metropolitan planning beyond the horizon,* the *State Planning Strategy* (draft), the *Activity Centres Policy* and sub-regional plans for the Perth and Peel regions, the Strategy represents the strategic planning direction for industrial land into the future. The EELS is consistent with the wider objectives of the Western Australian Planning Commission (WAPC), which is actively pursuing a more integrated and coordinated approach to infrastructure planning and provision for infill and greenfield land releases for the Perth and Peel regions.

The Strategy focuses solely on general and light industry needs and does not include heavy industry. Therefore, references to industrial land in the EELS mean "general and light industrial land" unless otherwise stated. Demand for heavy industrial land is derived from a different set of drivers to that of general and light industrial land, being more project dependant than other industrial land uses, therefore it has been excluded from consideration in the EELS.

Purpose

Key elements of the Strategy are to:

- Identify the areas, type and locations of general and light industrial land required over the next 20 years.
- Review the existing industrial land development program and identify possible expansion opportunities.
- Identify and evaluate the suitability of locations for new general and light industrial estates.
- Develop a strategy to facilitate the ongoing supply of general and light industrial land, and assist in the restoration of the Western Australian Government's long term general and light industrial land bank.

The Strategy details a number of key initiatives that will be actively pursued by the Government to address the industrial land supply shortfall and secure an adequate ongoing supply of industrial land over the next 20 years and beyond.

Background

Industrial land is a vital component of a healthy, growing economy. During times of economic uncertainty, the availability of industrial land and infrastructure is important in order to encourage new industries to develop. An adequate supply of appropriately serviced industrial land will assist in staving off the effects of economic slowdown, and improve confidence in any industrialised economy.

Since the 1970s, proactive and strategic planning for future industrial land has been limited in the Perth and Peel regions of Western Australia. The resources boom of the late 1990s and early 2000s exposed this inefficiency in strategic planning through a significant shortfall in development ready industrial land. The result was a stagnant industrial property market with limited opportunity to expand.

This shortage negatively impacted on the industrial land market, resulting in significant increases in the value of industrial land, and, in some cases, rendering the development of available land unviable. Effectively, the developed land became too expensive for people to buy or rent, leaving developers unable to on-sell land, and the available industrial land pricing itself out of the market. State Government intervention was needed to address strategic planning for industrial land and ensure that the economic buoyancy being enjoyed by Western Australia could be sustained and supported.

Study area

The study area for the EELS encompasses the statutory boundaries of the Perth Metropolitan and Peel regions, as defined by Region Schemes. This study area comprises approximately 805,633 ha, 13,798 ha is currently zoned for industrial purposes (Figure 1).

Methodology

The EELS was prepared over a four-year period. A number of technical studies support and inform the strategy, and each is described in further detail in separate Technical Summary documents, which supplement this strategy document (refer to Appendix A - EELS methodology technical summary).

The EELS is the culmination of three studies: the Industrial Land Needs Study which examined the current industrial stock for the Perth and Peel regions, noted historical consumption trends and forecasted likely future demand for industrial land over the next 20 years; the Industrial Land Capacity Assessment Study, which, using forecast demand figures, identified potential future industrial sites using a multi-criteria evaluation methodology, and subsequently prioritised those sites; and a separate market analysis to ascertain what current and potential industrial land users and owners want and need the strategy to deliver land for current and future needs (Figure 2).

Figure 1: Study area

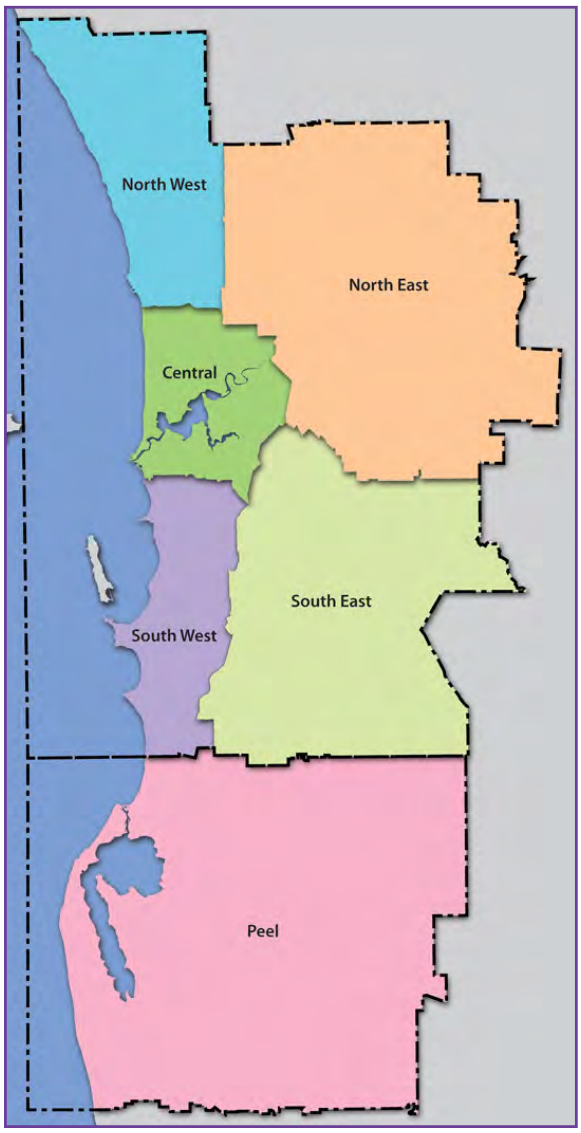
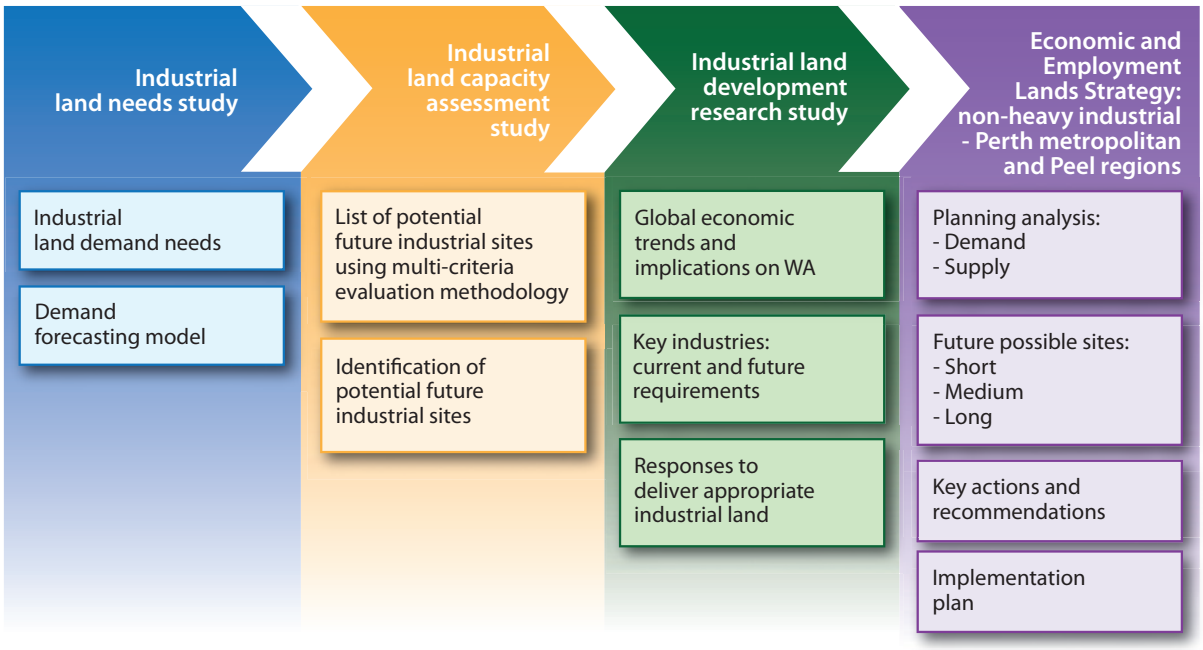


Figure 2 - Methodology



Key assumptions

The preparation of these supporting documents and the strategy was underpinned by a number of key assumptions, namely that:

- There will be a continued need for general and light serviced industrial land driven by increased population growth independent of economic conditions.
- Despite the global financial crisis in late 2008, the economic health of the Western Australian economy and related demand levels for industrial land will remain generally commensurate with demand levels experienced in the lead up to the resources boom of the early 2000s.
- The spatial and multi-criteria analysis undertaken to identify potential future industrial sites represents only the preliminary stages of a more involved and complex investigative process to determine the ultimate feasibility of these sites.
- The identification of potential future industrial sites within the strategy, does not give certainty that industrial development will be approved over 100 per cent of the site.
- The provision of a more robust and enabling planning framework for industrial land use planning will generate greater private sector involvement in industrial land development than presently is experienced.
- The State Government and its key servicing and infrastructure agencies will better understand and subsequently choose to adopt a more coordinated and proactive approach to assisting in the facilitation of industrial land use development.
- A strategic land bank of industrial land is necessary and should be actively maintained.

Part 2 - Role of industry and industrial land

Photograph courtesy: Eastcourt Property Group

Primarily providing employment opportunities, industrial land also has an intrinsic link to the economic sustainability and strength of a city and, on a wider scale, contributes to the overall national and global economy. As a significant contributor to employment for the Perth and Peel regions, its importance to the resource sector in regional Western Australia, and as a hub for international trade, it is crucial that planning for industrial land is proactive and dynamic.

What is industrial land?

The strategy focuses on light and general industry only. These are described below in further detail:

Industrial Typologies and Location Criteria

Industry typology	Activity	Location criteria
Light / Commercial - Local light and service industrial estates. Generally have small scale operations which don't normally require land use buffers	• Consumer oriented e.g. household goods and clothing • Local and district catchments • Manufacturing which uses partially processed materials to make products • Showroom and services • Can be home based	• Highly accessible, visible frontage, transport / activity corridors / some residential locations • Very close to centres of population and trade • Areas where there is minimal impact on neighbouring uses but do not require major buffers of separation zones • Micro / small to medium scale sites • Local employment catchment
General - District Estates and Special Use sites of local significance. Estates with small to moderate sized industries.	• Consumer and business orientation • Regional, state and international catchments • Not hazardous or offensive • Can include business parks, offices, local services, fabrication and manufacturing • Some limited retail/bulky goods	• Interstate, interregional arterial roads, preferably High Wide Load corridors, rail freight • Potable and processing water, sewer/ land for waste water disposal, electricity, other energy (food and metal processing are heavy water users and may require associated recycling facilities • Large, skilled workforce catchment • Moderate to large, relatively flat sites – any processing is land intensive • Potential for large amounts of onsite storage
General (Warehousing and Distribution)	• Storage and display of goods • May include wholesale • May be hyper large sites dependent upon scope of operation • Trend towards automated goods handling and smart buildings • Trend towards dedicated distribution parks (see logistics below) • Sites to be as flat as possible, allowing for large buildings with maximum accessibility for handling vehicles	• Freeways, rail freight routs • Transport corridors • Proximity to strategic and regional centres • Close to equidistant between centres of population and trade • Areas where there is minimal impact on neighbouring uses but do not require major buffers or separation zones • Large sites, verge large lots, can be multi-storey • Large hardstand areas and parking sites • Local employment catchment • Linked to logistics and transport industries

Continued on page 6

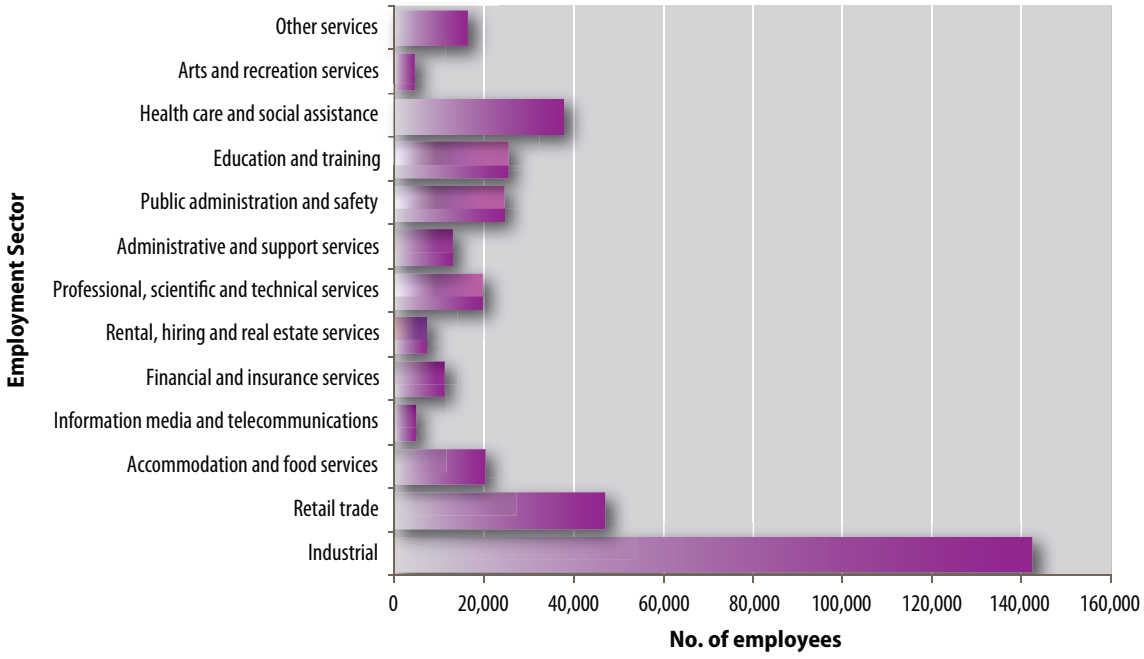
Industry typology	Activity	Location criteria
General (Transport and Logistics)	• Transport and courier depot and services • Distribution centre • Packaging, parts and services • Disposal, recycling • Material management • Geared towards high technology / smart automated systems • Likely to need expansion / growth to be identified as later phases of sequential development	• Airport • Seaport • Interstate, inter-regional arterial roads, rail freight • Very large sites (up to 200 hectares in Europe), very large lots (possibly 9,000m^2 minimum) • Large hardstand areas and parking sites • Links to warehousing sites • All utilities including ICT networks

Industrial land: Employment provider

Industry employs on average 34 per cent of the labour force in the Perth and Peel regions, or approximately 336,000 people. With the industrial sector supporting such a large proportion of the labour force, it emphasises the need to protect existing industrial land and continually provide new industrial land.

As Figure 3 shows, the distribution of employment across sectors is greatest for industrial land, and industrial related activities. With a "resource State" label, Western Australia relies heavily on a conducive and supportive service sector, to cater for the larger scale resource sector, to maintain its economic buoyancy. While a diverse economy is encouraged, it is most likely there will be a continued reliance on the resource sector as the primary driver of employment and economic growth for at least the next 50 years. This further adds to the need for a proactive approach to the protection and preservation of existing industrial land and an ongoing identification of future industrial land, to sustain the growth of the resources sector.

Figure 3: Employment by Industry Sector



Source: *ABS Cat. No. 2068.0 - 2006 Census Tables; 2006 Census of Population and Housing Perth and Mandurah (Major Statistical Regions)*

Industrial land: The changing face

The appearance of industrial land has changed considerably over the past two decades, with increasing pressure to convert industrial land to other higher end uses, such as offices and residential uses. There has also been an increasing blurring of the lines between what is regarded as traditional industrial uses and commercial uses. The lack of a consistent regulatory approach across local government boundaries has enabled this encroachment of less traditional, and in some cases, inappropriate land use activities in industrial zoned areas.

The contemporary challenges facing industrial areas include:

- The diversification and specialisation of industrial business models;
- The evolution of entertainment and recreation businesses into large format business models which are encroaching into traditional industrial areas; and
- Bulky-goods retailers locating into traditional industrial areas particularly in locations offering high traffic exposure.

Without a consistent regulatory framework to protect traditional industrial uses from encroaching land uses, the more commercial and higher end uses have been "allowed" to gradually intrude into industrial areas, which in effect has changed the land use composition. The resultant effect of the inconsistent approach to industrial land use planning can be seen in areas such as Osborne Park, Malaga and Balcatta, whereby industrial estates have evolved into quasi-commercial centres, where large scale bulky good retailers are now located and traditional industrial operators have been limited in their opportunity to expand due to higher end competing uses.

Although that it is important to allow industrial land to evolve as technological advancement and innovation occurs, there is still a need to ensure that traditional industrial land uses and their operations are not impeded due to non-industrial uses being allowed to encroach into industrial land. Industrial land must be protected for industrial uses into the future.

Zoning for industry

It is important to recognise that industrial type activities are not restricted to only occurring on land which has been zoned 'industry' under a scheme. An example of this is land used for industrial activities within the City of Belmont. Within the upper northern portion of its local government boundary, exists a light industry area, zoned 'light and service industry' under the local planning scheme. Under the MRS, this area is zoned 'Urban'. In this particular instance, the land was considered to be suitable for these lighter forms of industrial use given the specific characteristics of the area and its relationship to adjoining land uses.

By allowing industry in "urban" zones is necessary to avoid adverse impacts upon neighbouring areas, particularly residential areas. Appropriate buffer zones are typically utilised in such cases to separate incompatible land uses.

The strategy identifies potential locations where industrial type uses may be suitable. It represents the State Government's blueprint for future industrial land use planning, in the Perth metropolitan and Peel regions. The areas identified in this strategy only indicate the extent of the investigation area, and do not represent the proposed development area or the likely extent of the rezoning of this area to industrial.

Key points

- Industrial land supply is in high demand, and a proactive approach to industrial land use planning and land banking must be undertaken as a matter of urgency.
- Industrial land is a significant provider of employment to the wider population of Perth and Peel, therefore, forms a vital part of the urban fabric and economic prosperity of the State.
- Industrial land use activities are diverse and varied, and through technological advancement and innovation, are changing rapidly in nature.
- Industrial land use activities should not be restricted to occurring just on land zoned "Industry" under a Region Scheme. Local town planning scheme provisions can also manage land use activities dependant on local issues and the local context.
- There is increased pressure and subsequent dilution of the function of industrial land because of a lack of a consistent statutory planning framework.

Photograph courtesy: Eastcourt Property Group

Part 3 - Planning for industrial development

Photograph courtesy: Eastcourt Property Group

During the past decade Western Australia has experienced an unprecedented economic boom that has transformed the State's economy. Over the ten year period from 2001 to 2011 the population of Western Australia grew from around 1.9 million to 2.35 million (ABS, 2011). Western Australia's population growth rate of 2.4 per cent over the past year makes Western Australia currently the fastest growing State.

This rate of population growth will not only impose significant pressures on the urban planning process for the Perth metropolitan area, but also adjacent areas such as Peel and parts of the South West along the Bunbury corridor. To cope with this projected growth it will be necessary for WA to provide optimal locations for employment opportunities, housing and infrastructure which, in turn, will require industrial development. It is vital that planning for industrial land moves in a direction where the planning system and development industry can capably respond to this anticipated demand.

Planning for industrial land

Planning for industrial land is challenging. The basis for its need is derived from unpredictable economic cycles and with the pace of innovation in technology and processes, which makes it difficult for planning regulators to respond. The strategy recognises these challenges, and aims to offer a more intuitive and responsive planning framework that factors in flexibility to accommodate this constantly changing environment.

Adding to this already challenging planning context is the lack of understanding of the vital economic benefits derived from industry. Industrial land is an essential part of the urban fabric, that must be afforded its economic and social importance.

The inconsistency applied at both State and local government levels in industrial land use planning, particularly when it comes to determining permitted land uses and the prescription of minimum lot sizes for new industrial developments, results in ad hoc industrial land use planning. Larger lots are being further subdivided into smaller "more affordable" lot sizes and inappropriate uses are being allowed in industrial areas, in the absence of any industrial land use guidelines stipulating otherwise.

This inconsistency adds further challenges for developers, and means uses that would be better suited elsewhere are permitted within industrial estates. Non-industrial uses in industrial areas directly impact on the operational capacity and potential of some industries, thus compromising the optimal functioning of industrial areas. Furthermore, the relevance of some planning regulations (e.g. car parking ratios being based on total floor areas), particularly in terms of built form and lot development, further diminishes the ability for industry operators to realise their potential.

The strategy recognises there is an urgent need to review the current planning regulations to ensure a better overall planning outcome for industrial estates.

Planning framework: Key planning documents

Historically, the prominence of industrial land use planning for the Perth and Peel regions has varied, depending on the focus of the State Government at the time, and the economic climate. The shortfall identified in late 2006 highlighted the inability of the existing planning system to adequately deliver industrial land to the market as demand dictated. The shortfall exposed a reactive rather than proactive planning system resulting in an industrial land supply deficiency unable to meet the level of demand. A summary of the key planning documents that have shaped the Perth and Peel regions are outlined in Appendix B.

In recent times, the approach to State planning has undergone a review and revitalisation. Strategic planning direction has evolved, reflecting a more holistic and integrated approach where the objectives are underpinned by social, environmental and economic considerations. The key planning documents, which have a direct relationship with the Strategy's strategic objectives, are outlined as follows:

State Planning Strategy

The State Planning Strategy is a long-term plan providing the broad strategic direction for Western Australia. Guided by an overarching vision and State strategic directions, the strategy will shape Western Australia as it heads toward 2050. The Strategy outlines a set of planning principles, objectives and priorities for strategic land use and development in Western Australia. These principles and key objectives are listed below:

Principle	Objective
Community	To enable diverse, affordable, accessible and safe communities that support social well being, quality of life and cultural identity for all West Australians
Economic	To enable trade, investment, employment and community betterment that enhances the economic prosperity for Western Australians
Environment	Conserve the State's natural environment through managed land development, as well as supporting the sustainable supply of and demand for the State's natural resources
Infrastructure	To coordinate physical and social infrastructure to support land development and community well being.
Regional Development	To build upon the competitive and collaborative advantages of the State's regions in order to empower regions in land development matters
Governance	To continually improve the business of land development to be integrated, consistent, transparent and timely in order to build community confidence in land development affairs

It also recognises that the State needs strategically identified project-ready industrial areas and zoned industrial land for all industry types to afford a diversity of industrial development and to attract investment in Western Australia's economy. Industry in Western Australia relies heavily on physical and social infrastructure, and, at the same time, is responsible for the planning and delivery of this infrastructure.

Directions 2031 and Beyond: Metropolitan planning beyond the horizon

"*Directions 2031 and Beyond*" was adopted and launched in August 2010. It is a high level strategic plan that establishes a vision for future growth of the Perth metropolitan and Peel regions, and provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate that growth. The anticipated population increase to 2.2 million by 2031 will translate directly into the need for another 328,000 houses and 353,000 jobs.

One of the key objectives of *Directions 2031 and Beyond* is to improve the relationship between where people live and work, to reduce commuting time and cost, and the associated impact on transport systems and the environment. The connected city scenario is expected to deliver improved levels of employment self-sufficiency across all sub-regions.

To address this anticipated demand and informed by separate strategies such as the EELS and the Department of Planning's Urban Development Program, *Directions 2031 and Beyond* represents a number of sites identified in these preceding studies that indicate some level of potential for future residential and industrial land uses within the Perth and Peel regions.

Directions 2031 and Beyond recognises the importance of developing an economic and employment strategy for the Perth and Peel regions to identify and provide employment land and its distribution over the long term in order to sustain the expected population growth.

It will also ensure that suitable land is identified to support the economic activity of the city and State, particularly for infrastructure provision and industrial development.

Directions 2031 and Beyond also recognises the importance of freight movement to the city's economic prosperity. The Western Australian Planning Commission's *State Planning Policy 5.4 Road and Rail Transport Noise* identifies a freight movement network of road and rail infrastructure. In planning for the future growth of the city it is critical that the freight network is well connected to key industrial areas and a balanced system of intermodal facilities.

Sub-regional strategies

As an implementation mechanism of *Directions 2031 and Beyond*, draft sub-regional strategies have been prepared for both the Central and Outer sub-regions. The draft *Central Metropolitan Perth Sub-regional Strategy* addresses issues relating to creating more housing opportunities across the 19 local government areas in the inner/middle sectors of metropolitan Perth. The draft *Outer Metropolitan Perth and Peel Sub-regional Strategy* focuses on providing an adequate supply of suitable urban land to support the strategic and sustainable growth of the city to 2031 and beyond. Both strategies also outline the need for additional employment land to cater for the increased population base that is expected over the next 20 years.

The industrial sites denoted on the sub-regional plans, which form a part of the overall *Directions 2031 and Beyond* document, are those future key sites identified as part of the strategy where the government's strategic focus should be. However, it must be recognised that the 'Under investigation' status allocated to these sites does not imply that the land will be inevitably rezoned for industrial use. As is clearly represented in the EELS, there are further and more detailed investigations that must be carried out before any rezoning is considered. Consideration is also given to applying appropriate buffers to conflicting land uses such as residential developments and industrial land uses.

State Planning Policy 4.1 State Industrial Buffer Policy

In July 2004 the WAPC released a Draft State Industrial Buffer Policy. This policy is based on an assumption that routine industrial emissions and risk factors are identified during planning and environmental assessment processes and managed in accordance with licence conditions or statutory environmental conditions. Where licences and statutory environmental conditions are not applicable, high standards of environmental management should be adopted by industry and infrastructure providers.

The *State Planning Policy 4.1 State Industrial Buffer Policy* is currently under review. The purpose of the policy is to provide a consistent statewide approach for the protection and long-term security of industrial zones, transport terminals (including ports) other utilities and special uses.

It will also provide for the safety and amenity of surrounding land uses while having regard to the rights of landowners who may be affected by residual emissions and risk.

The policy establishes objectives and principles and how the principles should be applied to define and secure buffer areas and who should pay for them. It is intended that the WAPC will, after the policy has been in operation for a period of two full years, undertake a review of its effectiveness, and if necessary amend the policy.

The objectives of this policy are:

- To provide a consistent statewide approach for the definition and securing of buffer areas around industry, infrastructure and some special uses;
- To protect industry, infrastructure and special uses from the encroachment of incompatible land uses;
- To provide for the safety and amenity of land uses surrounding industry, infrastructure and special uses; and
- To recognise the interests of existing landowners within buffer areas who may be affected by residual emissions and risks, as well as the interests, needs and economic benefits of existing industry and infrastructure which may be affected by encroaching incompatible land uses.

State Planning Policy 4.2 Activity Centres for Perth and Peel

The *State Planning Policy 4.2 Activity Centres for Perth and Peel* (SPP4.2) gazetted on 31 August 2010, specifies broad planning requirements for the planning and development of new activity centres and the redevelopment and renewal of existing centres in the Perth and Peel regions.

SPP4.2 makes specific reference to the land use permissibility of bulky goods retail in order to reduce its potential dispersal throughout industrial zones. The policy directs bulky goods retail uses to selected Mixed Business or equivalent zones with suitable road and public transport access. Only recommended forms of retail and commercial development within industrial zones are noted in the policy. With regards to land for industrial purposes the policy aims to ensure that the key uses for industrial land are to be maintained and commensurate with industrial purposes.

Offices, unless incidental to, or servicing industrial developments, are discouraged from being located on land zoned for industry under region or local planning schemes. Criteria against which proposals can be assessed have been created for proposed office development in industrial areas. Shops and office development will only be permitted on land zoned industrial under region and local planning schemes where shops provide a local convenience service predominantly for people employed in the locality and are confined to a local centre; and offices are ancillary to the predominant industrial use of the premises or are confined to a local or small-scale centre that services industrial developments.

Planning Reform Act

On 19 August 2010, the Governor assented to the *Approvals and Related Reforms (No. 4) (Planning) Bill 2009*. The purpose of this Act is to amend the *Planning and Development Act 2005* to streamline and improve the approvals process.

The key elements of the Act are to:

- Establish development assessment panels, which will provide a more effective and efficient approval process for development applications to build significant urban, industrial and infrastructure developments;
- Significantly extend the use of existing strategic instruments such as improvement plans and planning control areas to strengthen state and regional planning throughout the State;
- Enable the State to collect data on local development decisions to monitor the effectiveness of reforms to the approvals process;
- Provide a mechanism for local planning schemes to be updated to implement State Planning Policies (Section 77 and 76); and
- Streamline and clarify existing provisions and processes to improve the efficiency of the approvals process.

The measures provided for in this Act will enhance the ability of the State to implement the objectives of the strategy. For example, the use of improvement plans (which will be updated through improvement schemes) or planning control areas, may allow more direct development control and/or designation of industrial areas. The decision to use such tools will be based on proper planning principles and be subject to consultation requirements. There is also greater capacity to enhance implementation of State Planning Policies relevant to industrial development. The Act provides the Minister with the power to direct local governments to amend their local planning schemes to be consistent with particular State Planning Policies.

Gnangara Sustainability Strategy

The Gnangara Sustainability Strategy (GSS) has a bearing on the strategy in so much that a vast majority of the land in the North-west sub-region is affected by the nomination of what are referred to as Priority areas of the Gnangara Water Mound.

The GSS is an integrated planning strategy designed to address land, water and biodiversity issues on the Gnangara mound through a transparent decision making framework in which tradeoffs can be considered between competing values. The GSS includes all agencies responsible for the management of land and water within the Gnangara groundwater system. At the time of preparing this document, the GSS was still awaiting final government approval.

The GSS outlines the impacts of pressures on the Gnangara groundwater system. It describes the extent to which changing land use and management options can assist in adapting and responding to these impacts. The GSS also addresses the larger policy directions around land use and water management on the system and provides options for long term management. The GSS aims to protect Perth's major drinking water supply and guides land uses to maximise the available water resource into the future.

Governance framework

The development of industrial land is a highly specialised field of activity that typically has a significant role for government. Industrial land requires long term planning and may take decades to assemble and bring to the market, then decades to fully establish. It requires a long term strategic vision for its purpose and ongoing management that few private sector organisations have the capacity to achieve. There are significant costs and risks associated with industrial land development and its strategic importance in the wider context of the State's economic growth makes the role of Government essential.

The current governance structure spans four key areas of influence:

- State government
- Local government
- Servicing agencies
- Industry stakeholders

Key stakeholders in industrial land development

State Government

The State Government comprises many different entities, each charged with their own role and areas of responsibility to plan protect and manage the State's assets, be it environmental, economic or social. While the roles and responsibilities of the various State Government agencies are well defined, there is a recognised need to enhance the level of inter-agency cooperation and collaboration, particularly when it comes to industrial land development.

Local government

Local government plays a vital role as the interface between the community and the wider government framework. Guided by many State Government policies, and dependent upon decisions made by the State Government agencies, local government authorities have a pivotal role in managing the orderly and proper planning within their local jurisdictions.

Local governments are increasingly challenged when managing land uses within industrial areas. The absence of a consistent statutory framework to apply to industrial estate land use planning has seen the incursion into industrial areas, particularly in the central sub-region to higher end and more commercial uses with bulky good retail uses, and entertainment uses (such as recreation centres and places of worship) being allowed to operate in industrial estates. Greater consistency, particularly as it relates to permitted land uses in industrial estates and development control on building form and the promotion of more sustainable practices, needs to be developed as a matter of urgency.

Infrastructure agencies and service providers (Infrastructure Coordinating Committee)

During the course of preparing the EELS, infrastructure provision was identified as one of the key issues and challenges that need to be overcome to create a more enabling environment for industrial land development to occur. Reporting directly to the WAPC, the Infrastructure Coordinating Committee (ICC) plays an increasingly vital role in coordinating infrastructure provision and service delivery. The ICC is chaired by the WAPC, and the infrastructure agencies and service providers represented on this committee are listed as follows:

- WAPC, Chair (Gary Prattley)
- local government representative
- professional representative
- Department of Housing
- Office of Energy
- Office of Environmental Protection Authority
- LandCorp
- Department of Environment and Conservation
- Department of Treasury
- Department of Finance
- Department of Planning
- Department of State Development
- Water Corporation
- Department of Education Services
- Department of Regional Development and Lands
- Department of Mines and Petroleum
- Department of Health
- Department of Water
- Department of Education
- Department of Transport
- Department of the Premier and Cabinet
- Department of Commerce

A major stumbling block for all servicing and infrastructure agencies for all urban development matters is the issue of pre-funding for infrastructure projects. With a relative scarcity of public funding it is important that through better coordination between the various agencies, unnecessary duplication and waste of funding does not occur. It will be imperative that the ICC engage with State and local government agencies and the private sector to plan for infrastructure over the longer term and that it leads rather than follows industrial development, as has been the case historically. The Urban Development Program, discussed later in this document, will play a vital role in providing this coordinated framework for government agencies and infrastructure and service providers to work within, to deliver an optimal outcome.

Development industry

The development industry is traditionally focused on large scale residential subdivisions and development, with the industrial portfolio of the larger scale developers being relatively small. Promoted by the resources boom, some of these development companies expanded the size of their industrial divisions in order to play a more active role in the industrial land development market. However, the global financial crisis, coupled with what had become a vastly inflated property market saw these same companies reduce their industrial land development visions, and retreated their presence in the market.

LandCorp

A major industrial land developer is LandCorp. Charged with the role of both a policy advisor and the State Government's developer, LandCorp has an important role to play in stimulating the industrial property development market and facilitating the on going availability of industrial land to cater for forecast demand. Through the development of the EELS it was recognised that the opportunity exists for LandCorp to activate its role and increase its focus on industrial land. The strategy recognises that there is a need for government to foster a much stronger working relationships with the private sector.

Key points

- Planning for industrial land is challenging because of its particular reliance on unpredictable economic trends.
- There is a need for stricter land use planning controls to exclude inappropriate uses from areas identified for industrial development and activity
- Planning and zoning regulations need to factor-in enough flexibility for industrial land to be developed successfully, while ensuring that the amenity and environmental considerations are taken into account.
- The poor understanding of what industrial land delivers beyond its economic contribution is one of the biggest weaknesses of the existing planning framework for industrial land at both State and local government levels.
- The State Government, through the recent release of key strategic planning documents, such as *Directions 2031 and Beyond* and the draft sub-regional strategies, is recognising the importance of industrial land to the urban fabric and economic health of Western Australia.
- There are various influencers of industrial development. A coordinated and more collaborative framework needs to be established to optimise the development of industrial estates.
- The WAPC's Infrastructure Coordinating Committee (ICC) is viewed as being a key facilitator in ensuring that State Government initiatives are supported across government. Its role in facilitating an improved industrial land use planning outcome is pivotal.

Part 4 - Demand analysis for industrial land

Photograph courtesy: Eastcourt Property Group

In Western Australia, a unique set of economic drivers, influenced by the State's heavy reliance on the resources sector, also affect the levels of demand for industrial land. This interrelationship means that while population growth remains as the primary driver for industrial land demand, economic conditions can also have a significant influence on the rate and type of consumption for industrial land depending on market conditions and trends.

Industrial land demand: Western Australia

The Western Australian economy is particularly sensitive to economic activity, especially when compared to other States in Australia. Heavily reliant on an export and import market, the resources sector and its strong trading ties with the South-East Asian region, the impact of changed global economic conditions can adversely impact on the demand for industrial land, as downturns in these cycles occur.

The combination of a continued strong export-oriented economy, upward employment trends and a growing population mean that an increase in demand for industrial land is likely to continue to be experienced in the Perth Metropolitan and Peel regions for the foreseeable future.

On a global scale, long term economic growth in key international markets such as China, Japan and Korea will drive growth within these industries, and subsequently increase the demand for industrial land. Key shapers will include State and local government agencies, and their ability to set policy and build infrastructure that is attractive to major investors.

Demand drivers

One of the greatest challenges in industrial land use planning is being able to predict future demand and from where it will originate. Although population growth can be relied upon as an indicator of growth and subsequent demand for residential land, predicting future demand for industrial land is not so simple. Various other drivers affect the volume of demand, and a solid understanding of economics and a commercial knowledge base are necessary to ensure that the planning for future demand is commensurate with the economic direction of the day.

Essentially, the demand for industrial land generally derives from a local, national and/or international demand for goods and services, with value adding to both locally generated products and products

generated in other regions. Industries usually seek sites with sufficient amenity and location advantage in order to perform their activity in a competitive way. Preferences will vary dependant upon the industry sector, but such amenities often include:

- Being contiguous to other industrial activities;
- Being well located in relation to supply chains and service providers;
- Having the potential for on-site expansion of existing industrial businesses;
- Being well located in relation to skilled labour pools;
- Being well located to take advantage of existing or proposed infrastructure or other economic development;
- Being well located in relation to freight connections and other important road and/or rail networks;
- Having the potential to provide for small industrial businesses serving the local area;
- providing sufficient space for adequate parking and turning space for industrial vehicles;
- Having the potential for 24 hour, 7 day a week operations;
- Having minimal or no adjoining land use constraints (or sufficient areas to prove internal buffers);
- Having minimal or no environmental, geotechnical or drainage constraints (or the potential to compensate off site);
- Not having constrained vehicle access and exit points;
- Being commercial developed with infrastructure and site preparation for future industrial activities; and
- Having sufficient on-site hardstand space.

Following consultation with industry bodies and private sector land owners, most land demand was from two distinct areas:

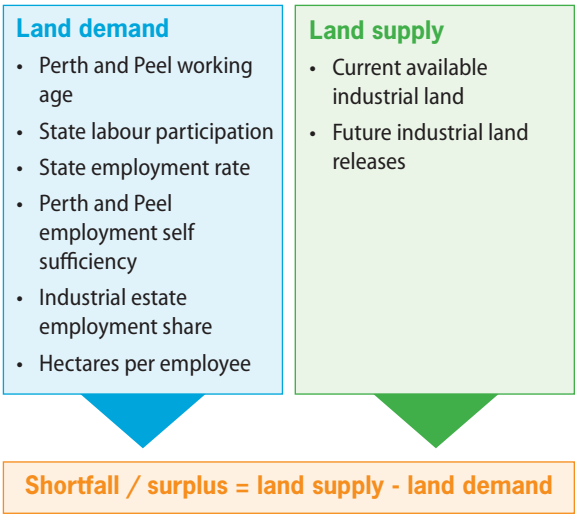
1. International and national firms seeking large warehouses (more than 4000 m^2) and land areas (above 2-3 ha).
2. Small scale local businesses seeking warehouse space less than 1000 m^2.

Forecasting demand

The EELS was predicated on the need to identify future land for industrial use, resulting from an identified shortfall in industrial land, witnessed in the late 1990s and early 2000s. To determine how much land needs to be identified to resolve this shortfall, demand modelling was undertaken to enable forecast demand rates to be determined. A forecast model was developed based on key data considered relevant to informing future demand levels. The key model inputs used were based on both historical and projected data, which are represented and were used as indicated in figure 4.

The forecast additional demand for industrial land in the Perth and Peel regions from 2006 until 2031 is calculated to be approximately 4726 ha. It should be noted that the forecast demand was based on a "business as usual" scenario, using WA Tomorrow

Figure 4: Industrial Land Demand Modelling Inputs

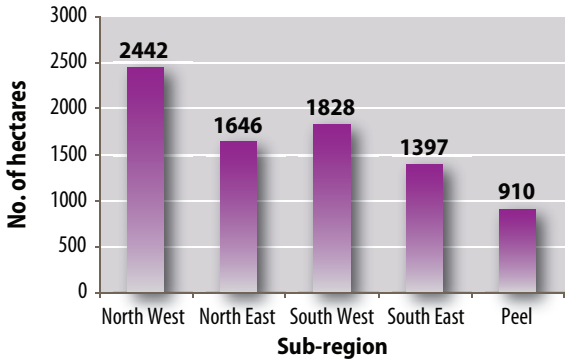


population projections and parameter values that are considered to show consistent trends.

Based on a population driven model, the sub-region where the greatest demand for industrial land can be anticipated is in the North-west sub region, as figure 5 clearly indicates.

Based on the current shortfalls in industrial land supply in each of the sub regions and forecast demand for the Perth metropolitan and Peel regions in the next 20 years, it will be approximately 10 years before the market can achieve a balance between industrial land supply and demand. It is therefore crucial that priority be given to the release of all available land within existing industrial estates (representing 1758 ha supply) and all necessary feasibility studies and investigations be promptly completed to enable delivery of the short, medium and long term sites that have been identified in this strategy.

Figure 5: Forecast demand levels by sub-region



Source: Internal DoP data/Property Council of Australia

Key indicators of demand

Consumption rate

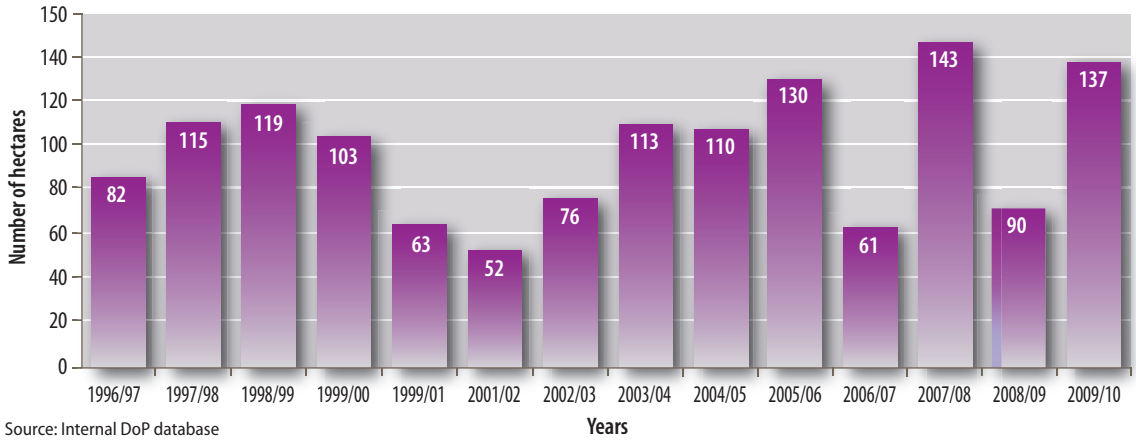
Historical consumption rates are an excellent indicator to enable future demand forecasting to be carried out. As figure 6 below indicates, WA's economic boom has led to above average industrial land consumption between 2003 and 2010. A key driver of this demand was resources and transport and logistics firms taking up large land parcels such as the 25 ha used by Coles Distribution Centre at Perth Airport.

With a significant amount of available industrial land not readily available due to planning and environmental constraints that still remained to be resolved in 2006/07, demand for industrial land outstripped the available supply.

The consumption rate for industrial land in the Perth and Peel regions, indicates a generally cyclical trend, with demand fluctuating from 80-150 ha per annum. The average demand is 99.5 ha per annum.

Using data derived from studies undertaken as part of the strategy, and confirmed following consultation with industry bodies, such as the Property Council of Australia, existing markets will be able to supply 1211ha (25 per cent) of the projected 4726 ha of demand up to

Figure 6: Consumption rates 1996-2010, Perth and Peel



Source: Internal DoP database

2031. In terms of timeframe:

- 238 ha is expected to be available in the short term.
- 430 ha is expected to be available in the medium term.
- 543 ha is expected to be available in the long term.

However, there are significant challenges facing the medium-to-long term delivery of sites in terms of coordinated planning, environmental management, infrastructure provision and finance. With strong demand anticipated from resource companies associated with the Gorgon and Pluto projects and limited development opportunities available at Perth Airport, significant supply shortages can be expected in the 2012-2014 period due long lead times associated with the development of land.

At present, using historical consumption rates, in existing industrial estates there is:

- 1.5 to 3 years supply in the short term
- 2.8 to 5.3 years supply in the medium term
- 3.6 to 6.8 years supply in the long term; and
- 8 to 15.1 years supply in total.

This demonstrates that current supply levels are finely balanced. If large outfits such as Linfox or Coles were to require a 40-50 ha site for their operations, this would significantly alter the supply/demand balance, and inflation in prices for industrial land would then be repeated.

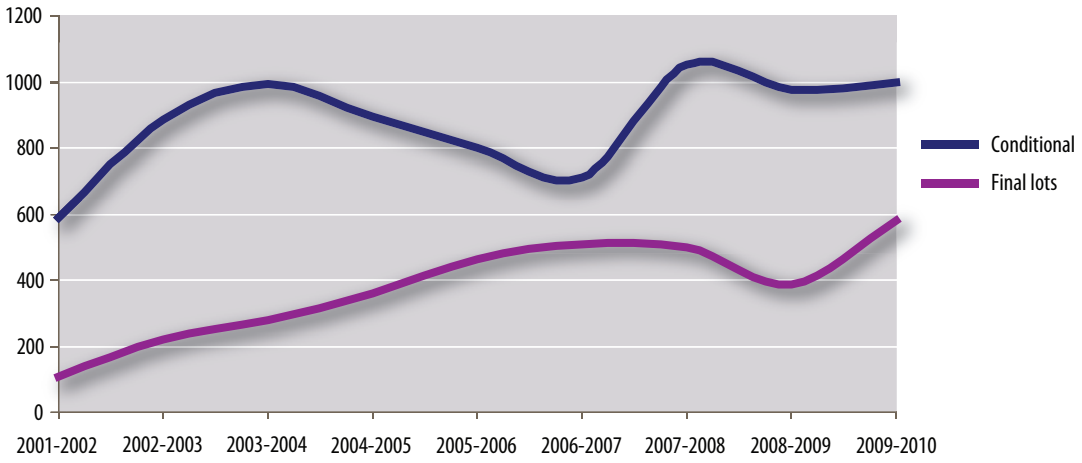
Subdivision approvals

The analysis of subdivision approval data for industrial land is also a good indicator of industrial land development activity and levels of demand. In examining the subdivision approval data for industrial land between 2001 and 2010, the following observations were made:

- The average number of conditional approvals granted per financial year during this period was 542 industrial lots;
- 743 lots was the highest number of conditional approvals granted in 2004 to 2005;
- The lowest number of conditional approvals, being 293 lots, was recorded in 2001 to 2002.

Current conditional approvals are those approvals that are still valid, but have not yet been issued with final approval. In general, these are approvals for which construction/servicing has not yet commenced or is currently under way. The balance of conditional

Figure 7: Industrial land subdivision conditional approvals



Source: Internal DoP database

approvals represents the stock of lots ready to be delivered to the market once the conditions of approval are met. Due to a number of factors, such as landowner intentions, market conditions or servicing conditions, not all conditional approvals reach final approval stage. As a rule of thumb, approximately 45 per cent of conditional approvals proceed to final approval stage for industrial land subdivisions. Final approvals represent lot creation and, therefore, correspond in a temporal sense to peaks of zoned land consumption recorded between 2001 and 2010.

Lot sizes

As land values of industrial land in the early 2000s continued to increase, the subdivision of larger lots into smaller, more affordable lots became a common trend, particularly in areas such as Bassendean and Osborne Park. Coupled with the existing trend of higher end uses locating within industrial areas, larger lots were less common, and as a result, major warehouse, transportation and storage operators were forced to look for alternative locations.

Historical trends have shown a strong demand for land parcels of 4000 sqm or less which account for 78 per cent of total industrial sales over this same period. However, a recent survey of key industry stakeholders have shown that with the increase of transport and logistic oriented industry activities, lot sizes of 4000 sqm and more, will continue to be in greatest demand.

The Perth Airport land has proven to be a popular location for these larger outfits such as Coles, Toll, Woolworths and the like to locate, given its central location, good infrastructure provision and road network. Mining companies have also chosen to locate at the airport, again making the most of what the location affords and also being within close proximity to the city and its metropolitan major operations centres. One of the other major attractors of the Perth Airport land for industrial occupiers of this scale is the availability of development ready land. This type of land is a rare product in the Western Australian industrial property market, and is an attractive option, in particular, for larger scale operators. It allows prompt start up of operations, without substantial time and costs being absorbed in gaining the necessary development and environmental approvals, before operations can commence.

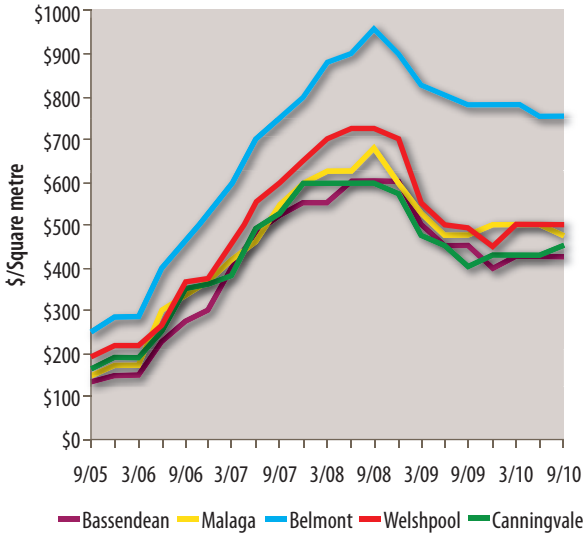
Land values

In recent years there have been very high levels of growth in both land values and rents. The economic boom as well as a shortage of industrial land ready for development has driven this. Although Perth's industrial land values and rents have traditionally sat well below those in other Australian States, recent growth has seen the Perth market come more into line with interstate land values because of this marked shortage. The rapid increase in land values in Perth between 2006 and 2008 was driven by the booming economic conditions in Perth, which led to a rapid take-up in industrial land and a subsequent shortage of available industrial land. It is worth noting that at the same time as land values were increasing in Perth, a similar trend was occurring in Adelaide and, to a lesser degree, Sydney. Melbourne has large areas of industrial land available and this, together with a relatively flat economy during this period, limited growth in land values there. However, this is likely to be a limiting factor on rent increases in Perth in the future, as national tenants are unlikely to pay significantly higher rents in Perth than those in other states.

According to Jones Lang LaSalle's market commentary on the Perth industrial market for the September quarter of 2010, a shortage of industrial land in Perth

should see the maintenance of land values in the medium-to-long term as the supply-demand balance remains relatively stable compared with those in other industrial markets (figure 8).

Figure 8: Land values Perth industrial 2004 to 2010



Source: Jones Lang La Salle Market Commentary, September Quarter 2010)

Current industrial land development program

In mid 2009, a review was undertaken of all existing industrial land developments in the process of being developed. The table included in figure 9 shows the land in the development pipeline over the next 15 years.

Figure 9 provides an overview of the amount of industrial land in the development supply pipeline, and highlights the significant amount of this land which has not progressed due to unresolved constraints (such as environmental clearances, service provision, site contamination and remediation requirements). It also correlates with the subdivision approval data which indicates that although a significant number of subdivisions have received conditional approval, a high proportion of these are not progressing to final approval due to unresolved constraints for specific sites. Priority must be allocated to resolving these constraints.

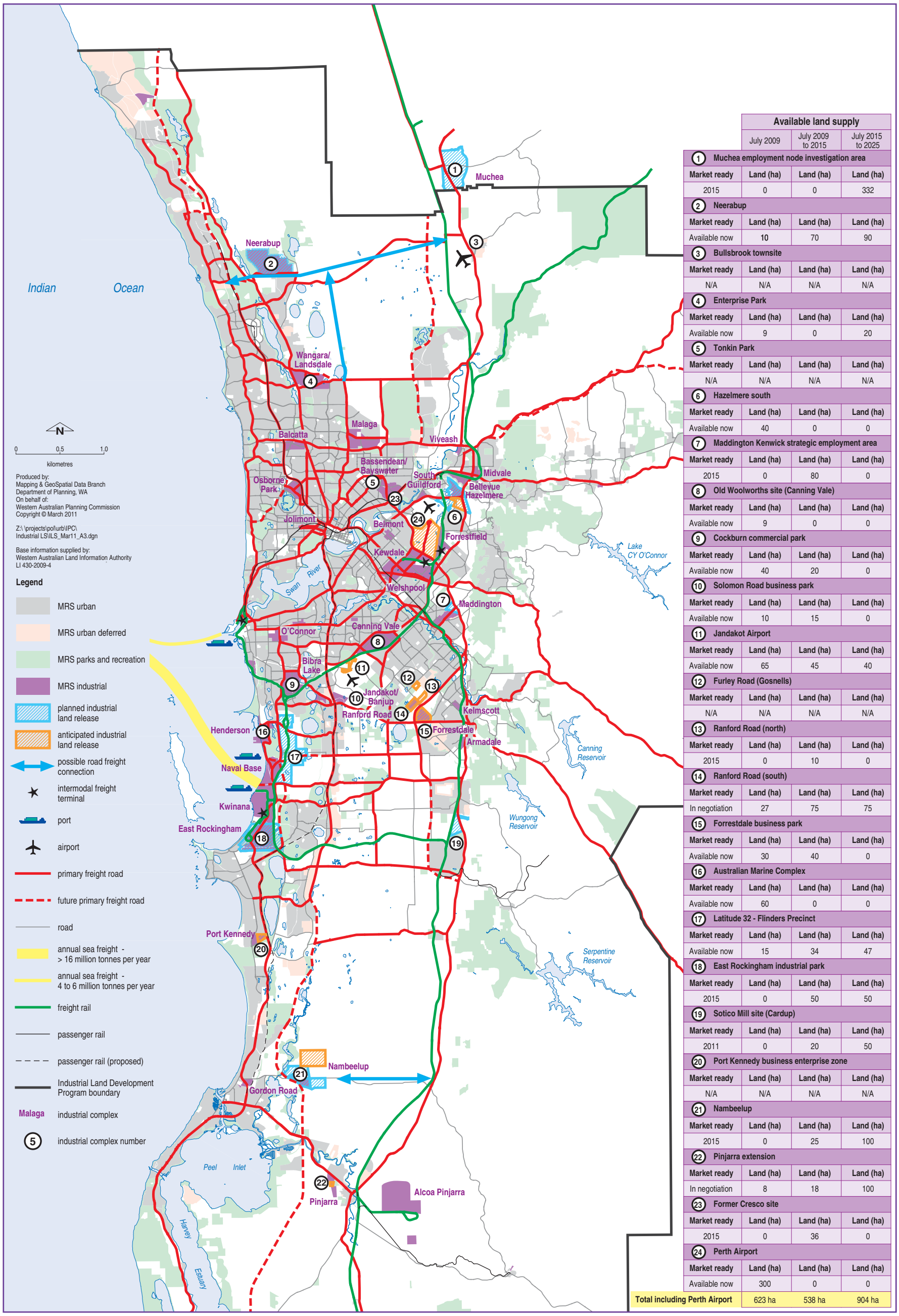
The forecast shortfall for industrial land in the Perth and Peel regions will be 4726 ha by 2031 if no additional land is identified and zoned for future industrial purposes in the interim. A proactive approach must be taken to facilitate the necessary approvals for those industrial areas in the development supply pipeline that are presently constrained by environmental, servicing or other issues, in order to unlock a significant amount of industrial land to cater for short-to-medium term demand.

Future demand

The WA Economy is anticipated to expand by around 4.75 per cent over the 2011/12 period, with economic growth remaining robust until 2014/15 with growth of four per cent per annum forecast. While the rate of growth in land values is unlikely to continue, the demand for well located serviced industrial land will still remain strong, given its scarcity, and as a result land values are expected to remain buoyant.

Table 2 demonstrates that with the supply of land provided through the strategy, along with the development of the short-to-medium term sites identified, there will be a shortfall against forecast demand for industrial land in all sub-regions with the exception of the South-east sub-region. Therefore, other future possible industrial sites (the land bank) must be assessed and prioritised based on their potential for development and appropriate action taken to release them to the market.

Figure 9: Current program - planned and anticipated industrial land release



	Available land supply		
	July 2009	July 2009 to 2015	July 2015 to 2025
1 Muchea employment node investigation area			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	0	332
2 Neerabup			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	10	70	90
3 Bullsbrook townsite			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
N/A	N/A	N/A	N/A
4 Enterprise Park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	9	0	20
5 Tonkin Park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
N/A	N/A	N/A	N/A
6 Hazelmere south			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	40	0	0
7 Maddington Kenwick strategic employment area			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	80	0
8 Old Woolworths site (Canning Vale)			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	9	0	0
9 Cockburn commercial park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	40	20	0
10 Solomon Road business park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	10	15	0
11 Jandakot Airport			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	65	45	40
12 Furley Road (Gosnells)			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
N/A	N/A	N/A	N/A
13 Ranford Road (north)			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	10	0
14 Ranford Road (south)			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
In negotiation	27	75	75
15 Forrestdale business park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	30	40	0
16 Australian Marine Complex			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	60	0	0
17 Latitude 32 - Flinders Precinct			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	15	34	47
18 East Rockingham industrial park			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	50	50
19 Sotico Mill site (Cardup)			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2011	0	20	50
20 Port Kennedy business enterprise zone			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
N/A	N/A	N/A	N/A
21 Nambeelup			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	25	100
22 Pinjarra extension			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
In negotiation	8	18	100
23 Former Cresco site			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
2015	0	36	0
24 Perth Airport			
Market ready	**Land (ha)**	**Land (ha)**	**Land (ha)**
Available now	300	0	0
Total including Perth Airport	623 ha	538 ha	904 ha

Table 2: Industrial land demand/supply forecast by planning sub-region

Planning sub-region	Demand at 2031 (ha)	Pipeline supply from current Land Development Program (ha)	Shortfall/ surplus based on current Land Development Program (ha)
Central	5243	3407	-1836
North-West	2442	2004	-438
North-East	1646	1765	-117
South-East	1397	1583	194
South-West	1828	1525	-303
Peel	910	304	-606

Source: Internal DoP data/Property Council of Australia

The outlook for general and light industrial land use

Increasingly there has been a move away from manufacturing operations towards transportation logistics and storage, warehousing and distribution centres. This emerging trend has resulted in an increased demand for larger lot sizes and the development of estates that can respond to and capably accommodate these larger scale uses. Access to large scale onsite hardstand space and co-located office premises will also increase the land requirements of industrial land users. Excellent access to road and rail infrastructure is becoming increasingly sought after, and will continue to be a prerequisite when such industry types are choosing a preferred location.

In recent years demand for larger lots of this type has been catered for by the Forrestfield/Kewdale/Welshpool area and the Perth airport land. As the rapid take-up rate of larger lots in the airport land indicates, industry players are looking for land parcels that are not only strategically located with easy access to key transport corridors that link to port and rail, but also land that is fully serviced and development ready.

With the ease of access and a relatively unconstrained regulatory environment compared with other locations, the airport land typifies the attributes considered favourable by such companies. The market preference for this location is due to the availability of infrastructure and services allowing for immediate development and occupation. The airport has done particularly well in attracting major tenants in recent years as the only strategically located land parcel in Perth able to offer fully serviced large lots (which were also relatively unconstrained from an environmental perspective). The added advantage of the airport land has been the ability to provide lots that meet tenants' specifications and the long-term vision and control over its industrial estate. However, the airport land will not last forever and alternatives will need to be found. A key objective of the strategy should be to offer similar land parcels that are fully serviced and free of constraints.

A number of development opportunities exist beyond the airport land. Both the Hazelmere industrial area and the redevelopment of the Kewdale/Welshpool area are such examples. However, it must be recognised that fundamental to the success of these areas being redeveloped will be the timely delivery of all necessary approvals (including environmental) and access to service infrastructure and adequately catering to market needs, particularly in terms of lot size.

The Goodman development located on Bushmead Road in the Hazelmere industrial area is likely to attract other industrial land developers to the area who are wishing to develop in a similar fashion. Provided that a similar relatively unconstrained regulatory framework to the airport land can be facilitated and the provision of service infrastructure factored into the early stages of planning for any future development within the Hazelmere industrial area, then future development within this area will be highly attractive to future investors. Within the Kewdale/Welshpool area, very little vacant land is available and of that which is left, if redeveloped, is unlikely to be of suitable lot size for many users.

The overflow port proposed at Kwinana, and the intermodal facility at Latitude 32, will result in a major influx of activity in the transport logistics and

distribution industries for the southern metropolitan and Peel regions. It will also most likely result in an increased demand for land that is well located and serviced to cater for these land use activities, which at present, do not have a significant presence in these regions comparative to the north-east sub-region.

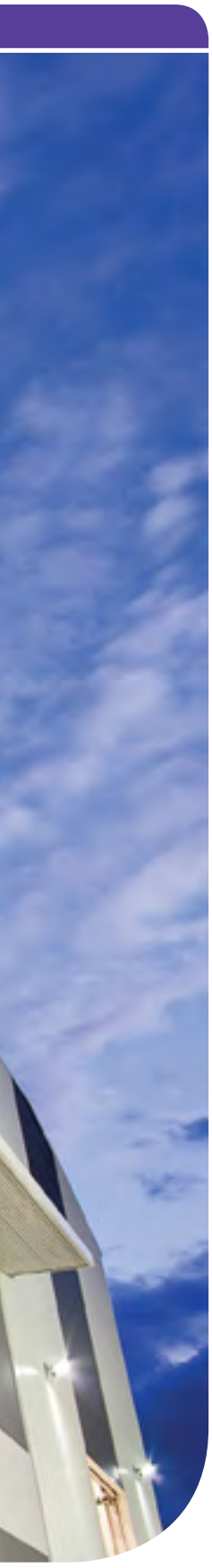
Key points

- The Western Australian economy is particularly sensitive to global economic activity, especially when compared to other States in Australia.
- The combination of a continued strong export-oriented economy, upward employment trends and a growing population mean that an increase in demand for industrial land is likely in the Perth metropolitan and Peel regions for the foreseeable future.
- Forecasting demand for industrial land is influenced by a number of key drivers and market trends such as population growth, subdivision approvals, lot sizes, land values, location , technological and operational changes.
- The consumption rate for industrial land in the Perth and Peel regions over the past decade, indicates a generally cyclical trend, with demand fluctuating from 80-150 ha per annum.
- A significant proportion of the industrial land supply is within the development supply pipeline, but subject to overcoming constraints before it can be released.
- The existing areas identified for industry is expected to cater for the forecast demand for the next 8 to 15.1 years.
- The forecast additional demand for industrial land in the Perth and Peel regions by 2031 is approximately 4726 ha.
- The provision of a range of lot sizes to allow land uses to move up or down in an estate is viewed as highly desirable by the end users, as is the ability to amalgamate smaller lots to larger landholdings.
- The absence of sufficient large development ready industrial lots can lead to a significant potential loss of inbound investment to WA.

Photograph courtesy: Eastcourt Property Group

Part 5 - Supply of industrial land

Photograph courtesy: Eastcourt Prope[illegible]roup



Industrial land supply stock

As at 1 July 2010 the total area of industrial zoned land in the Perth metropolitan and Peel region schemes totalled 13,737 ha (including 63 ha of land zoned special industry). At present, the assumed available supply of zoned industrial land for development is 9403 ha, of which 8192 ha is occupied and 1211 ha is vacant. A common misconception is that there is a more than adequate supply of industrial land available. However, on further examination the amount of industrial land actually available is significantly less than the area of zoned land due to large portions being constrained or unable to be developed in the short-to-medium term because of pre-existing activities such as limestone quarries and turf farms.

Many shortages of industrial land that generate the most publicity are those involving large firms. While these are small in number, very substantial parcels of land with highly specific requirements are involved. The challenge facing WA is to strike a balance between having a ready supply of smaller lots for the majority of small-to-medium sized firms, and keeping sufficient large lots for the major players.

The priorities in planning for more industrial land are to:

- Facilitate the more intensive use and the extension of existing industrial sites with high economic and location value;
- provide a steady supply of suitably sized lots for the majority of small-to-medium sized firms while also ensuring there are sufficient large lots for major industry types to be accommodated; and
- Prioritise the deconstraining of those new sites with high economic value, including facilitating a streamlined and consistent regulatory environment, and to encourage significant pre-planning prior to any development or rezoning .

The consumption rate of general industrial land has accelerated in recent years. In the period between 1988 and 2001 the area occupied by general industries grew by an average of 80 ha a year, but from the low point in the demand cycle in 2001 the consumption rate increased by 250 per cent over the next five years. Due to the resources boom, consumption of industrial land has run above the 15 year average trend of 99.5 ha per annum, with supply constraints causing the main restriction on demand during five of the past seven years.

Types of vacant industrial land

The type and amount of vacant industrial land can be classified into three categories:

- *Development ready*: Land of this type is already zoned, service infrastructure already provided, and is ready to be occupied by an end user. This category of land comprises 258 ha within Perth and Peel's industrial land stock.
- *Constrained*: This category of land comprises over 953 ha of Perth and Peel's current industrial land stock. For this land to be available to the market, significant constraints need to be overcome such as service infrastructure provision and connection, site remediation

(including decontamination), expiry of mining leases, drainage and groundwater monitoring being required, flora and fauna surveys, etc

- *Not developable*: This land is already zoned industrial, but has significant constraints of such magnitude or complexity which means the site cannot be developed. Such constraints may be, for example, conservation category wetlands, bush forever, threatened ecological communities (such as Carnaby's Cockatoo or the Graceful Sun Moth) or declared rare flora or fauna.

In addition, there are also sites which may be zoned for future industrial purposes, but their availability to the general market is not expected to be in the short to medium term. This category of vacant industrial land is described as follows:

- Zoned but latent availability. This category of site includes sites which may already be zoned industrial but the timing of the land becoming available is unknown. In some instances this may be land which has been identified for future expansion, comprises part of a buffer or may be subject to an extraction licence, as issued under the *Mining Act 1992*. These sites in particular need to be protected and subsequent development be programmed to occur in a sequential manner.

Supply challenges and issues

An important starting point to developing an approach to facilitate the deconstraining of industrial zoned land, is to understand the key issues currently affecting industrial land supply. They are identified as follows:

- Lack of available service infrastructure:
  - Electricity supply: the vast majority of industries are reliant on electricity for operational needs. However, there is a marked difference in the electricity supply provided to a domestic customer versus an industrial customer and often getting this additional supply requires significant forward planning with the servicing agencies because expensive "headworks" upgrades may be required;
  - Water supply: particularly the provision of adequate levels of water pressure to allow firms to meet FESA requirements;
  - Access provision: The development of residential areas around many of the older industrial estates in the Perth metropolitan area and the Peel region has resulted in traffic congestion and problems for heavy vehicle access. Small firms are particularly susceptible to problems with vehicle access into and out of their sites;
  - Inadequate public transport access, which is of particular concern to firms based in the more inaccessible areas of Perth and the Peel Region in relation to moving employees to and from work, and will only result in more road traffic;
- Environmental constraints (for example, Bush Forever sites and conservation category wetlands) limiting the development potential of land;
- Extractive industries leases that can limit the developable area of industrial sites and immediate availability of industrial zoned land;
- Highly fragmented ownership of existing estates making the amalgamation of sites difficult;
- Industrial land being eroded by higher end uses (i.e. commercial office and residential);
- Lack of public-private participation in the industrial land development industries, resulting

in a fragmented and disjointed development industry;

- Existing industrial estates being underutilised due to past design trends, particularly in the central sub-region;
- The trend by industry to withhold land for future expansion or buffering purposes;
- The optimal number of employees per hectare ratio not being realised, particularly in central sub-region; and
- Land use conflicts as residential areas impact on industrial activities, resulting in the relocation or cessation of industries.

To better understand the impact of these issues on the end user, further consultation with key industry stakeholders was undertaken. As a result, the challenges and frustrations identified with current industrial land development could be divided into two major categories. These are represented below:

Planning and zoning issues:	Design and specification issues:
• Land availability • Approvals and permits • Multiple government agencies / coordination • Multiple local government authorities spanning industrial estates • Impact of mixed use zoning and approvals • Availability of sand / fill - mining prospects	• Residential encroachment • Landscaping • Parking ratios • Lot ratios and setbacks • Lot sizes / mix within estates • Changes to rules and regulations • Road design and access to estates • Utilities • Accessibility to support services

Expanding upon these identified pressures and challenges, the key industry stakeholders expressed the following current issues for industrial land development:

- Industrial land that is available does not cater to specific operational needs and requirements;
- The lack of project ready (i.e. serviced) land to choose from and locate to, to commence immediate operations;
- Industrial estates not catering to all industry sectors, with larger lots usually not planned into the estates and inadequate protection of larger lots from being subdivided into smaller lots;
- The trend is for new estates to be located in the outer reaches of the outer sub-regions, which creates a number of challenges;
- Weaker or lagged provision of infrastructure and transport links (especially from rail terminals and freight networks), which many industries rely upon;
- Costs incurred with the relocation of a business because of expansion limitations in current location;

- Impacts on supply chain efficiencies with the incurring of higher operational costs due to further distances from suppliers, clients etc. (e.g. travel costs) and impediments on product quality because of additional distance needing to be travelled (i.e. concrete); and
- The constant threat from residential encroachment and the subsequent restrictions being imposed on occupiers (e.g. concrete batching plants in East Perth). This is particularly true for those industries located within the central sub-region.

Monitoring supply

One of the key indicators of determining whether there is an adequate ongoing supply of industrial land for market consumption is the monitoring of supply. To date, the monitoring of industrial land consumption and the type of occupier has been largely informed by the Industrial Land Use Survey (ILUS). Charting market trends and rates of occupancy, the ILUS provides a good reference for industrial land use activities and locations of industrial complexes throughout the Perth metropolitan and Peel regions. However, the challenge lies in monitoring the rate of development (in a timely manner as the ILUS is undertaken infrequently) in terms of lot sizes and consumption, due to the absence of density provisions for industrial estates.

The Urban Development Program, which replaces the Metropolitan Development Program, collates and monitors all lot development and lot consumption rates for all land uses from residential, commercial, industrial to public purposes. It will provide a more regular, comprehensive and integrated monitoring tool than the Industrial Land Use Survey to enable supply stocks to be more closely monitored.

Key points

- As of 1 July 2010 the total area of industrial zoned land in the Perth metropolitan and Peel region schemes totalled 13,737 ha (including 63 ha of land zoned special industry). The supply of zoned industrial land available for development is 9403 ha, of which 8192 ha is occupied and 1211 ha is vacant.
- The amount of land zoned industrial available for industrial development is usually significantly less than the amount of zoned land at either regional or local scheme level.
- Three categories of vacant industrial land include: development ready; constrained and not developable.
- A significant proportion of Perth and Peel's industrial land supply is constrained by a lack of service infrastructure; environmental requirements; extractive industry leases; higher competing uses; lack of framework to facilitate public-private sector joint ventures; and inefficient use of land.
- Industry operators are faced with numerous challenges when developing land for future industrial use. These can be categorised into Planning and Zoning issues and Design and Specification issues that affect the ability for developers to get industrial land to the market.
- There is a limited amount of project ready (i.e. adequately serviced) land being made available to the market.
- The limited supply of available industrial land within the central and inner sub-regions are forcing industrial occupiers to locate at the outer reaches of the Perth metropolitan and Peel regions, which bring numerous challenges.
- The Urban Development Program (UDP) will provide a more regular, comprehensive and integrated monitoring tool to enable supply stocks to be more closely monitored.

Part 6 - Sub-regional overview

Sub-regions structure

To assist in better understanding the following sections relating to the sub-regions and the potential industrial areas identified within each sub-region, the following overview is provided.

The various potential industrial areas that have been identified as part of the strategy have been divided into the following six sub-regions as shown below.

These sub-regions are consistent with *Directions 2031 and Beyond*.

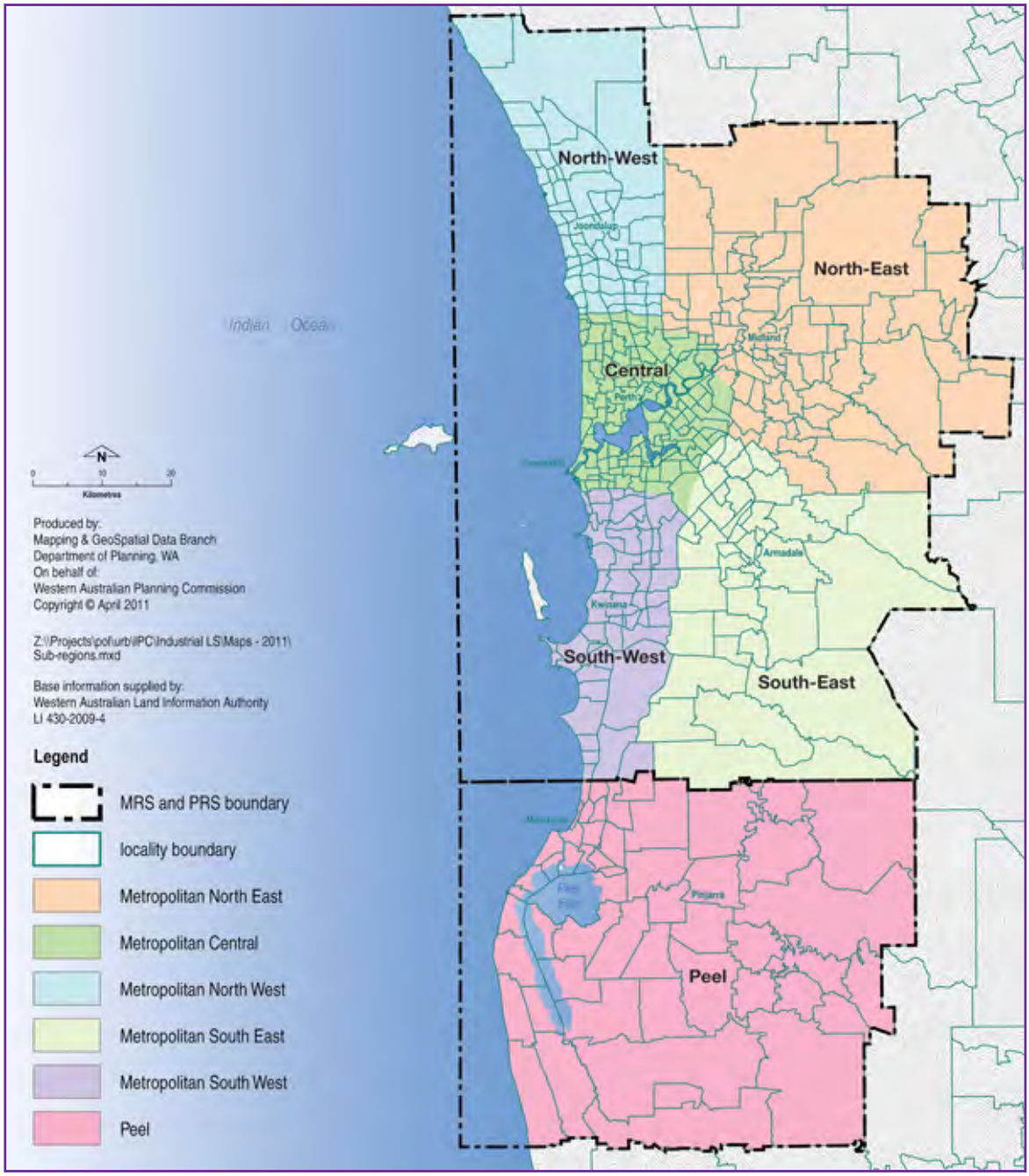


Figure 10: Sub-regions

Potential non-heavy industrial areas

The industrial areas that have been identified within each sub-region have been categorised into three types and allocated estimated delivery timeframes for this land to be rezoned for industrial uses. Each category is described below, including key characteristics that have influenced which category they belong:

Type	Timeframe	Key characteristics
Future short term industrial sites	0 - 4 years	• Land is not yet rezoned to accommodate industrial uses • Some preliminary planning has already commenced • Some planning and/or environmental studies may already be completed • There already exists some level of commitment that these sites will progress to the next stage of planning (i.e. rezoning)
Potential medium term industrial sites*	4 - 10 years	• Land is not yet rezoned to accommodate industrial uses • Key characteristics for the subject area identified • Preliminary desktop planning investigations completed for some sites accompanied by "key actions", generally consistent with multi-criteria analysis ranking
Potential long term industrial sites (strategic land bank)	10 years +	• Identified as a strategic land bank • Substantial planning and environmental studies required to be undertaken to determine feasibility

** The medium term sites have been further divided into two categories relating to this type of site. A "key action" table supports those potential medium term sites that have been identified as priority sites. For other medium term sites where rezoning is still considered to be reasonably achievable within the medium term timeframe of 4 to 10 years, only the known characteristics are listed, and no key action table provided.*

The timeframes that have been allocated to the different types of potential industrial sites identified are based on the conservative estimated timeframes to undertake the necessary planning and environmental studies and investigations (including the investigation of infrastructure provision) to achieve a rezoning of the parcel of land, or part thereof, identified.

It is again important to emphasise that the purpose of this Strategy is to identify potential areas of land where industrial uses can be accommodated. It does not represent the State Government's intent to rezone the land identified to "industry" or otherwise. This Strategy provides a blueprint for the industrial land use planning for the next 20 years and beyond, and should be regarded as a starting point from which a substantial amount of further feasibility work and investigations must be undertaken prior to any industrial land uses occurring on the sites identified.

Sub-regional overview

The following section provides an overview of the key characteristics of each of the sub-regions and any larger scale strategic planning being undertaken that may influence industrial land development.

Central sub-region

This sub-region represents the engine room of the metropolitan area in terms of generating the highest employment self-sufficiency and highest economic value associated with existing industrial areas. However, the landscape is quickly changing, as industrial land is being occupied by higher end commercial uses. Other industrial users and activities, particularly in the inner region close to the CBD, are being forced to relocate, as land becomes more and more valuable and sought after for residential and office uses. According to the Property Council of Australian Suburban Office Development Survey, 43,500 m^2 of commercial office space was developed on industrially zoned land between 2007 and 2010.

Due to these other high end competing uses, such as residential and commercial, the land stock is under extreme pressure and if no intervention is taken to protect the remaining industrial land parcels the land stock will be dramatically reduced. An example of this conflict between competing uses is the concrete batching plants located in East Perth. The local authority wishes to have the batching plants relocated to enable urban zoning to occur and subsequent residential development to take place. However, there is an important need for industrial land to be located within close proximity of the central city and, where located adjacent to primary arterial routes into and out of the city, these land uses should be protected and preserved.

There remains limited ability within the Central sub-region to capably cater for any future growth, as most industrial sites are already nearing capacity. Any future demand will have to be met by other sub-regions within Perth and Peel.

North-west and North-east sub-regions

Opportunities exist in both these sub-regions for future industrial development. However, resolution of the east-west connectivity between these two sub-regions needs to be made a priority to have the true potential realised.

The North-east sub-region has good access to both rail and freight infrastructure, making it the more attractive option for freight dependant industry. On the other hand, while the North-west subregion has limited transport infrastructure to service industrial land, making it less attractive to industry wishing to locate in this sub-region, the growing population base in this sub-region means that a growing workforce will be available to employees. Employment opportunities must be created for this local population in order to reach the sub-region's own employment self-sufficiency targets. Much like the southern sub-regions, site servicing and staging is identified as a current and potential long term constraint.

South-west, South-east and Peel sub-regions

These sub-regions are already well serviced by established rail and road networks. Existing industrial development, location and accessibility are major attractors to industries opting to locate in these two sub-regions. Land availability and the speed of approvals through the planning process will significantly influence the preference between the southern sub-regions.

The southern sub-regions are collectively experiencing rapid expansion. The growth in these sub-regions is dependant on infrastructure servicing issues, such as the extension and development of wastewater treatment plants (WWTP) at Gordon Road (Mandurah) and East Rockingham. Other identified deficiencies for these sub-regions are the under-provision of High Wide Load routes, connections to a freight line, and the absence of consistent heavy goods vehicle access routes to and from the Fremantle and Bunbury ports. The northern sector of the South-west and South-east sub-regions offers the greatest opportunity and economic value.

The most southern portion of the Peel sub-region is influenced by the strong population growth between Mandurah and Bunbury. Industry, which will service markets in the Perth region, will be attracted to locating in this sub-region.

Infrastructure needs

A significant constraint in many of the sub-regions, particularly the Central sub-region is the increasingly high costs associated with acquiring suitable land and upgrading or constructing new facilities and infrastructure. The complexity of these projects requires considerable lead time, strategic forward planning and coordination between the relevant service and infrastructure agencies.

Movement network

Accessibility is an important consideration for the future growth of the Perth metropolitan and Peel regions. There is an identified need for an integrated system of public and private transport networks to assist in reducing the time, cost and impact of travel. For industrial land, an improvement must be made in terms of access to and from these locations for both employers and the employees.

Road network

The provision of excellent road networks is essential to enable goods to be transferred between locations into, out of, and within the Perth and Peel regions. A number of key strategic road planning projects need to be pursued, to improve current capacities and linkages. The key strategic roads planned for each sub-region are highlighted further in the latter part of this document, under each sub-region.

Freight network

Due to Western Australia's reliance on the resources sector and Perth's relative isolation, there is a high level of dependence on the efficient movement of freight in and around the city. Large numbers of containers arrive at Fremantle Inner Harbour and also via rail and road train from interstate. The intermodal facilities at Kewdale-Welshpool and the proposed Kwinana intermodal facility will have an increasingly vital role in the distribution of goods intra-state, interstate and overseas. It is anticipated that the throughput of these freight terminals will significantly increase, to almost double the current freight moving through the central sub-region over the long term.

The distribution of goods is mostly carried out by road, because of the flexibility afforded in door-to-door pick up and delivery. Nearly 70 per cent of this freight movement is conducted by light commercial vehicles, rather than large semi-trailer trucks which are usually associated with freight movement. As a result, freight vehicles interact with general traffic on a daily basis.

Further intermodal facilities in key locations need to be identified, to optimise supply chain efficiencies as a result of increased containerisation trends. A study is underway to identify potential locations for intermodal facilities at Bullsbrook South and West Mundijong in addition to the existing Kewdale-Hazelmere and planned Kwinana intermodal facilities.

Essential services

One of the key challenges for the development of industrial land is the provision of adequate services to achieve optimal operational capacity of the industrial areas. Industrial occupiers are often faced with limited location and expansion options due to there being inadequate infrastructure provision and built-in capacity.

Water and wastewater

Water can be a critical constraint to planning for development; especially for industrial development. There are concerns for planning in that the Government wants certainty that water supplies in a locality are sufficient to meet projected demands and that the proposed land-uses can accommodate water constraints within the landscape. The requirements

for both water quality and quantity can constrain development and increase the need for alternative infrastructure and sources, and new ways of supporting water-use efficiency, re-use, and recycling.

The Water Corporation requires long lead-times in order to be able to properly plan for, secure capital funding, design, construct and commission infrastructure across the State. The proposed major industrial sites identified in the EELS are mostly situated on land that has long been zoned Rural, reserved for Parks and Recreation, or designated for other purposes in WAPC planning strategies. Planning for the future servicing of these areas for industrial development requires a strong case to be made for infrastructure planning to be undertaken through the Water Corporation's Statewide Planning Program. Scheduling and the securing of capital funding then needs to be undertaken for the necessary infrastructure headworks identified in the water, wastewater and drainage scheme planning. In the absence of such planning, the sites identified in the strategy will be regarded as pioneer developments and the cost of all new infrastructure and system upgrades to facilitate development of these sites will be borne by the developers, which may well mean they are not viable developments.

Defining and maintaining buffer zones for Waste Water Treatment Plants (WWTP) is also essential.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Key points

- The Central sub-region represents the engine room of the metropolitan area, generating the highest employment self-sufficiency and highest economic value associated with existing industrial estates. However, it is the sub-region where the most significant threat to industrial land is being experienced.
- The Northern sub-regions present good opportunities for industrial expansion but are heavily reliant on an improved east-west transport linkage route to optimise the opportunities available between the North-east and North-west sub-regions.
- The Southern sub-regions are collectively experiencing rapid expansion. The growth in these sub-regions is dependant on infrastructure servicing issues.
- A significant constraint in many of the sub-regions, particularly the more central sub-regions is the increasingly high costs associated with acquiring suitable land and upgrading or constructing new facilities and infrastructure.
- The provision of excellent freight road networks is essential to enabling goods to be transferred between locations into, out of, and within the Perth and Peel regions.
- Further intermodal facilities in key locations need to be identified, to optimise supply-chain efficiencies as a result of increased containerisation trends.
- Industrial land occupiers are often faced with limited options on location or expansion opportunities due inadequate infrastructure provision and built-in capacity.
- Additional energy infrastructure will be required to service the growing population.

Part 7 - Central sub-region

The Central sub-region comprises 19 local government areas. These include the Cities of Bayswater, Belmont, Canning, Fremantle, Melville, Nedlands, Perth, South Perth, Stirling, Subiaco and Vincent, the Shire of Peppermint Grove, and the Towns of Bassendean, Cambridge, Claremont, Cottesloe, East Fremantle, Mosman Park and Victoria Park. The Central sub-region covers an area of 45,290 hectares, of which 3013 ha is industrial zoned land (6.6 per cent) – representing 29 per cent of the metropolitan total of industrial zoned land.

Demographic profile

The 2010 ABS estimated resident population for the sub-region is 764,439 (ABS, 2011), with a forecast population of 910,000 by 2031.

Planning profile

The planning profile for the Central sub-region includes activity centres, urban growth areas, transit-oriented development nodes, urban corridors and industrial areas. As a fully urbanised sub-region, the planning context also includes existing built form, particularly as it relates to housing stock. These structural elements are linked by a series of movement and green networks including the existing rail network, transport corridors, parks, lakes, wetlands and waterways.

The hierarchy of activity centres in the Central sub-region include the following five types as shown in the table below.

Directions 2031 and Beyond aims to achieve an increase in dwellings from 319,000 in 2008 to 440,000 dwellings in the Central sub-region by 2031.

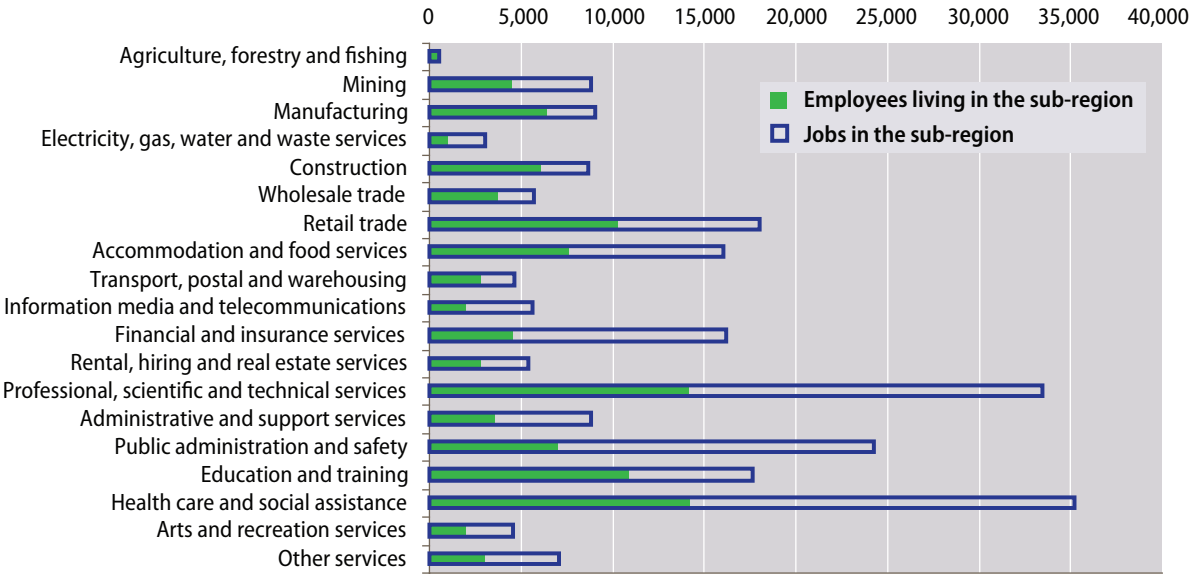
Capital City	Strategic Metropolitan Centres	Secondary Centres	District Centres	District Centres	District Centres	District Centres	Specialised Centres
Perth	Cannington	Belmont	Ashfield	East Victoria Park	Main St	Petra St	Murdoch
East Perth	Fremantle	Booragoon	Bassendean	Fitzgerald St	Maylands	Risely St	Curtin/ Bentley
Northbridge	Morley	Claremont	Bentley	Floreat	Melville	Riverton	Perth Airport
West Perth	Stirling	Karrinyup	Bull Creek	Glendalough	Mount Lawley	Scarborough	UWA-QEII
		Leederville	Burswood	Highgate	Mount Hawthorn	Southlands	
		Mirrabooka	Canning Bridge	Inglewood	Noranda	Stirling Central	
		Subiaco	Cottesloe	Wembley/ Jolimont	North Fremantle	West Leederville	
		Victoria Park	Dianella	Kardinya	Northlands	South Perth (Peninsula)	
			Dog Swamp	Livingston	Oats Street		

Source: *Directions 2031 and Beyond*

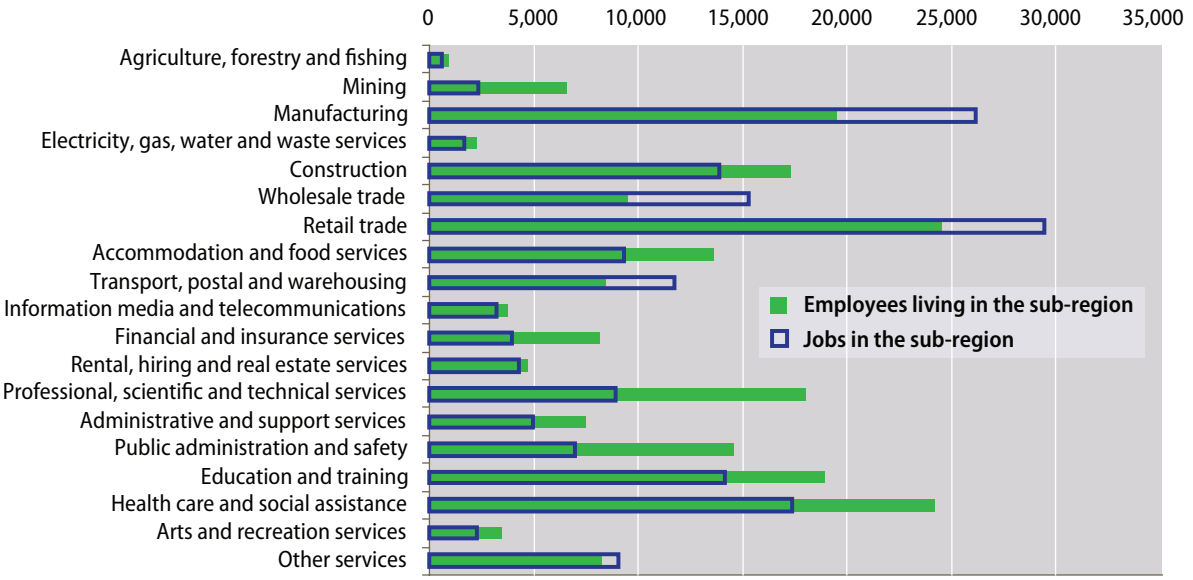
Economic profile

The following graphs represent the number of employees living in the inner and middle sectors of the Central sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in these sectors (blue bar).

Inner Sector



Middle Sector



Sources: 2006 ABS Census of Population and Housing

The main employment industry sector in the Central sub-region is the service sector representing more than 70 per cent of total businesses with the highest concentration in the Perth, Stirling, Melville and Canning local government areas.

Due to the concentration of existing commercial and employment centres, the Central sub-region enjoys a very high level of employment self-sufficiency (ESS), and has a greater range of high-order services and jobs.

In 2008, the Central sub-region had an ESS of 124 per cent. This is also a result of the fact that more than half of the metropolitan region's labour force live in the Central sub-region.

Directions 2031 and Beyond identified an ESS target of 121 per cent for the Central sub-region by 2031. An additional 147,000 jobs will need to be created to achieve this target.

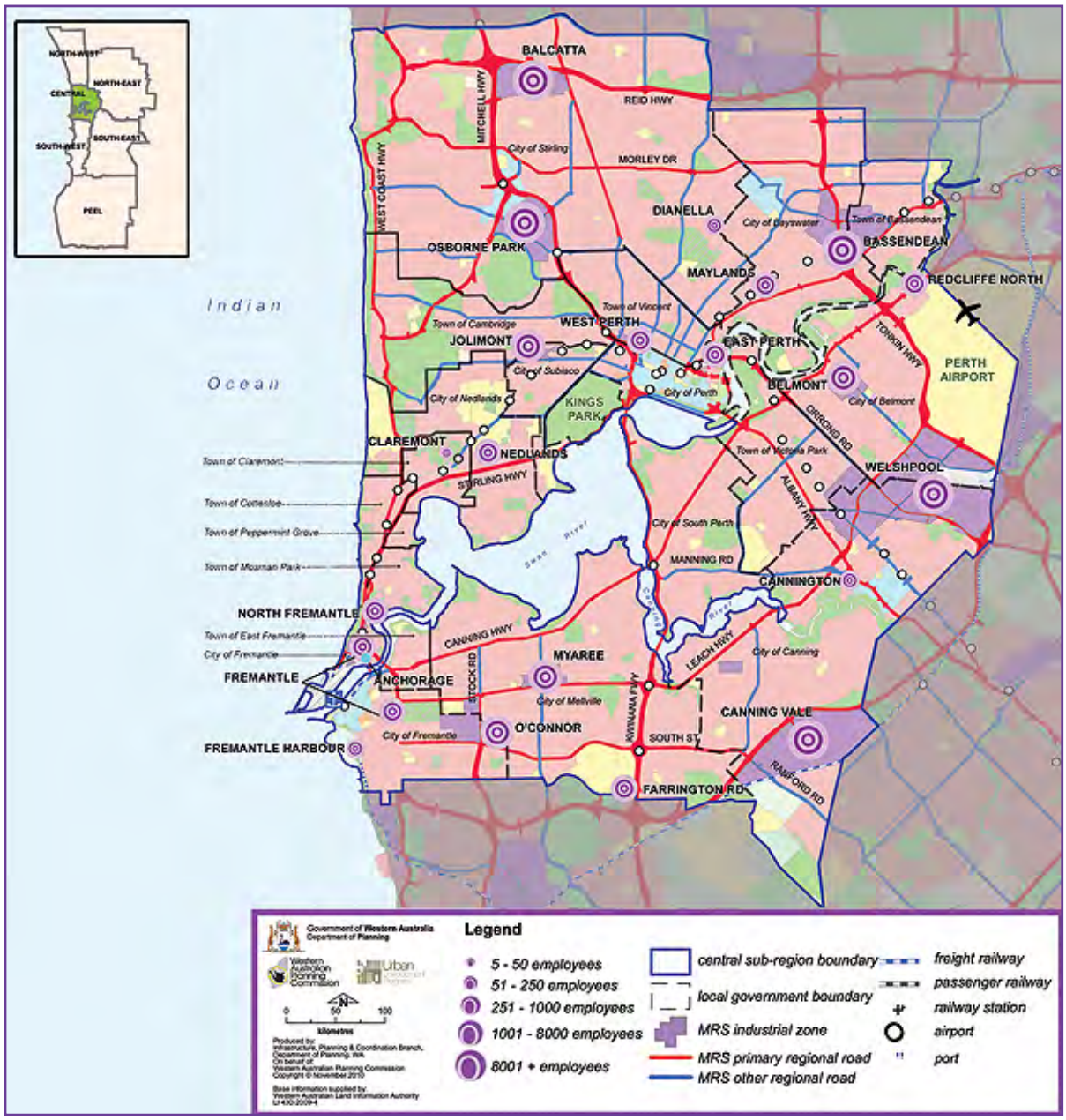


Figure 11: Industrial employment centres - central sub-regions

Physical infrastructure

Future population growth and residential development in the Central sub-region will need to be supported by new or upgraded essential service infrastructure. Existing infrastructure should be used to capacity and enhanced where necessary to maximise gains in cost efficiencies.

Water

The Water Corporation is developing new water source infrastructure to boost the capacity of the Perth Integrated Water supply scheme. While almost all new water source options will be located outside the Central sub-region, it will generate a significant component of overall demand. A range of works is also being considered over the next few years to accommodate growth in wastewater inflows to Perth's treatment plants.

Road and freight network

Much of the Central sub-region's road network has already been developed, so there are limited opportunities to establish or plan for new routes. Congestion at peak times is a significant issue for the Mitchell and Kwinana Freeways, in the context of the efficiency of freight movements.

There are opportunities for providing additional lanes on the Tonkin, Reid and Roe controlled access highways. Improved connections between activity centres in the Central sub-region will help moderate pressure on the central city area and reduce the need for trips through or into and out of the city to reach other destinations.

Industrial zones

Industrial zones in the Central sub-region provide the highest number of jobs (95,000) outside of the Perth and West Perth business districts. Industrial centres are focussed on providing a range of commercial and industrial products and services to the metropolitan region and its hinterland. The five established regional industrial areas in the Central sub-region are Canning Vale, Osborne Park, Ashfield (Bayswater-Bassendean), O'Connor and Kewdale/Welshpool.

Issues raised from an industrial land perspective in the Central sub-region include:

- The erosion of industrial land within inner metropolitan sites at the expense of higher order uses, without understanding the regional implications.
- Encroachment of residential and commercial land uses in and around industrial areas because of the perceived higher land values of commercial and residential land uses.
- The need to protect existing key strategically located industrial facilities i.e. concrete batching plants.

There still remains limited ability within the Central sub-region to capably cater for any future growth, as most industrial sites are already nearing capacity. Any future demand will have to be met by other sub-regions within Perth and Peel or through an intensification of land uses in the sub-region for industrial purposes.

The strategy has identified one possible industrial site within the Central sub-region. Further planning and environmental investigations are required for this identified site and the exact area and configuration of this site is still subject to change.

Name	Zoning Status (MRS)	Stage (if relevant)	Gross Area
Future short term industrial sites (0-4 years)			
Canning Vale	Rural and Public Purpose	N/A	96 ha
		Total gross area	96 ha

*Note: The areas provided in this table exclude land that already is zoned "Industrial" in the Metropolitan Region Scheme. Please note that the total area of this site is still subject to investigation.

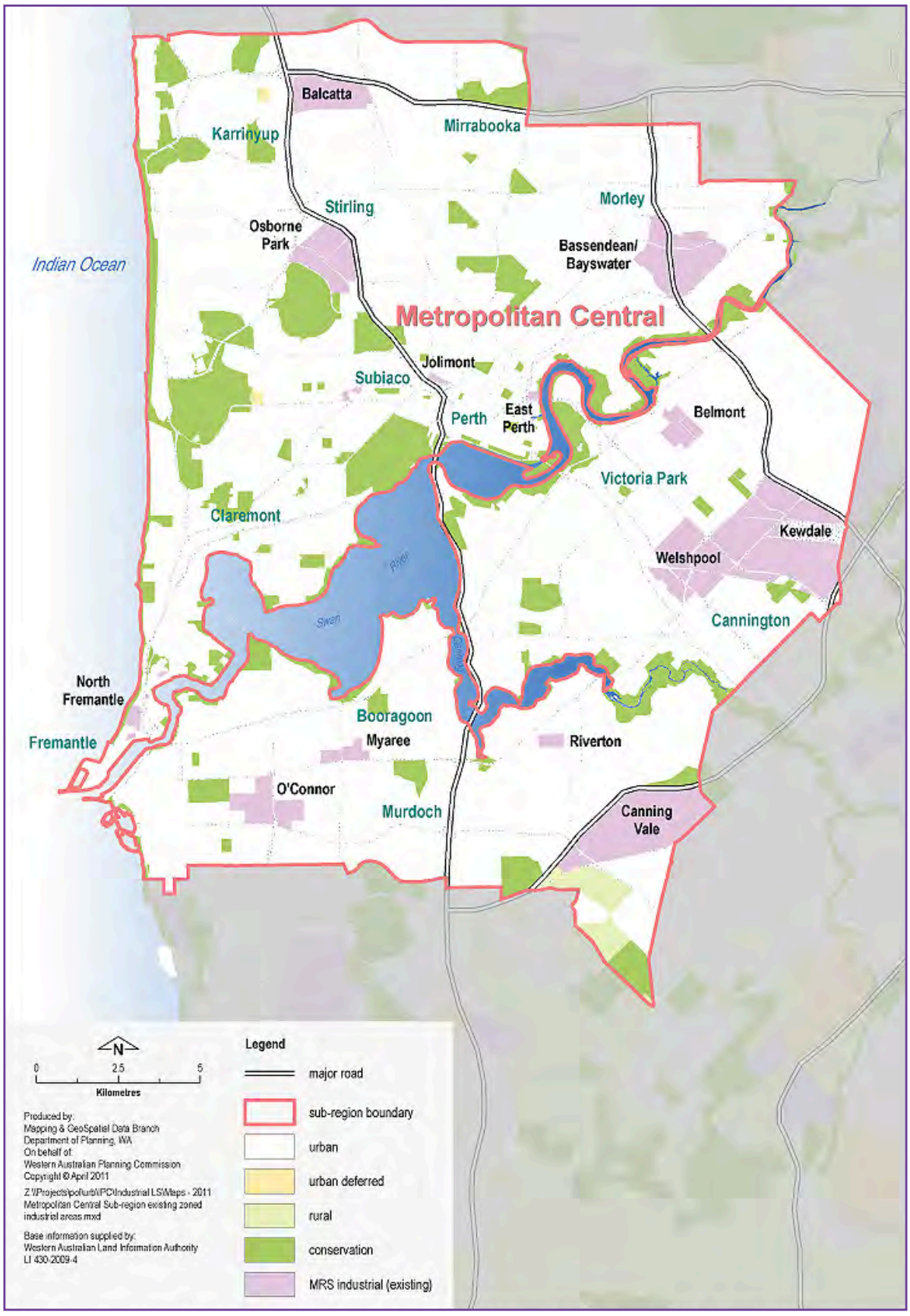


Figure 12: Metropolitan central sub-region existing zoned industrial land areas

Central sub-region possible non-heavy industrial site

The following section provides an overview of the possible industrial site that has been identified as part of the EELS, to support future growth and demand in the Central sub-region.

Future short term non-heavy industrial site

The short term industrial site identified within the Central sub-region is as follows:

Canning Vale

Located just south of the railway line, the current zoning is "Rural" under the MRS, with a portion zoned "Public Purpose Reserve" which is associated with a wastewater treatment plant, bounded by Ranford, Clifton and Lothian Roads and the railway. Some of the land is affected by Bush Forever and Resource Enhancement wetlands. Also there are likely issues with potential for populations of declared rare flora, which are known to exist in this area.

Status of availability

- The land zoned "Public Purposes" is currently used as a Water Disposal facility. It is regarded as an extension of the Canning Vale estate, co-siting with the waste water treatment plant (United Group depot) and natural extension of Jandakot industry base.
- The availability of this land for release will be reliant on market forces and the decisions of landowners to collaborate in order to progress this land parcel from its current predominant rural zoning to industrial uses.

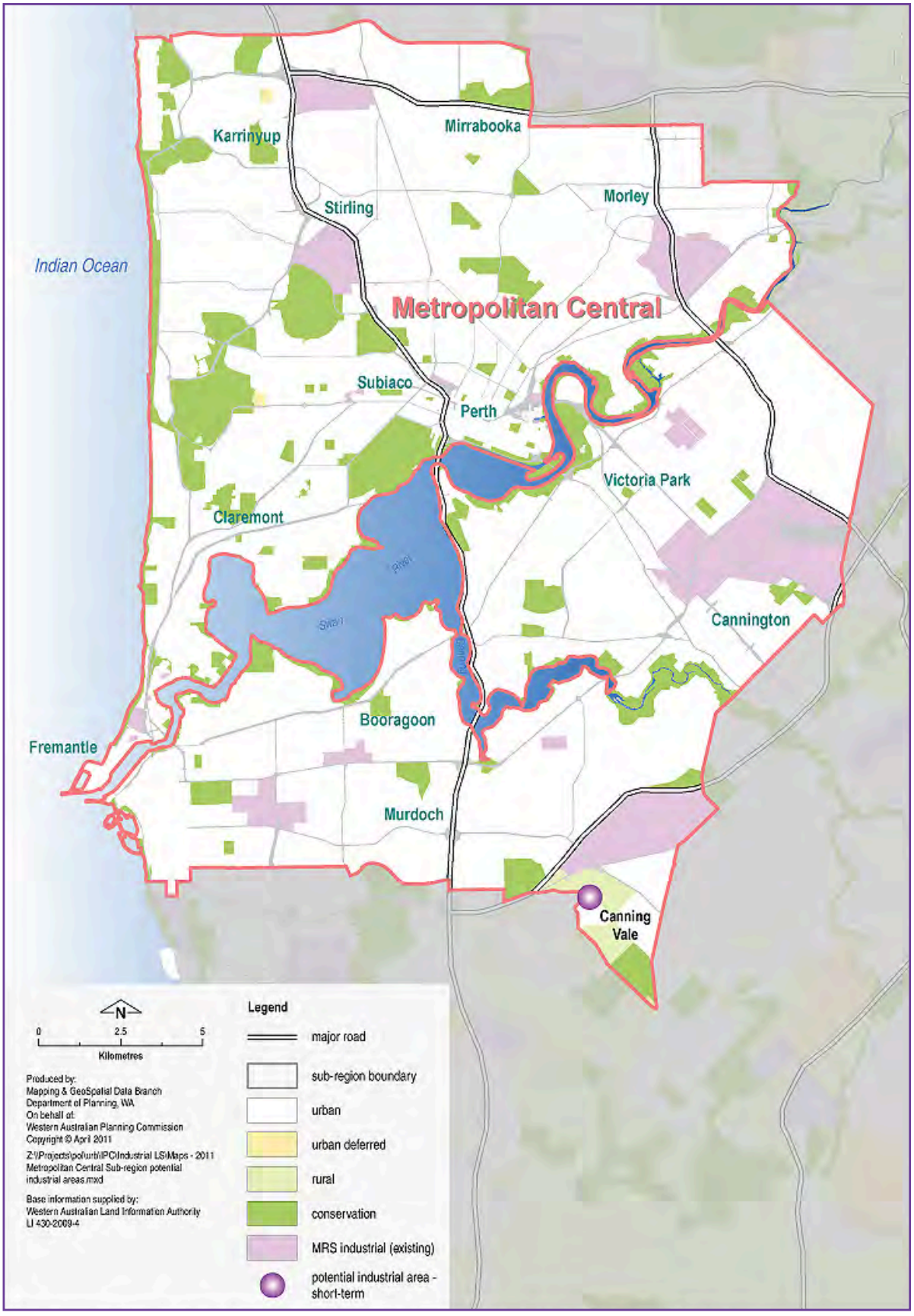


Figure 13: Metropolitan central sub-region potential non-heavy industrial areas

Key planning actions for the central sub-region

Key Stakeholders	Actions
Local Governments • City of Bayswater • City of Belmont • City of Canning • City of Fremantle • City of Melville • City of Nedlands • City of Perth • City of South Perth • City of Stirling • City of Subiaco • Shire of Peppermint Grove • Town of Bassendean • Town of Cambridge • Town of Claremont • Town of Cottesloe • Town of East Fremantle • Town of Mosman Park • Town of Victoria Park • Town of Vincent **WAPC** **Department of Planning** **LandCorp** **Department of State Development**	• Develop, in conjunction with Local government, an economic development and employment strategy for the Central sub-region.
Water Corporation	• Develop new water source infrastructure to boost the capacity of the Perth Integrated Water Supply Scheme.
Landowner/s and/or proponent/s **Department of Planning** **Department of Environment and Conservation**	• Consultation required for sites with buffers for conservation and resource enhancement wetlands. • Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands; if appropriate. • Undertake acid sulphate soil investigations. • Flora and fauna investigations. • Ascertain if any buffers to sensitive land uses are required.
Landowner/s and/or proponent/s **Department of Water**	• Water management investigations and documents to be prepared in accordance with Better Urban Water Management (WAPC 2008).
Alinta Gas **Western Power**	• Facilitate infrastructure provision to allow development of sites.
Main Roads Western Australia, **Public Transport Authority**	• Reduce congestion at peak times on the Mitchell and Kwinana Freeways. • Additional lanes on Tonkin, Roe and Reid Highways. • Improved connections between activity centres.
Swan River Trust	• Monitoring former industrial sites where contamination exists.
Landowner/s and/or proponent/s **Department of Indigenous Affairs** **Heritage Council of Western Australia**	• Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.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Part 8 - North-west sub-region

The North–west sub-region comprises the local government areas of the City of Wanneroo and City of Joondalup. The total area of zoned land in this sub-region is 78,430 hectares, of which 1770 ha is industrial land (2 per cent) – representing 17 per cent of the metropolitan total of industrial zoned land.

The North-west sub-region has a high population base, and is projected to grow rapidly posing challenges to meet various strategic planning goals particularly with respect to employment self-sufficiency (ESS), as set by *Directions 2031 and Beyond*.

Demographic profile

The 2010 ABS estimated resident population for this sub-region is 314,551, with 150,106 people in the City of Wanneroo and the remaining 164,445 people in the City of Joondalup (ABS, 2011). The forecast population by 2031 is 395,000 for the sub-region. Compared with other sub-regions in the Perth metropolitan region, this sub-region has a greater percentage of people aged 20 years and younger and a higher proportion of people aged between 34 and 55 years.

Planning profile

Joondalup has been identified in *Directions 2031 and Beyond* as a strategic metropolitan centre. A significant amount of investment by State and local government and the private sector has been directed to the City of Joondalup in recent times, and this is set to continue into the future. The City of Joondalup has developed a new city centre structure plan for Joondalup to guide future commercial and residential development, while a new strategic city centre will be developed at Yanchep in the City of Wanneroo to support longer term urban growth in the North-west sub-region.

The hierarchy of activity centres in the North-west sub-region include the following three types:

Strategic Metropolitan Centres	Secondary Centres	District Centres
Joondalup Yanchep*	Alkimos* Clarkson Two Rocks North* Wanneroo Warwick Whitfords	Alexander Heights Butler (Brighton)* Currambine Eglington* Girrawheen Yanchep centres 'C', 'F' and 'K'* Greenwood Madeley Neerabup (Banksia Grove)* Sorrento Woodvale

*emerging centre

Source: *Directions 2031 and Beyond*

Directions 2031 and Beyond aims to achieve an increase in dwellings from 107,000 in 2008 to 172,000 dwellings in the North-west sub-region by 2031.

The City of Wanneroo covers the largest land area in the North-west sub-region. Earlier in 2010 the district structure plans for Alkimos-Eglinton and Yanchep-Two Rocks were approved by the WAPC, and in early 2011 the final East Wanneroo Structure Plan was released. This latter structure plan provides direction for the planning and management of urban growth in East Wanneroo, including the provision of employment land.

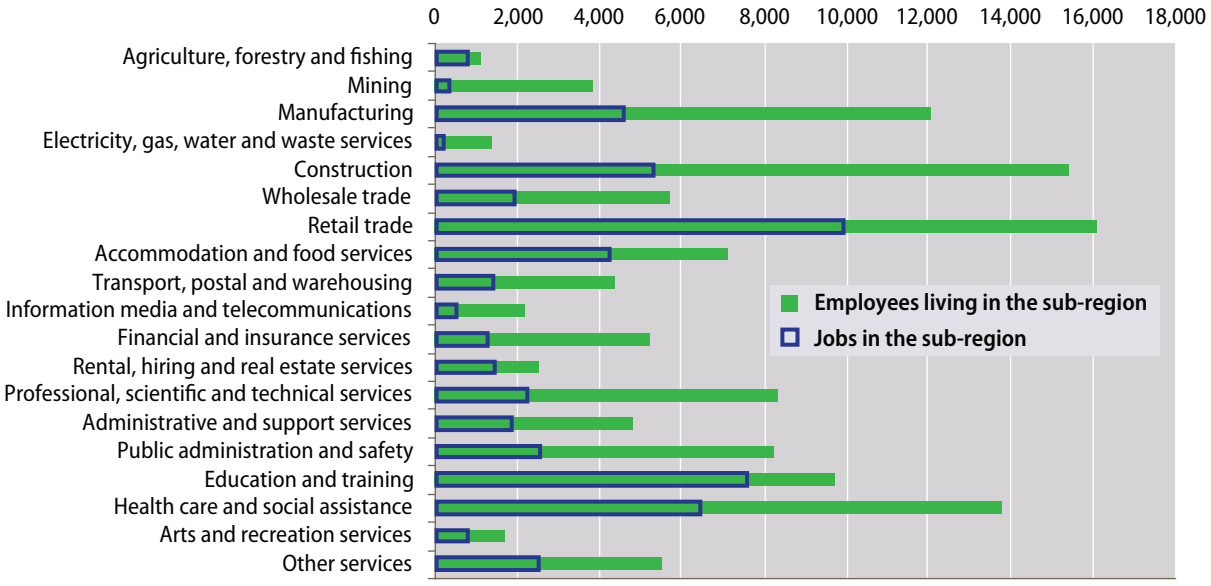
Economic profile

The graph below represents the number of employees living in the North-west sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in the sub-region (blue bar).

As the graph indicates, the main employment industry sectors in the North-west sub-region are retail and construction. The construction industry has experienced the highest share of employment growth in Wanneroo.

The absence of major physical infrastructure such as a port or airport in this sub-region means that the majority of the labour force tends to work in manufacturing, retail and the service sector. Many of the working residents of the North-west sub-region must travel to the CBD or the Central sub-region for work, resulting in peak hour congestion on the road system and negative externalities such as pollution, lost productivity and increased travelling costs for the commuting worker. The current ESS in the North-west sub-region of 41 per cent reflects this reality.

Directions 2031 and Beyond identified an ESS target of 60 per cent for the North-west sub-region. To achieve this ESS target, between 131,000 and 157,000 additional jobs will need to be created in this sub-region over the next 25 years. While the planned strategic metropolitan centres at Yanchep and Joondalup will cater for a substantial portion of this employment need, there will still be a requirement for additional jobs to be provided to meet this sub-region's ESS target. With its projected rapid population growth, the North-west sub-region has the potential to significantly improve its level of ESS while providing its growing population with high level access to goods and services.



Source: 2006 ABS Census of Population and Housing

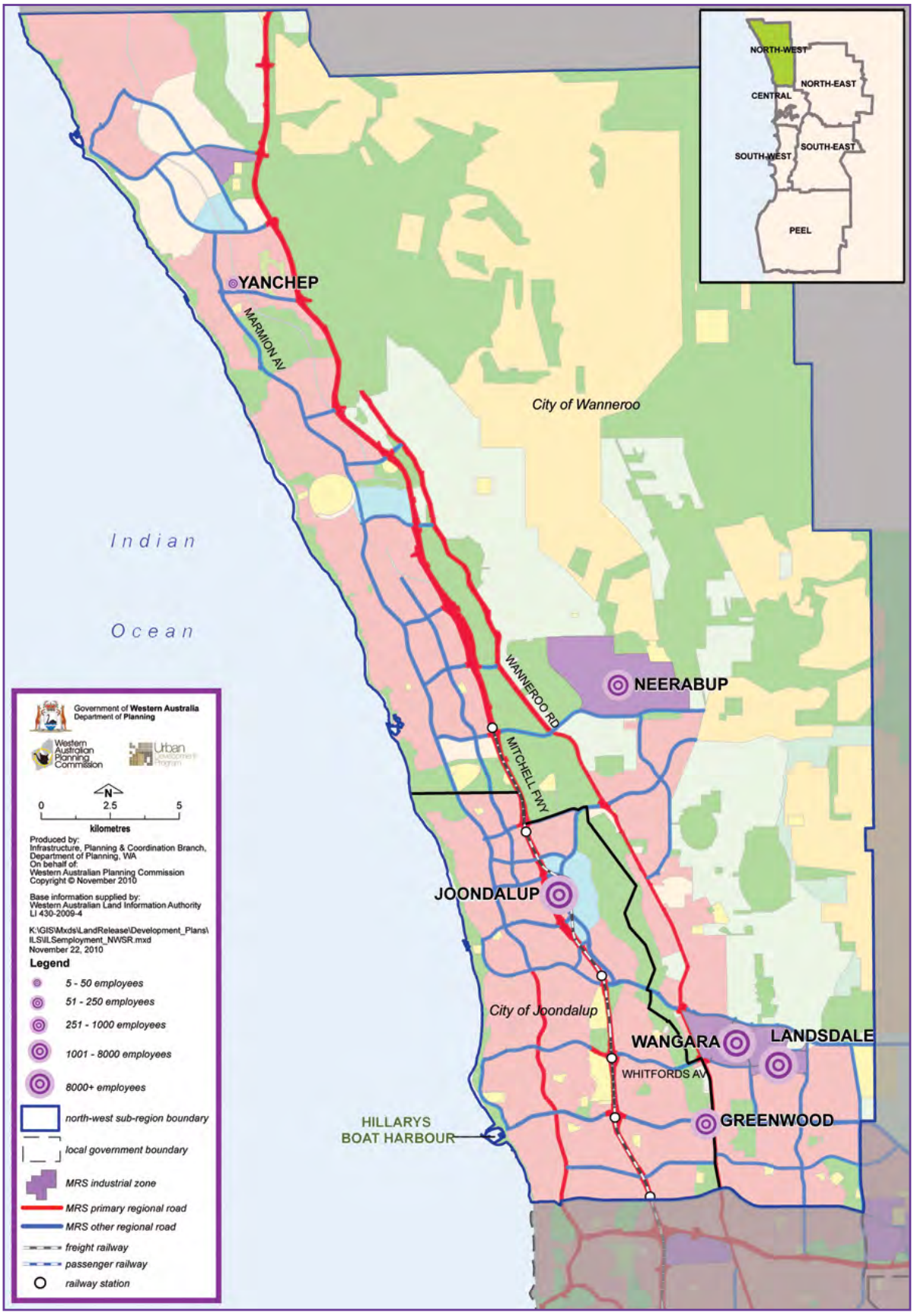


Figure 14: Industrial employment centres - north-west sub-region

Physical infrastructure

The physical infrastructure available in the North-west sub-region is insufficient to support the ESS target and to attract people wanting to work and live in the region. The passenger rail linkages and freight networks within the sub-region are limited, and the poor connectivity between the North-east and the North-west sub-regions further reduces the potential capacity of the sub-region to achieve its ESS targets.

Water

The availability of groundwater for potable supplies or irrigation of public open spaces is limited for most of the outer sub-regions and solutions will require the trade or transfer of existing licences should they be available or the investigation of alternative water resources.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Road and freight network

One of the missing components of the sub-region's road network is its connection with the North-east sub-region, particularly in respect to freight movements. The opportunity to strengthen the east-west connection by the upgrading of Neaves Road and Gnangara Road needs to be further investigated. The current environmental constraint associated with both routes traversing the Gnangara Water Mound requires careful consideration of how this east-west link can be accommodated without adversely affecting the Gnangara Water Mound. Furthermore, as northern development progresses, a north-south connection to East Wanneroo from the Reid Highway/Tonkin Highway interchange will be required.

No intermodal sites are planned or being considered for this sub-region.

Industrial and employment land in the sub-region

The City of Joondalup has limited industrial land within its boundary, while the City of Wanneroo accommodates most of the sub-region's industrial land. Currently, within the City of Wanneroo there are four industrial estates that service the North-west sub region. These are Wangara, Landsdale, Neerabup and Yanchep.

The Wangara Industrial Estate (WIE) is attracting medium-sized companies many of which are involved in manufacturing and producer services, and some of which incorporate advanced computer technology into their operations. The industrial area is located alongside north-south and east-west arterial roads. WIE has easy access to the Perth CBD, domestic and international airports, northern haulage routes and Fremantle Port.

The Landsdale industrial estate, located east of and adjacent to WIE, provides more light and general industry, while the Neerabup Industrial Estate to the north is currently being developed and will be the centre of up to 20,000 local jobs.

It is also noted that the Wanneroo-Carabooda area remains an area of state significance for agriculture, as identified in WAPC's *State Planning Policy (SPP) 2.5 Agricultural and Rural Land Use Planning*. Loss of productive agricultural land close to the metropolitan industry is a significant issue for industry, and according to SPP 2.5 an Agriculture Impact Assessment should be conducted prior to the land being rezoned.

Figure 15: Metropolitan north-west sub-region existing zoned industrial areas

Future industrial land supply in the sub-region

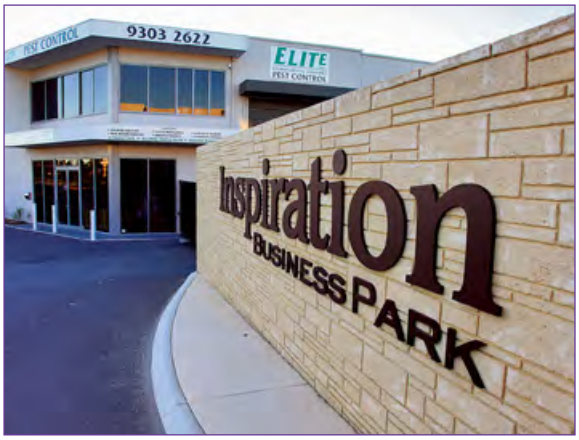
The strategy identifies locations where possible future industrial sites may be considered, to accommodate future demand and economic growth. The identified drivers of this demand for the North-west sub-region are considered to be:

- Population growth;
- Sustained levels of economic growth and employment targets;
- Increased industrial land values;
- Improvements in the transport network;
- Improvements in service infrastructure; and
- Resolution of environmental issues.

The population forecast for this sub-region by 2031 is estimated to be 395,000 people.

As the North-west sub-region has the highest population base comparative to other outer sub-regions, the demand for employment land in this sub-region is the highest at 2442 ha.

The industrial land supply in this sub-region to 2031, is represented as follows:



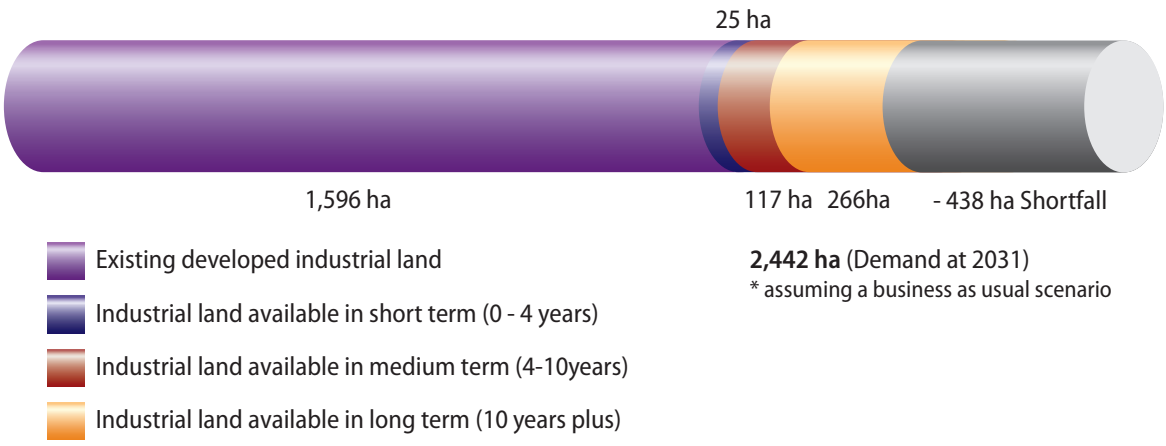


Figure 16: Current non-heavy industrial zoned land supply: North-west sub-region
(Source: Property Council of Australia)

Figure 17: Metropolitan north-west sub-region potential non-heavy industrial areas

With a forecast demand of 2442 ha by 2031, and based on existing data on the available supply in the pipeline, the sub-region will encounter a deficit of 438 ha if no additional land is released to the market by 2031.

The strategy has identified several possible industrial investigation sites or areas within the North-west sub-region. These investigation areas are not currently zoned "Industrial" in the Metropolitan Region Scheme. Further planning and environmental investigations are required for all the identified sites and the exact area and configuration of these sites are subject to change. These sites have been categorised into anticipated zoning timeframes, however, these timeframes are subject to further investigation and are dependent upon various factors, including proponents' willingness to progress the necessary planning, environmental and servicing investigations to support rezoning proposals.

Name	Zoning Status (MRS)	Stage (if relevant)	Gross Area
Future short term non-heavy industrial sites (0-4 years)			
N/A			
Potential medium term non-heavy industrial sites (4-10 years)			
Pinjar South (7 plus years subject to GSS)	State Forest	N/A	742 ha
Wangara extension	Rural	N/A	101ha
Potential tong term non heavy industrial sites (strategic landbank sites) (10 years +)			
Pinjar North	Rural	N/A	306 ha
Nowergup	Rural	N/A	662 ha
Nowergup (1)	Rural, State Forest, Water Catchment Reservation	N/A	559 ha
Nowergup (2)	Parks and Recreation, Special Uses	N/A	125 ha
Jandabup	Rural, Water Protection or Water Catchment Reservation	N/A	545 ha
		Total gross area	**3040 ha**

***Note:** The areas provided in this table exclude land that already is zoned "Industrial" in the Metropolitan Region Scheme. Please note that the total areas of these sites are still subject to investigation.

North-west sub-region possible future non-heavy industrial sites

The following section provides an overview of the potential non-heavy industrial sites that have been identified as part of the EELS, to support future growth and demand in the North-west sub-region. The sites are defined by three separate categories: future short term industrial sites, potential medium term industrial sites, and potential long term industrial sites (strategic landbank sites).

Future short term non-heavy industrial sites

Within the North-west sub-region there are no additional industrial areas identified that will have the capacity to cater for industrial land supply needs in the short term.

Potential medium term non-heavy industrial sites

The sites highlighted and discussed in the following section are those which, through the multi-criteria analysis and subsequent ranking of weighted scores, were seen as warranting further investigation and analysis.

The Pinjar South site is noted as a potential site for future non-heavy industrial development in the North-west sub-region. Until the outcome of the GSS is known, further preliminary planning work will not be undertaken.

Wangara Extension is also identified as becoming available in the medium term.

Issue	Pinjar South
Land ownership	• Government owned and managed, and is therefore less likely to present land assembly issues.
Accessibility (including transport networks)	• Located within an area that affords effective transport linkages and routes (Flynn Drive, Wanneroo Road, and Tonkin Highway). • Will strengthen the need for the north-south East Wanneroo connector. • With the likely upgrading of Neaves Road, this site will be further strengthened by the future North – South Road west of the Gnangara Water Mound, commencing at the intersection of Reid Highway and Tonkin Highway. Another planned route that should be included is the Perth Darwin National Highway.
Environmental sensitivities	• Majority of this site is a pine plantation which is being harvested, or cleared agricultural land. • No native vegetation clearing permits will be required and aspects of vegetation clearing will not be a significant factor in environmental impact assessments or approvals.
Topography/soil	• 29 per cent of the site has an average site slope of 1-3 per cent which is optimal for industrial development, particularly large lot development. • Some areas of steep slope exist, as do large flat areas of less than 1 per cent slope, however, based on preliminary assessment these areas may be graded across the site to achieve a more optimal average slope. • The chain of wetlands in this area indicates possible shallow groundwater. Investigations into groundwater levels and appropriate drainage infrastructure to achieve a suitable separation distance to groundwater will be required. • Requires significant fill.
Potential land use conflict	• Interfaces with special rural and residential land uses to the south and east, and associated buffers to these sensitive land uses could restrict the developable area, depending on the industry type and potential for negative impact due to emissions. • Proposed urbanisation of areas to the south and west may impact types of industries, and buffers may apply.
Gnangara underground water pollution control area	• The majority of the site is within a Priority 1 Public Drinking Water Supply Area. • Unlikely that the WAPC would consider a proposal to develop industrial land on the scale proposed at this site to be compatible with the priority 1 area. Investigation into the reclassification of the P1 PDWSA as defined by the GSS is required prior to any further preliminary planning work being undertaken. • Water Corporation production bores and wellhead protection zones located on site.
Conservation	• Designated conservation areas including wetlands, Bush Forever sites and recorded priority flora and fauna are noted on site. Flora and fauna studies will need to be conducted prior to structure planning. Also wetland mapping may need to be confirmed. • Significant Bush Forever site borders the site to the north and east. Developments that increase the risk of disturbance, weed invasion, fire or other impacts may not be compatible adjacent to a Bush Forever site.
Heritage	• Not applicable for this site.
Site contamination	• No contaminated sites registered in the DEC contaminated sites database, and no significant acid sulphate soils or contamination issues have been noted. • The Pinjar piggery was located in the central western portion of the site (a number of groundwater investigation and monitoring bores are present in the vicinity of the piggery site). No other significant potentially polluting historic activity is noted across the site. • The majority of the site is denoted as low to moderate risk for acid sulphate soils (ASS) risk. Pockets of high risk ASS are evident, predominantly within or adjacent to wetland areas.

Continued on page 60

Issue	Pinjar South
Service infrastructure accessibility	• The capacity of existing water and sewer services to the site is limited. • No wastewater treatment and disposal planning studies have been undertaken for this area. • A planning study would be required to look at the options for and feasibility of servicing this area for wastewater treatment and disposal purposes. • A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.
Close to work force	• Work force is located within close proximity to this site in Banksia Grove and areas south-west of the subject site.
Design specifications	• Not applicable for this site.

Preferred uses and potential end users

This site is well suited to the provision of warehousing and distribution uses and possibly some transport logistic function. The area has good freight network route linkages to the eastern part of the State which would need to be upgraded for the full strategic potential of this site to be realised. The Pinjar South site should be considered as land for employment purposes subject to further planning, which may include provision for residential land. The strategy represents more recent thinking than the East Wanneroo Structure Plan (EWSP) which will be subject to further refinement over time. There will be further investigation of an extension of Flynn Drive to Neaves Road in the Pinjar South area.

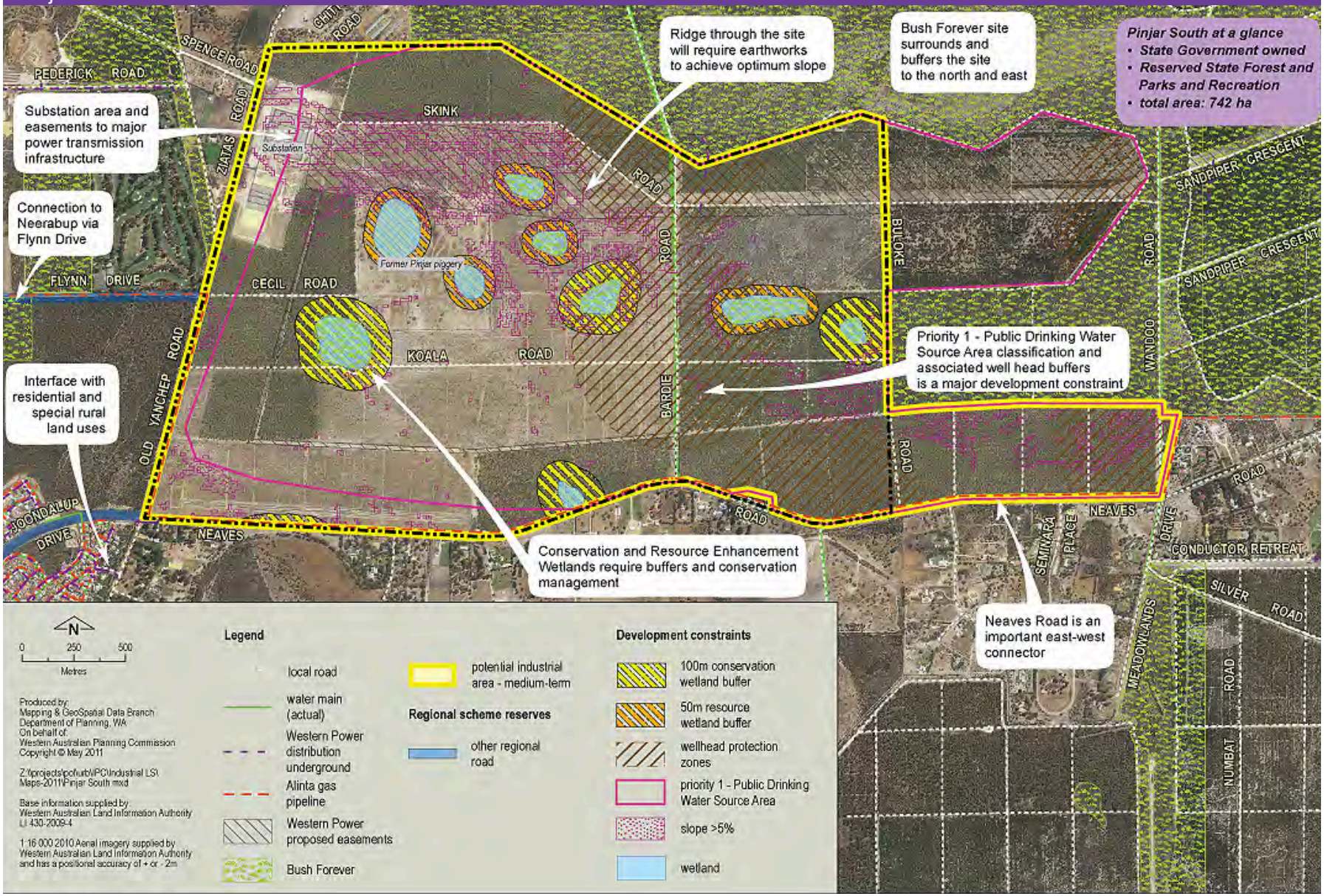
Warehousing and distribution

- Storage and display of goods
- May include wholesale
- May be hyper large sites or numerous small sites dependant upon scope of operation
- Trend towards dedicated distribution parks (see logistics below)
- Trend towards automated goods handling and smart buildings

Transport and logistics

- Transport and courier depot and services
- Distribution centres
- Packaging, parts and services, including food
- Disposal and recycling depots
- Material management
- Geared towards high technology/smart/ automated systems likely to require expansion as the industry evolves.

Pinjar South

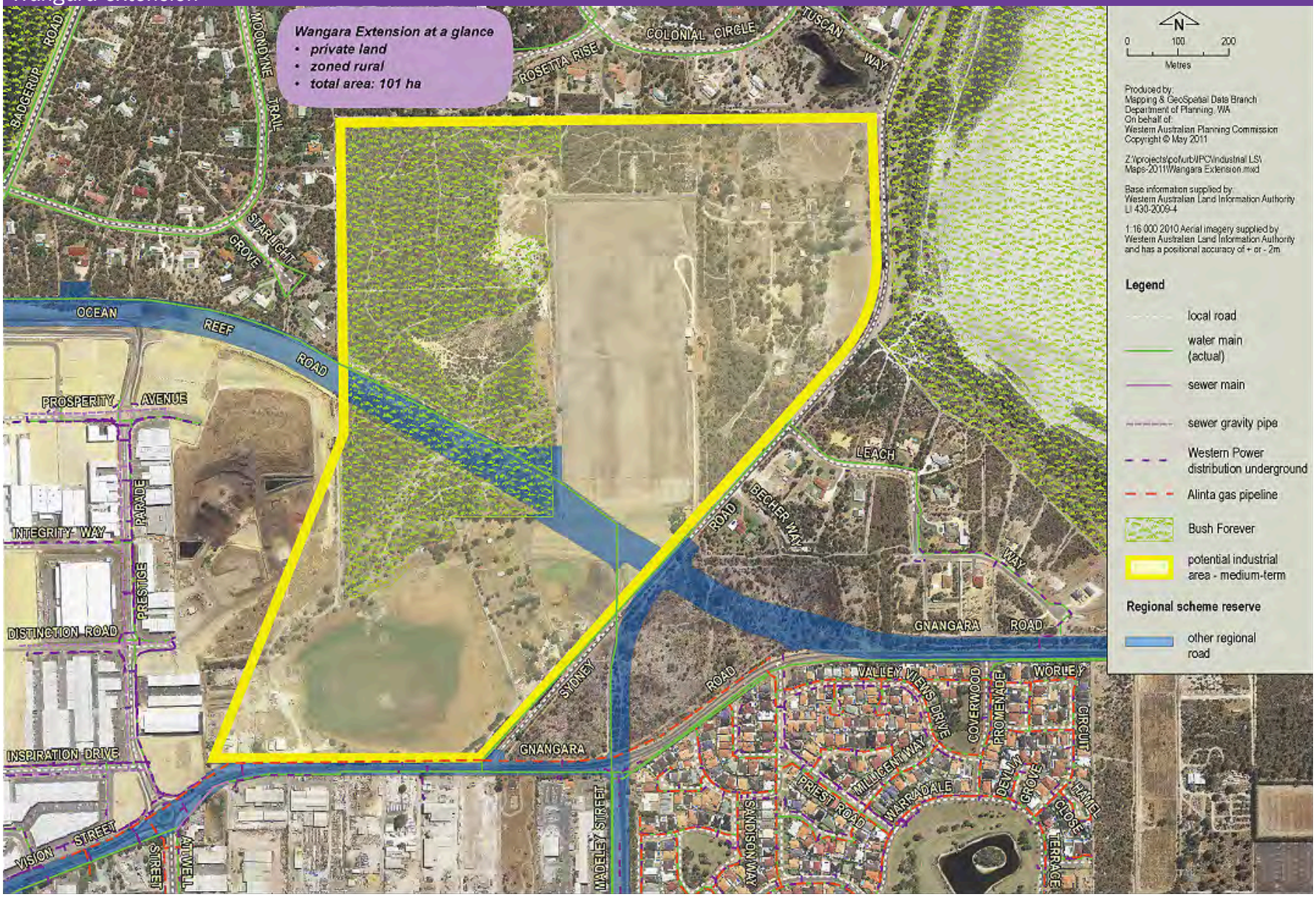


Key actions - Pinjar South

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake MRS amendment.	Up to 7 years from commencement to complete key planning related Actions (these are contingent upon the completion of key infrastructure studies)
	2	Prepare a District Structure Plan.	
	3	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	4	Prepare Local Structure Plan(s).	
	5	Investigate buffer requirements with surrounding existing and proposed urban and rural land uses and any additional interface issues.	
Environment	6	Initiate the review of the Priority 1 Public Drinking Water Supply Area (PDWSA) classification affecting the subject site. The process to review the extent of the Priority 1 classification will be required to follow that outlined in the Gnangara Sustainability Strategy Implementation document.	Up to 3.5 years from commencement to complete key environmental Actions, including the required groundwater monitoring of the Gnangara Mound.
	7	Undertake a flora and fauna survey.	
	8	Investigate the potential reclassification of identified wetlands and confirm status, including boundaries.	
	9	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008).	
Infrastructure and servicing	10	Water Supply from Carabooda may be possible if the Nowergup reservoir is not constructed by the time that this area is developed. A detailed planning study to be undertaken by the Water Corporation to identify the potential and feasibility to utilise Carabooda Reservoir (soon to be in operation) as the water supply source for the area.	Up to 7 years from commencement to complete key infrastructure studies, including 7 years for the planning and construction of the East Wanneroo North/ South and East/West Neaves Road/Flynn Drive road links
	11	Water Corporation to undertake a planning study to look at the options and feasibility to service this area for wastewater treatment and disposal purposes.	
	12	Undertake investigations on future demand on power and gas.	
	13	Investigate an east-west transport and infrastructure corridor based on the existing Neaves Road alignment.	
Physical Landform and Soils	14	Undertake an acid sulphate soils investigation and prepare an Acid Sulphate Soils Management Plan if acid generating material is identified.	3 months to complete the preliminary site assessment for acid sulphate soils.
	15	Undertake Heritage Surveys (Indigenous and European).	

Issue	Wangara industrial estate extension
Land ownership	• Large portion of land owned by Aboriginal Lands Trust (ALT). The balance of the identified site is in private ownership (approximately 9 private and corporate landowners).
Accessibility (incl. transport networks)	• Ocean Reef Road extension dissects the site into northern and southern portions. Well located to offer opportunity for heavy haulage and a good east-west connector to the North-east sub-region.
Environmental sesitivities	• The subject site has an identified Bush Forever area in the north-western portion of the site. Development adjacent to Bush Forever sites should be sensitive to the environmental values of the Bush Forever sites and take measures to reduce potential environmental impacts. Note: The Bush Forever portion of this site should be removed from the proposed industrial area boundary. This area should not be considered for development. • No declared rare or priority flora, or significant fauna locations are recorded within the site. • Limited impact on developable area as a result of the Gnangara Lake buffer area to the east.
Topography/soil	• Generally flat. Key topographical feature is the proximity to Gnangara Lake, immediately east of the site. • The identification of a multi–use wetland on a portion of the site indicates possible shallow groundwater. Investigations into groundwater levels and appropriate drainage infrastructure to achieve a suitable separation distance to groundwater will be required.
Potential land use conflict	• There is limited interface between the urban precinct to the south-east of the site and the proposed site. An area of land located adjacent to the junction of Ocean Reef Road and Sydney Road is zoned "Urban Deferred" but it is considered to have limited development potential as a future residential area given its location and size. • Land to the north of the site is currently used as "Rural Residential". Any future uses within the Wangara Extension site would need to be sensitive to the amenity of this use and appropriate measures being put in place to mitigate any negative impacts. • Transport impact assessment will be required to address access issues into the estate and potential traffic impacts on the surrounding road network.
Conservation	• A multi-use wetland is identified in the southern portion of the site. This wetland has been determined to have no significant environmental values by the Department of Environment and Conservation.
Heritage	• The subject site has some heritage significance that is associated with the ALT land. There is an Aboriginal cemetery located in the far north-eastern portion of the site. It is recommended that this area be excised from consideration of any future rezoning proposals for the area.
Site contamination	• No sites are recorded in the DEC Contaminated Sites Database within the area. Evidence of existing/ historic market garden and turf farm activities on site. Preliminary contamination investigation may be required. • The majority of the site is low to moderate risk for acid sulphate soils, however, further investigations would need to be undertaken to determine the extent of ASS on the site.
Service infrastructure accessibility	• Sewer, water and gas connections exist to the south and east of the site. • Power substation exists to the south of the site with new substation being established to the east of the site. • No wastewater planning exists for this area. No water planning has been undertaken for this area and a District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.
Close to workforce	• Existing residential development lies within close proximity to the site with future residential development planned to occur in the area as a result of the East Wanneroo Structure Plan (2011). This is likely to provide increased incentive to developers and businesses to undertake activities in the area as population driven demand for the area is clearly evident.

Wangara extension



Potential long term non-heavy industrial sites (strategic landbank)

In addition to the investigation areas with existing industrial estates, other sites were identified which indicate some level of potential for further investigation in the longer term that would contribute to the strategic landbank for future industrial land supply.

It should be acknowledged that a number of these sites may already have existing uses that preclude industrial activity taking place in the medium-to-long term. In these instances the future uses of these sites will be based on future needs of the sub-region as well as the results of detailed investigations and studies.

In the North-west sub-region, these sites are as follows:

- Nowergup
- Nowergup (1)
- Nowergup (2)
- Pinjar North
- Jandabup

Nowergup | Total Area 662 ha

Land status: Medium – large lots owned by only 10-12 different corporations and private landowners, with some State Government land and one Water Corporation Lot.

Zoning: MRS: Rural. TPS: General Rural, Rural Resource.

Current uses: Highly constrained by Basic Raw Materials resource protection policy areas, making it only a long term opportunity for sequential development. Animal Processing, Poultry and Piggery buffers in place. The GSS does not identify a change of use for this land.

Environmental constraints: Bush Forever, TEC and flora (DRF) constraints. Good quality Banksia woodland and DRF populations in this area. Outside of the PDWSA Protection Area boundaries. Potential use of land for extractive industries.

Transport linkages: Wesco Road RAV Network. Main access routes Wesco Road, Hopkins Road and Wattle Ave West.

Serviceability: Power is available (overhead and underground). Water, sewer, gas services not available. Gas available at Wanneroo Road. All other services stop west of railway reserve (Ridgewood/Clarkson area). A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.

Potential land use hierarchy: This area is well suited to the provision of Producer services. The area is adjacent to industrial land, and can service the proposed GSS horticultural precinct north of the site.

Nowergup (1) | Total Area 559 ha

Land status: State Forest land in State Government ownership and management (DEC).

Zoning: MRS: State Forest. TPS: State Forest.

Current uses: Plantation Forestry. Currently unconstrained by Basic Raw Materials resource protection policy areas.

Environmental constraints: Bush Forever (Carnaby's Cockatoo), Resource Enhancement Wetland.

The GSS identifies this land as providing industrial development potential in the future. Approximately half of the site is within the Priority 1 PDWSA Protection Area boundaries. Review of this boundary in order to allow development on this land is subject to the outcomes of the GSS. Potential use of land for extractive industries.

Transport linkages: Wesco Road and Old Yanchep Road RAV Network. Main access routes via Hopkins Road and Wattle Avenue East.

Serviceability: Power is the only service available at the immediate site. Gas at Pederick Road (to the south). Water and sewerage at least 4 km away (at Banksia Grove to the south). A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.

Potential Land Use Hierarchy: This area is well suited to the provision of Producer Services and a Strategic Export/Knowledge based industry. The area is adjacent to current industrial land, and can service the proposed GSS horticultural precinct north of the area.

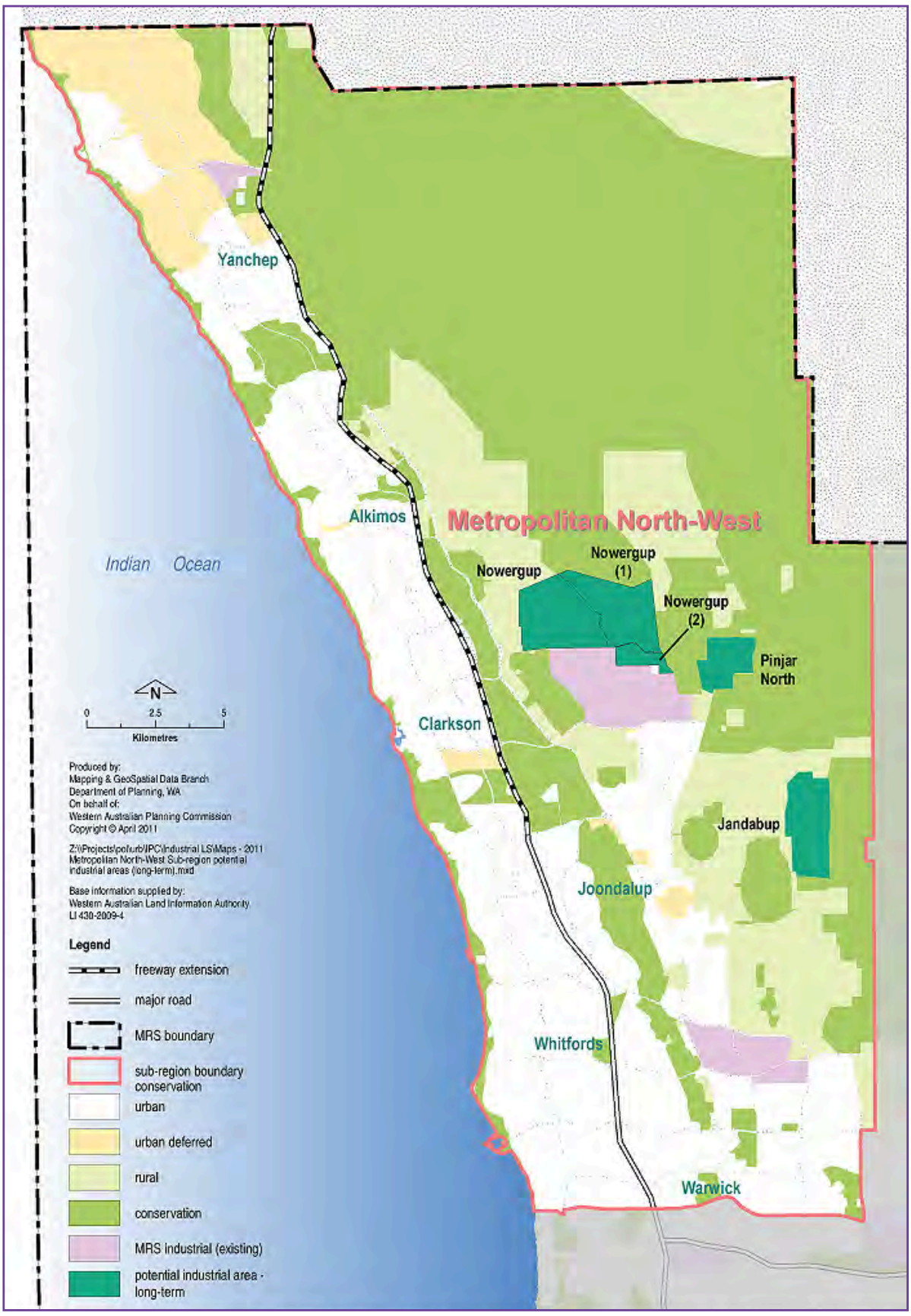


Figure 18: Metropolitan north-west sub-region potential non-heavy industrial areas (long term)

Nowergup (2) | Total Area 125 ha

Land status: Crown land vested with the City of Wanneroo and leased to Barbagallo Raceway.

Zoning: MRS: Parks and Recreation.

Current uses: Motocross, Raceway, Kartway and Driver Training Centre. The GSS identifies this land as potentially providing industrial development potential in the future.

Environmental constraints: Bush Forever, Carnaby's Cockatoo.

Outside of the PDWSA Protection Area boundaries. Potential use of land for extractive industries.

Transport Linkages: Old Yanchep Road is on the RAV Network. Access via Wattle Avenue East and Orchid Road.

Serviceability: Power is the only service available at the immediate site. Gas at Pederick Road (to the south). Water and sewerage approx. 4 km away (at Banksia Grove to the south). A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.

Potential land use hierarchy: This area is well suited to the provision of Producer services. The area is adjacent to current industrial land, and would add to the net developable area of Neerabup.

Pinjar North | Total Area 306 ha

Land status: Nine private landowners, within site boundary, and significant WAPC landholdings currently under consideration by government for alternative land use. Has been identified previously as an opportunity for industrial development.

Zoning: MRS: Rural. TPS: General Rural.

Current uses: Grazing, horticulture, poultry farm. The GSS does not identify a change of use for this land.

Environmental constraints: Flora and fauna and Conservation wetland constraints to the east. Outside of the PDWSA Protection Area boundaries.

Transport Linkages: Perry Road and Old Yanchep Road RAV Network. Minor road access via Chitty, Ziatas and Spence Road.

Serviceability: Overhead power is available. Gas at Pederick Road (to the south). Water and sewerage approximately 2km away (at Banksia Grove to the south). A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.

Potential land use hierarchy: This area is well suited to the provision of Producer services. The area is adjacent to current industrial land, and has suitable inter-modal freight distribution roads.

Jandabup | Total Area 545 ha

Land status: Government land (DEC), part of 1610ha land parcel. Has been proposed by DEC as a site suitable for industrial use.

Zoning: MRS: State Forest. TPS: State Forest.

Current use: State Forest (partly cleared).

The GSS does not identify a change of use for this land – it gives priority to excision of the land to the north (Pinjar South) from the P1 area for potential industrial development.

Environmental constraints: P1 PDWSA Protection Area. Investigation into the reclassification of the P1 PDWSA is required prior to any further preliminary planning work being undertaken.

Transport linkages: Potential future East Wanneroo Road Network to the west linking Flynn Drive. Subject to future Planning and the outcomes of the East Wanneroo Road Network Study and the Gnangara Sustainability Strategy. RAV Network 3 access from Townsend Road.

Serviceability: Power is available (overhead and underground). Water, sewer, gas services not available. A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.

North-west sub-region – long term outlook

The North-west sub-region is the most rapidly growing area in the Perth and Peel regions. It also reflects one of the lowest employment self-sufficiency levels, which can largely be attributed to the very high proportion of residential/urban zoned land in this sub-region. The need for industrial land closely located to these concentrations of population is self-evident. However, the corridor is very elongated and some locations at the fringes of the corridor may be uneconomic and unattractive to many industries because of the constrained accessibility and potential land use conflicts that may arise.

Land for industry must be well serviced and accessible in this location. It is forecast that 35,000 to 45,000 strategic employment positions will be required in the North-west sub-region by 2031.

Key planning actions for the north-west sub-region

Key Stakeholders	Actions
City of Wanneroo City of Joondalup WAPC Department of Planning LandCorp Department of State Development	Develop, in conjunction with the local governments, an economic development and employment strategy for the North-west sub-region. Undertake a local demand assessment to determine the staging requirements for the release of land in line with population growth.
LandCorp Department of Planning Department of Environment and Conservation Department of Water Main Roads of Western Australia Water Corporation Office of Energy Alinta Gas Wester Power Heritage Council	Undertake feasibility studies with respect to the identified medium term sites in the North-west sub-region and determine most appropriate delivery models and level of government involvement in this sub-region to facilitate industrial land development.
Water Corporation	Investigation into alternative water sources.
Landowner/s and/or proponent/s Department of Planning Department of Environment and Conservation	Consultation required for sites with buffers for conservation and resource enhancement wetlands. Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands, if appropriate. Undertake acid sulphate soil investigations. Flora and fauna investigations. Ascertain if any buffers to sensitive land uses are required.
Department of Water Department of Planning Department of Environment and Conservation Water Corporation	Review classification of Priority 1 Public Drinking Water Supply Area.
Alinta Gas Western Power	Infrastructure provisioning to facilitate development of the sites.
Main Roads Western Australia	Improve connections between North-west and North-east sub-regions. Consideration of upgrading Gnangara Road and Neaves Road to Primary Regional Roads.
Proponent/s and/or landowner/s Department of Indigenous Affairs Heritage Council of Western Australia	Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.
Proponent/s and/or landowner/s Department of Water	Water management investigations and documents to be prepared in accordance with Better Urban Water Management (WAPC 2008).

Part 9 - North-east sub-region

The North-east sub-region comprises the local government areas of the City of Swan, Shire of Kalamunda and Shire of Mundaring. The total area of zoned land in this sub-region is 203,600 hectares, of which 1439 ha is dedicated as industrial zoned land (1 per cent) - representing 14 per cent of the metropolitan total of industrial zoned land.

Demographic profile

The 2010 ABS estimated resident population for this sub-region is 207,684, with 55,684 in the Shire of Kalamunda, 38,910 in the Shire of Mundaring and 112,960 in the City of Swan (ABS, 2011). By 2031 the population is forecast to be 258,000. The North-east sub-region displays an age profile which reflects the metropolitan profile in terms of the ageing population. The Shire of Mundaring has experienced a more significant reduction in the number of people aged between 20-35 years, compared with similar reductions in the Shire of Kalamunda and City of Swan.

Planning profile

The hierarchy of activity centres in the North-east sub-region include the following three types:

Strategic Metropolitan Centres	Secondary Centres	District Centres
Midland	Ellenbrook	Forrestfield Kalamunda Mundaring Albion*

*emerging centre

Source: *Directions 2031 and Beyond*

The Midland city centre forms the major location for the interaction between commercial, community, retail, entertainment and residential activity. It also is the primary employment node for this sub-region. The work being undertaken collaboratively between the City of Swan and the Metropolitan Redevelopment Authority is aimed at the continued growth and revitalisation of this centre into a principal centre of activity.

Directions 2031 and Beyond aims to achieve an increase in dwellings from 73,000 in 2008 to 113,000 dwellings in the North-east sub-region by 2031.

In the draft *Outer Metropolitan Perth and Peel Sub-regional Strategy* there are identified urban cells at Albion, West Swan and Caversham (collectively known as the Swan urban growth corridor) along with areas in Bullsbrook and Upper Swan. Similarly, Gidgegannup and Bushmead are also indicated as future urban investigation areas. Incremental growth and consolidation around established townsites is expected in the Shire of Mundaring, while planning is under way in and around Forrestfield and Wattle Grove in the Shire of Kalamunda.

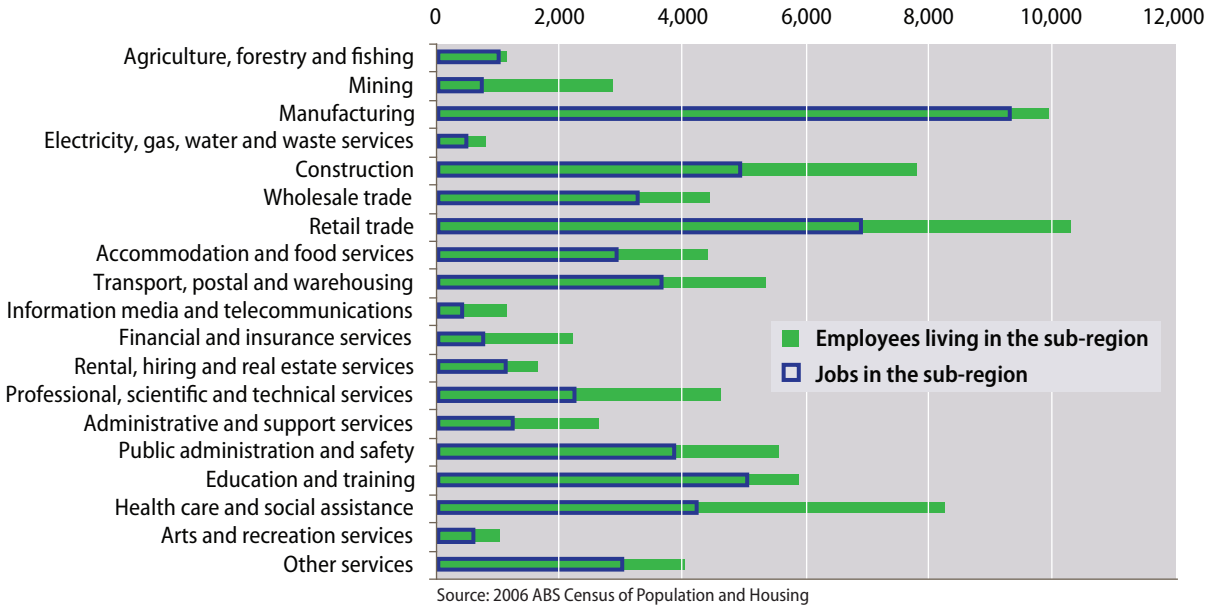
The issues currently constraining development in these areas such as servicing, waste water treatment, public transport and traffic implications, are likely to be resolved over the next 10 years. With the influx of additional population to the region through these developments, it will be important to provide adequate local employment opportunities.

Economic profile

The graph below represents the number of employees living in the North-east sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in the sub-region (blue bar).

Based on 2006 ABS data, the majority of the North-east sub-region's labour force is in the manufacturing, retail and service sectors. Much of the workforce of the North-east sub-region travels to the CBD or the Central sub-region for work, resulting in peak hour congestion on the road system and negative externalities such as pollution, lost productivity and increased travelling costs for the commuting worker.

The current employment self-sufficiency (ESS) in the North-east sub-region of 63 per cent is significantly higher than the North-west sub-region, and the target ESS of 75 per cent is realistic, provided that adequate employment options are provided within the sub-region to facilitate and meet this target. This target translates into the need for an additional 53,000 to 64,000 jobs in this sub-region over the next 25 years.



Source: 2006 ABS Census of Population and Housing

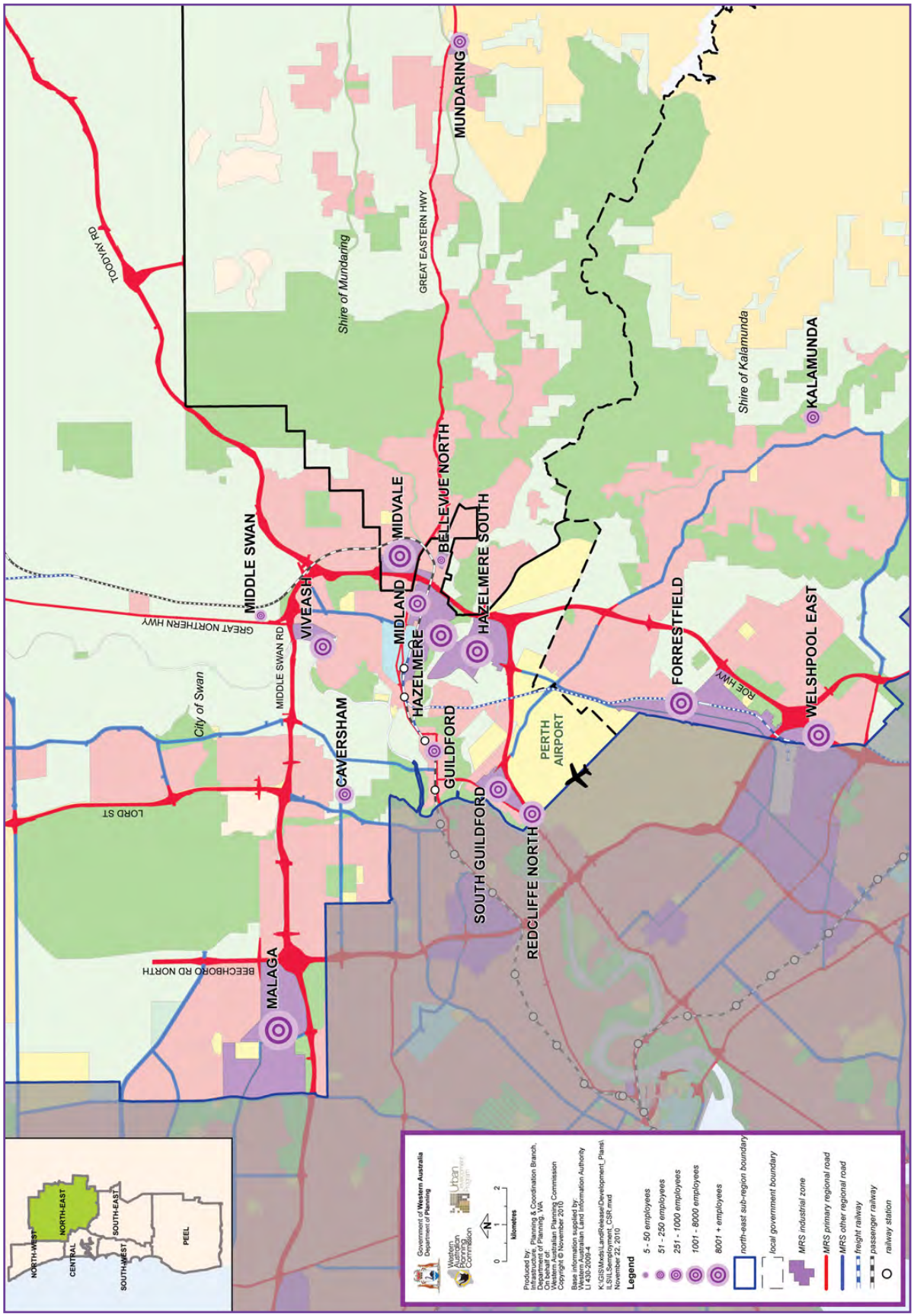


Figure 19: Industrial employment centre north-east sub-region

Physical infrastructure

The physical infrastructure in the North-east sub-region is relatively better than other regions, given its historic connections and gateway status into the agricultural regions of WA including the Wheatbelt, Mid West, Gascoyne and beyond. A strong east-west connector between the North-east and North-west sub-regions is missing, and it is recommended as part of this strategy that provision of this connection be investigated and feasibility studies undertaken to determine how it can be facilitated.

Water

Planning for additional water infrastructure is well underway for this sub-region. The Water Corporation, reporting through the draft *Outer Metropolitan Perth and Peel Sub-regional Strategy*, states that there are plans underway to expand existing wastewater treatment plants at Mundaring and Bullsbrook, and establish new water storage and water treatment plants throughout the sub-region. The availability of groundwater for potable supplies or irrigation of public open spaces is limited for most of the outer sub-regions and solutions will require the trade or transfer of existing licences should they be available or the investigation of alternative water resources.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Road and freight network

This sub-region contains some of the major freight routes into and out of the Perth metropolitan area. Main Roads Western Australia continues to seek funding for the upgrading of key freight and road corridors such as Great Northern Highway, Roe Highway, Reid Highway and Great Eastern Highway. Other strategic road projects have also been identified for the sub-region, but are yet to receive funding to enable these to progress. One such key strategic project is the construction of the Perth-Darwin National Highway which will provide a critical piece of transport infrastructure to support future growth in the North-east sub-region. It is a recommendation of this Strategy that the funding allocation for this particular strategic project be brought forward.

The east-west links of Gnangara and Neaves Road require upgrading physically and in terms of their status. They should both become primary regional roads with the view to protecting their integrity and access control, and it is a recommendation of this strategy that this be investigated.

A number of sites have been identified within the North-east sub-region as having potential for an intermodal transport facility. For this sub-region, an intermodal facility is vital to strengthen and support level of activity in this region. In this instance, it would comprise an inland facility, acting as a staging point for containers moving by rail to and from seaports. With the existing narrow gauge rail network having reached capacity (which extends from Geraldton-Mullewa to Perth and services the Mid West and north-western Wheatbelt regions), this further emphasises the need for such a facility in this sub-region.

Investigations are underway to examine the suitability of intermodal freight terminals at various strategic locations throughout the Perth and Peel regions, of which Bullsbrook South and the North Ellenbrook site in the North-east sub-region are being considered.

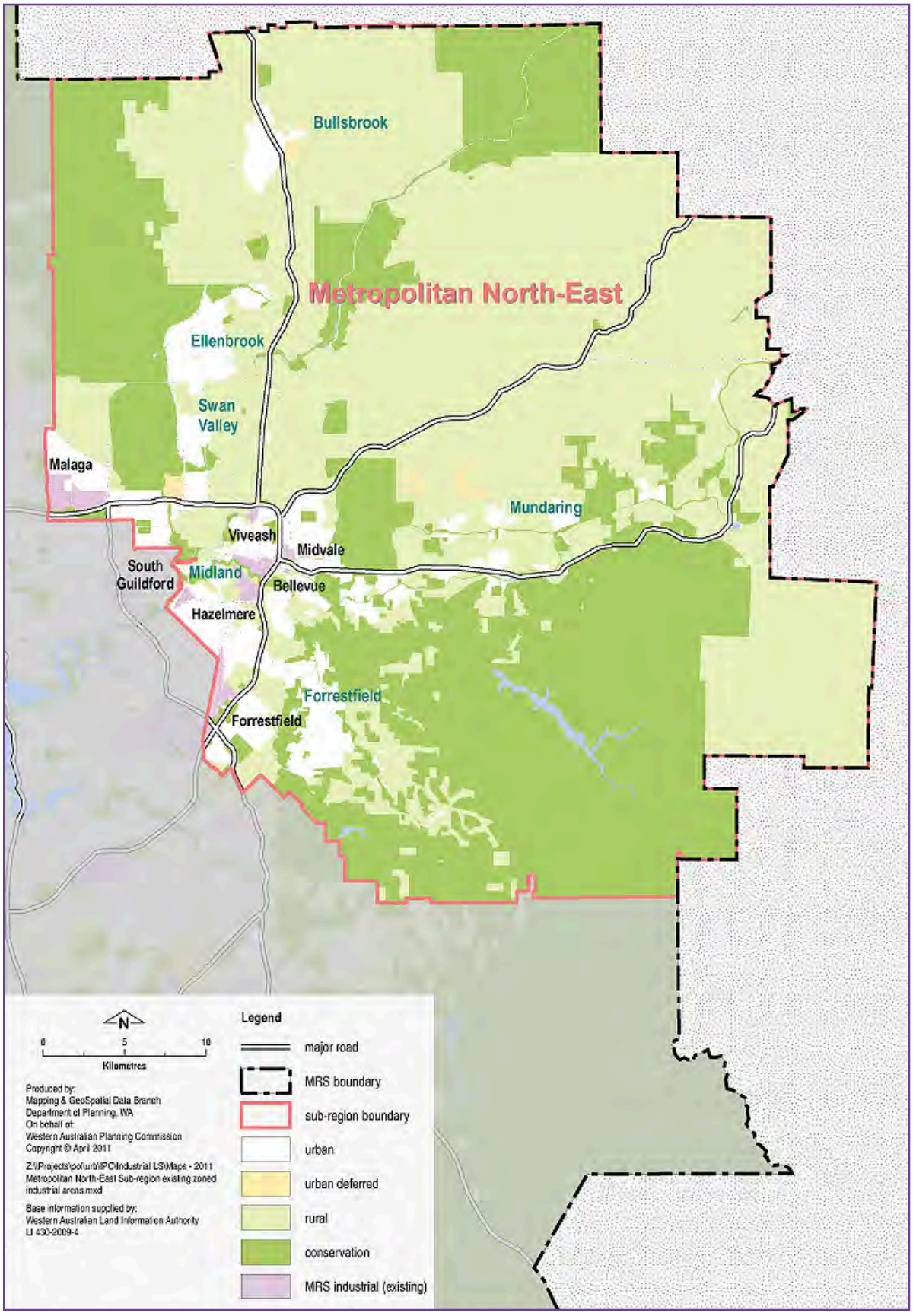


Figure 20: Metropolitan north-east sub-region existing zoned industrial areas

Industrial and employment land in the sub-region

A small portion of the Kewdale/Welshpool strategic industrial centre is located in the North-east sub-region. Kewdale/Welshpool combined with the Perth Airport specialised centre which lies immediately adjacent to the North-east sub-region, provides a significant employment hub.

Future industrial land supply in the sub-region

The EELS has identified locations where possible future industrial sites may be considered, to accommodate future demand and economic growth. The future drivers for the North-east sub-region are:

- Population growth;
- Sustained levels of economic growth and employment needs; and
- Close proximity to existing transport and freight routes.

The industrial land supply in this sub-region to 2031, is represented as shown below in figure 21.

With a forecast demand of 1646 ha by 2031, and based on existing data on the available supply in the pipeline, the sub-region will encounter a deficit of 117 ha if no additional land is released to the market by 2031.

The strategy has identified possible industrial investigation sites or areas within the North-east sub-region. These investigation areas are not currently zoned "Industrial" in the Metropolitan Region Scheme. Further planning and environmental investigations are

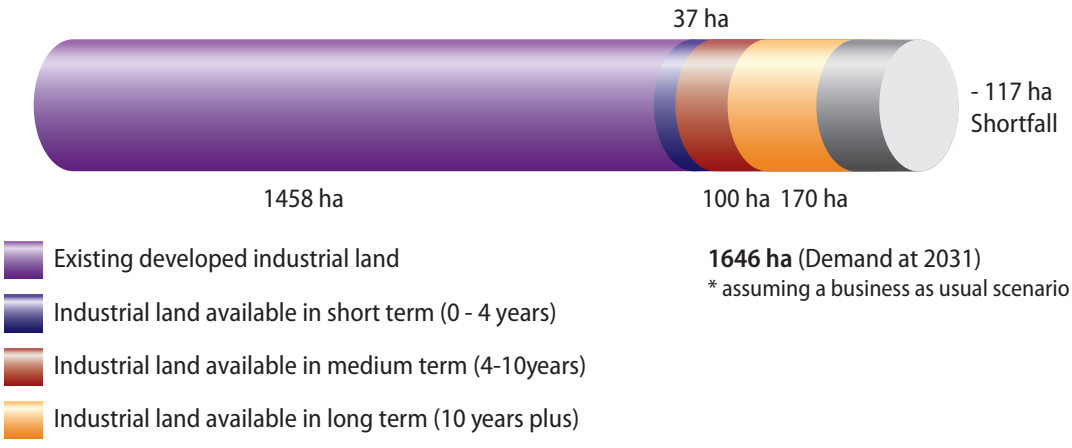


Figure 21: Current non-heavy industrial zoned land supply: North-east sub-region
(Source: Property Council of Australia)

required for all the identified sites and the exact area and configuration of these sites are subject to change. These sites have been categorised into anticipated zoning timeframes, however, these timeframes are also subject to change and dependent upon various factors, including proponents' willingness to progress the necessary planning, environmental and servicing investigations to support rezoning proposals.

Name	Zoning Status (MRS)	Stage (if relevant)	Gross Area
Future short term non-heavy industrial sites (0-4 years)			
Forrestfield (1)	Urban, Parks and Recreation	N/A	71 ha
Potential medium term non-heavy industrial sites (4-10 years)			
Hazelmere South	Rural	N/A	100 ha
Whiteman	Rural	N/A	85 ha
North Ellenbrook	Rural	N/A	2428 ha
Forrestfield (2)	Urban	N/A	22 ha
Forrestfield (3)	Rural	N/A	108 ha
Bullsbrook South	Rural	N/A	471 ha
Potential long term non-heavy industrial sites (strategic landbank sites) (10 years +)			
Bullsbrook Townsite Precinct (North)	Rural	N/A	115 ha
		Total gross area	**3400 ha**

***Note:** The areas provided in this table exclude land that already is zoned "Industrial" in the Metropolitan Region Scheme. Please note that the total areas of these sites are still subject to investigation.

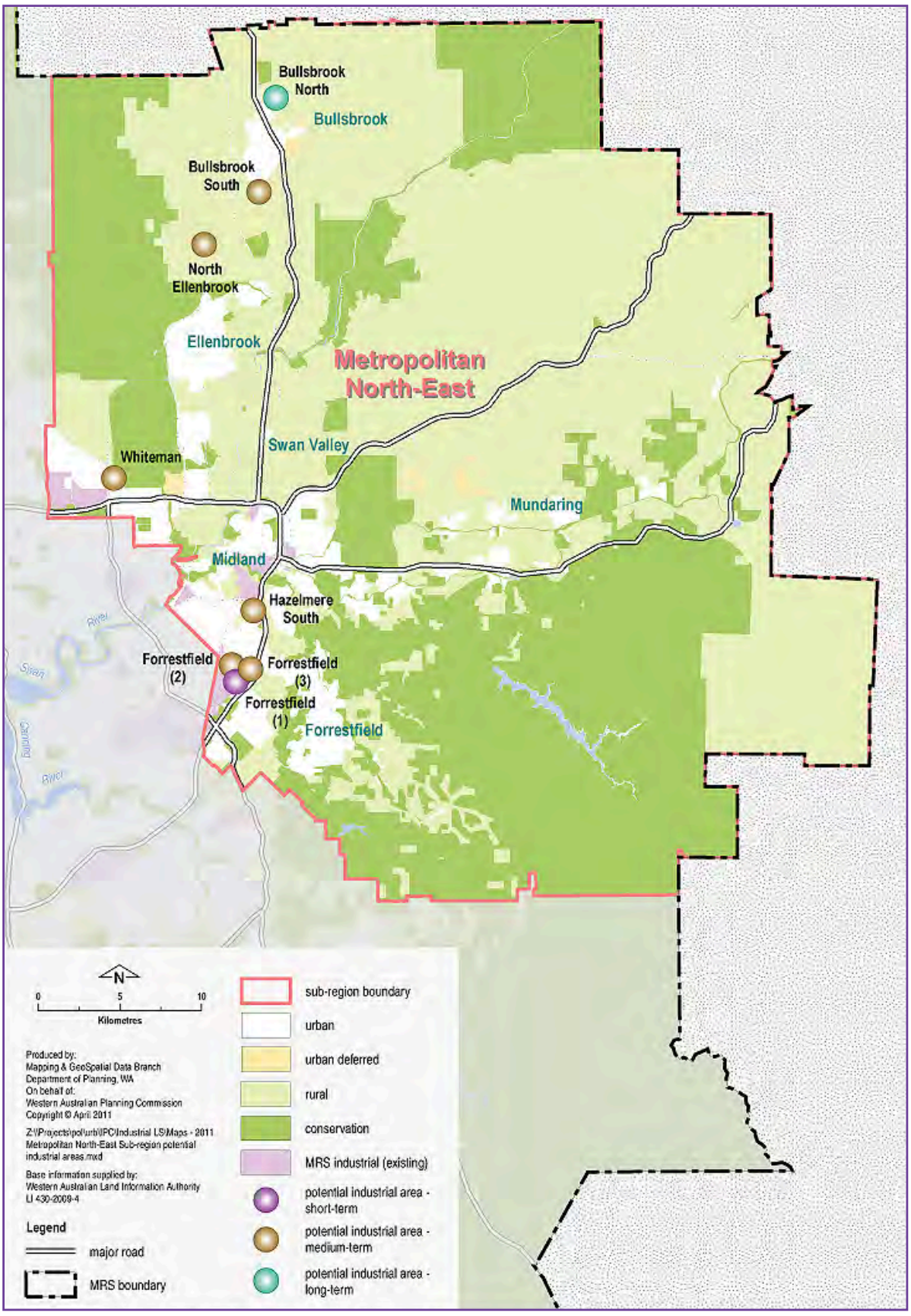


Figure 22: Metropolitan north-east sub-region potential non-heavy industrial areas

North-east sub-region possible non-heavy industrial sites

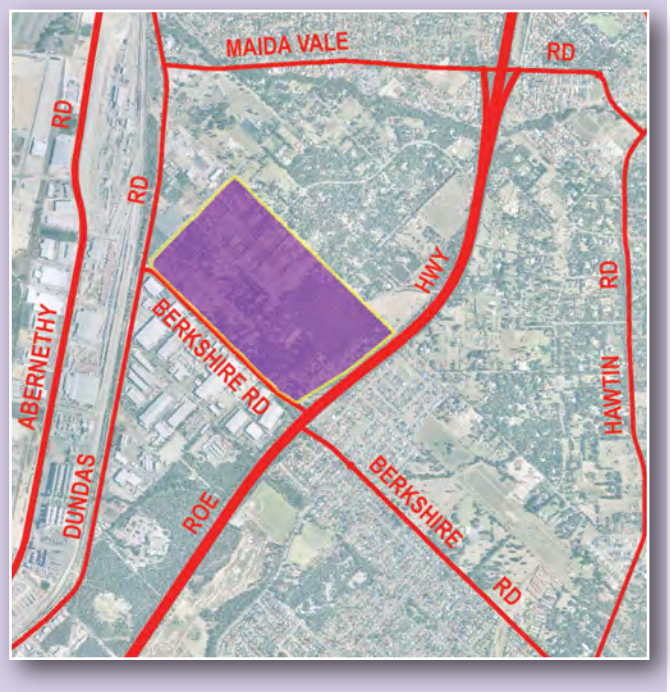
The following section provides an overview of the possible industrial sites that have been identified as part of the strategy, to support future growth and demand in the North-east sub-region. The sites are defined by three separate categories: future short term industrial sites, potential medium term industrial sites, and potential long term industrial sites (strategic landbank sites).

Future short term non-heavy industrial sites

The short term industrial site within the North-east sub-region is:

Forrestfield - Stage 1

The Forrestfield/High Wycombe Industrial Area has been identified as an area of strategic and regional significance and one of the key development areas that underpins the Shire of Kalamunda's Draft Local Planning Strategy.



Status of availability

- An MRS amendment to rezone the land to 'Urban' was approved in April 2011.
- The urban zoning will facilitate light industrial development.
- Local Planning Scheme Amendment No. 34 to rezone the land to Industrial Development, currently with the WAPC for final approval.
- Structure Plan and Development Contribution Plan finalised and to be advertised to the community.
- Additional water monitoring commenced mid 2011.
- Expect planning of the area to conclude in late 2012.

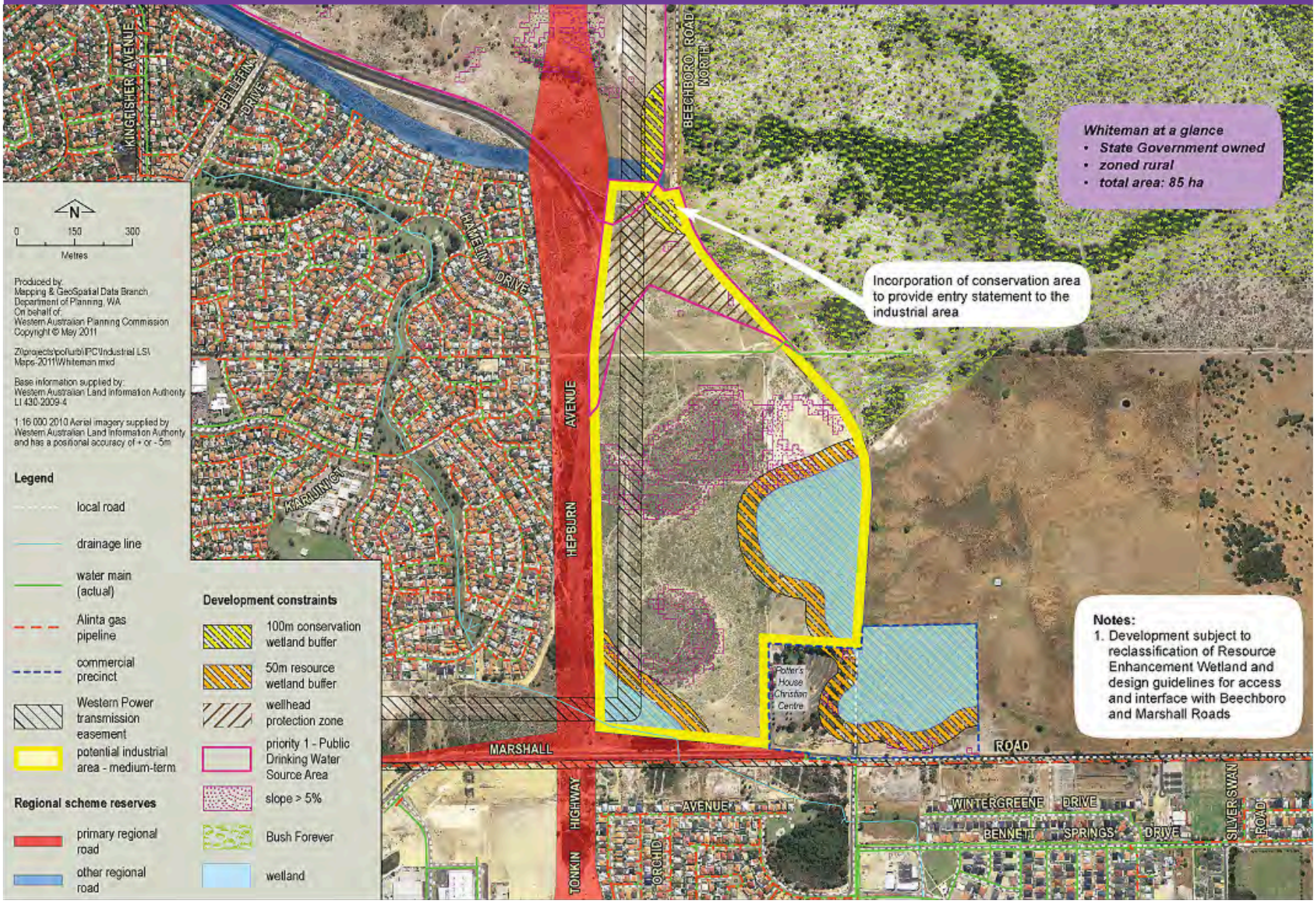
Potential medium term non-heavy industrial sites

In the North-east sub-region, five sites have been identified which have Government support for further planning investigation and to remove constraints, subject to more detailed investigations into their feasibility. These sites are Whiteman, Bullsbrook South, North Ellenbrook, Hazelmere South and Forrestfield. Each of these sites is described in the following section.

Issue	Whiteman
Land ownership	• Government owned (WAPC) and managed - less likely to present land assembly issues that may inhibit early development opportunities.
Accessibility (incl. transport networks)	• Serviced by effective transport linkages such as Gnangara Road, Alexander Drive, Beechboro Road, Hepburn Avenue, Reid Highway and the future Perth-Darwin highway. • These sites will be further strengthened by the future North-South road west of Gnangara Water mound, commencing at the intersection of Reid and Tonkin Highways.
Environmental sensitivities	• Resource enhancement wetlands can be further assessed to determine the full extent of conservation value that should be attributed to them, with the potential to increase the developable area. • Little native vegetation remains across the site and the wetland features present within the area do not impact greatly on the developable area. • Adjacent to the Whiteman Park reserve and Bush Forever site. Development must be sensitive to this significant regional recreation and bushland reserve.
Topography/soil	• Relatively flat, making it appropriate for industrial development. Apart from the two small hills in the southern site, no significant slopes occur on the site and earthworks costs are not expected to be high for the development. • The site is generally flat with low undulating swales. • Two small hills are located in the southern portion of the site, rising some 7-8 m above the surrounding land. • The identification of a multi–use wetland on a portion of the site indicates possible shallow groundwater. Investigations into groundwater levels and appropriate drainage infrastructure to achieve a suitable separation distance to groundwater will be required. • Significant earthworks (fill) required.
Potential land use conflict	• Site is bounded by Marangaroo Drive, Beechboro Road, Marshall Road, Hepburn Avenue and residential development in Ballajura to the west. A suitable industrial-residential interface will need to be incorporated into any future planning for this site to minimise land use conflict.
Gnangara Sustainability Strategy and Gnangara Underground Water Pollution Control Area	• Sites identified in Gnangara Sustainability Strategy as a Conservation Reserve and will be subject to future investigation and planning based on the outcomes of this strategy. • The majority of the site is situated within a Priority 1 Public Drinking Water Supply Area. Development within the P1-PDWSA zone and within well-head protection buffers is likely to be unacceptable unless this classification is reviewed.

Issue	Whiteman
Conservation	• Conservation wetland buffer to provide entry statement to the industrial area.
Heritage	• Areas of heritage and Indigenous significance are situated to the north of the site (Cullacabardee Village) • The subject site is not a site of known heritage significance.
Site contamination	• No sites are recorded in the DEC Contaminated Sites Database within the Whiteman area. No evidence of current or potential historic contaminating use was observed on site. • The majority of the site is classified as Moderate to Low risk of Acid Sulphate Soil (ASS) contamination.
Service infrastructure accessibility	• Currently the Whiteman site is predominantly vacant with areas of bushland and many unsealed access tracks. • Power infrastructure (132 kV transmission lines) and a high gas pressure main are located near both sites. Investigations into future demands on these services would be needed. • The Beechboro and Malaga substations are located approximately 2 km south and 2.5 km west, respectively from the proposed area. • Both substations are expected to meet the initial demand from the proposed industrial area. Western Power will monitor the demand growth of the area to be in the position to cater for the additional demand as it grows. • A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.
Close to work force	• Existing residential development lies within close proximity to the site with future residential development planned within the general area. This is likely to create high demand and provide increased incentive to developers and businesses to undertake development within the area. • The subject site is located close to the existing Malaga industrial area. This will act as a strong impetus for development with opportunities for linkages and synergies with existing development.
Design specifications	• Not applicable to this site.

Whiteman


KINGFISHER AVENUE
PELERIN DRIVE
BEECHBORO ROAD NORTH
HAMELIN DRIVE
KARRUNGA
HEPBURN AVENUE
MARSHALL ROAD
TONKIN HIGHWAY
ORCHID AVENUE
WINTERGREENE DRIVE
BENNETT SPRINGS DRIVE
SILVER SWAN ROAD
Potter's House Christian Centre
N
0 150 300
Metres
Produced by:
Mapping & GeoSpatial Data Branch
Department of Planning, WA
On behalf of:
Western Australian Planning Commission
Copyright © May 2011
Z:\projects\pol\url\IPC\Industrial LS\Maps-2011\Whiteman.mxd
Base information supplied by:
Western Australian Land Information Authority
LI 430-2009-4
1:16 000 2010 Aerial imagery supplied by Western Australian Land Information Authority and has a positional accuracy of + or - 5m
Legend
local road
drainage line
water main (actual)
Alinta gas pipeline
commercial precinct
Western Power transmission easement
potential industrial area - medium-term
Regional scheme reserves
primary regional road
other regional road
Development constraints
100m conservation wetland buffer
50m resource wetland buffer
wellhead protection zone
priority 1 - Public Drinking Water Source Area
slope > 5%
Bush Forever
wetland
Whiteman at a glance
• State Government owned
• zoned rural
• total area: 85 ha
Incorporation of conservation area to provide entry statement to the industrial area
Notes:
1. Development subject to reclassification of Resource Enhancement Wetland and design guidelines for access and interface with Beechboro and Marshall Roads

Preferred uses and potential end users

The City of Swan supports this location for general industrial land uses within the "Industrial Development zone" and commercial land uses within the Service Commercial zone as the site has a frontage that will be visible and accessible, with a relatively large catchment of existing residents located nearby.

Due to the availability of road networks, and the number of major regional, inter-regional and interstate transport routes converging upon the City of Swan in the eastern portion of the sub-region there could be some potential realised for the locating of a transport depot, or the like in this location, subject to further investigations. This site is envisaged to be a good location for higher end uses such as large scale retail, and service commercial uses, and more general industrial uses to the western portion of the site. Key characteristics that would be expected of this site would be influenced by:

- proximity to strategic and regional centres of population and trade
- a large, skilled work force catchment
- moderate to large, relatively flat sites
- warehousing and distribution which can be multistorey
- transport and logistics which require very large sites, possibly 9000 m^2 minimum
- the service/commercial node at the junction of Marshall Road and Beechboro Road
- the existence of areas where there is minimal impact on neighbouring uses (for example, those which are well suited to the rural and residential surrounds of the Whiteman site).

It is also envisaged that this site will support a relatively high level of consumer services due to its proximity to both existing and future proposed residential development and its accessibility by vehicle by many residents. Such services should occur within the "General Commercial" area of the site, with general industrial activities that are not hazardous or offensive being the predominant land use within the area of the site that is zoned "Industrial Development". An MRS Amendment for the south-western portion of the site to rezone the land from 'rural' to 'urban' on both the western and eastern sides of Marshall Road has been initiated and significantly progressed. To ensure that the industrial function of the land is not compromised for the remainder of the site, the Department of Planning will recommend that the permitted uses within this "urban" zone be limited to commercial and light industrial uses only, that are compatible with more general industrial uses, that are likely to occur in the north-western portion of the site.

Key actions - Whiteman

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake MRS amendment.	Up to 7 years from commencement to complete key planning related Actions (contingent upon the completion of water and sewer supply studies).
	2	Prepare a District Structure Plan.	
	3	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	4	Prepare Local Structure Plan(s).	
	5	Investigate buffer requirements with surrounding urban, rural land use and Whiteman Park and address interface issues.	
Environment	6	Initiate the review of the priority 1 PDWSA classification affecting the subject site. Studies to support this investigation will include: • modelling to show no impacts to current or future bore fields; and • water quality protection studies to show that no significant impacts to groundwater quality would result from a change.	Up to 3.5 years from commencement to complete key environmental Actions, including: • 25 months for the Detailed Site Investigation (if required); • 24 months for the Local Water Management Strategy (including groundwater monitoring); and • 12 months for the District Water Management Strategy.
	7	Undertake a flora and fauna survey.	
	8	Investigation into the potential reclassification of wetlands.	
	9	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008).	
Infrastructure and servicing	10	Water supply to this area could come from the Ballajura system to the west (supplied by the Mirrabooka Reservoir) or from the Morley Gravity Zone to the south (supplied by the Yokine Reservoir). It is likely that large diameter water distribution mains will need to be extended from neighbouring water zones to supply these industrial sites.	Up to 4.5 years from commencement to complete key infrastructure planning studies and construction, including 2.5 years for the Power Infrastructure Study and construction.
	11	Wastewater will need to be pumped from this development site into neighbouring systems that convey wastewater towards the Beenyup Waste Water Treatment Plant to the north-west. Servicing options and feasibility will need to be examined once more detailed information becomes available at the rezoning and structure planning stages of the project.	
	12	Undertake investigations on future demand for power and gas.	
Physical landform and soils	13	Undertaken heritage surveys (Indigenous and European).	3 months to complete the preliminary site assessment for acid sulphate soils.
	14	Undertake an acid sulphate soils (ASS) investigation and prepare an acid sulphate soils management plan if acid generating material is identified.	

Issue	Bullsbrook South
Land ownership	• The Bullsbrook site is predominantly utilised for rural-agriculture and poultry farming. • With the exception of the single lot to the west, the site is currently fragmented, under the ownership of multiple private owners. This could lead to difficulties in acquiring land for the proposed land use.
Accessibility (including transport networks)	• The site is located on the State Rail Network providing an opportunity for the development of an intermodal freight transport hub on the site. • The location has effective transport linkages with the Great Northern Highway HWL route, heavy haulage and RAV network providing the site with access to an appropriate road network for both freight and employment within the area. • The site is further strengthened with a transport linkage to the planned Perth-Darwin national highway via Stock Road.
Environmental sensitivities	• Development on the site will not require extensive earthworks and no significant clearing of native vegetation is expected. Provided conservation wetland areas can be avoided and the natural hydrology of the area is maintained in line with the stormwater best management practice. The environmental values of the site will not be significantly impacted and environmental approvals are not expected to be a constraint for this site.
Topography/soil	• The site is generally flat to gently sloping with the shallow Ellen Brook valley running north-south through the centre of the site. Flat areas are located within the western and central areas of the site, with gently sloping sections located east of Ellen Brook. • No perceived risk identified for Acid Sulphate Soils. • Land will require significant fill.
Potential land use conflict	• The key issue relating to impact on amenity is considered to be noise associated with the location and treatment of the road/rail interface, should an inter-modal facility be established. • The identification of a Commercial Industry zone in the eastern portion of the site where there is a greater density of sensitive land uses and the land is in closer proximity to the Bullsbrook Town Centre could address the land use compatibility issue identified in State Planning Policy 4.1 which contemplated tiered or graduated zones coinciding with off-site buffer areas around industry and infrastructure. Development of this type may have a limited demand based on regional/local opportunities, and the capacity of servicing infrastructure is problematic.
Conservation	• The site is dissected by Ellen Brook Reserve which is a Bush Forever site and denoted as a conservation wetland. This conservation area (and its buffer) must be avoided. If encroachment into the buffer area is proposed, consultation with the DEC and DoW will be required and may require additional environmental assessments and investigations. • Two small wetland conservation areas are to be avoided as far as practicable. As with the Ellen Brook Reserve, these wetlands and their buffers must not be developed without consultation with the DEC and potentially additional environmental investigations.
Heritage	• The site does not appear to have any heritage significance. However, the RAAF Pearce airbase does include registered sites of heritage significance, being the Pearce Aerodrome and adjacent bushland on the Register of the National Estate and the RAAF Base Pearce being registered on the art deco significant building survey.
Site contamination	• No locations within the Bullsbrook area are recorded in the DEC Contaminated Sites Database. Site investigation revealed some ad-hoc rural industrial uses in the eastern portion of the site which may be potentially contaminating, however, no significant contamination is known for this site. • The majority of the site is classified as No Known Risk of Acid Sulphate Soil (ASS) contamination. Ellen Brook itself is classified as Moderate to Low risk ASS.

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Issue	Bullsbrook South
Service infrastructure accessibility	• The Water Corporation currently operates a small waste water treatment plant located to the north of Bullsbrook townsite, which serves the townsite area. Current wastewater treatment and conveyance planning for the town does not allow for this proposed industrial area. Wastewater conveyance planning for the Bullsbrook Sewer District will follow, and it is currently anticipated that this work will commence in 2011. • Power infrastructure is not located in the vicinity. The closest power infrastructure (132 kV transmission lines) is located approximately 7 km east from the proposed area. Investigations into future demands on these services would be needed as demand for the area grows. • The Muchea substation is located approximately 15 km north from the proposed industrial area. Should this area be developed within a 5 to 10-year time frame, Western Power can cater for the initial load applications. • A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.
Close to workforce	• The site is close to the Bullsbrook townsite and Ellenbrook. This may act as a strong impetus for developers and businesses to undertake industrial development and activity within the area as linkages with existing residential (and associated land uses) development is clear.
Design specifications	• The site lies directly to the south of the RAAF Pearce Base and therefore height restrictions will apply to the majority of the site, however, the lowest maximum height required for a portion of the site will be 15 metres according to these requirements.

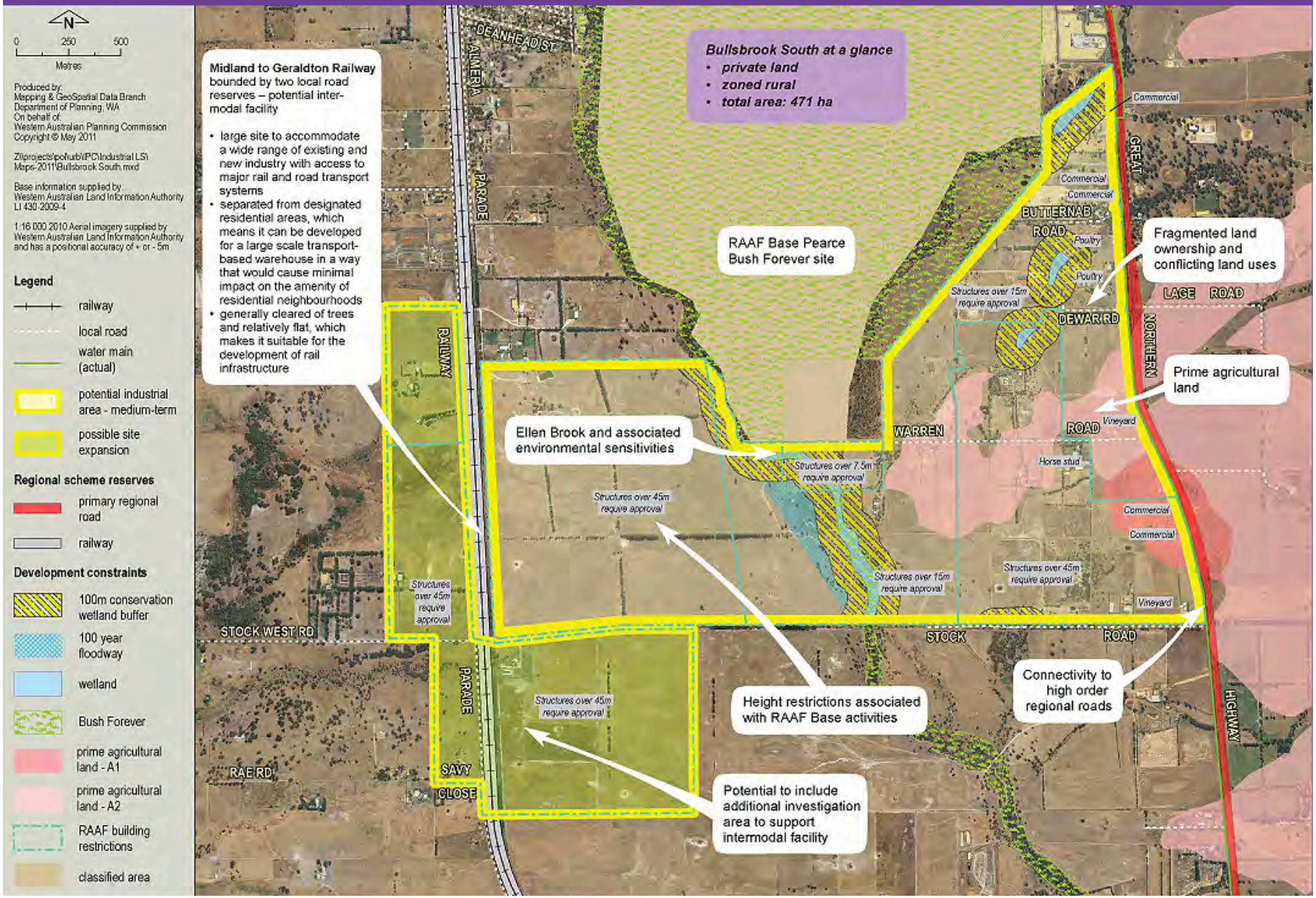
Preferred uses and potential end users

It is recommended that the site contain a mix of both light and general industry. However, there is more scope within this site to have a greater concentration of land used for general industrial purposes rather than light industrial within the Industrial Development zone as its main interface is with the RAAF Pearce Airbase and adjoining Rural land. Therefore, land uses such as a Fuel Depot, Motor Vehicle Repair and Warehouse could be suitable within areas zoned General Industrial. In areas zoned Light Industrial uses such as Funeral Parlour, Lunch Bar and Trade Display would be acceptable. The Industrial Development zoning could also be effectively utilised for the subject land as this provides a degree of flexibility with regard to the type of industrial development that could occur on site. Structure planning has not yet commenced, which will detail the types of permissible and discretionary uses on the site.

Further to this, the zoning General Commercial could be used to enable a commercial node to be located on the outer edge of the site, with land uses such as Fast Food Outlet, Lunch Bar, Shop and Showroom to service the existing residential catchment within Bullsbrook. This will also provide a more appropriate interface between the subject site and the surrounding land.

The inclusion of agri-food processor uses will be considered for this site due to its proximity to producers from the north-east rural hinterland; as well as to the Muchea Employment Node, which can lead to the development of synergies with existing agri-industry users. The inclusion of such land uses will be subject to compliance with town planning and zoning considerations. An industrial development zone could be considered which allows for zoning flexibility, subject to the preparation of a structure plan.

Bullsbrook South



Key actions - Bullsbrook South

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake a local demand assessment to determine the staging requirements for release of land in line with population growth and industrial land demand in the north-east corridor.	Up to 6 years from commencement to complete key planning related actions (these are contingent upon completion of water and sewer supply studies).
	2	Undertake MRS amendment.	
	3	Prepare a District Structure Plan.	
	4	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	5	Prepare Local Structure Plan(s).	
	6	Development Contribution Plan.	
	7	Address interface issues with conservation areas and urban and rural land uses.	
Environment	8	While no contaminated sites are listed in the DEC Contaminated Sites Database, a poultry farm is present in the north-eastern section of the site. Activities on this site may be potentially contaminating, investigation of contamination within this site may be required prior to development.	Up to 3.5 years from commencement to complete key environmental Actions, including: • 34 months for the Detailed Site Investigation (if required); • 12 months for the District Water Management Strategy; and • 12 months for the Local Water Management Strategy.
	9	Ecological investigation into buffer and development constraints may be required, and a management plan may need to be formulated to ensure that threatened ecological communities are not detrimentally impacted by any development proposal.	
	10	Undertake a flora and fauna survey.	
	11	Undertake noise modelling.	
	12	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008). Note: The drainage design, treatment and any discharge of water into the Ellen Brook should be discussed as part of the strategies and plans required under the BUWM framework.	

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Infrastructure and servicing	13	Water Corporation is currently undertaking a planning study to determine the feasibility and timing of expanding the treatment capacity and treated wastewater disposal capacity at the Bullsbrook WWTP. This work is due for completion in the first half of 2011 and will indicate when the plant upgrading is likely to be funded through the Water Corporation's Capital Investment Program.	Up to 3 years from commencement to complete key infrastructure planning studies, including power infrastructure and water and sewer investigations. Additional time (between 5 to 7 years) will be required for delivery of supply/trunk infrastructure.
	14	The Water Corporation is currently undertaking a water supply planning study for Bullsbrook. Existing long-term water planning for this area indicates that the supply to Bullsbrook via the Copely Road Tank and the distribution main running northwards up Great Northern Highway to the Bullsbrook Tank could be augmented by an additional distribution main from the future Gnangara Reservoir to the west. This will clarify options, timing and costs of infrastructure required.	
	15	Undertake investigations on future demand on power and gas.	
	16	Undertake an intermodal freight transport planning assessment to determine the need for a facility in the North-East sub-region.	
Physical landform and soils	17	Undertake heritage surveys (Indigenous and European).	3 months to complete the preliminary site assessment. for acid sulphate soils.
	18	Undertake a study on Minerals and Basic Raw materials.	
	19	Undertake an Acid Sulphate Soils investigation and prepare an Acid Sulphate Soils Management Plan if acid generating material is identified.	

Issue	North Ellenbrook
Land ownership	• Comprised of approximately 75 individual land parcels. • One of the least constrained areas in terms of land ownership.
Accessibility (including transport networks)	• Excellent freight network linkages with freight rail to the west. • Close proximity to Great Northern Highway (high-wide load corridor). • Proposed Perth Darwin National Highway runs through the middle of the site.
Environmental sensitivities	• Isolated wetland areas susceptible to waterlogging. • Portions of site contain good quality Banksia woodland. • GSS identifies this area as providing Gnangara Mound infiltration opportunities. • Strong environmental protection measures in place with Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002 and the associated buffer zone. No development can occur within the EPP area. The policy precludes rezoning and most major developments. Issues with drainage and impacts on catchments. • Abuts DEC nature reserves and vegetated State Forest areas. Includes areas of good bushland and Bush forever sites. Interface issues need to be addressed. • No known populations of declared rare or priority flora. • Several small waterways run through the area including sawpit gully.

Continued on page 90

Issue	North Ellenbrook
Topography/ soil	• More than 60 per cent of the subject land has an undulating terrain and generally slopes from the west to the east. The eastern half of the site ranges between 40 m and 50 m AHD while the western half ranges from 50 m to 77 m AHD. • Investigations into groundwater levels and appropriate drainage infrastructure to achieve a suitable separation distance to groundwater will be required. • Area will require selective filling to control surface water. • No significant constraint imposed by potential acid sulphate soils.
Potential land use conflict	• Will be compatible with surrounding land uses. To the south is Ellenbrook townsite, west is the Gnangara Pine Plantation (within State Forest 65), and to the east and north are rural land uses and nature conservation reserves.
Conservation	• Priority resource location in the south west. • Small conservation category wetlands exist within the area. • Minor pockets of Bush Forever. • Abuts several nature reserves and vegetated State Forest.
Heritage	• Heritage studies to be undertaken.
Site contamination	• Low-fair capability for on-site effluent disposal. • No known areas of contamination, consistent with historical use for grazing. • Vast majority of land is mapped as Low to Moderate Risk of Acid Sulphate Soil (ASS) contamination. Small scattered areas of moderate to high risk.
Service infrastructure accessibility	• Upper Swan Water pump station takes water to Bullsbrook to the east of this site. • Major gas pipelines (Pinjarra to Dongara and Dampier to Bunbury) run via the western edge of the site. • Investigations into future demand for power infrastructure and other services would be needed as the area progresses. • A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site.
Close to workforce	• Adjacent to Ellenbrook town site. When fully developed Ellenbrook will house approximately 30,000 people. • Strategically located north of the new Swan Urban Growth Corridor comprising the development areas of Henley Brook, West Swan and Caversham.

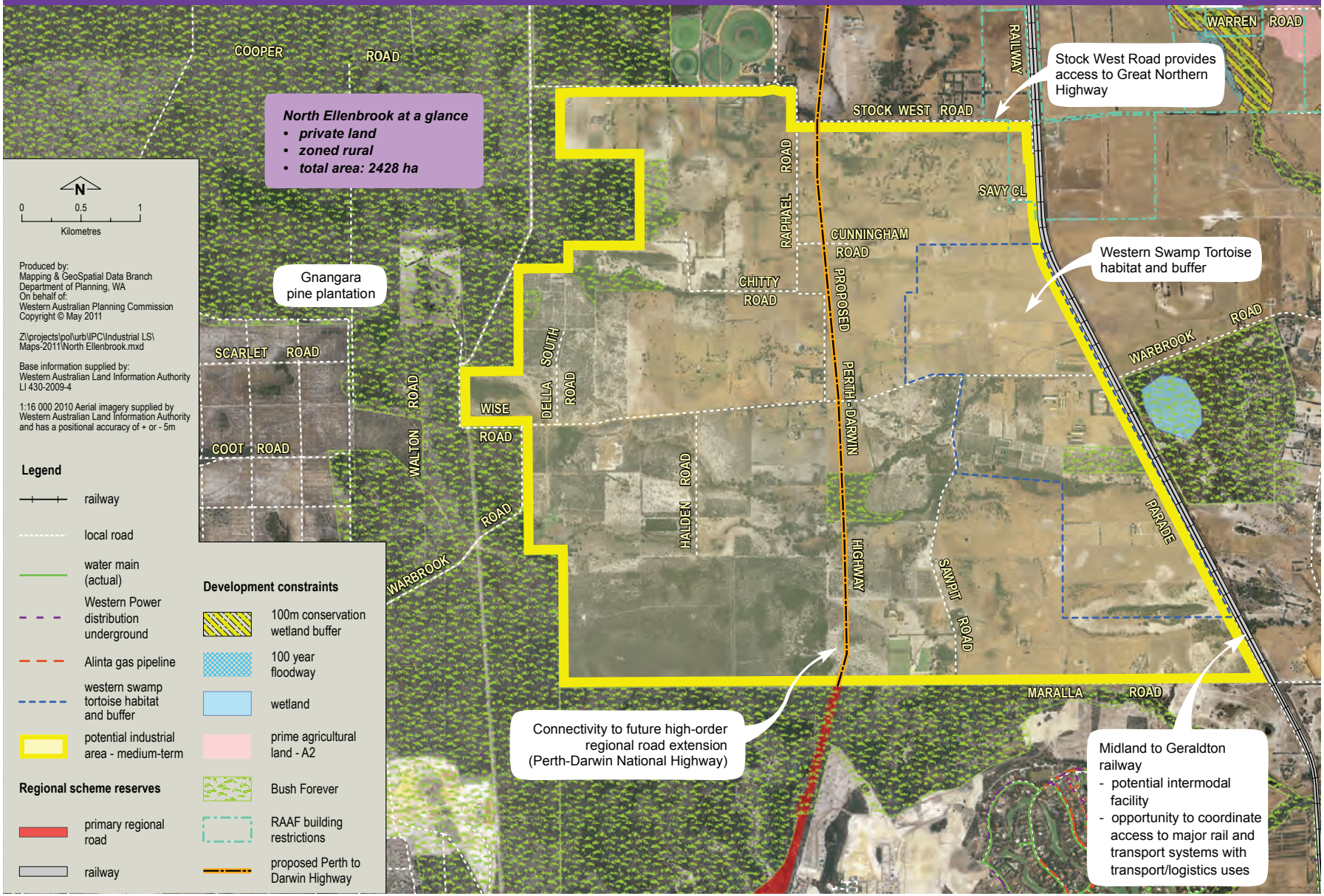
Preferred uses and potential end users

It is recommended that the site be considered for a broad mix of light, general and transport/logistics industrial uses. The site has strong connectivity to offer transportation industry opportunities, while providing for the full range of general and light uses given the extent of the land area. Some commercial uses should be considered to service the expansion of the industrial and, together with the movement network it will generate. As a strategically well located land parcel providing employment to Ellenbrook and urban cells to the south, manufacturing and processing industries requiring higher employment levels would be well suited.

An industrial development zone could be considered for the area which allows for zoning flexibility, subject to the preparation of a structure plan.

It is important to note that heavy industrial uses and noxious industries would be considered to be inappropriate.

North Ellenbrook



Key actions – North Ellenbrook

Technical Issue/ Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake a local demand assessment to determine the staging requirements for release of land in line with population growth and industrial land demand in the North-East Corridor.	Up to 7 years from commencement to complete key planning related Actions (these are contingent upon the completion of key infrastructure studies).
	2	Undertake MRS amendment.	
	3	Prepare a District Structure Plan.	
	4	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	5	Prepare Local Structure Plan(s).	
Environment	6	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008).	Up to 3.5 years from commencement to complete key environmental Actions.
	7	Environmental investigation into buffer and development constraints posed may be required.	
	8	Management plan needed to be formulated to ensure that Bush Forever sites are identified and maintained.	
	9	Undertake a Flora & Fauna surveys to ensure that good quality vegetation and fauna habitat is excluded from the development area.	
	10	Investigate the potential reclassification of identified important wetlands and confirm status.	
Infrastructure and servicing	11	Water Corporation investigation into the feasibility and timing of expansion of wastewater treatment disposal capacity for the site's development in required.	Up to 7 years from commencement to complete key infrastructure studies.
	12	Water Corporation forward planning into water supply provision is required. Investigations into additional distribution mains via the future Gnangara Reservoir, as well as timing to be undertaken.	
	13	Gas and Power infrastructure demand investigations should be undertaken as part of other forward planning for services.	
	14	Undertake intermodal freight transport planning assessment to determine the need for a facility in the North-East sub-region.	
Physical Landform and soils	15	Undertake heritage surveys (Indigenous and European).	3 months to complete the preliminary site assessment for acid sulphate soils.
	16	Undertake Acid Sulphate Soils Investigation and prepare an Acid Sulphate Soils Management Plan if acid sulphate soils are identified.	

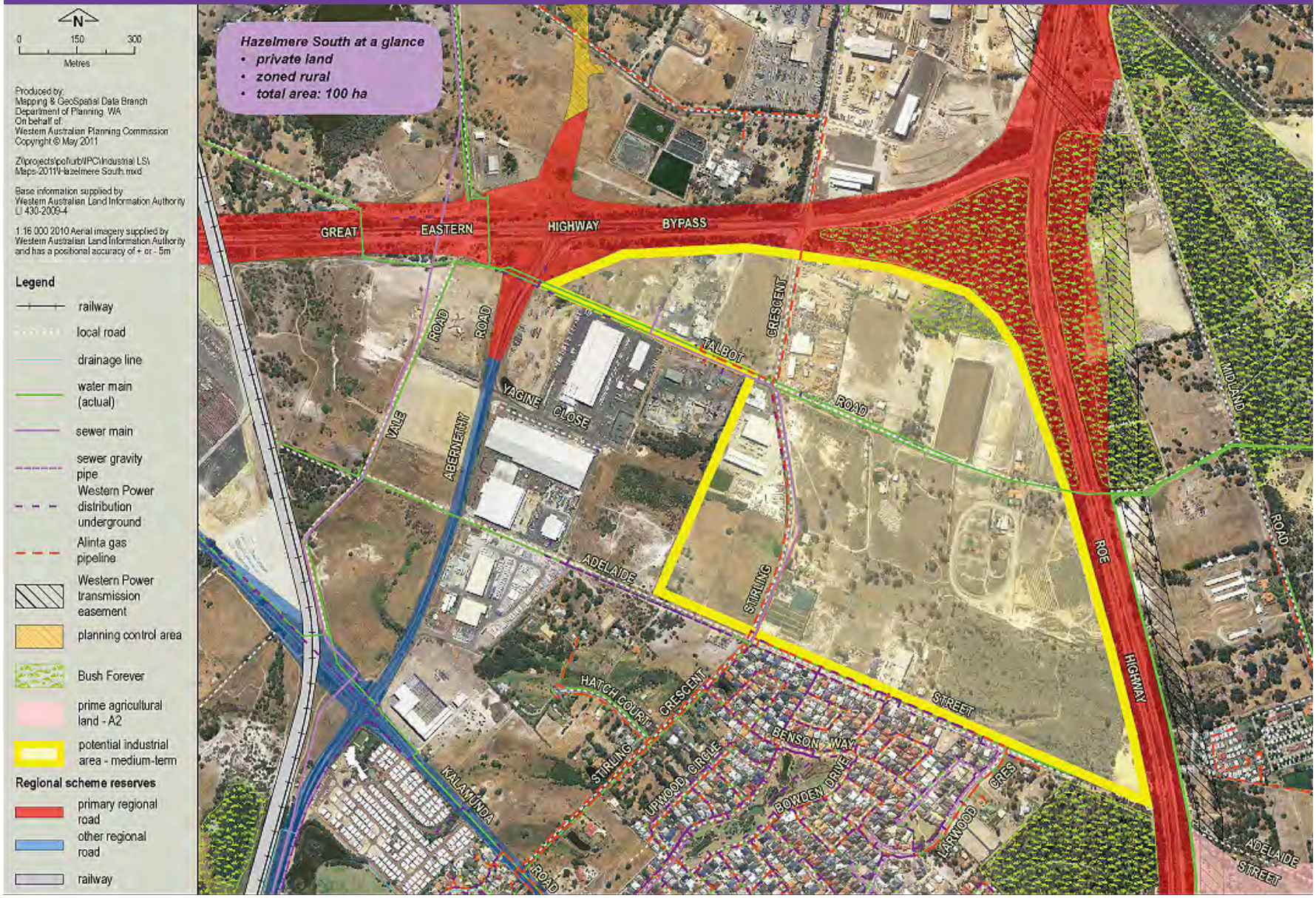
Issue	Forrestfield Stage 2
Land ownership	• Private landholders - zoned urban under MRS.
Accessibility (including transport networks)	• The area is located adjacent to the Forrestfield intermodal rail facility and Perth Airport. • Good access to strategic regional freight routes such as Roe Highway and Tonkin Highway.
Environmental sensitivities	• DEC advises that it is not likely to be a Carnaby's habitat, however, it does contain area of possible TEC. Was previously refused development at Structure Plan stage for development of Lot 12 Ibis Place. Vegetation Conservation Notice over this lot and protection through TPS.
Topography/soil	• Contains areas of "high to moderate" and "moderate to low" acid sulphate soils risk within three metres of the surface.
Potential land use conflict	• Close proximity to Perth Airport and existing industrial land.
Conservation	• A portion of one of the lots is identified as having a threatened ecological community and will be excluded from the study area. • Portion of site is mapped as Resource Enhancement category wetland.
Heritage	• Heritage surveys to be undertaken.
Site contamination	• DEC has indicated there may be some contamination concerns in the northwest lots for this site.
Service infrastructure accessibility	• New water distribution trunk main extensions will be required. • Power and sewer infrastructure reviews required. • The nearest electricity sub station to the site is located near the intersection of Abernethy Road and Dubs Close, located in the recently developed Access Park industrial area adjacent the Perth Airport land.
Close to workforce	• Close proximity to Midland.

Forrestfield - Stage 3
Status of availability
• Water monitoring for the District and Local water Management Strategy commenced September 2011.
• Flora survey commenced September 2011.

Forrestfield stage 2 and 3

Issue	Hazelmere South
Land ownership	• Land predominantly in private ownership.
Accessibility (incl. transport networks)	• The Kewdale Hazelmere Integrated Master Plan (KHIMP) identifies the area as a major strategic industry for the freight industry in Perth and WA. The site is located near several strategic freight facilities including the Forrestfield intermodal terminal and rail staging area and Perth Airport. • Site is in good proximity to Great Eastern Highway, Roe Highway and MRWA high-wide load corridors and heavy haulage routes.
Environmental sensitivities	• Groundwater is particularly high in this area. • Resource enhancement wetland may impact on potential development area if no opportunity to reclassify. • Number of declared rare flora populations and TEC issues.
Topography/soil	• Potential of an acid sulphate soil (ASS) disturbance risk on the site. • Majority of land has an appropriate separation distance between the groundwater and surface to support on-site effluent disposal.
Potential land use conflict	• Close proximity to Perth Airport and existing industrial land. • Site is directly adjacent to residential housing.
Conservation	• Minor Bush Forever and TEC buffer constraints. • Contains an area of the threatened ecological community Banksia attenuata woodland over species rich dense shrublands (SCP20a).
Heritage	• Heritage surveys to be undertaken.
Site contamination	• Significant potential for soil and groundwater contamination. • Further investigations will be required.
Service infrastructure accessibility	• Good availability or proximity to water mains, power and gas distribution. • Sewer in Hazelmere is problematic, with the area ultimately being serviced by the Maida Vale Main Sewer, which is not currently planned by the Water Corporation till at least 2040. Existing systems have capacity constraints and will require further review by the Water Corporation. • The closest electricity substation to this site is the future Hazelmere substation that is located within the proposed industrial area. Western Power distribution (132 kV and 330 kV) are located along (north – south) the proposed industrial area. • The Hazelmere substation is expected to meet the initial demand from the proposed industrial area. Western Power will monitor the demand growth of the area to be in the position to cater for the additional demand as it grows. • A substation is planned for 2010 to the south approximately 2 km away, and could also provide supply with a number of new feeders to the area.
Close to workforce	• Close proximity to Midland.
Design specifications	• Height restrictions of 61 metres AHD will apply to all buildings due to close proximity to Perth Airport.

Hazelmere South



Potential long term non-heavy industrial sites (strategic landbank)

In addition to the investigation areas and existing industrial estates, other sites were identified which indicated potential for further investigation in the longer term that would contribute to the strategic landbank for future industrial land supply.

It should be acknowledged that a number of these sites may already have existing uses that preclude industrial activity taking place in the medium-to-long term. In these instances the future uses of these sites will be based on the future needs of the sub-region as well as the results of detailed investigations and studies.

In the North-east sub-region, the site is as follows:

Bullsbrook townsite precinct (north)	**Total area 115 ha**
Land status: Two private landowners. **Zoning:** MRS: Rural. TPS: General Rural. **Current uses:** Rural Agriculture. Proposed in the Bullsbrook Townsite & Rural Strategy for Rural Industry. **Environmental constraints:** Within the Buffer of the Waste Disposal Site and Feedlot. **Transport linkages:** Accessed via Morrissey Road off Great Northern Highway. **Serviceability:** Water supply main south in Bullsbrook. Over head power distribution. Sewer in Bullsbrook town catchment only. A District Water Management Strategy would be required prior to any rezoning proposal being entertained for this site. **Potential land use hierarchy:** This area is suited to the provision of Producer services.	

North-east sub-region – long term outlook

The North-east sub-region is not growing as rapidly as the North-west and South-west sub-regions; however population growth is significant and therefore will be a major influence on the types of industry likely to locate in the sub-region. The central part of the sub-region is well serviced by road and rail and is at the gateway to the Eastern Goldfields and Wheatbelt and the established centre of Midland is close to the Perth Airport. Eastern parts of the sub-region (Darling Ranges and beyond) are remote from transport corridors which require long term planning and may also suffer from substantial environmental constraints and servicing issues.

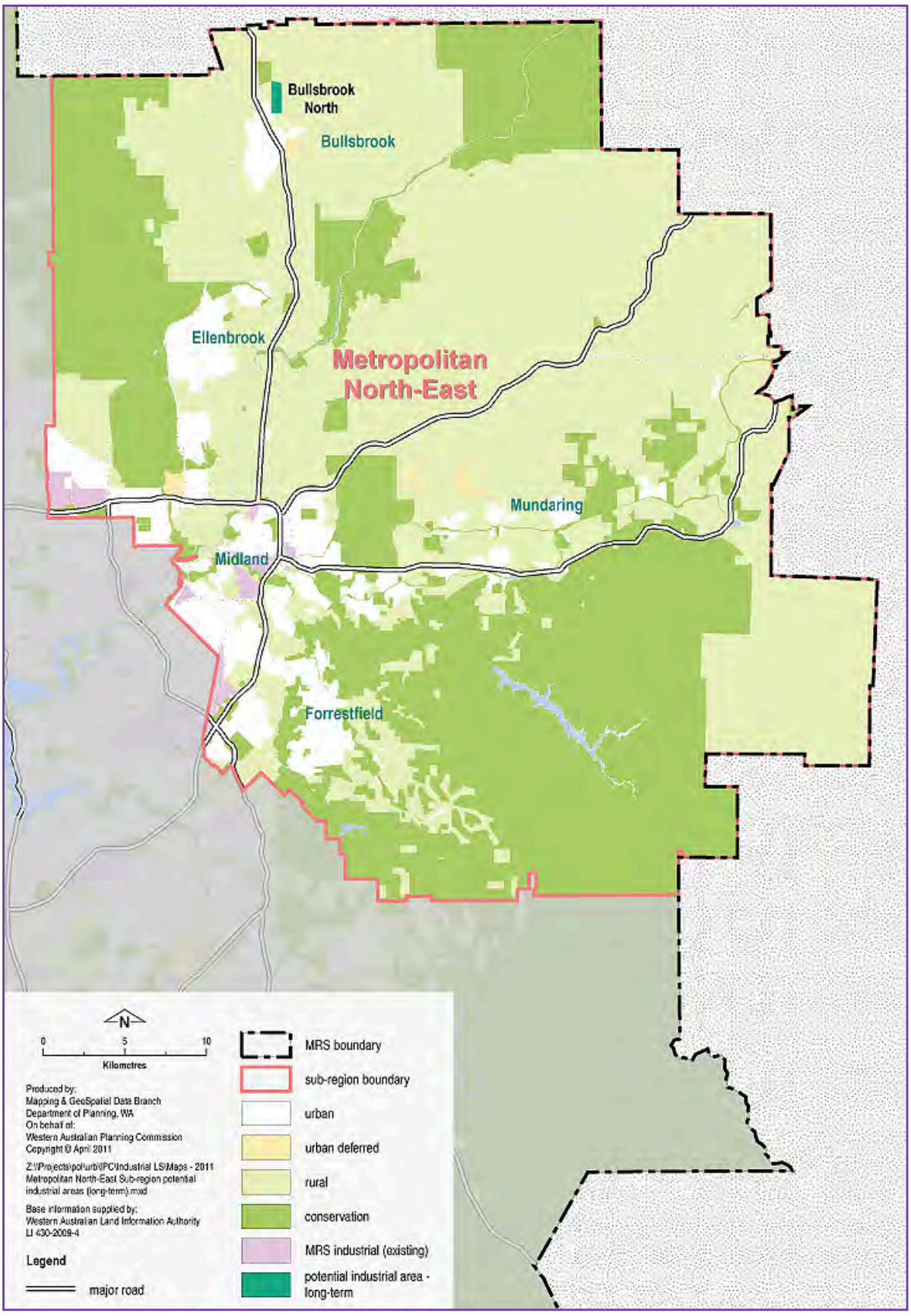
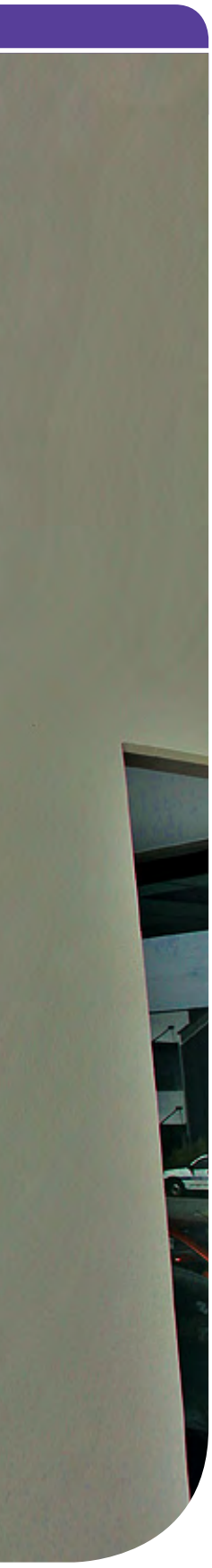


Figure 23: Metropolitan north-east sub-region potential non-heavy industrial areas (long term)

Key planning actions for the North-east sub-region

Key Stakeholders	Actions
Shire of Mundaring **Shire of Kalamunda** **City of Swan** **WAPC** **Department of Planning** **LandCorp** **Department of State Development**	Develop, in conjunction with local government, an economic development and employment strategy for the North-east sub region. Undertake a local demand assessment to determine the staging requirements for the release of land in line with population growth. Investigations for future intermodal terminal in the sub-region. Shire of Kalamunda – Complete planning studies for Forrestfield site, including MRS and LPS amendments and preparation of structure plan and local water management plan.
LandCorp **Department of Planning** **Department of Environment and Conservation** **Department of Water** **Main Roads of Western Australia** **Water Corporation** **Office of Energy** **Alinta Gas** **Wester Power** **Heritage Council**	Undertake feasibility studies with respect to the identified medium term sites in the North-east sub region and determine most appropriate delivery models and level of government involvement in this sub-region to facilitate industrial land development.
Water Corporation	Expand existing WWTP at Mundaring and Bullsbrook. Wastewater conveyance planning for the Bullsbrook Sewer District.
Proponent/s and/or landowner/s **Department of Planning** **Department of Environment and Conservation**	Consultation required for sites with buffers for conservation and resource enhancement wetlands. Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands, if appropriate. Undertake acid sulphate soil investigations. Flora and fauna investigations. Ascertain if any buffers to sensitive land uses are required.
Department of Water **Department of Planning** **Department of Environment and Conservation** **Water Corporation**	Review classification of Priority 1 Public Drinking Water Supply Area.
Alinta Gas **Western Power**	Infrastructure provisioning to facilitate development of the sites.
Main Roads Western Australia	Planning and construction of Perth-Darwin national highway. Investigations into future east-west connections between north-east and north-west sub-regions. Consideration of upgrading status of Gnangara Road and Neaves Road to primary regional roads.
Proponent/s and/or landowner/s **Department of Indigenous Affairs**	Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.
Proponent/s and/or landowner/s **Department of Water**	Water management investigations and documents to be prepared in accordance with Better Urban Water Management (WAPC 2008).

Part 10 - South-east sub-region



The South–east sub-region consists of the Shire of Serpentine-Jarrahdale, the City of Gosnells and the City of Armadale. The total area of zoned land in this sub-region is 159,077 hectares of which 668 ha is dedicated as industrial zoned land (0.42 per cent) – representing 6.5 per cent of the metropolitan total of industrial zoned land.

Demographic profile

The 2010 ABS estimated resident population for this sub-region is 184,919. An estimated 106,724 people live in the City of Gosnells with the majority of growth occurring in the south-western areas of Southern River, Forrestdale, Brookdale and Wungong. The City of Armadale has an estimated resident population of 60,983 according to 2010 ABS statistics. The Shire of Serpentine-Jarrahdale has an existing population of 17,212 residents (ABS, 2011). By 2031 the sub-region is forecast to have a population of 228,000.

The South-east sub-region generally reflects the same ageing of the population that is being experienced in other sub-regions. However, an exception to this trend has occurred in the Shire of Serpentine-Jarrahdale which has experienced a significant reduction in the number of people aged between 20-30 years old, and a higher number of people aged between 35 and 50 years old, with a corresponding peak in the 5 to 15 year old age group.

Planning profile

The primary strategic metropolitan centre in this sub-region is Armadale. In addition to its commercial function, Armadale also provides a range of facilities and services including local government administration offices, government and institutional facilities, major transport infrastructure, regionally significant open spaces and recreational areas, and a cultural and heritage precinct. The continued effort to improve the amenity of the city centre and capitalise on the area's distinctive cultural and location attributes will be critical to attracting new business and employment to the area and improving employment self-sufficiency (ESS).

The hierarchy of activity centres in the South-east sub-region have been categorised into the following three types:

Strategic Metropolitan Centres	Secondary Centres	District Centres
Armadale	Maddington	Byford Forrest Lakes Gosnells Kelmscott Wungong* Mundijong* Thornlie North Forrestdale (Newhaven)*

*emerging centre

Source: *Directions 2031 and Beyond*

Directions 2031 and Beyond aims to achieve an increase in dwellings from 65,000 in 2008 to 100,000 dwellings in the South-east sub-region by 2031.

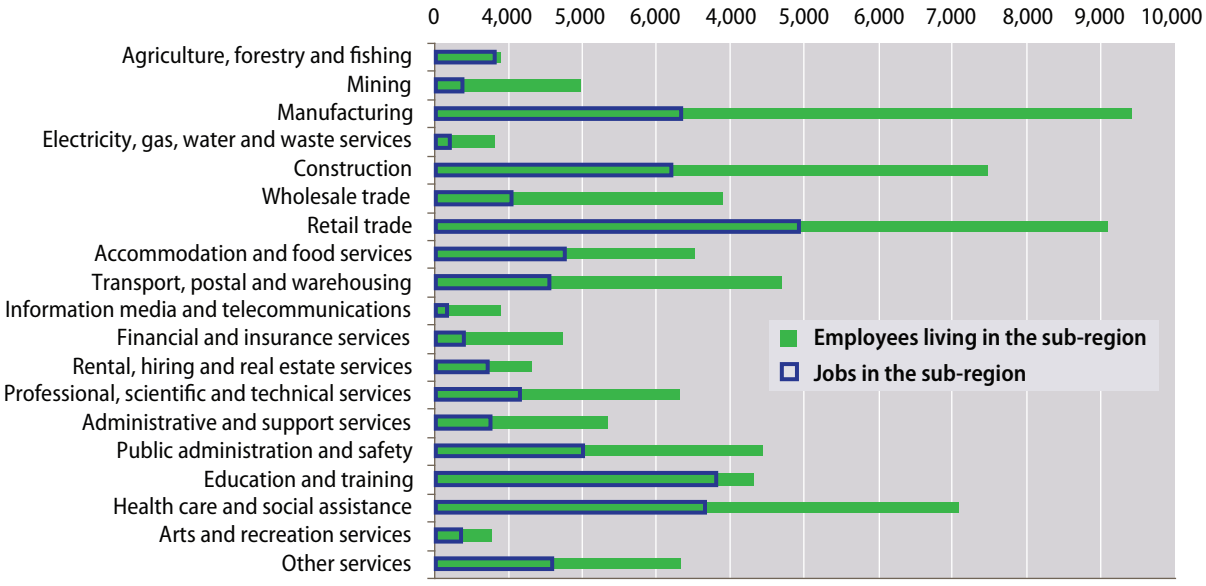
The majority of greenfield growth is expected to occur in the Shire of Serpentine-Jarrahdale and the City of Armadale, and the most significant infill/redevelopment opportunities exist in the City of Gosnells. With the increase in residential population in this sub-region, it will therefore be important to provide adequate employment land to cater for this increase.

Economic profile

The graph below represents the number of employees living in the South-east sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in the sub-region (blue bar).

The main employment industry sectors in the South-east sub-region are manufacturing, retail health care and social services. Serpentine-Jarrahdale has a significantly higher percentage employed in agriculture and construction, which reflects the Shire's rural characteristics.

The ESS for this sub-region is 42 per cent at present. *Directions 2031 and Beyond* identified an ESS target of 55 per cent for this sub-region. This target translates into the need for an additional 32,000 to 48,000 jobs in this sub-region over the next 25 years.



Source: 2006 ABS Census of Population and Housing

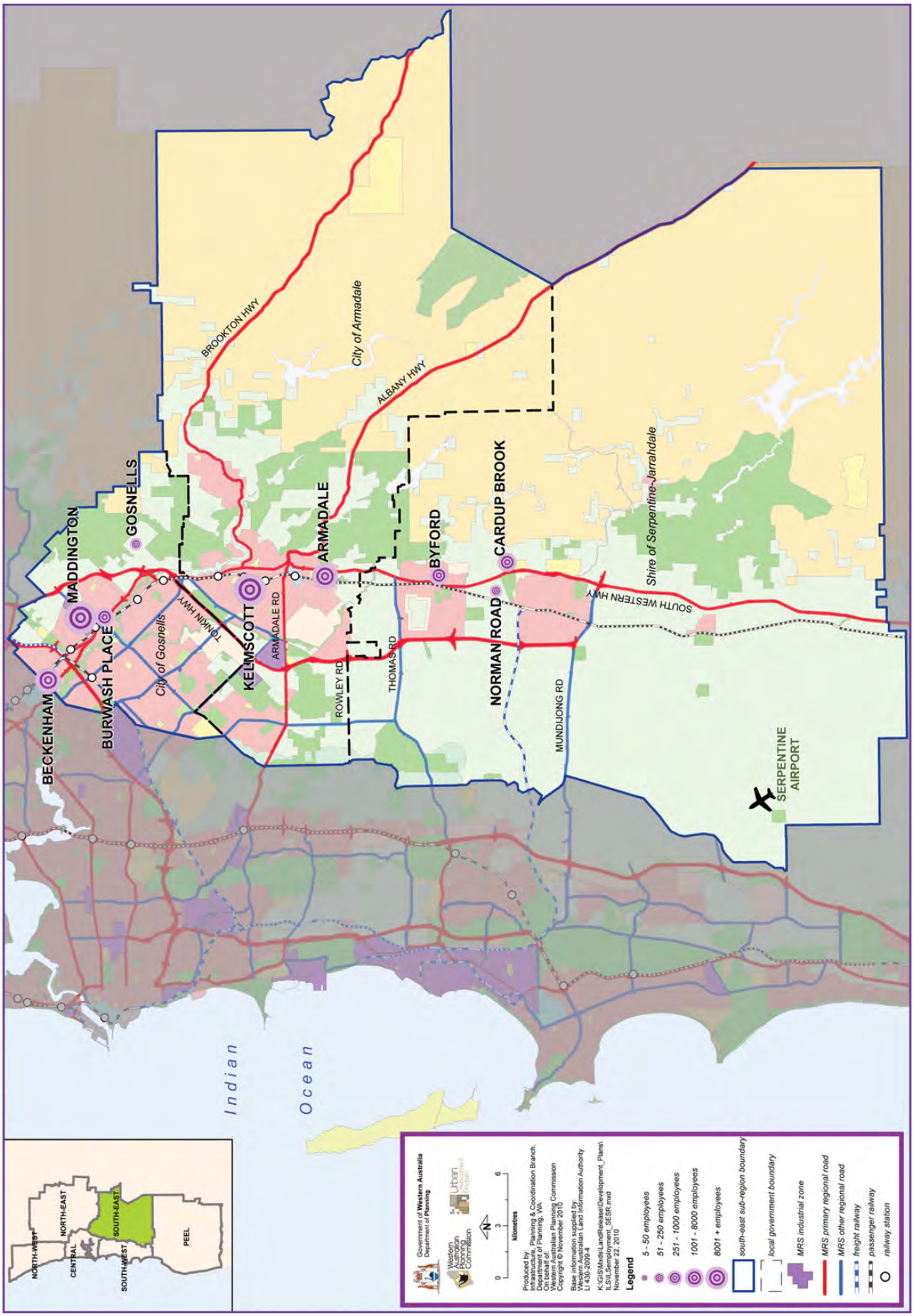


Figure 24: Industrial employment centres - south-east sub-region

Physical infrastructure

Infrastructure in the South-east sub-region is limited, and has no major airport or port facility. Nonetheless, it does have several infrastructure planning projects underway, which reflects the potential to offer a much stronger level of economic growth if the timely provision of infrastructure is incorporated with future strategic planning for the region.

Water

The availability of groundwater for potable supplies or irrigation of public open spaces is limited across most of the outer metropolitan Perth and Peel regions. Alternative options will be required to trade or transfer existing licences should they be available or investigations made into alternative water resources.

Additional water storage infrastructure is being planned in Byford, Mundijong and Forrestfield. In addition, there are potential water recycling plants being planned at Westfield and Jandakot, although both will be dependent on the level of demand forecast.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Road and freight network

Through the Main Roads Western Australia works program, a number of key strategic road planning projects, both planned and in progress, have been identified for the South-east sub-region. Provision has been made to increase the traffic volume capacity of both Armadale Road and Tonkin Highway to cater for additional urban development and the need to enhance the connection of Tonkin Highway with the South Western Highway near Mundijong.

A Southern Link Road will also be investigated that has the potential to provide a road link from the Mundijong area across Albany and Brookton Highways. This route would avoid the need for large heavy vehicles to traverse the Darling Scarp through more built up urban areas and provide a high standard of connectivity for freight vehicles from rural areas to the southern end of Tonkin Highway.

Similar to the North-east and North-west sub-regions, there are no east-west primary regional road routes south of Armadale Road until Pinjarra Road. With the further development planned for the Kwinana Industrial area, including the Outer Harbour, James Point Port and the completion of the Latitude 32 area, there will be an even more urgent need for improved east west connections into this area. Proposed routes include Rowley Road, Anketell Road and Mundijong Road.

Investigations are underway to examine the suitability of intermodal freight terminals at various strategic locations throughout the Perth and Peel regions, of which West Mundijong in the South-east sub-region is being considered, given its proximity to the intersection point of the rail system and the primary road network.

Industrial and employment land in the sub-region

The existing Maddington-Kenwick and Forrestdale regional industrial areas will be progressively developed to cater for a range of manufacturing, processing, warehousing and bulk goods handling activities. These centres are well connected to intermodal freight facilities at the Welshpool-Kewdale industrial centre and are ideally placed to take advantage of the potential synergies with major export oriented industrial centres such as Kwinana and Latitude 32, located in the South-west sub-region.

In response to strategic employment and economic issues, the Department of Planning, in partnership with the City of Armadale, City of Gosnells and the Shire of Serpentine Jarrahdale will develop regional economic development strategies to address:

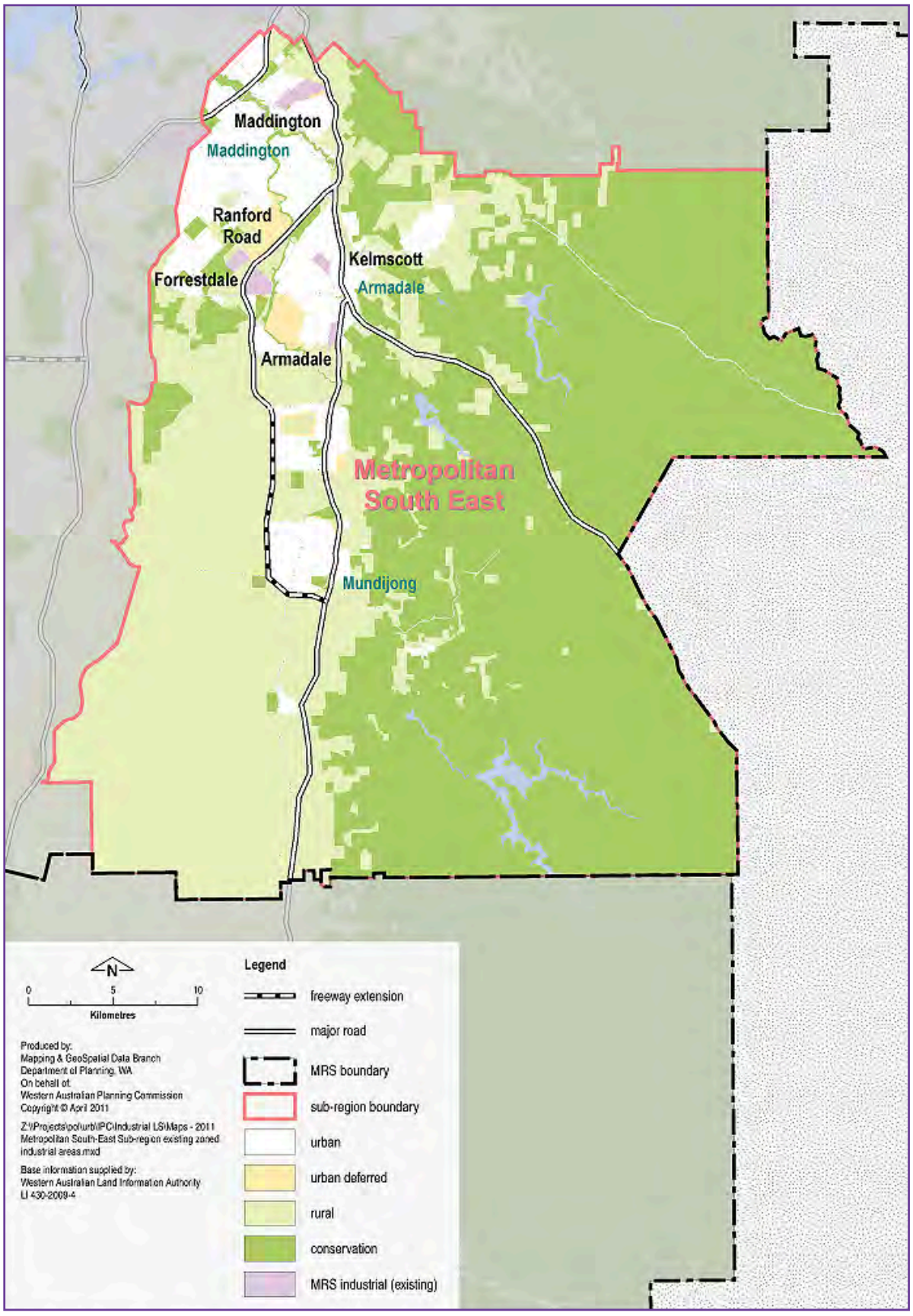


Figure 25: Metropolitan south-east sub-region existing zoned industrial areas

- Facilitating major revitalisation initiatives such as *Armadale Alive*;
- Capitalising on existing assets such as the Champion Lakes development;
- Diversifying local employment opportunities;
- Investment in industrial and employment land; and
- Facilitating economic development opportunities such as attracting business investment.

All local government authorities will be required to revise their Town Planning Schemes to better reflect current land uses occurring on site. This is particularly the case for land north-west of Kelvin Road, Maddington, presently zoned "Rural" under the local planning scheme, located within the City of Gosnells local municipal boundaries. Such land should be rezoned to industry or equivalent to reflect actual uses occurring on site.

Future industrial land supply in the sub-region

The strategy has identified several locations where future industrial sites may be considered, to accommodate future demand and economic growth. The future drivers for the South-east sub-region are considered to be:

- Population growth;
- Sustained levels of economic growth and employment targets;
- Improved freight infrastructure; and
- De-constraining existing industrial land.

The industrial land supply in this sub-region to 2031, based on Property Council of Australia (PCA) data, is represented below in figure 26.

With a forecast demand of 1397 ha by 2031, and based on existing data on the available supply in the pipeline, the sub-region will have a surplus of 194 ha of industrial land by 2031. Regardless of this forecast surplus in supply, forward planning to identify areas where additional industrial land may be located will still be required.

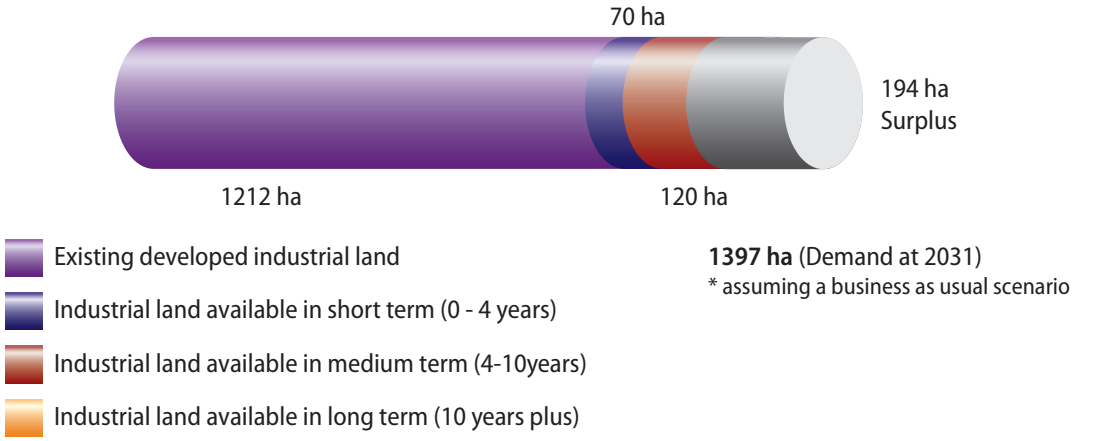


Figure 26: Current non-heavy industrial zoned land supply: South-east sub-region
(Source: Property Council of Australia)

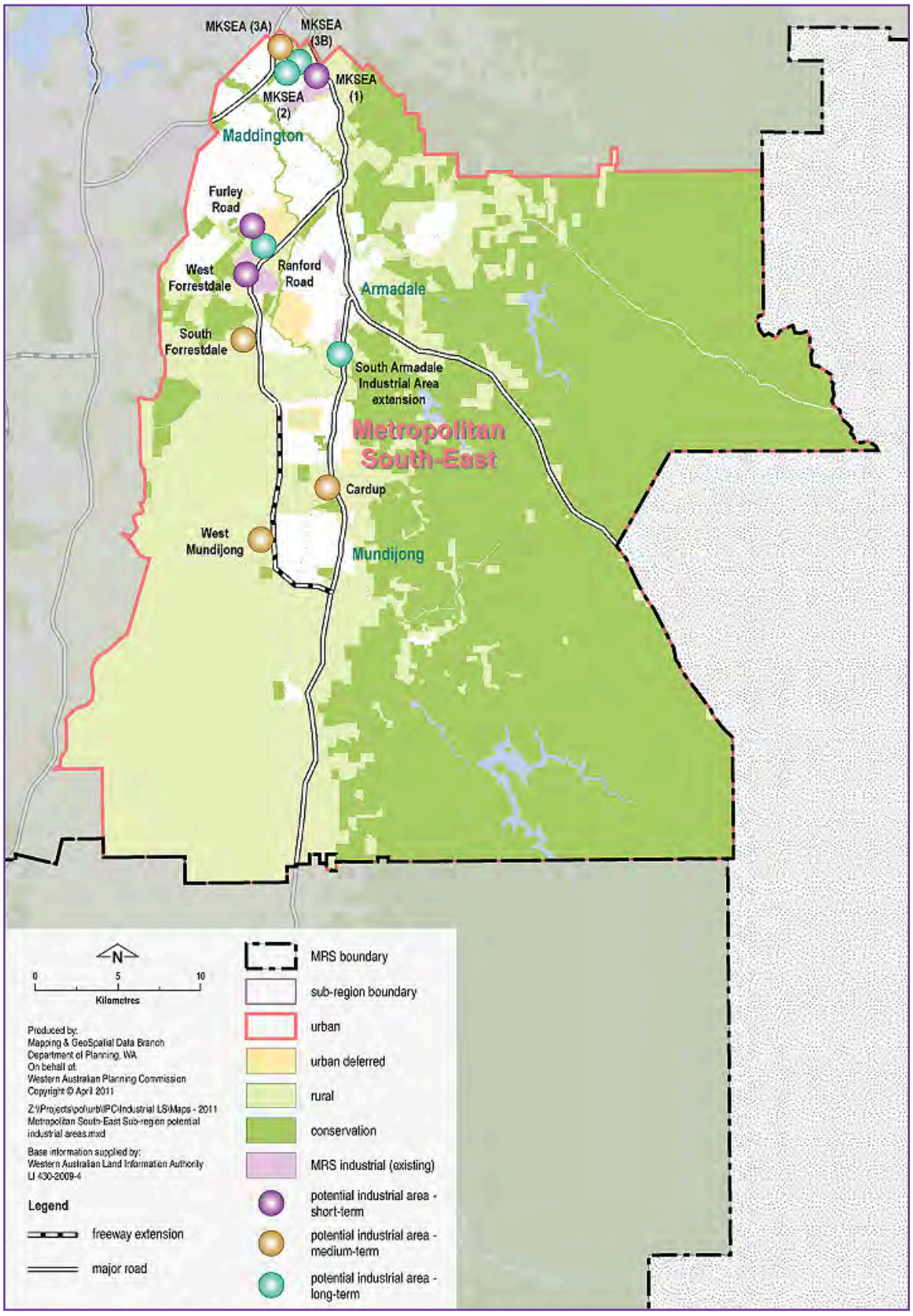


Figure 27: Metropolitan south-east sub-region potential non-heavy industrial areas

The strategy has identified possible industrial investigation sites or areas within the South-east sub-region. These investigation areas are not currently zoned "Industrial" in the Metropolitan Region Scheme. Further planning and environmental investigations are required for all sites and the exact area and configuration of these sites is subject to further investigation. These sites have been categorised into anticipated zoning timeframes, however, these timeframes are subject to change and dependent upon various factors, including proponents' willingness to progress the necessary planning, environmental and servicing investigations to support rezoning proposals.

Name	Zoning Status (MRS)	Stage (if relevant)	Gross Area
Future short term non-heavy industrial sites (0-4 years)			
Furley Road	Rural and Urban Deferred	N/A	47 ha
West Forrestdale	Rural	N/A	120 ha
MKSEA Precinct 1	Rural	1	104 ha
Potential medium term non-heavy industrial sites (4-10 years)			
South Forrestdale	Rural	N/A	354 ha
MKSEA Precinct 3A	Rural	3A	81 ha
Cardup	Rural	N/A	208 ha
West Mundijong	Rural	N/A	455 ha
Potential long term non-heavy industrial sites (strategic landbank sites) (10 years +)			
MKSEA Precinct 2	Rural, Parks and Recreation, Public Purposee	2	290 ha
MKSEA Precinct 3B	Rural	3B	17 ha
Ranford Road	Urban Deferred	N/A	75 ha
South Armadale Industrial Area	Rural	N/A	81 ha
		Total gross area	**1832 ha**

***Note:** The areas provided in this table exclude land that already is zoned "Industrial" in the Metropolitan Region Scheme. Please note that the total areas of these sites are still subject to investigation.

South-east sub-region possible non-heavy industrial sites

The following section provides an overview of the possible industrial sites that have been identified as part of the strategy, to support future growth and demand in the South-east sub-region. The sites are defined by three separate categories: future short term industrial sites, potential medium term industrial sites, and potential long term industrial sites (strategic landbank sites).

Future short term non-heavy industrial sites

The short term industrial sites within the South-east sub-region have been identified as follows.

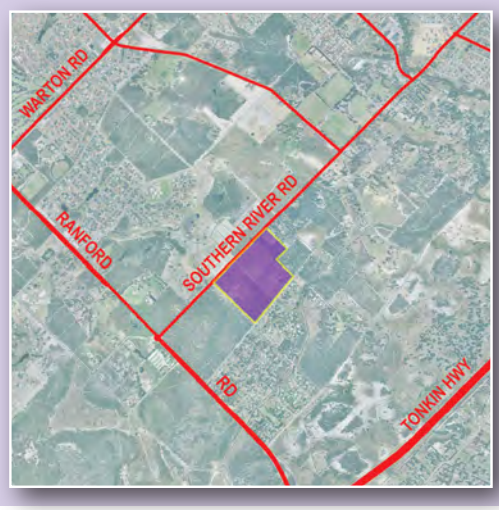
Furley Road

Currently zoned rural and urban deferred in the MRS, the site could be constrained by a resource enhancement wetland. The site has transport linkages to Southern River Road and Matison Road and has all services available.

The area is suitable to the provision of producer services.

Status of availability

- Planned release in two to four years.



West Forrestdale

This land is contained within the jurisdiction of the Metropolitan Redevelopment Authority (MRA) on the western side of the Tonkin Highway. It is being planned and developed by the MRA as an extension to the Forrestdale Business Park.

Preliminary investigations and studies are currently being undertaken prior to the preparation of a structure plan. A final structure plan and development contribution scheme are expected to be released in mid 2012.

West Forrestdale is intended to deliver general and light industrial land.

Status of availability

- Will require an MRS amendment.
- Parts of the site are constrained by wetlands.
- Abuts Jandakot Regional Park and potential for DRF/ priority flora.
- A high pressure gas easement (Dampier Bunbury Natural Gas Pipeline) runs through the middle of the site.

Maddington Kenwick Strategic Employment Area Precinct 1

The provision of industrial land within the Maddington Kenwick Strategic Employment Area (MKSEA) has been an active planning matter for well over a decade. A Concept Plan has been prepared and adopted by the City of Gosnells, detailing the staging and development of this area, to provide industrial land on an ongoing basis for the next 10 to 15 years.

Precinct 1 comprises 59 separate allotments with 55 landowners. Some of the area is also under consideration for eco-industry precincts, which are anticipated to accommodate benign industrial land uses. The proposed scheme amendment contains a Bush Forever site.

Status of availability

- A scheme amendment has been initiated.
- A management plan or a modification to the scheme amendment will have to occur before the amendment can be put out to public comment and adopted by the WAPC.
- Additionally, a water management plan and/or agreement will have to be negotiated with the Department of Water.

Potential medium term non-heavy industrial sites

In the South-east sub-region, two sites (South Forrestdale and Maddington - Kenwick Strategic Employment Area (MKSEA)) have been identified, which have Government support for further planning investigation and to remove constraints, subject to a more detailed investigation into the sites feasibility. A further two sites (Cardup and West Mundijong) have capacity to be developed in the medium term, however, investigative work for these sites has not occured to the same extent. Each of these sites is described in the following section.

Issue	South Forrestdale
Land ownership	• Six main landowners. Traditionally the subject site has predominantly been used for rural/ agricultural purposes, however, developers are willing to investigate alternative land uses as the land is no longer deemed viable for productive rural/ agricultural use. City of Armadale is supportive of new employment areas.
Accessibility (including transport networks)	• The site has effective transport linkages with routes such as Tonkin Highway, Rowley Road, Nicholson Road-Armadale Road and South-Western Highway, HWL and Heavy Haulage routes, therefore ensuring the site has access to an appropriate road network for both freight and employment within the area.
Environmental sensitivities	• The subject site is adjacent to Bush Forever areas. Development adjacent to Bush Forever sites should be sensitive to the environmental values of the Bush Forever sites and take measures to reduce potential environmental impacts. • Abuts a RAMSAR Wetland within Forrestdale Lake Nature Reserve. Appropriate drainage measures and wetland buffers required. • No declared rare or priority flora, or significant fauna locations are recorded within the site. A series of TEC areas are denoted north of the site, with 1000 m buffers from those areas extending into the study site. • Located close to Forrestdale Lake and wetlands.
Topography/ soil	• Generally flat and between 25 m and 30 m AHD. Key topographical feature is the proximity to Forrestdale Lake, immediately north-west of the site. More than 90 per cent of the site has a slope of less than 1 per cent drainage and stormwater management measures are expected to be extensive.
Potential land use conflict	• The interface between existing residential development adjacent to the northern site boundary and the existing semi-rural land adjacent to the western, southern and eastern boundaries of the site will require consideration.
Conservation	• Conservation and Resource Enhancement wetlands and their buffers (100 m and 50 m respectively) reduce the developable area of the site. Consultation with DEC is required where development within the buffers is proposed. Environmental investigations will be required if reclassification of the northeast Resource Enhancement wetland is to be considered.
Heritage	• The subject site has been recognised to be a site of heritage significance, being named "Forrestdale Lake and Adjacent Wetlands". This site is not registered on the State Register of Heritage Places as being one of heritage significance. However it is registered with the National Trust, the Municipal Inventory and the Register of the National Estate as having significance. • Forrestdale Lake and Thompson's Lake are collectively listed as Australian Ramsar site number 35 - a "declared Ramsar wetland" designated under Article 2 of the Ramsar convention.

Issue	South Forrestdale
Site contamination	• No sites are recorded in the DEC Contaminated Sites Database within the area. • The majority of the site is low-to-moderate risk for acid sulphate soils, with some areas of moderate to high ASS risk in the southern/central portion of the site and in the northeast corner, in association with a resource enhancement wetland.
Service infrastructure accessibility	• Existing underground and overhead power infrastructure exists to the site (132 kV and 330 kV transmission lines) along Nicholson Rd and through (north-south) the proposed area. • The proposed Forrestdale substation is due to be energised at a planned service date of 2015, and cater for the Forrestdale industrial area. The substation is located approximately 4 km west from the proposed area and should be able to meet the initial demand. • The proposed Armadale substation is also due to be energised at a planned service date of 2020. This substation may also be able to cater for the proposed industrial area as well. It is proposed to be located approximately 4 km east from the proposed industrial area as well. Western Power will monitor the demand growth of the area to be in the position to cater for the additional demand as it grows. • High pressure gas main located in Armadale Road with capacity to service future uses. • No wastewater planning exists for this area. No water planning has been undertaken for this area and it could be included as part of the wider Armadale Byford scheme that is being considered. The timing of this scheme review has not been set and is likely to be two to three years from completion. Extension from the existing system is unlikely to provide sufficient supply especially for fire requirements. • Parts of the site are located in the Forrestdale main drain catchment.
Close to workforce	• Existing residential development lies within close proximity to the site with future residential development planned to occur in the area. This is likely to provide increased incentive to developers and businesses to undertake activities in the area as population demand for the area is clearly evident. • The residential component of the Wungong Urban Water Master Plan should provide employment opportunities for the site. • The Wungong Project will provide a workforce that can provide workers for any industries that establish at South Forrestdale.

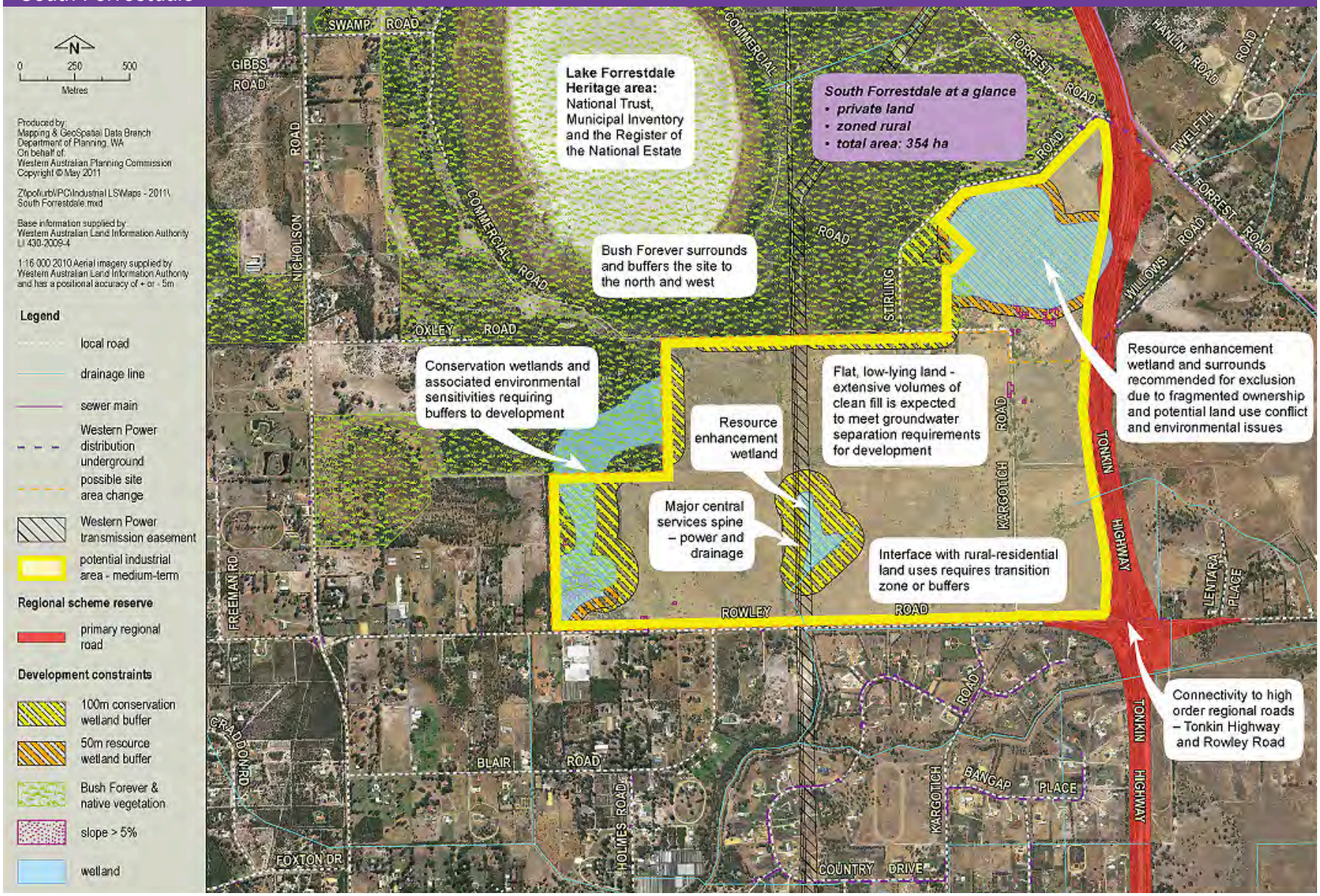
Preferred uses and potential end users

The above site is located within close proximity to Forrestdale Lake, which is an environmentally sensitive area located adjacent to existing residential development. Therefore, future industrial development should be sensitive to the surrounding environmental context. The predominant type of industrial development on-site will be general industrial development. However, some of the site should also be zoned Industrial Business in order to enable the provision of additional employment opportunities for those in nearby residential areas (both existing and future). In this regard, the General Industry development will contain land uses such as Commercial Vehicle Parking, Storage and Warehouse.

Development within the Industrial Business zone will contain land uses such as Recreation-Public, Garden Centre, Restaurant and Showroom. It is envisaged that this site is likely to contain a high degree of Producer and Consumer services, largely due to its proximity to existing and future planned residential development and other sensitive land uses.

Agri-food processor uses will be considered for this site due to its close location to rural producers from the south east and east; as well as close proximity to Perth. The inclusion will be subject to compliance with town planning and environmental considerations.

South Forrestdale

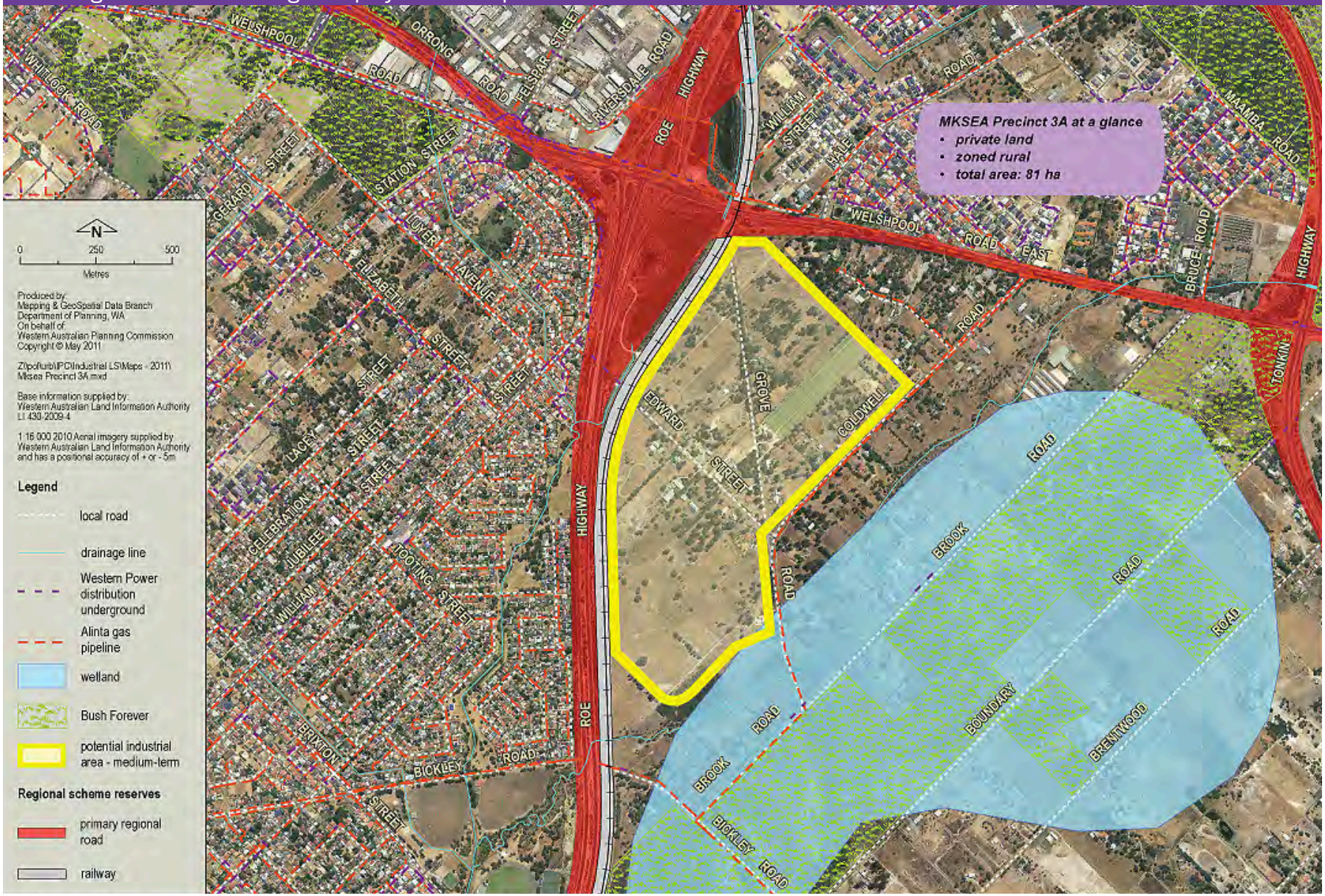


Key actions - South Forrestdale

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake MRS amendment.	Up to 7 years from commencement to complete key planning related actions (these are contingent upon the completion of key infrastructure studies).
	2	Prepare a District Structure Plan.	
	3	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	4	Prepare Local Structure Plan(s).	
	5	Development Contribution Plan.	
	6	Undertake a local demand assessment to determine the staging requirements for release of land in line with population growth and industrial land demand in the south east sub-region.	
	7	Address interface issues with conservation areas and urban and rural land uses.	
Environment	8	Development in this area will require careful consideration and minimisation of potential polluted water flows into Forrestdale Lake and the Peel Harvey catchment. Drainage may need to be installed and directed to interception or treatment wetlands prior to discharge and development would require application of Water Sensitive Urban Design principles including peak flow reduction and adequate nutrient reduction.	Up to 3.5 years from commencement to complete key environmental actions.
	9	Investigate, in consultation with the DEC, the acceptability of industrial development within the identified TEC buffer affecting the northern portion of the site.	
	10	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008). Management plans should be consistent with the recommendations of the Southern River Integrated Land and Water Management Plan (DoW 2009) and Forrestdale main drain arterial drainage strategy (DoW 2009) for portions of the site.	
	11	Follow up outcomes of initial environmental and groundwater draining investigations to determine capability of the land to alternative (potential industrial) development.	
Infrastructure and servicing	12	No wastewater planning exists for this site. Water Corporation to undertake a detailed water supply study for the site, if development is to occur. No water planning has been undertaken for this area and it could be included as part of a wider Armadale Byford scheme that is being considered. Subject to resource priorities and availability of sufficiently detailed information about proposed industrial area, the Water Corporation may be able to schedule this work on Statewide Planning Program within two to three years.	Up to 7 years from commencement to complete key infrastructure studies.
	13	Commence investigations for servicing, rezoning and structure planning with particular regard to drainage and water servicing provision and cost.	
	14	Undertake investigations on future demand on power and gas.	
Physical landform and soils	15	Undertake Acid Sulphate Soils investigations and prepare an Acid Sulphate Soils Management Plan where moderate to high acid sulphate soils risk levels are detected.	3 months to complete the preliminary site assessment for acid sulphate soils.
	16	Undertake heritage surveys (indigenous and European).	

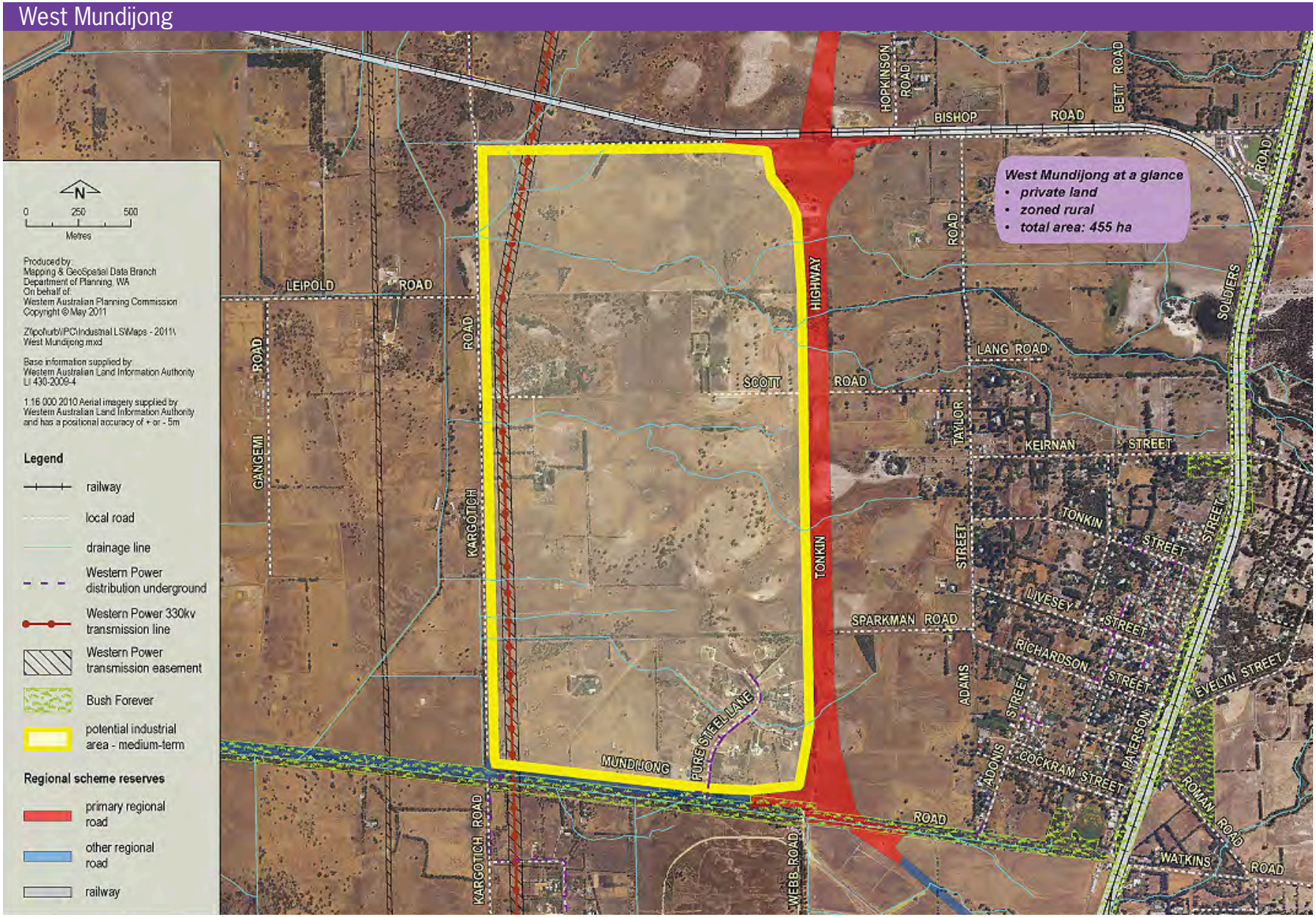
Issue	Maddington Kenwick strategic employment area precinct 3A
Land ownership	• Fragmented ownership.
Accessibility (including transport networks)	• Tonkin and Roe Highways are in close proximity. Welshpool Road is located directly to the north of the site. Nearby Kelvin Road provides access direct to Albany Highway. • Located close to the Kewdale Intermodal Terminal which provides freight connections to Fremantle, Kwinana, Midland and interstate. • Perth Airport is within 5 km of the site via Tonkin Highway.
Environmental sensitivities	• Numerous populations of threatened flora. Adjacent to Bush Forever site 387 (Greater Brixton Street Wetlands, Kenwick).
Topography/ soil	• Low lying site. • The site contains areas of high-to-moderate and moderate-to-low acid sulphate soils (ASS) risk within three metres of the surface. Portion of high risk running through entire site following creek/drainage channel and area of ASS associated with a wetland.
Potential land use conflict	• Adjacent to existing industrial land. This may constrain development of certain types of industrial uses.
Conservation	• Adjacent to Greater Brixton Street Wetlands (Bush Forever Site 387) which will require an appropriate buffer and best practice urban water management regimes. • Adjacent numerous TEC's and populations of DRF/ priority flora. • Contains portion of Yule Brook. • Flora and vegetation studies required to identify any areas of high conservation to be protected.
Heritage	• Heritage studies to be undertaken.
Site contamination	• The amount of land that is rezoned industrial will depend on the amount of land required for drainage purposes. This will be determined from environmental site surveys, water management programs and environmental monitoring.
Service infrastructure accessibility	• Will require considerable additional servicing infrastructure. • The closest substation to this site is the Kalamunda substation that is located approximately 8 km north-east of proposed industrial area. Existing power distribution exists to the site (330 kV) along (north – south) the proposed area. This substation should be able to meet the initial demand from the proposed industrial area. Western Power will monitor the demand growth of the area to be in a position to cater for the additional demand as it grows. • The proposed Maddington substation has not been constructed and is proposed to be commissioned in 2011.
Close to workforce	• The Kewdale/Welshpool industrial area is located close to the site. • Located close to the residential areas of Kenwick, Beckenham, East Cannington, Forrestfield and Wattle Grove.

Maddington Kenwick strategic employment area precinct 3A



Issue	West Mundijong
Land ownership	• Private and corporate landowners.
Accessibility (including transport networks)	• Freight rail located to the north of the site. • Close proximity to Tonkin Highway and Mundijong Road (long vehicle and road train access). • Proposed extension of Tonkin Highway from Thomas Road to Mundijong Road and ultimately to South Western Highway. • Site has good access to Perth Airport, the proposed Kwinana Port, the Kwinana Freeway and the South Western Highway.
Environmental sensitivities	• TEC and flora (DRF) constraints along Mundijong Road.
Topography/soil	• Land subject to inundation (palusplain). • Low to fair agricultural capability.
Potential land use conflict	• Minimal.
Conservation	• Small areas of conservation category wetland. • Comprehensive vegetation assessments required to identify any important flora species and communities.
Heritage	• Heritage studies to be undertaken.
Site contamination	• Investigations need to be undertaken to determine any site contamination issues.
Service infrastructure accessibility	• Power is available (330kV transmission as well as overhead and underground distribution). • Water services available in the town site. • The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008).
Close to workforce	• Close proximity to Armadale, a strategic metropolitan centre.

West Mundijong



Issue	Cardup
Land ownership	• Effectively controlled by three to four parties who are working together to advance the rezoning of the land to industrial.
Accessibility (including transport networks)	• Direct access from South Western Highway. • Existing south east rail corridor runs along the site along the western boundary. • Excellent freight and network rail linkages.
Environmental sensitivities	• Some Bush Forever constraints.
Topography/ soil	• The topography of the subject site is undulating with a generally western aspect. The natural surface height ranges from 48 metres Australian Height Datum (AHD) along the western boundary to approximately 80 m AHD in the south east corner of the subject site, resulting in a north-westerly aspect.
Potential land use conflict	• No surrounding land uses that will adversely impact on development potential.
Conservation	• The conservation of wetlands and vegetation which occur within the project area can be readily accommodated. • Numerous TEC's adjacent or within the site. • Includes portion of Bush Forever Site 361. • Require vegetation assessments prior to consideration of area for development.
Heritage	• No heritage sites of Aboriginal or European significance have been discovered within the project area.
Site contamination	• Contamination is unlikely to be an issue and can be managed through the environmental approvals process. A small amount of localised contamination may be present within Lot 10 and Lot 60 and is predominantly associated with some aboveground and underground storage tanks and stormwater discharge into a holding pond. This will likely require a Detailed Site Investigation and possible remediation to support subdivision.
Service infrastructure accessibility	• Close proximity to utility infrastructure. • The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008).
Close to workforce	• Strategically located between the urban growth areas of Byford and Mundijong-Whitby.
Design specifications	• Has the potential to be developed to accommodate supporting business/industry uses such as for the commercial and services sector.

Cardup

Cardup at a glance
• private land
• zoned rural
• total area: 208 ha
N
0
280
560
Metres
Produced by:
Mapping & GeoSpatial Data Branch
Department of Planning, WA
On behalf of:
Western Australian Planning Commission
Copyright © May 2011
Z:\pc\lurb\IPC\Industrial LS\Maps - 2011\Cardup.mxd
Base information supplied by Western Australian Land Information Authority LI 430-2009-4
1:16 000 2010 Aerial imagery supplied by Western Australian Land Information Authority and has a positional accuracy of + or - 5m
Legend
railway
local road
drainage line
sewer gravity pipe
Western Power distribution underground
Alinta gas pipeline
Bush Forever
potential industrial area - medium-term
Regional scheme reserves
primary regional road
railway
HIGHWAY
ORTON
DOLEY ROAD
LAWRENCE WAY
ROAD
WARRINGTON ROAD
TURNER ROAD
NETTLETON ROAD
SOUTH WESTERN HIGHWAY
ROAD
CARDUP SIDING ROAD
ALICE ROAD
REDCLIFFE ROAD
KILN ROAD
SOUTH WESTERN HIGHWAY
BAIGUP LOOP
KARBRO DRIVE
BETT ROAD
SOLDIERS ROAD
NORMAN ROAD
SHALE ROAD
TONKIN ROAD
HOPKINSON
BISHOP ROAD

Potential long term non-heavy industrial sites (strategic landbank)

In addition to the investigation areas and existing industrial estates, further sites were identified which indicated some level of potential for further investigation in the longer term that would contribute to the strategic land bank for future industrial land supply.

It should be acknowledged that a number of these sites may already have existing uses that preclude industrial activity taking place in the medium-to-long term. In these instances the future uses of these sites will be based on the future needs of the sub-region as well as the results of detailed investigations and studies.

In the South-east sub-region, these sites are as follows:

Ranford Road	Total area 75 ha

Land status: A 75ha portion of land located north-west of the Tonkin Highway / Ranford Road intersection has been identified for future light industrial development in the Southern River / Forrestdale / Brookdale / Wungong district structure plan.

Zoning: MRS: Urban Deferred. TPS: General Rural.

Current uses: Adjoins Ranford Road south (a 100 ha site located north-west of the Forrestdale Business Park, zoned Industrial). At present the site is severely constrained by Bush Forever reservations (62 ha), and a Water Corporation drain (5 ha), leaving less than 25 ha of net land for industrial development. LandCorp is in the process of undertaking local structure planning for the site however, the timing associated with land availability is at this stage unclear.

Environmental constraints: Significant wetland constraints.

Transport linkages: Ranford Road long vehicle, road train and RAV route.

Serviceability: All services available at Ranford Road end.

Potential land use hierarchy: This area is suitable to the provision of Producer services, and is close to good freight network route linkages.

MKSEA Precincts 2 and 3B	Total area 307 ha

Land Status: Fragmented ownership.

Zoning: MRS: Rural, Parks and Recreation. TPS: General Rural, Special Rural.

Current uses: Various land uses.

Environmental constraints: A large portion of the site is constrained by environmental issues, which excludes it from being developed to its full industrial potential. Precinct 3B is less likely to be rezoned to industrial due to environmental considerations (Yule Brook) and Aboriginal heritage significance.

Transport linkages: Tonkin and Roe Highways, Welshpool Road.

Serviceability: Will require considerable additional servicing infrastructure.

Potential land use hierarchy: Rezoning the land through the scheme amendment process will depend on requisite buffers to the greater Brixton Street wetlands and existing conservation wetlands (zoned parks and recreation) and a water management plan to be adopted.

South Armadale Industrial Area	Total area 81 ha

Land Status: Fragmented ownership.

Zoning: MRS: Rural; TPS: Rural Living 2 and Parks and Recreation.

Current uses: Various land uses.

Environmental constraints: To be further investigated.

Transport linkages: Adjacent to South Western Highway. Easy access to Tonkin and Albany Highways.

Serviceability: To be further investigated.

Potential land use hierarchy: To be further investigated.

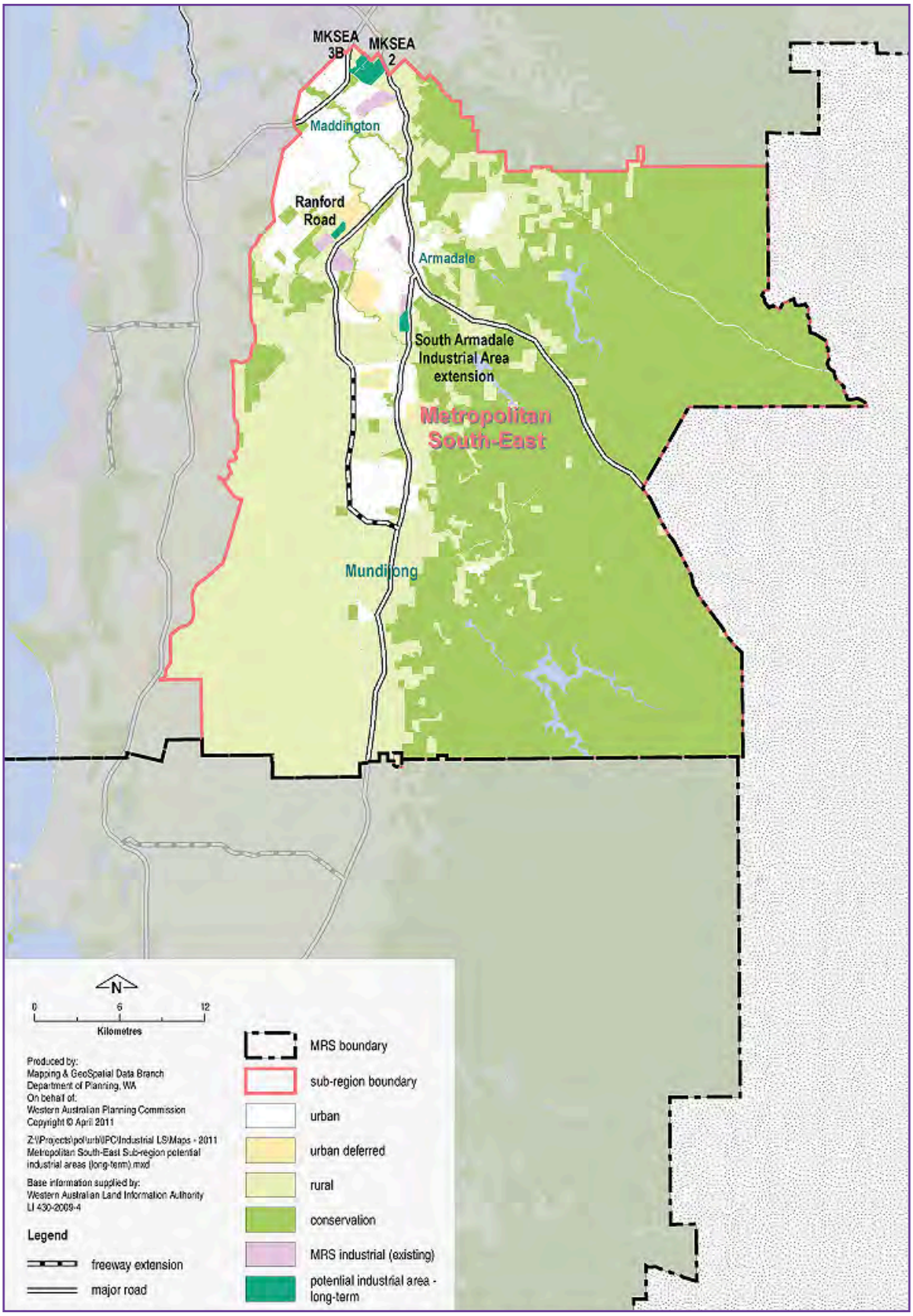


Figure 28: Metropolitan south-east sub-region potential non-heavy industrial areas (long term)

South-east sub-region - long term outlook

The resolution of existing development constraints facing sites in the South-east sub-region will require prioritisation in order to realise the additional land supply potential within the sub-region.

Key planning actions for the south-east sub-region

Key Stakeholders	Actions
Shire of Serpentine-Jarrahdale **City of Armadale** **City of Gosnells** **WAPC** **Department of Planning** **LandCorp** **Department of State Development**	• Develop, in conjunction with the local governments, an economic development and employment strategy for the South-east sub-region. • Undertake a local demand assessment to determine the staging requirements for the release of land in line with population growth. • Shire of Serpentine-Jarrahdale — finalise district structure planning process to form the framework for future local structure planning in Mundijong and Cardup. • City of Gosnells to finalise structure planning and scheme amendments for MKSEA. • All local authorities be required to review and revise town planning schemes to properly reflect current land uses occurring in certain locations, in particular, the land located north-west of Kelvin Road, Maddington.
LandCorp **Department of Planning** **Department of Environment and Conservation** **Department of Water** **Main Roads of Western Australia** **Water Corporation** **Office of Energy** **Alinta Gas** **Wester Power** **Heritage Council**	• Undertake feasibility studies with respect to the identified medium term sites in the South-east sub-region and determine most appropriate delivery models and level of government involvement in this sub-region to facilitate industrial land development.
Water Corporation **Jandakot Airport Holdings**	• Additional water storage infrastructure planned for Byford, Mundijong and Forrestfield. • Potential water recycling plants being planned at Westfield and Jandakot. • Wastewater planning to be undertaken, including the Armadale Byford scheme.
Proponent/s and/or landowner/s **Department of Planning** **Department of Environment and Conservation**	• Consultation required for sites with buffers for conservation and resource enhancement wetlands. • Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands, if appropriate. • Undertake acid sulphate soil investigations. • Flora and fauna investigations. • Ascertain if any buffers to sensitive land uses are required.

Key Stakeholders	Actions
Proponent/s and/or landowner/s **Department of Water** **Department of Planning** **Department of Environment and Conservation** **Water Corporation**	• Water management plan for MKSEA to be finalised.
Alinta Gas **Western Power**	• Facilitate infrastructure provision to allow development of sites. • Western Power - proposed Forrestdale and Armadale substations. Commissioning of Maddington substation.
Main Roads Western Australia	• Increase the traffic volume capacity of Armadale Road and Tonkin Highway. • Enhance the connection of Tonkin Highway with the South-Western Highway near Mundijong. • Improve east-west connections into the sub-region.
Proponent/s and/or landowner/s **Department of Indigenous Affairs** **Heritage Council of Western Australia**	• Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.
Metropolitan Redevelopment Authority	• Finalise structure plan for Forrestdale Business Park.
Proponent/s and/or landowner/s **Department of Water**	• Water management investigations and documents to be prepared in accordance with Better Urban Water Management (WAPC 2008)

Part 11 - South-west sub-region

The South-west sub-region comprises the City of Cockburn, City of Rockingham and Town of Kwinana. The total area of zoned land in this sub-region is 52,700 hectares, of which 3,400 ha is dedicated as "industrial" zoned land (6 per cent) – representing 33 per cent of the metropolitan total of industrial zoned land.

The South-west sub-region accommodates the largest percentage of industrial zoned land within the Perth and Peel regions, with the Kwinana Industrial Area and the Australian Marine Complex being key contributors.

Demographic profile

In 2010 the ABS estimated resident population for this sub-region was 224,472 people. The City of Rockingham accommodates the majority of the population with its resident population estimated to be 104,130, followed by the City of Cockburn with 91,313 people. The Town of Kwinana, which has the largest proportion of industrial zoned land within its area, has a resident population of 29,029 (ABS, 2011). By 2031, the sub-regions population is forecast to be 278,000.

In terms of the ageing population, the South-west sub-region is similar to other sub-regions. However, the South-west sub-region has experienced the highest increase in the number of residents aged between 20 and 40 years old in recent years.

Planning profile

Directions 2031 and Beyond identifies Rockingham as the major strategic metropolitan centre in the South-west sub-region. It provides a full range of services, facilities and activities necessary to support the communities within its catchment. Other centres within this sub-region are classed as follows:

Strategic Metropolitan Centres	Secondary Centres	District Centres
Rockingham	Cockburn Kwinana	Baldivis Cockburn Coast* Karnup* Secret Harbour Spearwood Warnbro Wandi*

*emerging centre

Source: *Directions 2031 and Beyond*

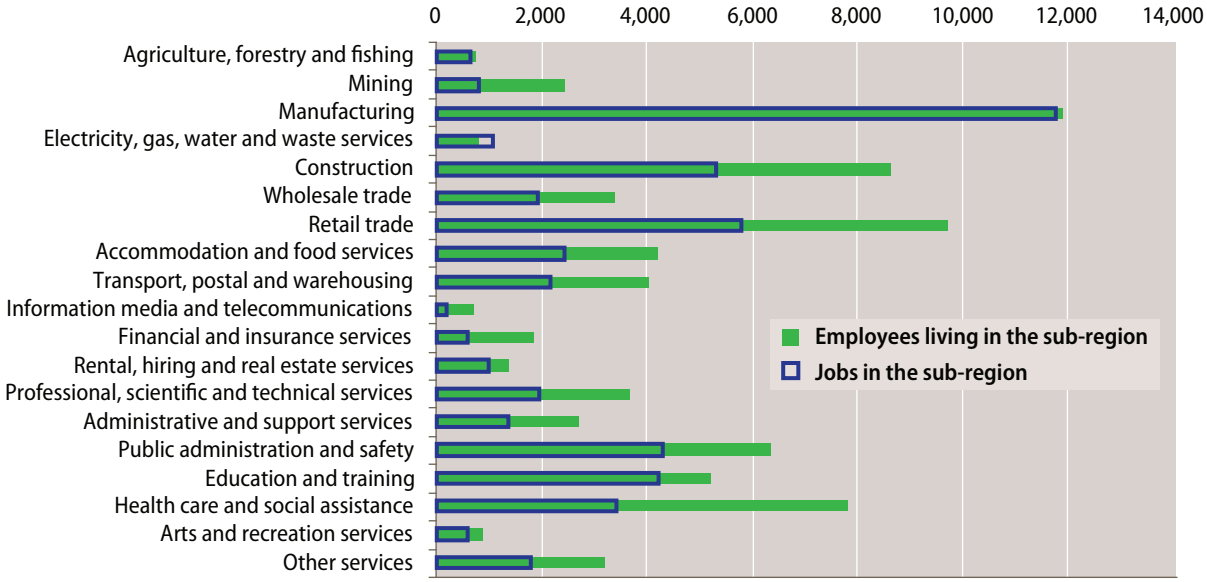
Directions 2031 and Beyond aims to achieve an increase in dwellings from 82,000 in 2008 to 123,000 dwellings in the South-west sub-region by 2031.

The South-west sub-region has approximately 8700 ha of undeveloped urban and urban deferred zoned land.

More than 40 per cent of the total of the Perth and Peel region's urban expansion and investigation areas indicated in the Department of Planning's draft urban expansion plan has been identified in the South-west sub-region and includes Karnup and Baldivis.

Economic profile

The following graph represents the number of employees living in the South-west sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in the sub-region (blue bar).



Source: 2006 ABS Census of Population and Housing

The main industries providing employment in the South-west sub-region are manufacturing, construction, retail trade, health care and public administration. As mentioned previously there is a large proportion of land within this sub-region dedicated to industrial land use activities. However, as the distribution of employment by sub-region clearly reflects, there is still a substantial amount of the industrial labour force working outside the sub-region.

The employment self-sufficiency (ESS) for this sub-region is currently 60 per cent. *Directions 2031 and Beyond* identified an ESS target of 70 per cent for this South-west sub-region. This target translates into the need for an additional 87,000 to 113,000 jobs in the sub-region over the next 25 years.

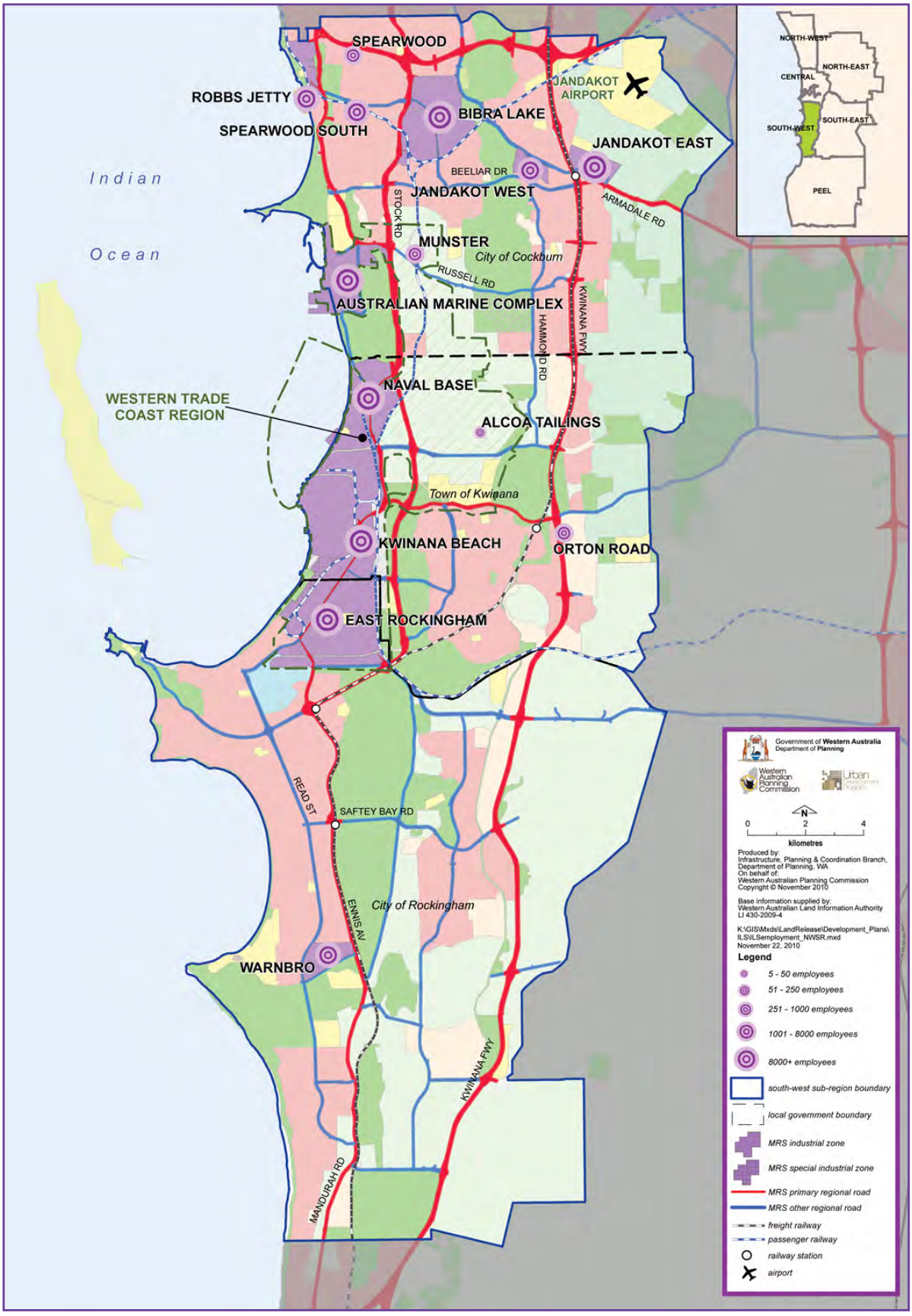


Figure 29: Industrial employment centres - south-west sub-region

Physical infrastructure

The South-west sub-region differs from all of the other outer sub-regions having both a seaport and general aviation airport within the sub-region. Both have significant development and expansion planned over the next decade and beyond.

Fremantle Harbour

The Fremantle Inner Harbour is anticipated to reach its capacity to handle container traffic by 2020. To ensure that long term needs are met for the forecast containerised import and export demands, an additional overflow port has been identified to cater for this eventual overflow. In 2009, the State Government established the Fremantle Port Optimum Planning Group to provide future strategies for ports in the Fremantle-Cockburn areas. This group presented its findings to Government, which identified proposals for future consideration.

Jandakot Airport

The Jandakot Airport Masterplan was released in 2009. It is an update of the Jandakot Airport Masterplan 2005 and outlines the strategic direction for the efficient and economic development of Australia's busiest general aviation airport. Recognising the need for external investment to fund further infrastructure necessary for the continued growth of aviation at the airport, the masterplan identifies opportunities for commercial development on the airport land. The masterplan proposes to manage, maintain and develop Jandakot Airport in a safe, balanced and environmentally responsible manner in order to enhance the economic vitality and community service needs of Western Australia.[1]

Water

Planning for upgrades to some of the existing waste water treatment plants in this sub-region is already under way. Construction of the East Rockingham Waste Water Treatment Plant is expected to commence in 2015. This will bring much needed added capacity to the sub-region, and will enable the rezoning of a number of Urban Deferred areas to Urban. With the urban development of Karnup, there is also a planned reservoir to be constructed after 2020, to cater for anticipated demand. The Water Corporation has also been investigating the potential for a water recycling plant at Port Kennedy, and establishing a potential water trading arrangement.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Road and freight network

There are a number of key freight routes running through this sub-region, including Roe Highway and the Kwinana Freeway/Forrest Highway. Rowley Road, which will be a primary access route to the new port (Kwinana Quay) and into the Latitude 32 Industrial Estate, will also play a vital role.

The recently completed construction of Roe Highway Stage 7 has resulted in improved road safety, reduced freight transport costs and enhanced community amenities and access between Midland/Kenwick and Kwinana and beyond. The Kwinana Freeway/Forrest Highway has taken long distance heavy haulage traffic away from built-up areas and provides relief for coastal routes through Mandurah and the South-Western Highway.

This sub-region still suffers the same poor east-west connectivity as its northern counterparts, and the upgrading and extension of such roads as Rowley Road, Anketell Road and Mundijong Road will facilitate better east-west links than that which presently exist.

The Kwinana Intermodal Terminal is already planned for the South-west sub-region within the Latitude 32 Industrial Estate. However, further extensive studies are still required to be carried out before its feasibility can be determined.

1 Jandakot Airport Master Plan 2009, Foreword

Industrial and employment land in the sub-region

The Western Trade Coast strategic industrial area will continue to be a major focus of metropolitan and state industrial activity, with a focus on heavy manufacturing, processing, fabrication and export. It comprises the Kwinana Industrial Core, Latitude 32, the Rockingham Industry Zone; and the Australian Marine Complex precinct at Henderson.

These industrial centres will provide a significant amount of employment land to meet the short, medium and long term market demand for industrial land in metropolitan Perth, and will generate significant employment opportunities for the South-west sub-region. The planned outer harbour in Cockburn Sound will provide a regional hub for the continued growth of both national and international trade.

In order to realise the strategic employment potential for this sub-region, a new governance model for the continuing development and evolution of the Western Trade Coast strategic industrial area is now in place.

Figure 30: Metropolitan south-west sub-region existing zoned industrial areas

Future industrial land supply in the sub-region

The strategy has identified locations where future industrial sites may be considered to accommodate future demand and economic growth. The future drivers for the South-west sub-region are considered to be:

- A continued resource boom and associated economic growth;
- Diversity in Industrial land uses and lot sizes;
- Provision of land to suit more specific industrial related land uses;
- Excellent access to transport linkages; and
- Synergies of industries within the Western Trade Coast.

The industrial land supply in this sub-region to 2031 is represented as shown below in figure 31.

With a forecast demand of 1828 ha by 2031, and based on existing data on the available supply in the pipeline, the sub-region will encounter a deficit of 278 ha if no additional land is released to the market by 2031.

There is a reasonable amount of land identified within the supply pipeline, however, some of it may only become available in the very long term and other land identified is constrained by environmental conditions which need to be resolved prior to the release of the land. Future supply is heavily reliant on the effective capacity of Latitude 32 and the ability of LandCorp to facilitate the release of land to the market.

The strategy has identified possible industrial investigation sites or areas within the South-west sub-region. These investigation areas are not currently zoned "Industrial" in the Metropolitan Region Scheme. Further planning and environmental investigations are required for all the identified sites and the exact area and configuration of these sites are subject to change. These sites have been categorised into anticipated zoning timeframes, however, these timeframes are also subject to change and dependent upon various factors, including proponents' willingness to progress the necessary planning, environmental and servicing investigations to support rezoning proposals.

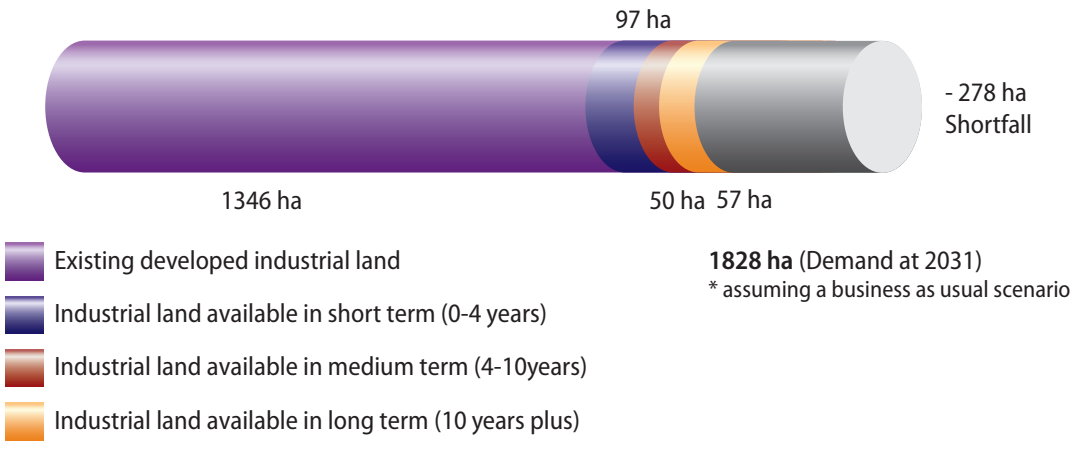


Figure 31: Current industrial zoned land supply: Metropolitan south-west sub-region
(Source: Property Council of Australia)

Name	Zoning Status (MRS)	Stage (if relevant)	Gross Area
Future short term non-heavy industrial sites (0-4 years)			
Jandakot Airport	Public Purpose	N/A	148 ha
Latitude 32 - Flinders	MRS does not apply. Subject to Hope Valley – Wattleup Act and Masterplan.	Stage 1	70 ha
Potential medium term non-heavy industrial sites (4-10 years)			
North East Baldivis	Rural	N/A	1026 ha
Latitude 32	MRS does not apply. Subject to Hope Valley – Wattleup Act and Masterplan.	Stages 2 (Wattleup) and 3 (Cockburn Cement)	195 ha
Potential long term non-heavy industrial sites (strategic landbank sites) (10 years +)			
Postans	Rural and Public Purpose	N/A	159 ha
Latitude 32	MRS does not apply. Subject to Hope Valley – Wattleup Act and Masterplan.	Stages 4-10	952 ha
Latitude 32 Extension	Rural	N/A	400 ha
		Total gross area	**2950 ha**

***Note:** The areas provided in this table exclude land that already is zoned "Industrial" in the Metropolitan Region Scheme. Please note that the total areas of these sites are still subject to investigation.

South-west sub-region possible non-heavy industrial sites

The following section provides an overview of the possible industrial sites that have been identified as part of the EELS, to support future growth and demand in the South-west sub-region. The sites are defined by three separate categories: future short term industrial sites, potential medium term industrial sites, and potential long term industrial sites (strategic landbank sites).

Future short term non-heavy industrial sites

The short term industrial sites within the South-west sub-region have been identified as follows on page 133.

Jandakot Airport

The airport site comprises a total area of 622 hectares over which Jandakot Airport Holdings Pty Ltd (JAH) holds a 99 year lease. In addition to operating the aviation facilities and maintaining large conservation areas JAH has approval to develop approximately 150 hectares of land for "non-aviation" use - predominantly commercial/industrial, mixed business use.

The relatively recent completion of "Roe 7" now provides very good vehicular access into the airport site which is located between other major industrial precincts - Canning Vale (600ha), Jandakot (200ha) and Bibra Lake (540ha).

To date approximately 40 hectares of land has been developed with a further 25 hectares being available now. The expectation is that future take up will average 12-15 hectares per year.

Latitude 32 Industry Zone - Flinders Precinct

The project area (formerly known as the Hope Valley Wattleup Redevelopment Project) covers 1400 ha and consists of two former town sites and the surrounding rural area, which are to be redeveloped for a mix of industrial uses. The first stage of development known as Flinders Precinct (former Hope Valley townsite) was released in early 2010. A District Structure Plan for the remainder of the site was advertised for public comment in mid 2010.

Status of availability

- 70 ha already zoned Industrial being developed by LandCorp at the Flinders Precinct - available now.
- Some of the site has already been earmarked to be set aside for conservation of wetlands and bushland.
- Detailed planning and feasibility investigations under way for next stage of development at Wattleup, pursuant to the Act and Structure Plan, with the potential for up to 40 ha to be released in 2013.

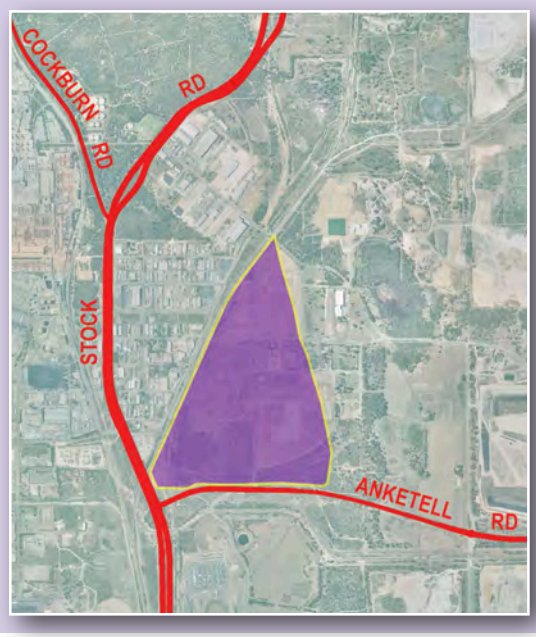


Figure 32: Metropolitan south-west sub-region potential non-heavy industrial areas

Potential medium term non-heavy industrial sites

The sites highlighted and discussed in the following section are those which, through the multi-criteria analysis and subsequent ranking of weighted scores, were seen as warranting further investigation and analysis.

The North East Baldivis site is noted as the preferred site for future industrial development in the South-west sub-region.

Issue	North East Baldivis
Land ownership	• Large areas of contiguous land still remain in the ownership of a few parties. • At least one private landowner is supportive of land being utilised for industrial purposes.
Accessibility (including transport networks)	• Very well located in relation to major transport infrastructure. • Mundijong Road designated as a regional road and proposed to be upgraded to provide more direct access to the Rockingham regional centre. Mundijong Road extends east to the South Western Highway and will ultimately connect with the extension of the Tonkin Highway. • The subject land is adjacent to the Kwinana Freeway which, with its connection into the Forrest Highway, provides better connectivity and releases pressure from coastal routes and the South-Western Highway. • The planned Fremantle-Rockingham Controlled Access Highway (FRCAH) will improve access to the site and will have a direct connection to Mundijong Road. • Planned improvements to the road network will provide more direct access to Rockingham. • Located close but with good separation to significant urban growth precincts in the south-west corridor (particularly in Baldivis/Karnup/Wellard/Kwinana) and the related workforce.
Environmental sensitivities	• Industrial development is unlikely to be constrained by existing buffers for surrounding land uses (feed lots, poultry farms and a waste landfill site). Some limited environmental investigation may be required and remediation works undertaken if contamination is found. • Environmental considerations should include the assessment of drainage, and the possible role of new and existing constructed wetlands as nutrient filters.
Topography/soil	• The site is generally flat and low lying at approximately 5-10 m AHD with very gentle to flat land surface. • Site will require significant fill. • The land is within the floodplain of the Serpentine River and Peel Main Drain. Further technical investigations will be required to determine the amount of land that can be developed for industrial purposes and any associated infrastructure requirements. Based on the DoW's current floodplain development strategy for the area, a proponent will need to demonstrate that proposed development does not detrimentally impact the general flooding regime.
Potential land use conflict	• Existing and surrounding uses may present conflicts, particularly with encroachment of Special Rural land uses and treatment of existing uses within any development (e.g. WaterSki Park and Golden Ponds Fish and Marron Farm) in the subject area. • Visual impact will require thorough consideration through any development application or rezoning process in accordance with requirements of the relevant Town Planning Scheme, and in particular consideration for the rural buffer to the Freeway (with associated landscape protection and revegetation requirements) is likely to be a key issue. • Future detailed planning should occur to ensure that the amenity of residential areas is not adversely affected.

Continued on page 136

Issue	North East Baldivis
Priority natural resources	• Future alternative subdivision and use of the land can be considered if it is demonstrated any land in the Policy Area does not contain raw materials worthy of protection and/or the Western Australian Planning Commission resolve to exclude that land from the Basic Raw Materials Policy Area.
Conservation	• A Threatened Ecological Community (TEC) exists outside the eastern edge of the site and two Priority Flora (P4) locations are found within the site. Priority flora locations should be avoided where possible. Investigation into the buffer requirements around the TEC will be required. • Important roadside vegetation exists along Mundijong Rd. No road widening proposals should impact this vegetation. • Flora, vegetation and fauna assessments will be required. • Impacts on Bush Forever Sites and wetlands should be avoided.
Heritage	• There is one registered Aboriginal Heritage site located at the corner of Millar Road and the Kwinana Freeway; which is a camp site. It is contained and as such is not expected to impact on the developable area. • The proposed site is not within any known heritage site listed under the State Register of Heritage Places.
Site contamination	• No mention of the area is recorded in the DEC Contaminated Sites Database. • A number of activities undertaken within the site have the potential to result in contamination. • Some limited environmental investigation may be required and remediation works undertaken if contamination is found. • Moderate to low risk for Acid Sulphate Soils (ASS).
Service infrastructure accessibility	• Water planning has been reviewed by Water Corporation to accommodate potential industrial land uses in this area. Significant distribution mains will be required through southern residential areas. • A significant constraint could be on site drainage; the area is within the Mundijong drainage district and is set up as a rural drainage system. • Investigations into groundwater levels and appropriate drainage infrastructure to achieve a suitable separation distance to groundwater will be required. • Some capacity in existing power and scheme water services is available and the site has good proximity to the Serpentine Main Drain. Power infrastructure (132kV and 330KV transmission lines) run north-south along the ends of the proposed area. Investigations into future demands on these services are required. • The proposed Baldivis substation is due to be energised at a planned service date of 2014 and will cater for the increase in general population and commercial activity. This substation should be able to meet the initial demand from the proposed industrial area. Western Power will monitor the demand growth of the area to be in a position to cater for the additional demand as required. • It is envisaged that any wastewater generated in this area would be conveyed to the proposed East Rockingham WWTP that is scheduled to be in operation by 2016. The Water Corporation is not prepared to support the rezoning of the North East Baldivis site until the site for the East Rockingham Waste Water Treatment Plant is secured. While there is existing gas distribution infrastructure to the north and south of the subject area, it is probable that it does not have the capacity to service a commercial/ industrial development. That being the case, network reinforcement would be required if this area was selected for development. • A new or modified District Water Management Strategy will be required prior to rezoning. • The Department of Water has completed a review of the Serpentine River and Peel Main Drain flood studies as well as a groundwater model for this area. Consultation with the Department is recommended to further determine the extent of water resource constraints to development.

Preferred uses and potential end users

The North East Baldivis site is a large land area suitable for a wide range of uses. The site is likely to be suitable for larger lot general industrial uses.

Owing to the low-lying and flat nature of the land, it is expected that low-polluting, low water use industries would be more suited to the location. Although there may be demand for some minor consumer services within the site, and a need for light/service industry along the special rural interface, it is envisaged that the majority of the site will be used for general industrial uses that are not hazardous.

This site is well suited to the provision of producer services and has the potential for Strategic Export/ Knowledge based industry. The area also has good access to the freight network route connections with road and rail opportunities that position the site as a strategic industrial location.

Potential end users are therefore expected to be those that provide producer services such as:

Warehousing and distribution

Storage and display of goods, which may be wholesale; hyper large sites or numerous small sites dependant upon scope of operation; tend towards dedicated distribution parks (see logistics below) and demonstrate a trend towards automated goods handling and smart buildings.

Key actions - North East Baldivis

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake MRS amendment.	Up to 6 years from commencement to complete key planning related actions (these are contingent upon completion of water and sewer planning studies).
	2	Prepare a District Structure Plan.	
	3	Amend the Local Planning Scheme to appropriate zoning and land uses.	
	4	Prepare Local Structure Plan(s).	
	5	Development Contribution Plan.	
	6	Address interface issues with surrounding land uses.	
Environment	7	Although no contaminated sites are listed in the DEC Contaminated Sites database, environmental investigations may be required for the landfill on Millar Road between Mandurah Road and Baldivis Road; feedlots within the site east of Kwinana Freeway; and the poultry farm on Millar Road east of Kwinana Freeway.	Up to 3.5 years from commencement to complete key environmental actions, including: • 34 months for the Detailed Site Investigation (if required); • 12 months for the District Water Management Strategy; and • 12 months for the Local Water Management Strategy.
	8	The appropriate water management investigations for this site should be undertaken by the proponent in accordance with Better Urban Water Management (WAPC 2008) prior to rezoning. A new or modified District Water Management Strategy will be required.	
	9	Conduct a vegetation assessment.	
	10	Undertake investigations to determine the buffer requirements for any TECs on site in consultation with DEC.	
	11	Undertake flora and fauna surveys and relevant wetland assessments.	

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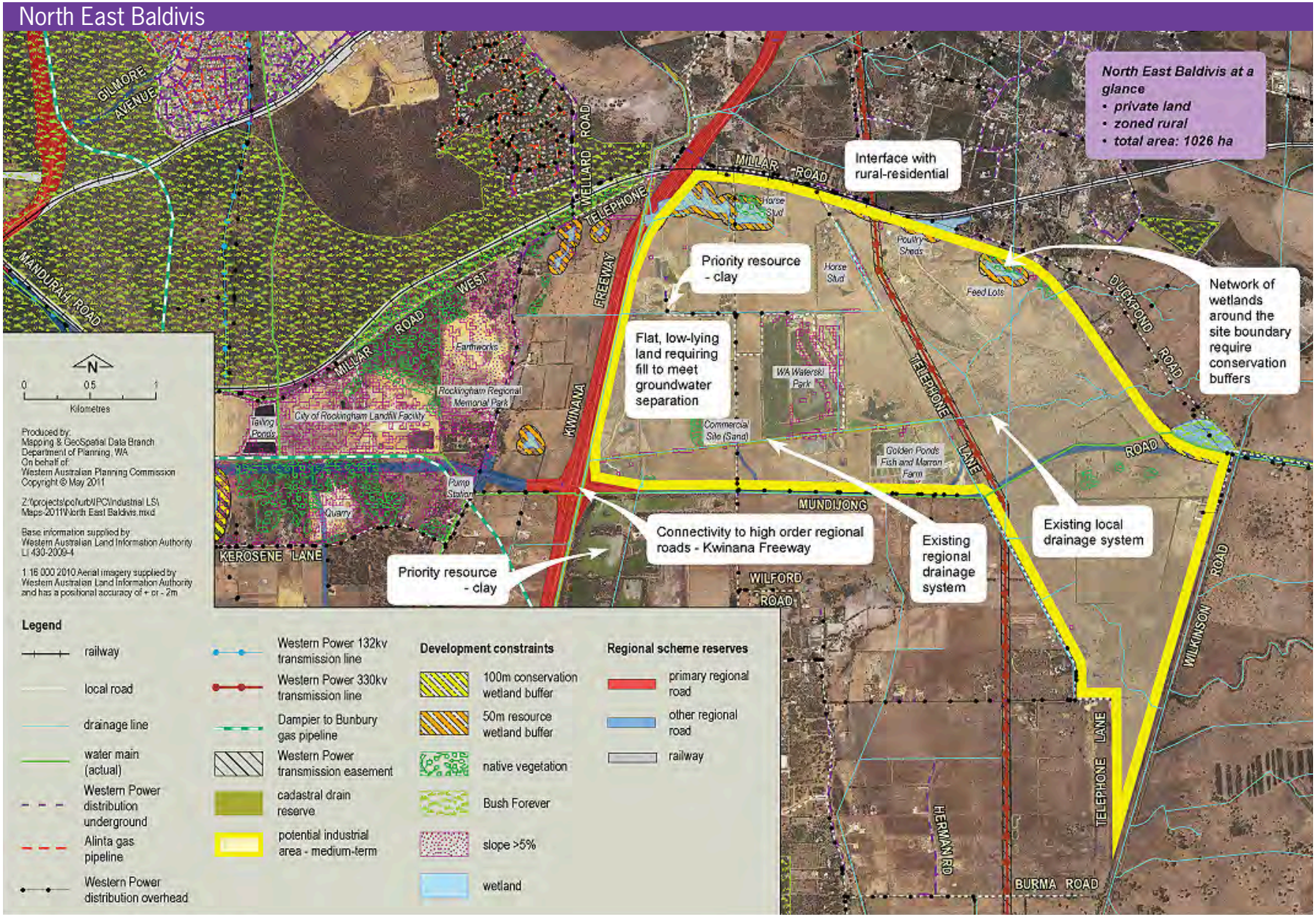
Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Infrastructure and servicing	12	Water Corporation indicated that water supply could potentially come from the Tamworth reservoir. However, further studies would need to be undertaken to identify the flows that could be supplied from this source. Further planning studies would need to be undertaken by the Water Corporation to confirm that the Rockingham WWTP is the most suitable option.	Up to 6 years from commencement to complete key infrastructure planning studies; including planning and construction of the proposed East Rockingham Waste Water Treatment Plan (target completion 2016).
	13	Undertake a Regional Transport Strategy that will help inform the rezoning process.	
	14	Undertake investigations on future demand for power and gas.	
Physical landform and soils	15	Undertake heritage surveys (Indigenous and European).	3 months to complete the preliminary site assessment for acid sulphate soils.
	16	Investigate whether land to the east of Kwinana Freeway contains raw materials worthy of protection and, if none found, exclude from basic raw materials policy area.	
	17	The majority of the area located east of Baldivis Road is noted as moderate to low risk for acid sulfate soils (ASS). Where significant earthworks are required, an acid sulphate soils assessment, and potentially an acid sulphate soils management plan to the satisfaction of the DEC, will be required.	
	18	Undertake floodplain investigations, to determine the amount of land that can be developed for industrial purposes and any related infrastructure requirements to avoid potential detrimental impact on the general flooding regime of the area.	

North East Baldivis



Issue	Latitude 32 stages 2 and 3
Land ownership	• 40 hectare concentrated LandCorp ownership within the Wattleup town site. However 10 remaining residential properties require acquisition. • Fragmented land ownership north and south of the Wattleup town site. • Majority of Stage 3 land owned by Cockburn Cement and currently being quarried for limestone.
Accessibility (incl. transport networks)	• Currently serviced by poor standard rural roads, which will require substantial upgrading and / or delivery of new transport network. • Restricted access available from Rockingham Road, due to the future construction of the Fremantle Rockingham Controlled Access Highway (FRCAH). • Upgrading and widening of Russell Road (including possible realignment) will be required. • Area currently not serviced by public transport.
Environmental sensitivities	• No known environmental sensitivities.
Topography/soil	• Some earthworks will be required at Wattleup town site, however, land is generally well graded for industrial development. • Stage 3 land is currently being quarried by Cockburn Cement. Extensive earthworks may be required to accommodate batters to new road and rail infrastructure and to provide separation to groundwater post quarrying. • No known acid sulphate soils present.
Potential land use conflict	• Wattleup town site is adjacent to existing market gardens within Stage 2, however, is well removed from major residential areas. • Stage 3 in close proximity to rural-residential community north-east of Latitude 32, which is already sensitive to Cockburn Cement's operations. • Increased industrial traffic movements on Russell Road may create conflict with new residential areas east of Latitude 32, near the Kwinana Freeway.
Priority natural resources	• Latitude 32 classified as a Priority Resource Extraction Area by the WAPC and will be subject to extensive quarrying over the medium to long term. • Rocla has lodged an exploration licence over the entire Latitude 32 area, which would provide them first right of access to materials on Crown Land, including road reserves within the Wattleup town site. • Cockburn Cement's quarrying operations at Stage 3 will cease over the next five years.
Conservation	• No known conservation issues.
Heritage	• No known heritage issues.
Site contamination	• Market garden land north and south of the Wattleup town site may have site contamination issues due to current and previous rural activities, however this should not affect development.
Service infrastructure accessibility	• Area currently poorly serviced by infrastructure. • Close proximity to new service infrastructure corridors in the Rockingham Road reserve, in particular sewer being constructed to service the Flinders Precinct. However, new pumping stations will be required. • Some electricity capacity within the Wattleup town site, however, overall development will require major power upgrades including new zone sub-stations. • Existing 300mm and 500mm distribution water mains will require extension from Rockingham Road and Russell Road corridors.

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Lattitude 32 stages 2 and 3

Issue	Latitude 32 stages 2 and 3
Close to work force	• South-west corridor is undergoing major population growth, with several major new urban developments in Kwinana, Cockburn and Rockingham, which have traditionally been blue collar workforce areas.
Design specifications	• The Latitude 32 District Structure Plan indicates a variety of lot sizes within Stage 2, ranging from Local Commercial Centre lots of 2500 m^2, General Industrial lots of 5000 m^2 and Transport Industry lots up to 5 hectares. • Anticipated lot sizes within Stage 3 range from 5000 m^2 – 5 hectares (General Industry). • Design guidelines will be required for each stage prior to development commencing.

Potential long term non-heavy industrial sites (strategic landbank)

Additional to the investigation areas and existing industrial estates, other sites were also identified which indicated some level of potential for further investigation in the longer term that would contribute to the strategic land bank for future industrial land supply.

It should be acknowledged that a number of these sites may already have existing uses that preclude industrial activity taking place in the medium to long term. In these instances the future uses of these sites will be based on the future needs of the sub-region as well as the results of detailed investigations and studies.

In the South-west sub-region, these sites are as follows:

Postans	Total area 159 ha

Land status: Government land (Agriculture WA), 2 x C Class Crown Reserves with management order with CEO for Agriculture.

The Medina research station is a support research annex in close proximity to the Department's metropolitan facilities. Subject to further planning work the Department may be able to consolidate research activities on around 60 ha, with the balance of the land being potentially surplus to requirements.

Current use: Research centre.

Environmental constraints: Limestone outcrop (approx. 80,000 m^3 rock on hill) and Spearwood sands – quality appears to range from armour to road base. Some existing vegetation on site though does not appear to be of any significance. Westernmost block has low grade limestone.

Transport linkages: Thomas Road.

Serviceability: Major sewer, gas and other infrastructure running through site (southern and eastern boundaries).

Latitude 32 Stages 4-10	Total area 952 ha

Land status: Highly fragmented land ownership. Limited LandCorp ownership (around 5%).

Zoning: MRS does not apply. Area subject to Hope Valley – Wattleup Redevelopment Act and Masterplan.

Current uses: Market gardens, turf farms, rural lifestyle, quarries.

Environmental constraints: Some wetlands, which are to be preserved. Potential for site contamination due to ongoing rural activities.

Transport linkages: Currently serviced by poor standard rural roads. Will require the provision of an extensive new transport network, including the construction of major arterial roads (Rowley Road, Fremantle Rockingham Highway, Anketell Road widening) and new local roads. Area currently unserviced by public transport. Kwinana – Midland freight railway line traverses the area, with Latitude 32 identified as a suitable location for a new intermodal freight terminal.

Serviceability: Existing ground levels, ongoing quarrying operations and the fragmented land ownership make servicing of Stages 4-10 very difficult in the short to medium term.

Potential land use hierarchy: Transport industry around major infrastructure (intermodal terminal, Rowley Road), supported by General Industry (capitalising on close proximity to Kwinana) and light industry on eastern and northern boundaries to minimise land use conflict.

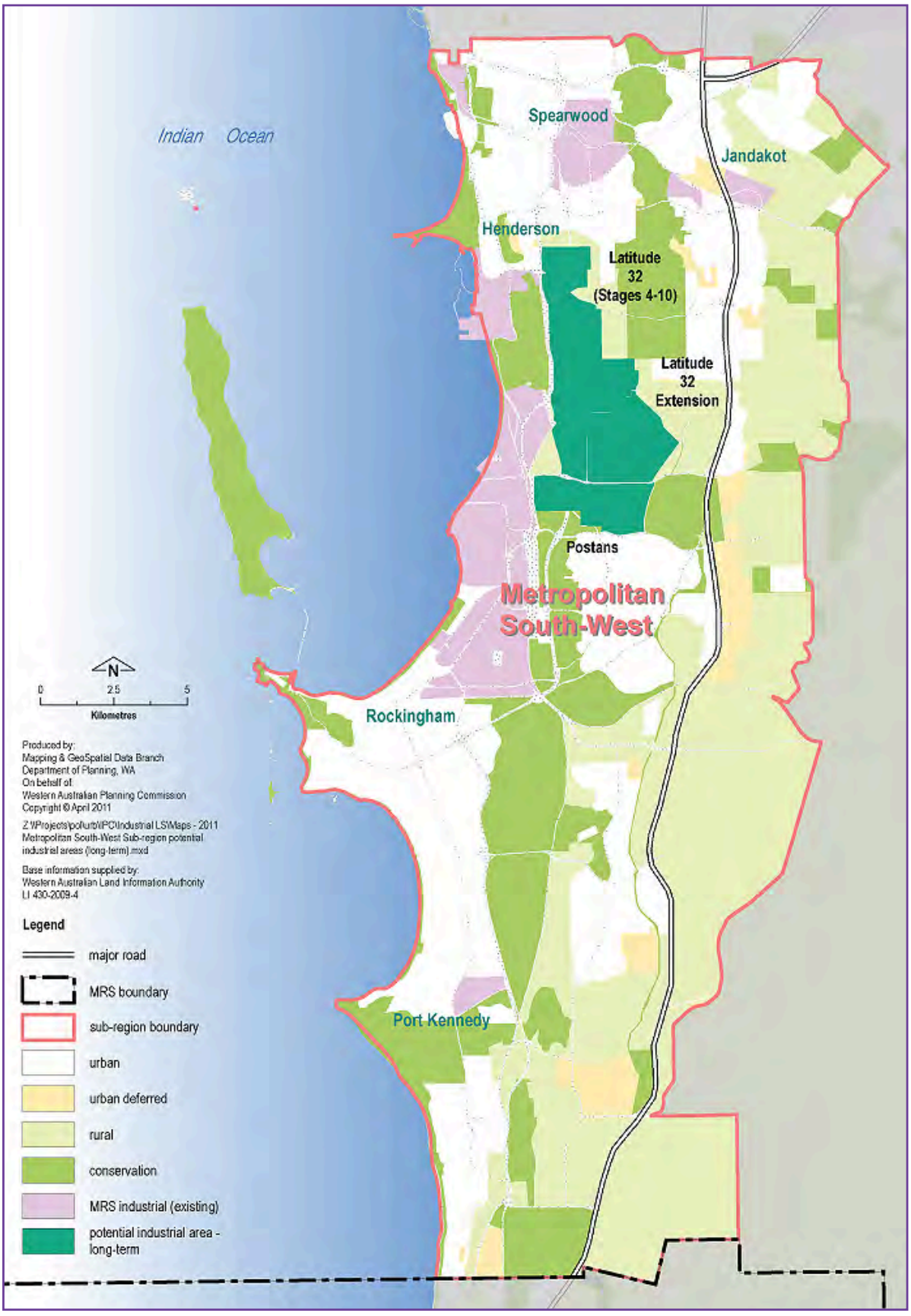


Figure 33: Metropolitan south-west sub-region potential non-heavy industrial areas (long term)

Latitude 32 Extension	Total area 400 ha

Land status: Fragmented Rural land around large Alcoa landholding. Highly dependent on Latitude 32 outcomes.

Zoning: MRS: Rural. TPS: Rural A and Rural B.

Current uses: Alcoa ponds mostly surrounded by natural bushland (Bush Forever) with some semi-rural, rural industry developments to the north east.

Environmental constraints: There is a threatened ecological community buffer area in the south western portion of the area.

Transport linkages and serviceability: Well developed access to rail and freight network roads due to adjacent existing industrial land.

Potential land use hierarchy: This area is well suited to the provision of both Consumer and Producer services (to improve employment self containment in Kwinana) as well as Strategic Export/Knowledge based industries pending the development horizon for the Alcoa industries and mud lakes. This area has excellent freight network route linkages and is also in close proximity to planned port facilities. The inclusion of an agri-food processing plant will be considered for this site, subject to compliance with town planning and zoning considerations.

South-west sub-region - long term outlook

Taking into consideration the anticipated growth of the metropolitan region, and major infrastructure upgrades associated with the Outer Harbour project and Latitude 32, the expansion potential of existing general industrial areas in the South-west sub-region will become critical to land supply and should be explored in greater detail.

Key planning actions for the south-west sub-region

Key Stakeholders	Actions
City of Cockburn City of Rockingham Town of Kwinana WAPC Department of Planning LandCorp Department of State Development	• Develop, in conjunction with local government, an economic development and employment strategy for the South-west sub-region. • Undertake a local demand assessment to determine the staging requirements for the release of land in line with population growth. • To consolidate future intermodal terminal location in the sub-region. • City of Rockingham to provide Cumulative Impact Assessment as part of the MRS rezoning process for the Rockingham Industrial Zone.
LandCorp Department of Planning Department of Environment and Conservation Department of Water Main Roads of Western Australia Water Corporation Office of Energy Alinta Gas Wester Power Heritage Council	• Undertake feasibility studies with respect to the identified medium term sites in the South-west sub-region and determine most appropriate delivery models and level of government involvement in this sub-region to facilitate industrial land development. • Complete structure planning for Latitude 32 and Rockingham Industrial Zone.
Water Corporation	• Complete construction of the East Rockingham waste water treatment plant. • Potential for water recycling plant at Port Kennedy.
Proponent/s and/or landowner/s Department of Planning Department of Environment and Conservation	• Consultation required for sites with buffers for conservation and resource enhancement wetlands. • Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands, if appropriate. • Undertake acid sulphate soil investigations. • Flora and fauna investigations. • Ascertain if any buffers to sensitive land uses are required.
Alinta Gas Western Power	• Infrastructure provisioning to facilitate development of the sites.
Main Roads Western Australia	• Improve east-west connectivity. • Upgrading and extension of Rowley Road, Anketell Road and Mundijong Road.
Proponent/s and/or landowner/s Department of Indigenous Affairs	• Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.
Proponent/s and/or landowner/s Department of Water	• Water management investigations and documents to be prepared in accordance with Better Urban Water Management (WAPC 2008).

Part 12 - Peel sub-region

The Peel sub-region comprises the City of Mandurah and the Shires of Murray and Waroona. The total area of zoned land in this sub-region is 199,950 hectares of which 3393 ha is zoned for industry in the Peel Region Scheme (1.7 per cent).

Demographic profile

The ABS 2010 estimated population in the Peel sub-region is approximately 89,656 people. The City of Mandurah has the highest population with 70,413 people. The second highest population is in the Shire of Murray with 15,401 people and then followed by the Shire of Waroona which has a resident population of approximately 3842 people (ABS, 2011). The population of the Peel sub-region is expected to increase to 133,000 by 2031.

The Peel sub-region differs significantly from `outer metropolitan Perth sub-regions as there has been a significant decrease in the number of people aged 20 to 30 years old and a greater increase in people aged 50 to 60 years over the last few years.

Planning profile

Mandurah is the primary strategic metropolitan centre for this sub-region, providing regional comparable retail, community and health services, and professional and business services for a large catchment. Mandurah city centre will continue to be the primary focus for commercial activity within the sub-region into the future.

Strategic Metropolitan Centres	Secondary Centres	District Centres
Mandurah	Pinjarra	Falcon Halls Head Lakelands Waroona Ravenswood (Riverfront)*

*emerging centre

Source: *Directions 2031 and Beyond*

Directions 2031 and Beyond aims to achieve an increase in dwellings from 38,000 in 2008 to 64,000 dwellings in the Peel sub-region by 2031.

Economic profile

The graph below represents the number of employees living in the Peel sub-region employed in the particular industry (green bar) represented against the number of jobs existing for that industry in the sub-region (blue bar).

Compared to other sub-regions, there is strong representation of the manufacturing, construction and retail trade employment sectors, with health care and social assistance and education and training being the second tier of sector employment providers in the sub-region.

The Employment Self Sufficiency (ESS) for this sub-region is currently 71 per cent. *Directions 2031 and Beyond* identified an ESS target of 80 per cent for the Peel sub-region. This target translates into the need for an additional 36,000 to 56,000 jobs in this sub-region over the next 25 years.

The Peel sub-region will continue to grow and perform strongly, given the potential development opportunities that exist as well as an increasing population base.

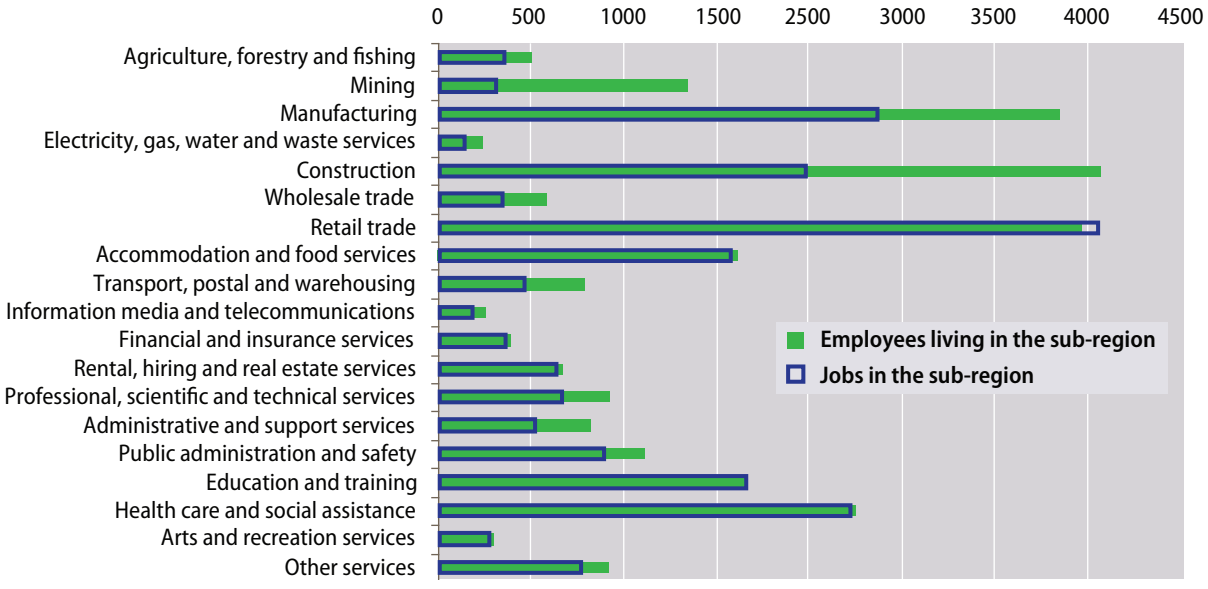
Physical infrastructure

The Peel sub-region continues to experience rapid growth, which will place increasing pressures on existing infrastructure and increase the need to provide for additional key infrastructure to service the growing region into the future.

Water

The greater Mandurah wastewater catchment currently comprises treatment plants at Gordon Road, Halls Head, Caddadup and Pinjarra. With forecast rapid population growth, and current maximum operating capacities nearing their threshold, there will be a need for an increase in treatment and conveyancing capacity. Wastewater planning for the greater Mandurah area catchment is currently being reviewed by the Water Corporation.

The Department of Water has released the draft Murray Drainage and Water Management Plan which aims to facilitate development that embraces total water-cycle management principles and water sensitive urban design (WSUD) best-management practices. It provides a framework for future planning and development



Source: 2006 ABS Census of Population and Housing

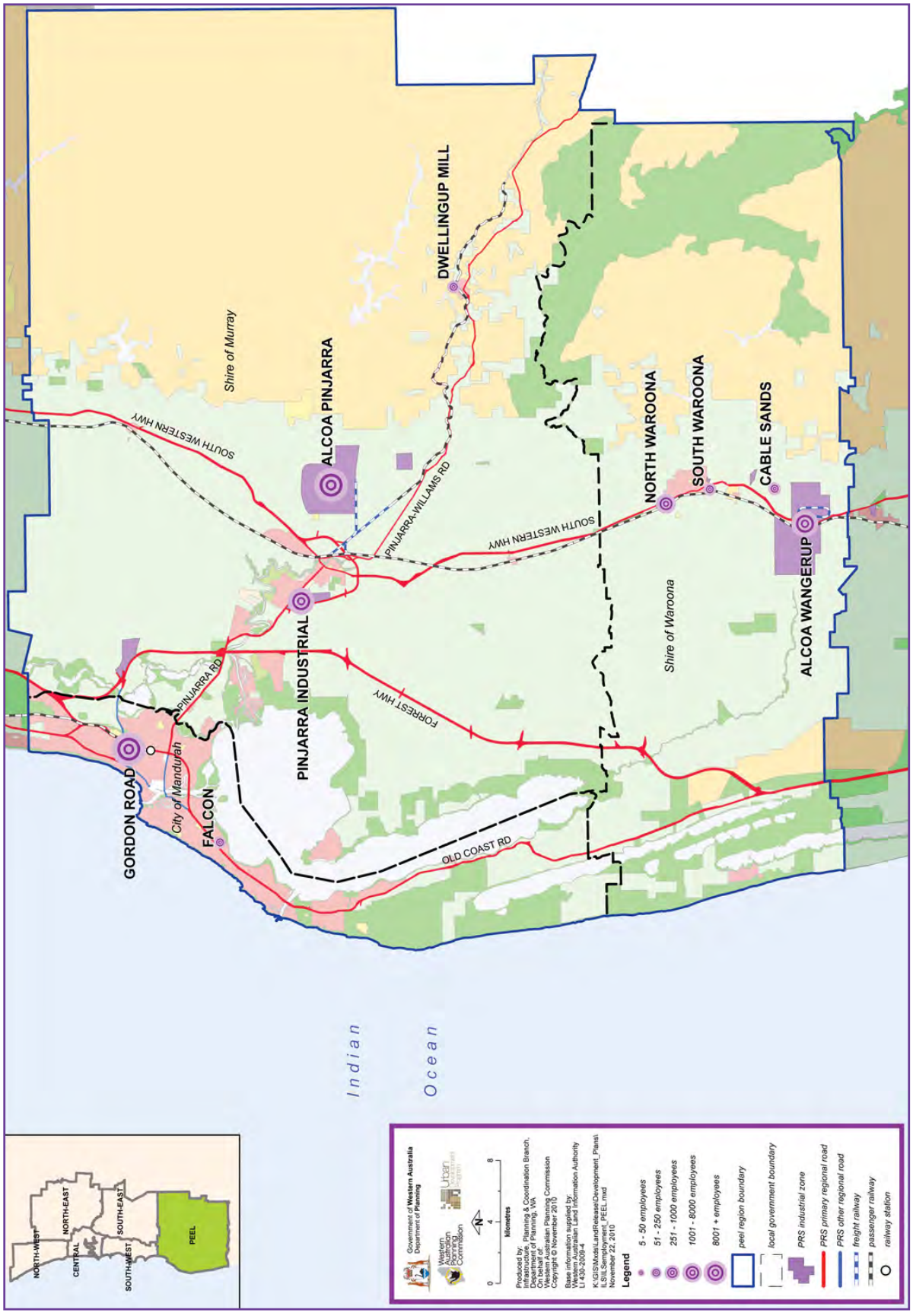


Figure 34: Industrial employment centres - Peel region

associated site-specific water management strategies and plans. The plan has been undertaken at a sub-regional scale and does not absolve proponents from undertaking detailed design studies and meeting all other statutory requirements, during the planning phase of development.

Energy

Additional energy infrastructure will be required to service the growing population. The Department of Planning and Western Power have developed a Network Capacity Mapping Tool that shows electricity capacity and utilisation as a result of land/building development and the future planning capacity of electricity infrastructure.

Road and freight network

Within the Peel sub-region there are some key freight and regional road routes that provide access from the metropolitan area to the South West. The recent opening of the Kwinana Freeway/Forrest Highway has resulted in improved road access to the South West of WA. Freight traffic can now travel via this route rather than along Old Coast Road.

Industrial and employment land in the sub-region

The Oakley and Wagerup strategic industrial centres, being Alcoa's Pinjarra and Wagerup refineries, underpin much of the industrial activity within the sub-region. The mineral processing plants generate substantial export revenue for the sub-region, and offer the opportunity for a number of support industries to operate within the region, boosting its employment base.

The Nambeelup industrial area, located approximately 10 kilometres north-east of the Mandurah city centre, will become increasingly important to the sub-region and its establishment and expansion are regarded as a high priority. Work is presently underway to prepare a District Structure Plan for the Nambeelup core industrial area and its outer extent.

Future industrial land supply in the sub-region

The strategy has identified locations where possible industrial sites may be considered, to accommodate future demand and economic growth. The future drivers for the Peel sub-region are considered to be:

- Population growth;
- Sustained levels of economic growth and employment targets;
- Proximity to existing infrastructure including Kwinana Freeway and Forrest Highway;
- Availability of land for development; and
- Affordability of land relative to Perth Metropolitan land.

The population forecast for this sub-region by 2031 is estimated to be 133,000 people.

The industrial land supply in this sub-region to 2031 is represented as shown in figure 35.

With a forecast demand of 910 ha by 2031, and based on existing data on the available supply in the pipeline, the sub-region will encounter a deficit of 544 ha if no additional land is released to the market by 2031.

The provision of sufficient industrial land will be dependent upon arrangements being made to provide suitable service infrastructure for priority industrial areas, such as Nambeelup.

The strategy has identified possible industrial investigation sites or areas within the Peel sub-region. These investigation areas are not currently zoned "Industrial" in the Peel Region Scheme. Further planning and environmental investigations are required for all sites and the developable area and lot configuration of these sites are subject to change. These sites have been categorised into anticipated zoning timeframes, however, these timeframes are also subject to change and dependent upon various factors, including proponents' willingness to progress the necessary planning, environmental and servicing investigations to support rezoning proposals.

Name	Zoning Status (PRS)	Stage (if relevant)	Gross Area
Future short term non-heavy industrial sites (0-4 years)			
N/A			
Potential medium term non-heavy industrial sites (4-10 years)			
Greenlands Road	Rural	N/A	295 ha
Nambeelup	Rural	N/A	1148 ha
West Pinjarra	Rural	N/A	229 ha
		Total gross area	**1672 ha**

*Note: The areas provided in this table exclude land that already is zoned "Industrial" in the Peel Region Scheme. Please note that the total areas of these sites are still subject to investigation.

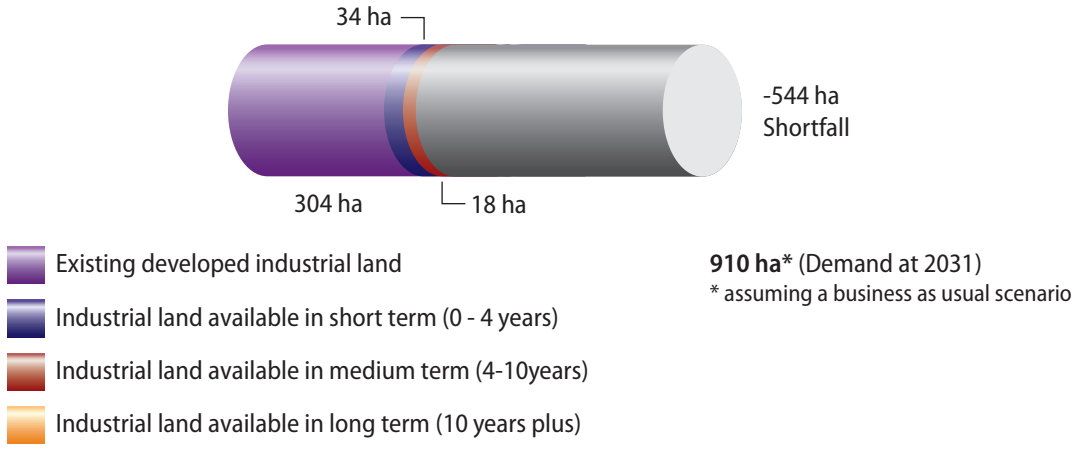


Figure 35: Current non-heavy industrial zoned land supply: Peel sub-region
(Source: Property Council of Australia)

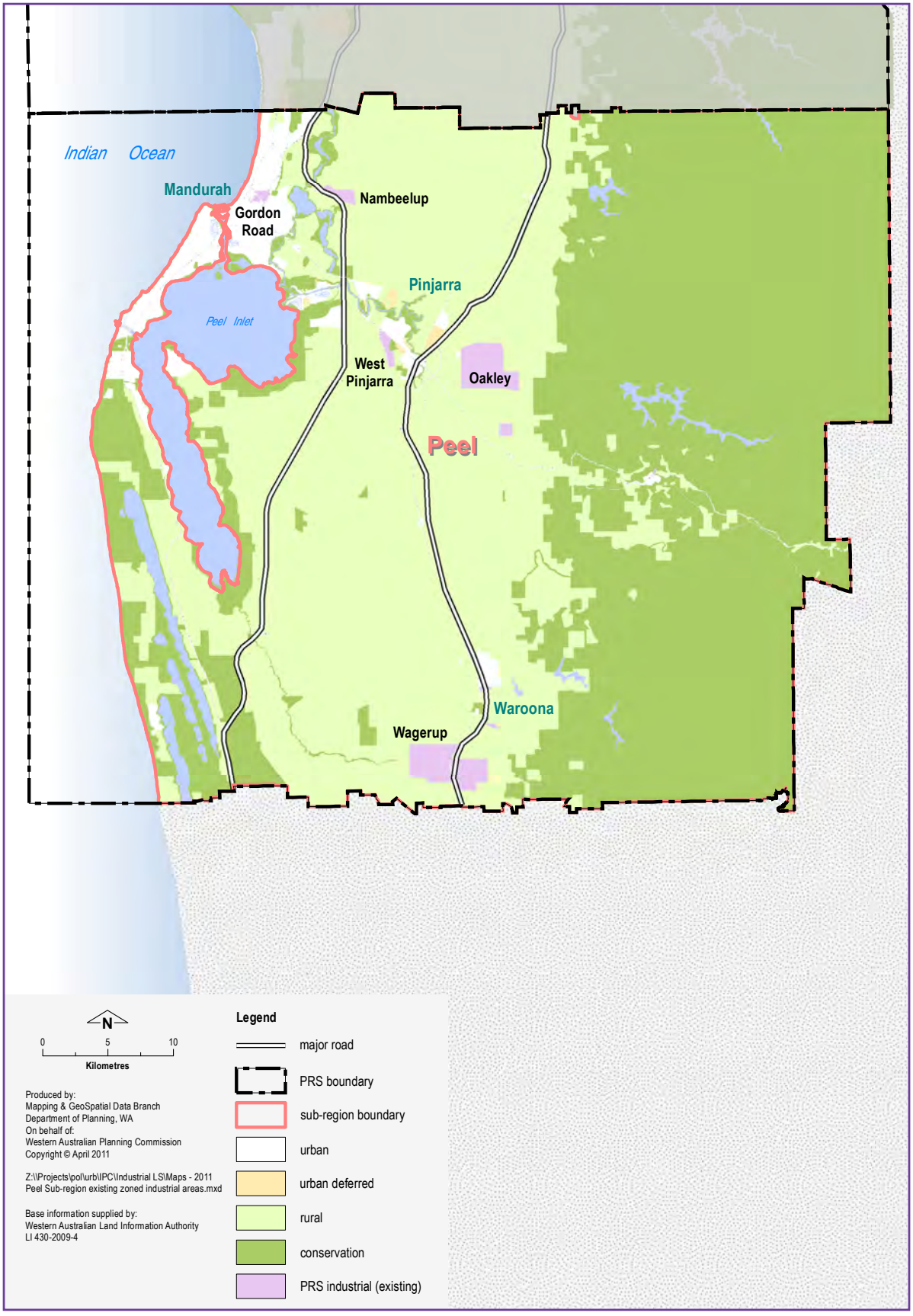


Figure 36: Peel sub-region existing zoned industrial areas

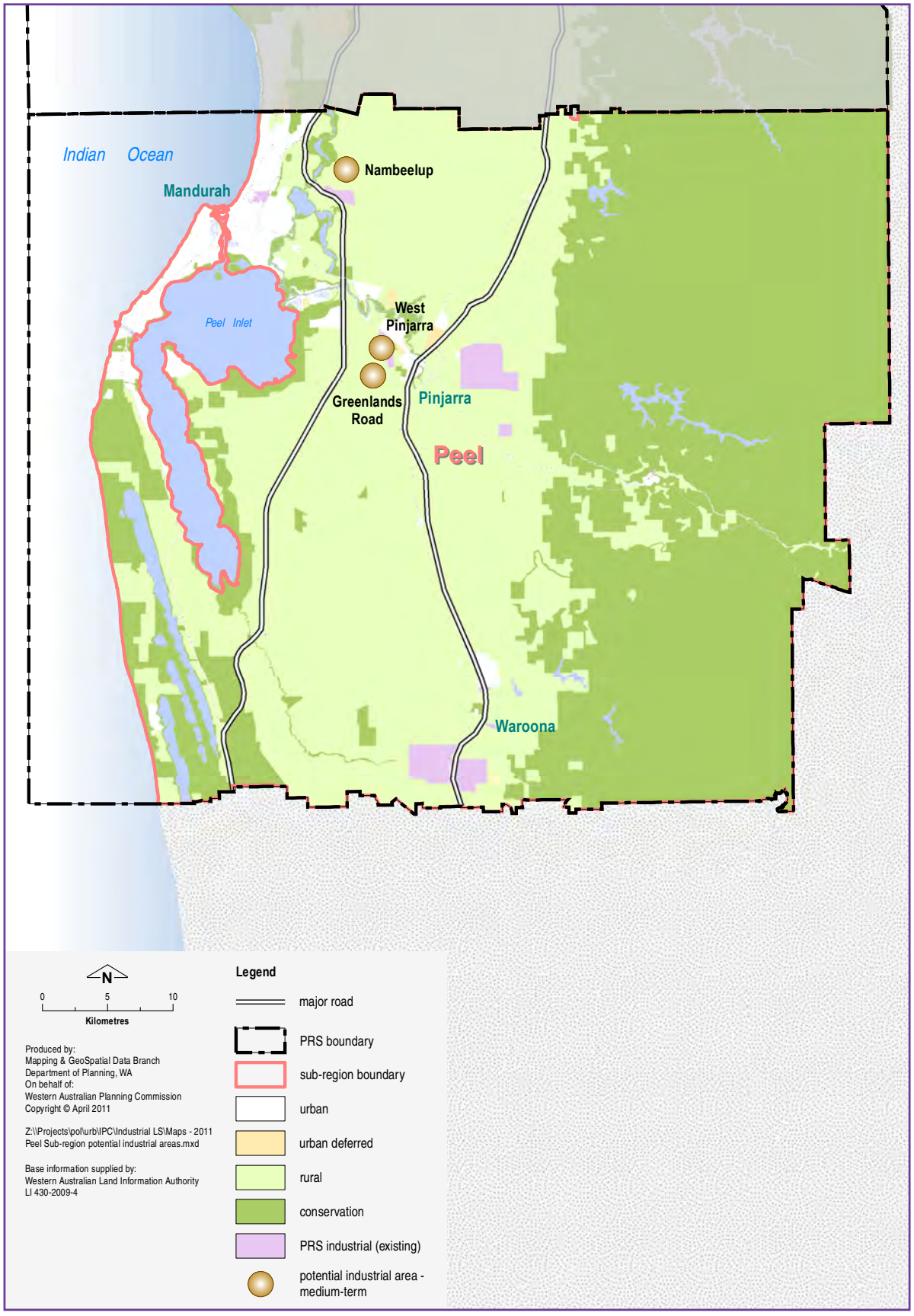


Figure 37: Peel sub-region potential non-heavy industrial areas

Peel sub-region possible future non-heavy industrial sites

The following section provides an overview of the possible industrial sites that have been identified as part of the strategy, to support future growth and demand in the Peel sub-region. The sites are defined by three separate categories: future short term industrial sites, potential medium term industrial sites, and potential long term industrial sites (strategic landbank sites).

It should be noted that the final configuration of all industrial areas within the Peel region, particularly the Greenlands Road site, will be determined through the South Metropolitan Peel Structure Plan. The draft structure plan is currently being prepared.

Future short term non-heavy industrial sites

There are no potential short term industrial sites identified within the Peel sub-region as part of this strategy. It should be noted however that land from the existing zoned Nambeelup industrial area is likely to be released to the market over the short term.

Potential medium term non-heavy industrial sites

In the Peel sub-region, two sites (Greenlands Road and Nambeelup) have been identified which have Government support for further planning investigation and removal of constraints, subject to the recommendations of more detailed investigations into their feasibility. West Pinjarra is also identified as becoming available in the medium term. However, investigative work for this site has not been as extensive as that for Greenlands Road and Nambeelup. Each of these is described in the following section.

Issue	Greenlands Road
Land ownership	• Owned by one private landowner and five private companies. Largely in the ownership of companies, land assembly issues are not likely to be an impediment, depending upon landowner willingness to consider alternative land uses. • The site is predominantly utilised for rural/ agricultural purposes, with some existing industrial land located nearby.
Accessibility (including transport networks)	• Serviced by effective transport linkages with frontages to the South-Western Highway, Pinjarra Road, the Perth-Bunbury Highway and Greenlands Road ensures the site has access to an appropriate road network for both freight and employment within the area. • Existing rural residential development lies within close proximity to the site. This is likely to provide increased incentive to developers and businesses to undertake activities within the area as population growth in the area is evident. • Existing industrial development lies within close proximity to the site.
Environmental sensitivities	• The site is predominantly cleared of native vegetation. Two small stands of remnant vegetation remain on the site in the centre and northwest. • The site is generally unconstrained by environmental issues apart from a small conservation dampland. Providing the development can avoid the conservation dampland and adequately address drainage requirements environmental impacts and associated approvals will not be a significant consideration. • The site falls within the Peel-Harvey Water Catchment area.

Issue	Greenlands Road
Topography/soil	• Soils in the area are characterised by Bassendean sands in the western portion of the site and sandy clay Guildford pockets in the eastern section of the site. • The site is predominantly flat and low lying. With more than 90 per cent of the site having a slope of less than 1 per cent, the site may present some difficulties for drainage. With the site being seasonally waterlogged and likely to consistently require fill of 1 m (average) appropriate treatment of stormwater, groundwater and drainage will be necessary. • Land will require significant fill.
Potential land use conflict	• There is an existing rural residential area immediately north of the 'potential industrial area' north of Greenlands Road.
Conservation	• The whole area is a seasonally waterlogged palusplain multiple-use geomorphic wetland. A conservation category dampland is located within the centre of the site. Development is constrained within the conservation dampland and its buffer area (100m).
Heritage	• There are no registered areas of aboriginal or cultural heritage significance within the site.
Site contamination	• No contaminated sites exist within the investigation area on the DEC Contaminated Sites database, however, a site immediately to the east of the area is noted as having contaminated soils and groundwater. The contaminated area was the site of a canola processing plant and contamination has been identified in the area. The extent of contamination into the Greenlands investigation site is not known; further investigation to the site contamination is recommended. Development which requires significant earthworks in the area will require a preliminary site assessment for ASS and potentially an ASS management plan.
Service infrastructure accessibility	• No water supply infrastructure currently exists within the site. Water supply in the surrounding areas is complicated and a Regional Water Strategy Scheme is currently being undertaken for the area. Further studies would be required to determine preferred sources. • There is no wastewater infrastructure currently existing within the site. At present wastewater in adjacent areas is being conveyed to the Pinjarra WWTP, however, due to capacity issues, this is a short term option. • Overhead power distribution (132kV) is present at the site and a number of transmission lines run north-south to the east of the site. • The Pinjarra substation is located approximately 8 km from the proposed area, but mainly caters for the underlying growth of the area. This substation should be able to meet the initial demand from the proposed industrial area. Western Power will monitor the demand growth to the area to be in the position to cater for the additional demand as it grows. • Limited gas supply. While there is a natural gas distribution network in the townsite of Pinjarra that is about 3.2 km away, this network does not currently have the capacity to service this potential industrial site. • In June 2011 the Department of Water released the final Murray Drainage and Water Management Plan (DWMP) to provide district level water management guidance with respect to groundwater, surface water and flood protection. The DWMP will inform subsequent district and local planning and development decisions for the area and provide guidance for the preparation of water management documents in accordance with Better Urban Water Management (WAPC 2008). • Water management investigations and documents will need to be prepared in accordance with Better Urban Water Management (WAPC 2008).
Close to workforce	• The Pinjarra townsite and Mandurah are located close to the subject site, and are likely to provide the necessary workforce for future use.
Design specifications	• Local planning scheme and policy requirements will need to be formulated.

Preferred uses and potential end users

While there may be demand for some minor consumer services within the site, and a need for light/service industry, the majority of the site is envisaged for General Industrial uses providing Producer Services including warehousing and distribution (storage and display of goods on a wide variety of lot sizes) and transport and logistics (depots and distribution centres on large lots, material management including disposal and recycling). The site is well placed to accommodate high technology/smart/automated systems that will need to expand at later phases of sequential development.

Agri-food processor uses will be investigated for this site due to its proximity to South West rural producers, as well as proximity to good existing transport networks.

Key actions - Greenlands Road

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Undertake a local demand assessment to determine the staging requirements for release of land in line with other industrial development existing and proposed at West Pinjarra and Nambeelup.	Up to 10 years from commencement to complete key planning related actions (these are contingent upon completion of key infrastructure studies).
	2	Following completion of various structure planning and environmental investigations, initiate amendment to the Peel Region Scheme to rezone the site from 'Rural" to "Industry". A corresponding amendment will be initiated to the Shire of Murray Local Planning Scheme No.4 to rezone the site from "Rural" to "Industrial Development".	
Environment	3	An investigation into the environmental impacts of any proposed development and examination of buffer requirements for the identified conservation damp land will be needed.	Up to 3.5 years from commencement to complete key environmental actions.
	4	Drainage studies required given relatively flat topographical profile of site.	
	5	A District Water Management Plan will be required to demonstrate that the area is capable of supporting the change in land use, identify areas required for water management and future investigations more appropriately manage stormwater in a sustainable manner throughout the proposed development. This would need to be prepared in conjunction with Department of Water and involve the requirement for monitoring of surface water and groundwater for a minimum period of 18 months. *note: Water Management Plan should include proposals to promote the capture, storage, treatment and environmentally responsible disposal and/or reuse of stormwater. The Department of Water has released the draft Murray Drainage and Water Management Plan (DWMP) to provide district level water management guidance with respect to groundwater, surface water and flood protection. The DWMP will inform subsequent district and local planning and development decisions for the area and provide guidance for the preparation of water management documents in accordance with Better Urban Water Management (WAPC, 2008).	
	6	Undertake a flora and fauna survey.	

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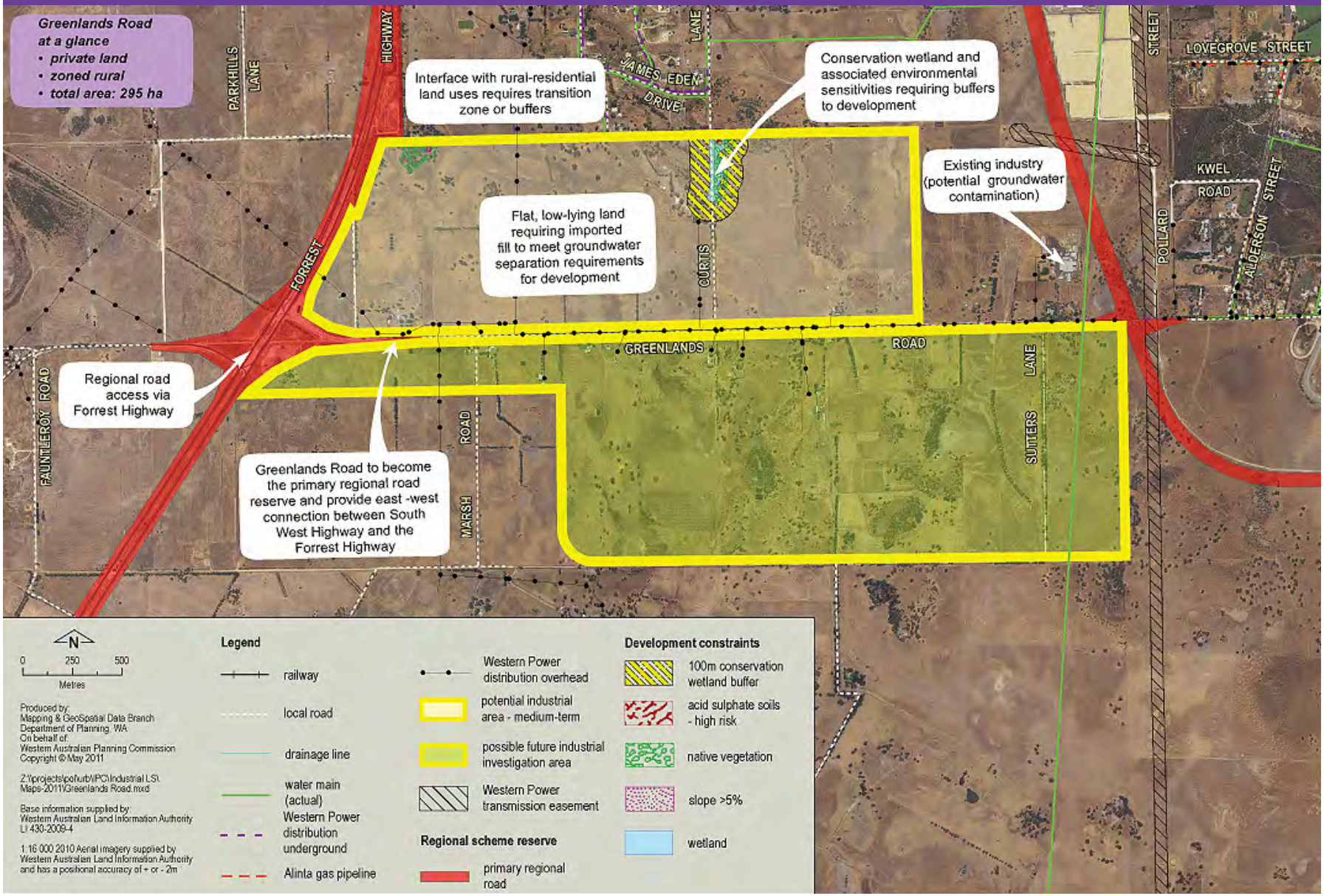
Greenlands Road



Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Infrastructure and servicing	7	The Water Corporation has indicated that it is unlikely that the supply would not come from the trunk main. A planning study would need to be undertaken by the Water Corporation to determine the potential for utilising this main as a water supply to the development.	Up to 9 years from commencement to complete key water and sewer infrastructure studies and complete construction/ delivery of required supply and trunk infrastructure.
	8	Water Corporation would need to undertake a planning study to look at the options and feasibility to service this area for wastewater treatment and disposal purposes.	
	9	Investigations into the upgrading of the existing gas network connection from the Pinjarra town to meet future capacity demands need to be looked at by Western Power.	
Physical landform and soils	10	Undertake an Acid Sulphate Soils investigation and prepare an Acid Sulphate Soils Management Plan if acid generating material is identified.	Up to 6 months from commencement to assess the fill requirements.
	11	Soil and groundwater investigations are undertaken for all sites with potential contamination and management plans are prepared and implemented in accordance with guidelines issued by DEC's Contaminated Sites Branch.	
	12	Undertake heritage surveys (indigenous and European).	

Issue	Nambeelup
Land ownership	• The majority of land within the Nambeelup site is in private ownership, with three properties being owned by private landowners and five properties owned by private companies. LandCorp also owns one of the super lots (120 ha). Land assembly is not likely to be an impediment as the land is currently in large landholdings 40 – 200 ha parcels. • The majority of the site is currently vacant land, formerly used for grazing, with exception of an operating piggery and a composting facility in the north-eastern portion of the site, a concrete batching plant on Lot 604 Lakes Rd and a disused abattoir on a portion of Lot 1 (north-western part of the site). An existing kennel estate is located in the central part of the Nambeelup area, which consist of 32 individually owned 2 ha lots. Consideration is being given for inclusion of the Nambeelup park kennel estate as part of the longer term industrial investigation area within the Nambeelup District Structure Plan currently being prepared by the DoP. Further to the east of the kennel estate is Murrayfield Airpark which currently serves as a small aircraft aerodrome for the Peel sub-region.
Accessibility (including transport networks)	• Perth-Bunbury Highway provides direct connection to Perth in the north and Bunbury in the south. • Lakes and Paterson/Gull Roads provide good east-west and north-south access to Mandurah, Pinjarra and future Keralup development. Due to importance of Lakes and Paterson Roads it is likely that these roads will become "Other Regional Roads" and will be widened and upgraded to the required standard in order to accommodate the long-term development needs of the sub-region.
Environmental sensitivities	• The site is mostly cleared but retains remnants of native vegetation. • High groundwater level is the characteristic of the whole Nambeelup area. Placement of fill and subsoil drainage would be required at the development stage to achieve adequate separation of development to groundwater. • The majority of land within the Nambeelup area is classified as a "Multiple Use Wetland". DEC mapping also shows "Resource Enhancement Wetlands" and 'Conservation Category wetlands' (CCW) within the site. Some properties also contain EPP lakes. • Further work will be required to be undertaken in relation to CCW's on individual lots prior to any development in order to determine wetland boundaries, buffer distances and specific management requirements.

Issue	Nambeelup
Topography/soil	• The majority of the site is classified as Bassendean Sands with underlying Guilford Formation clays. Portions of the site are prone to inundation with groundwater being close to the surface, therefore, management of high groundwater levels and drainage is a significant issue. • The majority of the land within the Nambeelup area is classified as 'having moderate-to-low' risk of ASS occurring within 3 m of natural soil surface. However, there are some occurrences of high-to-moderate risk, mainly within land abutting Nambeelup Brook and waterlogged areas. • Acid sulphate soils reports would be required prior to development on properties with 'High to Moderate' risk of acid sulphate soils (ASS). Such reports should provide detailed information on the likely presence and distribution of the ASS on the property and also demonstrate the capacity of land to sustain the proposed land uses. • Fill required to be imported from off-site.
Potential land use conflict	• The area is adjacent to existing key freight network route linkages. • Suitable interface with the freeway, regional roads, future residential development at Keralup and surrounding rural residential areas will be an important consideration during detailed planning stages for Nambeelup Industrial Estate. • Existing kennel estates are located in the centre and to the east of the Nambeelup site. As these estates contain residential dwellings, careful consideration will need to be given to the types of industrial uses in the vicinity to ensure any potential off-site impacts are acceptable. Consideration is being given to rezoning and developing the Nambeelup Kennel Park for industrial purposes in the long-term. • Also off-site impacts and buffers of existing uses in Nambeelup, such as the piggery and composting facility, Murrayfield aerodrome, abattoir (currently not in operation) and a concrete batching plant need to be considered during detailed planning stages.
Conservation	• A number of Conservation Category and Resource Enhancement wetlands are found within the Nambeelup Industrial project area. • Populations of threatened and priority flora species may exist. Further detailed flora surveys would be required during the rezoning stage on individual landholdings.
Heritage	• An artefact scatter site on Lot 11 Lakes Rd (Murrayfield Airfield gravel airstrip) was found in the course of the 2005 work previously undertaken for the WAPC. Also Serpentine River (Permanent Listing) and Nambeelup Brook (Stored Data listing) are two registered sites located along the western and southern boundaries of Nambeelup area. These sites are not likely to be an impediment to future industrial development, however consultation with the DIA may be required and any obligations under the Aboriginal Heritage Act 1972 will be required to be observed by developers. • There are no known sites of European Heritage at Nambeelup.
Site contamination	• There are two contaminated sites registered on DEC's Contaminated Sites database at Nambeelup, being Lots 89 & 109, which contain a piggery and compost/waste management facility operations. • Groundwater and soil beneath these sites have been monitored for several years as required by the licence conditions. Soil investigations found elevated levels of nutrients and ground water investigations revealed higher levels of ammonia concentrations. The sites are classified as Contaminated - restricted use, which would not be an impediment for any future industrial uses, however further testing/analysis should be carried out if any groundwater extraction is proposed.

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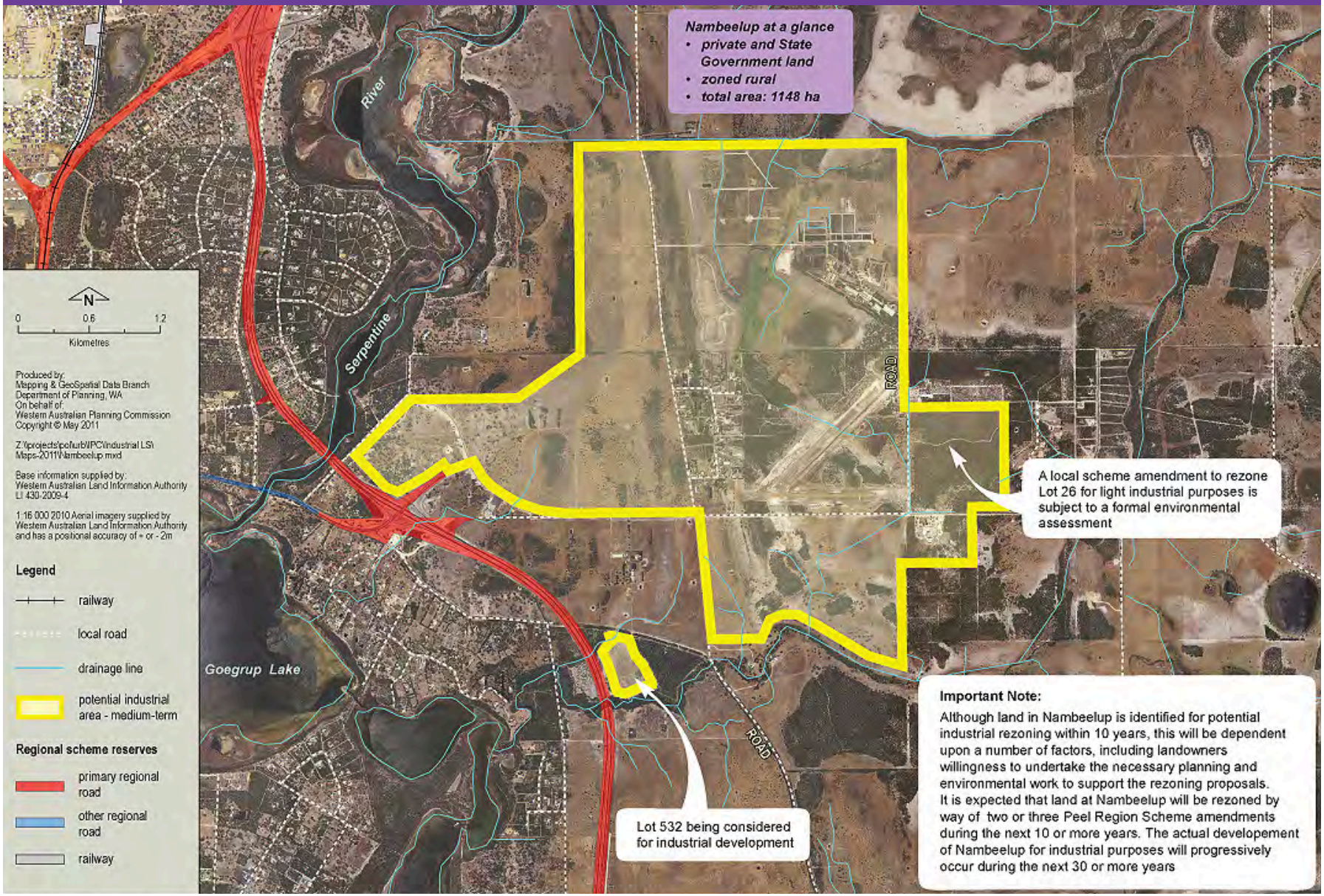
Issue	Nambeelup
Service infrastructure accessibility	• Provision of services is one of the main impediments to future industrial development in Nambeelup, as currently there are no services to the site and the extension of services will be at the developers' cost, which may be cost prohibitive. • Water Corporation is currently undertaking an investigation into the most appropriate strategy for provision of water services to Nambeelup and Keralup areas. • The Stirling Dam Trunk Transfer Main – DN1400 is located to the east of the site. Water Corporation also has recently constructed an additional DN 1400 trunk main in Lakes Road to support the supply to the Mulga Drive High Level Water Tank. Water Corporation advises that a direct connection to this main would not be possible. At this stage there is no detailed planning for supply of potable water to Nambeelup. • Mandurah Lateral Gas pipeline was recently installed and is running east-west through the centre of Nambeelup along Redheads Road. There is an opportunity to connect to this pipeline, however, pressure reduction infrastructure would be required to be constructed. • Western Power is currently investigating possible options for provision of power to the site. It is likely that a new substation will be required to be located centrally in Nambeelup in the vicinity of Lakes and Paterson Roads intersection.
Close to workforce	Nambeelup is located 10 km from Mandurah City Centre and approximately 12 km from Pinjarra, and is also abutting Keralup development site to the north, which is predicted to achieve up to 90,000 population when fully developed. Nambeelup Industrial Area would play a major role in achieving employment self-sufficiency target of 80 per cent identified for the Peel sub-region in *Directions 2031 and Beyond*.
Design specifications	Local planning scheme, policy requirements and design guidelines will apply.

Preferred uses and potential end users

This area is well suited to the provision of both Consumer and Producer services as well as Strategic Export/Knowledge based industries. The inclusion of agri-food processor uses will be investigated for this site due to its proximity to South West rural producers and proximity to existing transport networks.

Nambeelup


Nambeelup at a glance
• private and State Government land
• zoned rural
• total area: 1148 ha
River
Serpentine
ROAD
ROAD
Goegrup Lake
A local scheme amendment to rezone Lot 26 for light industrial purposes is subject to a formal environmental assessment
Lot 532 being considered for industrial development
Important Note:
Although land in Nambeelup is identified for potential industrial rezoning within 10 years, this will be dependent upon a number of factors, including landowners willingness to undertake the necessary planning and environmental work to support the rezoning proposals. It is expected that land at Nambeelup will be rezoned by way of two or three Peel Region Scheme amendments during the next 10 or more years. The actual developement of Nambeelup for industrial purposes will progressively occur during the next 30 or more years
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Kilometres
Produced by:
Mapping & GeoSpatial Data Branch
Department of Planning, WA
On behalf of:
Western Australian Planning Commission
Copyright © May 2011
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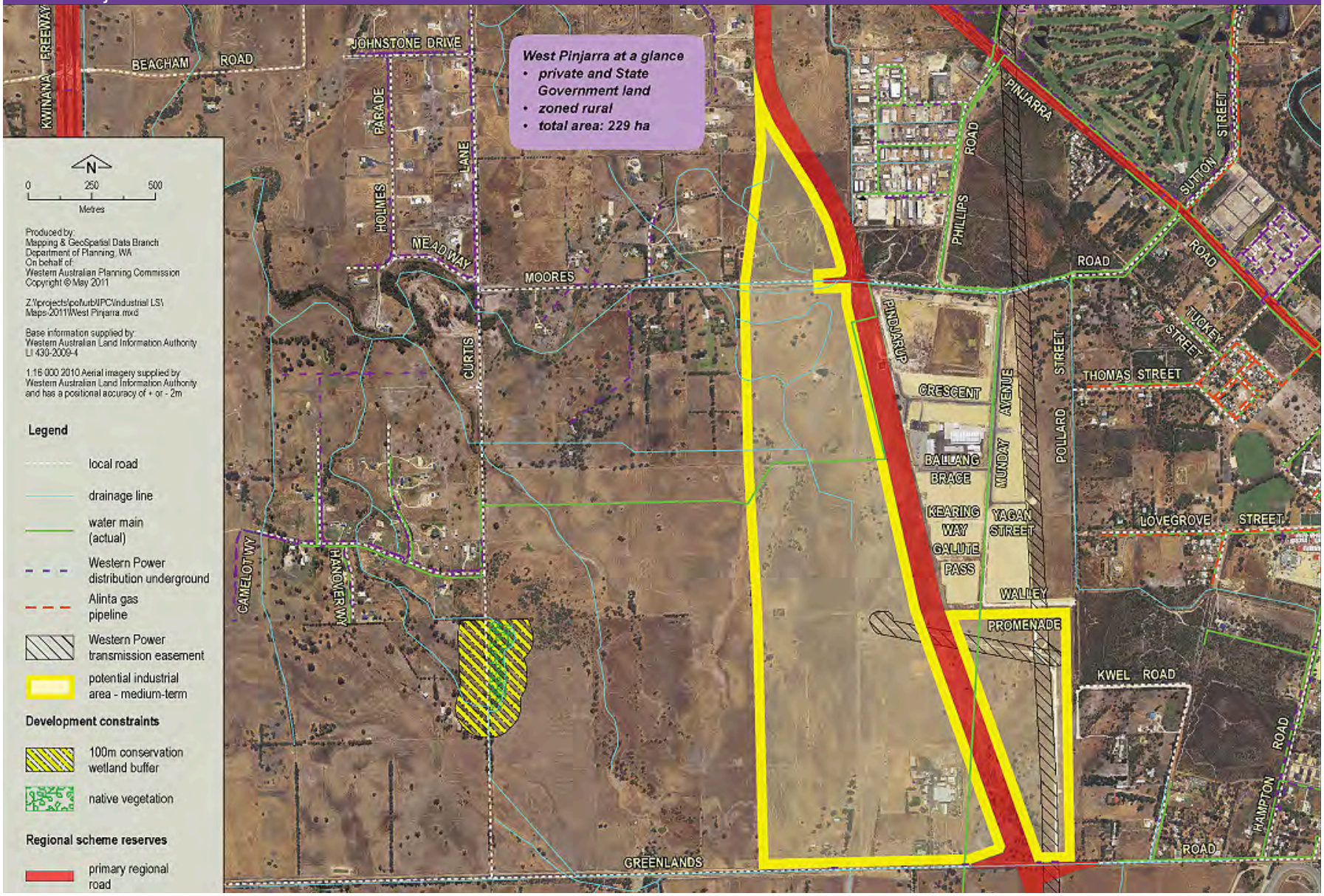
Base information supplied by:
Western Australian Land Information Authority
LI 430-2009-4
1:16 000 2010 Aerial imagery supplied by Western Australian Land Information Authority and has a positional accuracy of + or - 2m
Legend
railway
local road
drainage line
potential industrial area - medium-term
Regional scheme reserves
primary regional road
other regional road
railway

Nambeelup - Key actions

Technical Issue/Criteria	Action	Key Action	Delivery Timeframes
Planning and land use	1	Peel Region Scheme amendments to rezone various stages/properties within the Nambeelup Industrial Area from Rural to Industrial, will be initiated following completion of relevant planning and environmental investigations.	Up to 18 months from commencement to complete key planning actions.
	2	Amend the Local Planning Scheme to appropriate industrial zoning.	
	3	Prepare and finalise a District Structure Plan (DSP) for Nambeelup Industrial Area (NIA).	
Environment	4	Prepare District Water Management Strategy to support the NIA DSP.	Up to 2 years from commencement to complete key environmental actions.
	5	Environmental Report to be prepared as part of the DSP process, which would help to identify critical environmental issues, areas required to be protected, provide recommendations on location of public open space, buffer distances and setback requirements from environmentally sensitive areas.	
	6	Wetland assessment and management plan.	
	7	Undertake flora and fauna surveys.	
Infrastructure and servicing	8	Servicing Report to identify options for provision of necessary essential services to Nambeelup. Servicing Report will be done as part of the NIA DSP preparation process and would include initial liaison with the major service providers.	Up to 2 years from commencement to complete key infrastructure studies.
	9	Water Corporation to investigate and plan for provision of potable water and sewerage services to Nambeelup Industrial area.	
	10	Undertake investigations on future demand for power and gas.	
	11	Traffic/Access report to be prepared as part of the NIA DSP, which will also review any available background information and also previous traffic modelling and reports in relation to Keralup site. This report will provide conclusions and recommendations in relation to the regional traffic implications, road layout for NIA, road reserves, intersection treatment/ spacing, staging, etc.	
Physical landform and soils	12	Undertake an Acid Sulphate Soils investigation and prepare an Acid Sulphate Soils Management Plan if acid generating material is identified.	Approximately 3 months to complete preliminary site assessment for acid sulphate soils.
	13	Undertake heritage surveys (Indigenous and European).	

Issue	West Pinjarra
Land ownership	• Ownership includes two private landowners, three private companies, LandCorp and the State Government. Land assembly issues are not likely to be an impediment, depending upon landowner willingness to consider alternate land uses. • The extension area is predominantly utilised for rural/ agricultural purposes, with one of the lots for industrial use. • The West Pinjarra area abuts the existing industrial area, which includes LandCorp's recently created Pinjarra Industrial Estate along with the Pinjarra industrial area. In total the existing area is in the order of 145 ha.
Accessibility (including transport networks)	• Serviced by effective transport linkages with routes along the South-Western Highway, Pinjarra Road, Greenlands Road and the Perth-Bunbury Highway. The site has access to an appropriate road network for both freight and employment within the Pinjarra and Mandurah areas. • Existing residential development lies within close proximity to the site in Pinjarra townsite with future residential development planned within the area. This is likely to provide increased incentive to developers and businesses to undertake activities within the area as population demand for the area is able to be clearly seen. • Existing industrial development lies within close proximity to the site which is also likely to provide increased incentive to developers and businesses to undertake activities within the area as a working example of industrial development being utilised in the area.
Environmental sensitivities	• Few identified environmental constraints. • Predominantly low lying Prime Agricultural Land with some fair rating.
Topography/soil	• The site is located on the relatively flat alluvial Pinjarra plain system at the foot of the Darling Scarp. • The regional geology of the site is predominantly sandy clay, clays and clayey sands of the Guildford Formation. • Hydrogeological information indicates the site overlies the Serpentine Area superficial aquifer. Regional groundwater flow is expected to be in a north-westerly direction, eventually discharging into the Peel Inlet/Indian Ocean. Site specific groundwater flow is to the north. • The site is predominantly flat and low lying, presenting some difficulties for drainage. With the site being seasonally waterlogged and is likely to consistently require fill of 1 m (average) with appropriate treatment of stormwater, groundwater and drainage throughout the development, increasing development costs.
Potential land use conflict	• Minimal. Mainly due to the extension area abutting the existing industrial zoned land to the east with current rural land potentially rezoned to special rural in the future.
Conservation	• To be further investigated.
Heritage	• A search on the Department of Indigenous Affairs website found no registered areas of aboriginal or cultural heritage significance within the West Pinjarra area. Further site investigation is required.
Site contamination	• Two contaminated sites exist within the investigation area that is identified on the DEC Contaminated Sites database, however, further environmental investigations over an additional lot immediately to the east of the registered lots has identified groundwater contamination. It is understood this site will be included on the Contaminated Sites database in the near future. • DEC is working with the source site landowner to determine the level of contamination present. • Any development requiring significant earthworks in the area will require a preliminary site assessment for ASS and Dewatering requirements.
Service infrastructure accessibility	• Power is available through transmission lines with the proposed site, with a 330/132 Kv Western Power Terminal Station at Alcoa Pinjarra. A water main transects the proposed site, however, the closest sewer infrastructure is north east of the site in Pinjarra.
Close to workforce	• The Pinjarra townsite and Mandurah are located close to the subject site, and are likely to provide the necessary workforce for future use.
Design specification	• Not applicable to this site, with the exception of local planning scheme and policy requirements.

West Pinjarra



Potential long term non-heavy industrial sites (strategic landbank)

In addition to the investigation areas and existing industrial estates, other stages of the Nambeelup industrial development have been identified which indicate some potential for further investigation in the longer term that would contribute to the strategic land bank for future industrial land supply.

Peel sub-region – long term outlook

The future of general industrial land supply in the Peel sub-region depends heavily on the development of the Nambeelup industrial estate.

Key planning actions for the Peel sub-region

Key Stakeholders	Actions
City of Mandurah **Shire of Murray** **Shire of Waroona** **WAPC** **Department of Planning** **LandCorp** **Department of State Development** **Peel Development Commission**	• Develop, in conjunction with local government, an economic development and employment strategy for the Peel sub-region. • Undertake a local demand assessment to determine the staging requirements for the release of land in line with population growth.
LandCorp **Department of Planning** **Peel Development Commission** **Department of Environment and Conservation** **Department of Water** **Main Roads of Western Australia** **Water Corporation** **Office of Energy** **Alinta Gas** **Wester Power** **Heritage Council**	• Undertake feasibility studies with respect to the identified medium term sites in the Peel sub-region and determine most appropriate delivery models and level of government involvement in this sub-region to facilitate industrial land development.
Water Corporation	• Investigation into alternative water sources. • Long-term waste water treatment capacity and options for the Greater Mandurah area.
Proponent/s and/or landowner/s **Department of Planning** **Department of Environment and Conservation**	• Consultation required for sites with buffers for conservation and resource enhancement wetlands. • Assessment of any environmental investigations undertaken for reclassification of conservation and resource enhancement wetlands, if appropriate. • Undertake acid sulphate soil investigations. • Flora and fauna investigations. • Ascertain if any buffers to sensitive land uses are required. • Murray Drainage and Water Management Plan.
Alinta Gas **Western Power**	Infrastructure provision to facilitate development of the sites.
Main Roads Western Australia	Key east -west connectors such as Lakes Road and Greenlands Road to be considered for future widening. Consideration to Greenlands Road being upgraded to a primary regional road.
Proponent/s and/or landowner/s **Department of Indigenous Affairs** **Heritage Council of Western Australia**	Facilitate the undertaking of Indigenous and European heritage and ethnographic studies where necessary and required.
Proponent/s and/or landowner/s **Department of Water**	Water management investigations and documents to be prepared in accordance with the Better Urban Water Management Strategy (WAPC, 2008).

Part 13 - Economic and Employment Lands Strategy: non-heavy industrial

Photograph courtesy: Eastcourt Property Group

Summary

The EELS provides the vital strategic direction for the necessary planning to be undertaken to ensure on-going economic growth and sustainability for the Perth metropolitan and Peel regions and for Western Australia as a whole. The aim of the strategy is to ensure that adequate forward planning is undertaken for the on-going provision of industrial land in both the Perth metropolitan and Peel regions over the next 20 years and beyond, so to ensure that the market is poised to capably respond to forecast demand.

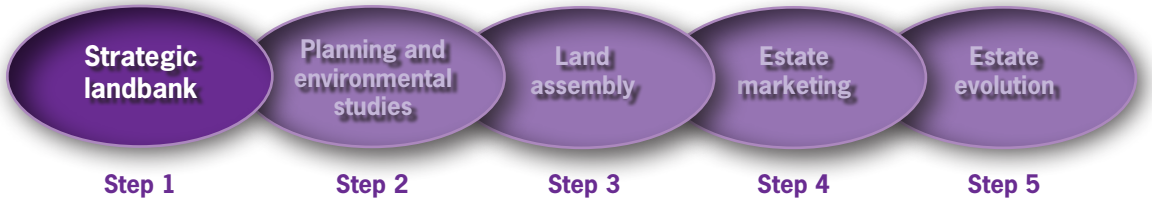
The population-driven forecast demand for industrial land will be for an additional 4726 ha by 2031. To meet the growing needs of industry sectors, this Strategy makes the following recommendations:

1. To provide and ensure the ongoing availability of a supply of industrial land, including a buffer of undeveloped industrial land to be available if demand increases.
2. Identification of and protection for a rolling 20-year "industrial landbank" to ensure a supply of industrial land is available to meet future demand on an ongoing basis.
3. Appropriate protection for existing industrial land to sustain long-term industrial activities.

Based on current shortfalls in industrial land supply in each of the sub regions and forecast demand for the Perth metropolitan and Peel regions in the next 20 years, it will be approximately 10 years before the market can achieve a balance between supply and demand for industrial land. Priority will be afforded to the release of the remainder of existing industrial estates (representing 1758 ha supply) and all necessary feasibility studies and investigations should be promptly completed to enable delivery of the short, medium and long term sites that have been identified in this Strategy.

The EELS provides the strategic framework for the on-going identification and delivery of industrial land in the Perth metropolitan and Peel regions, which will be supported by more detailed policies and programs relating to industrial land development. It will provide for an even distribution of industrial land throughout the Perth metropolitan and Peel regions that will be available via a strategic landbank to cater for all levels of demand in the various sub-regions. A strategic landbank of industrial land is vital to sustaining the economic vitality of the Perth metropolitan and Peel regions, and to Western Australia as a whole.

To better respond to the current inadequacies and future needs of industrial estates, it is important to understand the industrial estate planning process and outcomes. The EELS represents the first stage (Strategic Landbank) of the five step process involved in delivering an industrial estate to the market, by identifying land within the Perth metropolitan and Peel regions that can be subject to future site specific and detailed investigation and analysis.



Strategic landbank

The provision of a strategic industrial landbank for Perth and Peel will be facilitated by this strategy. Sites have been identified for the short, medium and long term. The identification, protection and delivery of industrial land is an essential ongoing initiative to be undertaken by State Government, key stakeholders and the development industry itself. The current land supply stock can cater for 1758 ha of the total 4726 ha needed to meet forecast demand by 2031. The strategy has identified just under 13,000 ha of potential gross developable land, but it is a reasonable expectation that this figure will be substantially lower following the rationalisation of sites through further constraints analysis and determination of the net developable area.

A number of significant benefits can be derived from the strategic landbanking of industrial land including:

- Infrastructure and service providers can forward-plan more capably than in the past;
- An equitable balance in the social, environmental and economic outcomes can be considered and achieved;
- Local government authorities will be actively engaged in the initial stages of the preparation of design guidelines and resolution of any planning issues; and
- The identification of potential land for industrial uses will allow the protection, preservation and prioritisation over competing uses.

Planning and environmental studies

A number of planning and environmental studies and investigations must precede any development whether for residential, commercial or industrial development. The purpose of these studies is to identify any constraints and/or challenges that may need to be considered or managed prior to any development occurring. Such studies may include:

- Acid sulphate soils investigations
- Contaminated sites investigations
- Flora and fauna surveys
- Wetland boundary and classification re-evaluation
- Drainage, including groundwater monitoring
- Heritage and ethnographic surveys
- Infrastructure capacity requirements for power, gas and water
- Undertaking of modelling to determine appropriate buffers to conflicting land uses
- Buffer investigations for conservation and resource enhancement category wetlands
- Basic Raw Materials, if relevant
- Water Management and preparation of district water management strategies
- Risk assessment and planning feasibility to reclassify Priority 1 Public Drinking Water Supply Area (PDSWA) classification affecting a site, if relevant
- Preliminary planning studies associated with Metropolitan or Peel Region Scheme Amendments and Local planning scheme amendments, including rezoning.

The timing of these studies can be anywhere from one to five years, and often are co-dependent on other studies.

Land assembly

Land assembly can represent a major challenge that needs to be managed prior to development. The acquisition and/or resumption of fragmented land into a single parcel provides a consolidated approach to the development of industrial land. One of the key outcomes of the land assembly process is the ability to develop a clear vision for an estate with well defined goals. A degree of flexibility can enhance future planning of an estate, to allow for its evolution and a more consolidated approach to approvals and infrastructure and service provision.

Early stages of the development process allow the opportunity for joint ventures and public-private partnerships. Joint ventures give the opportunity to involve the private sector and the community to produce the best outcome.

Estate marketing

Compared with residential property markets the industrial sector is a highly specialised field in which information is generally held within a relatively small circle of professional developers and real estate agents. Firms seeking to find suitable sites will be keen to get a credible assessment as to the relative merits of each location, and are likely to make use of multiple information sources. However, they will rely most heavily on advice from specialist real estate agents and use word-of-mouth referrals to help find such expertise, as well as confirming the credibility of advice and information given.

While not specifically addressed within the strategy, the issue of estate marketing should not be ignored. LandCorp and the private sector will seek to realise a return on any investments. Any land assembly and planning strategy should work in harmony with marketing strategies. The setting of clear visions for each estate will assist this process. For major anchor tenants a well developed in-bound investment strategy will be required that links the work of the strategy with the work of those agencies such as the Department of State Development or Department of Commerce with that of LandCorp and the Department of Planning. The Small Business Development Corporation may also play a role given the large number of small businesses that will occupy the land.

Estate evolution

Finally, successful implementation of the EELS requires protection of established industrial estates in the inner and middle sectors of the metropolitan area. A consistent whole-of-government and State to local level approach to industrial land development with a close interaction between the preservation and renewal of established estates, and residential land use planning is required. This will avoid residential encroachment issues. The use of regular land user surveys is a key part of the strategy. However, it is also important to establish a knowledge management system that collects and stores information about the historical evolution of an estate. This is a key issue when attempting to understand the problems and issues that might arise in the revitalisation of older estates.

With a better appreciation of the industrial estate planning process, and having examined current trends in industrial land use planning and development, the following section is an outline of the issues that need to be addressed to create a more enabling environment for industrial land development to occur.

Economic and Employment Lands Strategy: non-heavy industrial – Key directions

The following key directions have been identified for the planning and delivery of new estates and the regeneration of existing industrial areas.

1. Diversity in lot sizes with a focus on delivering large lots

Traditional industrial ownership (small to medium enterprises and investors) industrial subdivision in WA has usually delivered a number of small lots as developers seek to maximise their returns. However, the provision of small lots has other consequences such as:

- A general decrease in the overall developable land area because of the need to provide more roads and other services; and
- A tendency to encourage development of non-industrial uses due to higher land values.

With WA's label as a powerful resources State, the synergy between large resource projects in the North West and Perth metropolitan and Peel industrial estates needs to be better understood and catered for. Further planning is needed to understand the different requirements of "big" and "local" industry. Existing industrial estates service the needs of local industry well. Big industry is not as well served. With few industrial estates offering larger lots in the Perth and Peel markets, industrial occupiers requiring a larger lot are restricted to areas such as Kewdale and Kwinana. A mechanism designed to enable the provision of large lots is required.

A greater variety of lot sizes, in particular large lots, is necessary to cater for a variety of potential future and existing industrial occupiers, and that the economic activity occurring in regional WA can be supported by the local metropolitan economy.

The means whereby large industrial lots can be protected from further subdivision over the long-term, such as through structure planning, notification on titles or caveats with sunset clauses need to be defined and implemented.

2. Mixed-use development to create amenity

Particularly over the past 15 years, there has been a strong preference by developers and tenants to incorporate a higher proportion of office space as part of industrial developments and estates. Developers faced with increasing construction costs have needed to charge a higher office rent to make developments viable, while tenants are seeking to reduce costs by improving efficiencies wherever possible. According to the results of the Property Council of Australia Industrial Development Survey, (2009), the proportion of office space to warehouse space in new developments was 1:5; traditionally this ratio was 1:10 or 1:12. The "Perth Airport model", offering tenants and developers the option to co-locate head offices adjacent to their manufacturing and warehousing depots, demonstrates this trend. The benefits of a mixed-use development model for industrial include:

- Improved and greater efficiency in operations for tenants;
- The option for a greater workforce diversity;
- Higher levels of amenity for a workforce located within an estate with services such as gyms, childcare centres and cafes being available within the estates;
- Incorporation of planned transition zones between industrial and residential uses, reducing land use conflicts;

- A variety of lot sizes and built form options; and
- Improved accessibility to estates by public transport.

Structure plans for new industrial areas should include mixed use and suitable retail opportunities. These developments could be established in buffer areas and act as noise barriers to residential areas.

3. Identification of potential end users for each estate

Most existing industrial estates were planned in response to market demand at the time and often adjusted retrospectively to accommodate new tenants and end users. The strategy acknowledges that industrial estates of the future need to be forward planned, with the end user in mind. Without demand from tenants, new estates will remain undeveloped, and without provision of suitably located and sized land parcels for existing and potential industrial occupiers, the State risks economic disadvantage. Clear visions for each of the medium term sites identified in the strategy, in terms of potential build out and clustering opportunities, need to be developed in partnership with the private sector. Engaging with the private sector to harness these opportunities and attract potential occupiers to the future industrial estates is vital.

The State Government will actively engage with the private sector to better understand the end user needs and requirements and to identify and develop strategies to attract key anchor tenants to future estates.

4. Measures to facilitate greater private sector involvement

The absence of significant private sector involvement in industrial land development can be attributed to a number of key factors. The uncertainty faced by developers working through the planning process, and the number of approvals required before development can occur, has been a deterrent to developers being actively involved in the industrial property market. Consultation with the private sector and development industry has revealed that, involvement of the private sector is a more efficient way of releasing land to the market. This also reduces the risk for government agencies, as well as allowing agencies to focus on core business (the identification and facilitation of strategically located industrial land) and avoids any conflict of interest where government is the developer of the land.

A major impediment to the development of industrial land is the provision of adequate sewer, water, power and transport infrastructure. The cost of providing such infrastructure is often borne by the developer through the imposition of conditions of subdivision or development, with costs often prohibitive, particularly if major headworks are required. This can cause development to be stalled until the infrastructure front is closer to the developer's land which, in turn, delays the release of land to the market. The State Government will continue to play a key role in facilitating private investment.

The State Government, in consultation with local government authorities, servicing and infrastructure agencies and the private sector, will explore and identify appropriate delivery models to increase private sector involvement in industrial land supply. Opportunities for Private-Public Partnerships will also be explored.

5. Incentives to facilitate regeneration of existing industrial areas and delivery of new estates

Until recently, industrial land planning has identified new parcels of land for industrial activities, rather than redevelop existing industrial estates through an increase in density of land use and employment efficiencies. Estates have a natural evolution cycle, resulting in change such as the depletion of industrial land use activities (e.g. Osborne Park), which forces industrial occupiers to relocate. Measures to facilitate the regeneration of existing brownfield industrial estates as a complement to the delivery of new estates need to be explored in the future.

As an example of the evolution of an industrial estate, Canning Vale has developed contrary to its original intent. Small lot sizes have been created, the rail spur is now disused and service retail uses have developed over time. There are few planning mechanisms that allow for large well-serviced lots to be created by the amalgamation of smaller lots. Similarly, there is no incentive for landowners to do so as returns will be lower. In terms of new estates, incentives to attract key tenants, from existing locations and interstate, should be explored in association with private industry.

In both brownfield and greenfield sites, funding needs to be allocated for the re-location of existing land users and tenants. State Government incentives should also be used to encourage the most appropriate type of industrial development. Examples of incentives that may be suitable include:

- Facilitation of tenant relocation;
- Buy back clauses in titles;
- Major tenant attraction;
- Amenity provision;
- Fast tracked development approvals;
- Land Tax and Stamp Duty concessions; and
- Infrastructure pre-servicing.

At local government level, it is important that local authorities are better informed of the economic value and importance of industrial land to their local economy and community. The appointment of economic development coordinators, who work closely with the local business community, will enable opportunities to be better identified and catered for in each local government area than often is the case.

Incentives to attract key tenants and developers will be used to facilitate agreed visions for industrial areas. In addition, local governments need to actively engage with the local business community to achieve the vision for industrial areas.

6. Strategic protection from competing uses

The encroachment of non-industrial uses, including residential uses on industrial land has been a prevailing and increasing trend over the past two decades. With the absence of a robust planning framework that protects and preserves industrial uses in their current location, industrial land is under continual threat. State and local governments need to show commitment to the use of land for industrial purposes by resisting change to industrial land use unless there is a clear strategic benefit in doing so.

Industrial land is a scarce commodity and needs to be protected from competing land uses. As first highlighted in 1987, in the WAPC paper The Future of the Perth Metropolitan Region – The Preferred Strategy, there is a continuing trend towards diversification of uses on industrial land due to a decline in traditional industrial uses, such as manufacturing. Industrial areas have since become marketed as "trade centres", "showroom/warehouses" and "business parks", pointing to a greater mix of uses under industrial zonings.

One prominent example of this change is the development of bulky goods retailing. More than 500,000 m^2 of bulky goods retail has been built in WA in recent years. Most of this will be developed on land zoned for industry.

Another example is the development of office parks within traditional industrial areas. With Perth's major office markets (Perth CBD and West Perth) full, a number of suburban office developments have occurred in industrial areas, especially Herdsman and Belmont. The need for mixed use estates should still be pursued, however proposed land uses within the estate must demonstrate how they contribute to, rather than detract from the overall amenity and functionality of the estate. Structure planning of industrial estates will enable tighter controls to be applied over land uses and lot sizes than has previously been the case.

The State Government has endorsed *Directions 2031 and Beyond* as the strategic planning document for the Perth metropolitan and Peel regions. This document identifies Strategic Industrial Areas which should be afforded long term protection from incompatible or competing uses, based on their economic importance to the State, significant export function, extent of infrastructure investment and future industrial land supply.

An Assessment Framework for identifying prime industrial areas of economic importance to the State, which must have protection from rezoning and major subdivision, as used in the South Australian Industrial Land Strategy 2007, should be adopted.

Assessment Framework is attached as a reference in Appendix D.

7. Focus on sustainability

"Sustainability" and "industry" are often considered incompatible due to the past performance of some industrial estates. Sustainability is a relatively new concept within industrial development. There currently exists widespread adoption of rating tools for design and energy use in residential, commercial office and retail development. Until recently,there has been limited measures that industrial developers could undertake to assess the sustainability of their developments.

Industry recognises, particularly with climate change legislation looming, that future developments will have to be of a higher environmental standard than in previous years. To help facilitate sustainable practices in industrial property, the Green Building Council of Australia (GBCA) has recently completed its GreenStar rating tool for industrial property. The GreenStar tool measures the sustainability of buildings in terms of energy, water and material use but also includes items such as public transport links and site orientation. The Industrial Tool was ratified by the GBCA board in March and is now available for use by developers. It is expected that the tool will take time to gain traction within industry with key projects needed to further test and validate the tool.

In addition to the GBCA, LandCorp, through its triple bottom line approach and design guidelines, has encouraged sustainable industrial developments. Measures like rain water tanks and use of native vegetation have been embraced by industry.

Industrial development should be as sustainable as possible and can be assessed for its overall sustainability using techniques similar to those used in residential and commercial developments and the State government through Landcorp should develop a demonstration industrial project and measure its sustainability by using the GBCA industrial tool.

8. Understanding industrial market through data collection

Industrial land development information does not provide sufficient data for the State government to adequately plan for and deliver industrial land, therefore improved data collection and analysis is needed. The Urban Development Program (UDP) will in some part facilitate this, with planned annual monitoring through the industrial land development program and growth monitor to inform land use activity and subdivision trends. In 2011 the Department of Planning, on behalf of the WAPC, undertook a statewide industrial developers land intentions survey.

Details from the survey are used to:

- identify the yield and timing/staging of future land development areas over the next 20 years;
- assess infrastructure coordination needs;
- determine major development issues and constraints in the planning and development process;
- enable the planning process to focus on the most critical factors/areas that are delaying land development and/or increasing development costs; and
- inform regional strategies and other plans.

It is intended that the survey will be undertaken on a regular basis. The engagement of, and active participation from the private sector, will be vital to the success of this process.

Regular land use surveys will establish a knowledge management system about the historical evolution of estates and will help to facilitate the long term revitalisation of older estates.

Further work is required to understand how accurate the historical take up rates will be in predicting future needs. Recent private sector data notes that take up has been constrained by lack of supply and financial constraints. Industry needs to understand how much the level of demand varies at different stages of the economic cycle and what potentially large space requirements are in the pipeline. Without this information being both readily available and the historical context understood, forward planning will be compromised.

An Industrial Property Group comprising public and private sector organisations involved in industrial land development will be established to provide for the sharing of information and the exchange of knowledge in order to assist with the timely provision of appropriately located and serviced industrial land.

9. Ensure adequate buffer zones are planned and protected

The forward planning of industrial estates mainly facilitated through structure planning, will enable buffer zones to be considered and accounted for in the planning of an estate. The translation of structure plan requirements into statutory local planning schemes will also enable the appropriate controls to be implemented in order to reduce the level of encroachment of residential development on industrial areas. This should be reinforced in the review of *SPP 4.1 – State Industrial Buffer Policy*.

To protect both adjoining land uses and industrial operations, buffer zones should be incorporated into estates rather than relying on land that is outside of the control of the developer. With the increased diversity required in new estates, less intensive uses that do not require buffers themselves should be encouraged on the periphery of estates to provide a buffer from any adjoining sensitive land use.

10. Current constraints by financial institutions will impact upon development

The recent Global Financial Crisis has seen the amount of funding for commercial property development decline, and the number of financial institutions, reduced. Remaining lenders have tightened lending requirements in terms of risk profiles and funding benchmarks. Industrial land acquisition and development, given its long lead time and low income protection, is therefore not seen to be an attractive funding option for financial institutions.

While this Strategy's role is not to provide commentary on the practices of lending institutions, the reality of the funding environment needs to be acknowledged, as it has a direct impact on the ability of developers to provide industrial land, and in turn influences the confidence levels within the market. Lending institutions, like developers and occupiers, shy away from development that lacks some level of certainty in its delivery. While it is not appropriate for the State Government to be the sole provider of development ready land to the market, it does have a role to play in facilitating a more structured and robust planning framework, in which developers, occupiers and lenders alike can have more confidence.

Making land development-ready will be necessary in order to de-risk development from the perspective of property financiers. There will be limited debt funding available for long term landbanking. Purchasing and development options that are less reliant on debt funding, such as joint ventures and private-public partnerships, will need to be evaluated in the release plans of new, larger scale industrial estates.

Part 14 - Implementation and monitoring

As the preceding section clearly indicates, the success of the strategy will be heavily reliant on commitments from State Government (including servicing and infrastructure agencies), local government and the private sector to deliver the key recommendations and actions of this strategy. To assist with this delivery, an implementation plan is required to address how the strategy and its key actions and recommendations will be delivered both in strategic and statutory planning, and in terms of the delivery of land to the market.

Planning framework

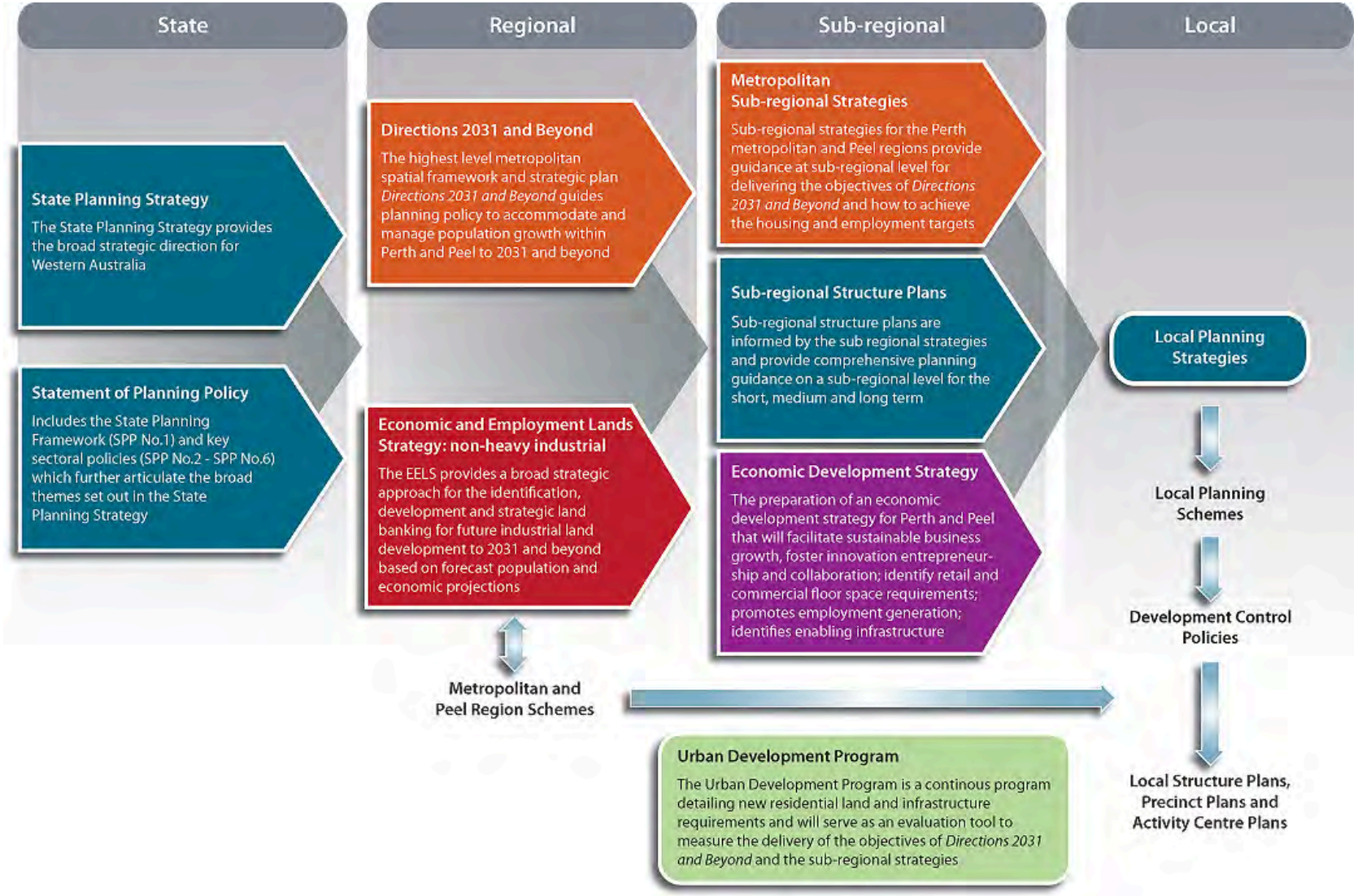
Fundamental to the success of the EELS is the extent to which strategy principles are embedded into all strategic planning initiatives by State Government, and appropriate measures put in place to preserve, protect and prioritise industrial land uses from other competing uses.

The implementation of the EELS at a statutory level will be effected through the Metropolitan and Peel Region schemes, local government planning strategies and schemes and individual site planning, and will be subject to the appropriate statutory approvals by the Western Australian Planning Commission (WAPC) and the Environmental Protection Authority (EPA).

As depicted in figure 38, there are a number of existing planning mechanisms where the key actions and recommendations of the strategy can be embedded and acted upon. At a strategic planning level, initiatives such as the State Planning Strategy and Statements of Planning Policy will secure the importance of industrial land use planning into the future. Planning tools such as *Directions 2031 and Beyond*, along with a suite of supporting policy statements and legislation, will be key vehicles for implementing the key actions and recommendations of the EELS at a strategic level. At a statutory planning level, the implementation of the strategy will be even more crucial. Therefore, it is important the actions and subsequent initiatives resulting from the implementation of the strategy are supported by statutory planning processes.

The effectiveness of the implementation of the strategy recommendations and actions will be dependent on the active participation and commitment from the various responsible authorities and relevant stakeholders as identified in each of the sub- regions and key action tables for medium term sites.

Figure 38: Policy framework



Key actions for all sub-regions

While each sub-region has a number of key actions specific to the sub-region that need to be completed, a number of these relate to all sub-regions. Briefly, the key actions are outlined in the table below:

Sub regions - key actions	
1.	Develop and prepare an economic development and employment strategy in conjunction with local governments for each sub-region.
2.	Prepare local demand assessments for each sub-region to determine the staging requirements for the release of land in line with population growth.
3.	Infrastructure and servicing agencies to work collaboratively to facilitate development of these sites.
4.	As part of the identification and selection of potential industrial sites, undertake water management investigations and develop district water management strategies where appropriate in accordance with the Better Urban Water Management Strategy (WAPC 2008).
5.	For some sub-regions, to further investigate appropriate locations for future inter modal terminals.
6.	Where preliminary site investigations reveal the need, undertake Indigenous and European heritage and ethnographic studies.
7.	Complete environmental assessments (flora and fauna surveys, wetland mapping, buffering) for each of the key short term and medium term sites identified.
8.	Undertake acid sulphate soil studies and preliminary contaminated sites investigations for each of the key short and medium term sites as identified.
9.	Investigate the feasibility and strengthening of east-west links in both the northern and southern sub-regions.
10.	Undertake feasibility studies with respect to each of the key medium term sites identified for each sub-region and determine the most appropriate delivery models and level of government involvement to facilitate industrial land development.

The strategy recognises that in order for these key actions to be delivered, they will need to be supported by an implementation plan. State Government intervention and facilitation of these actions is needed to address the critical shortage of industrial land supply and to achieve the strategic land banking of industrial land in a timely manner.

Implementation plan

With the critical need for industrial land in the short-to-medium term, an implementation plan is needed that outlines the essential studies and investigations to be undertaken and the estimated funding required to support these studies in order to provide infrastructure.

The implementation plan should be prepared in consultation with key agencies and stakeholders, with LandCorp as the lead agency. By engaging with key stakeholder agencies including service and infrastructure providers, a whole of government commitment to the facilitation and delivery of the key actions and recommendations of the strategy will result. The benefits of such a plan will be the provision of an implementation framework and works program, to enable agencies to program the necessary studies and investigations into their forward planning and capital works programs. The plan would comprise the following key parts:

- Implementation timeframes;
- Implementation costs; and
- Governance.

The implementation plan would detail what needs to happen for the short and medium term sites identified in the strategy to be made project ready .

Implementation timeframes

The implementation plan will detail the likely timeframes associated with the delivery of "project ready land". The implementation timeframes for each of the sites identified will vary depending on site-specific constraints and issues. Fundamental to the overall implementation plan timeframe will be identifying

the critical lead time required to meet and redress the imbalance in the supply and demand of industrial land. The main considerations in determining timeframes for the majority of the sites will be the planning, approval and delivery of the required trunk infrastructure (water, sewer, power and roads). Other influences will include the rezoning process and probable need to undertake further environmental studies (e.g. groundwater monitoring and water management) and approvals.

The willingness of the service agencies in particular, to commit to and start detailed planning studies will be critical in meeting delivery deadlines. Capital funding to undertake the required level of planning, approvals, design, construction and commission of works will need to be secured in a timely manner to ensure the orderly progression of these works.

Implementation costs

Through the examination and review of current processes and approaches to industrial land use planning, re-activation of confidence in the industrial land development industry will be dependent on some level of government funding and commitment. The level of government intervention and facilitation will instil confidence in lending institutions which, in turn, will be more willing to pre-fund industrial land development projects being proposed by private developers.

Some level of pre-funding from State Government will be required for the following stages of development for some of the sites identified:

- Planning and technical investigations (including environmental studies and surveys) required as prerequisites for any rezoning at both the Region Scheme (Metropolitan or Peel) and local planning scheme levels; and
- Infrastructure planning studies, particularly for agencies such as Water Corporation, Western Power and Main Roads Western Australia.

While there should be no obligation on the State Government to pre-fund any of these actions, in instances where the Government is the owner of the land, either in part or in full, there may be an incentive to fund and implement some of the priority planning and technical studies needed to support the rezoning and release of project ready land. The view of government should be that this level of initial investment will not only add value to the its existing land holding, but, importantly, expedite the de-constraining process in accordance with the strategic planning objectives of the strategy.

Where the majority of the site is held in private ownership, the responsibility for funding the required planning, environmental and servicing studies would typically rest with the landowner/landowner group. However, should the cost of some of the planning and technical studies be considered prohibitive for landowners, particularly in fragmented areas, some level of Government assistance to expedite development may be both necessary and appropriate to meet the broader objectives of the strategy.

Without the necessary government commitment to funding and planning, the substantive costs often associated with planning and delivery of trunk infrastructure may constrain and sterilise those identified short-to-medium term sites.

Governance

The shortfall in industrial land supply is symptomatic of the absence of a robust and streamlined governance framework in recent years. An effective and efficient governance framework will be critical to achieving target implementation timeframes in the most expeditious timeframe possible. An improved governance framework – a whole of government initiative – would enable the ongoing strategic identification and delivery of industrial land supply.

The establishment of the ILS Taskforce is an important facet of an overall governance framework (refer Appendix E : Governance Structure) for delivering the EELS. Its members comprise the Director Generals/ CEOs from key agencies including Department of State Development, Department of Planning, Department of Environment and Conservation and LandCorp, and representation of the private sector by Property Council of WA. With a direct reporting relationship to the ICC and WAPC, it offers a vital link to the service agencies.

Its functioning may benefit from including key service agencies and by giving the ILS Taskforce decision-making authority. This would maintain and prioritise the focus on industrial land supply.

At a statutory level, the fast tracking of delivery of industrial sites can be facilitated through the application of an effective and efficient governance and statutory planning framework for industrial land development. At present, current processes require MRS/PRS rezoning and District / Local level structure planning to run consecutively. The requirement to separate these two often co-dependent processes leads to protracted timeframes, with consequential higher risks to the delivery of zoned land. A more robust and centrally facilitated outcome-focused approach is more desirable and essential to achieve timely industrial land supply.

Delivery models to support the fast tracking of development of the identified sites will be examined and further investigated within the Implementation Plan. Examples of delivery models that may be appropriate, depending on the site specific details, include:

- Local authority led implementation with the support of LandCorp;
- Local authority led implementation in collaboration with private landowners;
- LandCorp / WAPC led implementation;
- Redevelopment Authority; and
- Improvement plans / schemes.

The use of any of the above delivery models will be subject to the review and sanctioning by the ILS Taskforce, and the allocation of appropriate resources within the WAPC and other Government Agencies.

Other measures

A number of key components have been identified to execute the key actions and recommendations of the strategy. These are listed in further detail below.

Integrate state planning and environmental approvals to overcome land constraints

One of the key requirements associated with industrial land development is obtaining the necessary approvals and undertaking all required environmental and social impact studies to demonstrate how the land can be developed with the least long-term impact. As the key actions for each of the medium term sites illustrate, the approvals required for a site can span across environmental, water, planning, health, and resources or mineral resources portfolios. The number of approvals a proponent may require before development can commence, along with the holding costs associated with to acquire these approvals, is often enough of a deterrent for the private sector to not go ahead with a development. As the popularity of the Perth Airport land illustrates, the industrial land developer, while accepting certain approvals must be obtained, prefers a streamlined approvals and robust governance framework and a single agency rather than dealing with a number of authorities and agencies, as is currently the case.

Proponents typically seek to identify potential industrial estates that are free of fatal flaws as they can enter into the detailed planning and development stages with some certainty of success. As the primary decision making authorities, the WAPC, EPA and Local Government authorities have a crucial role in ensuring environmentally sound development. This role integrates with the statutory and advisory roles of the DEC and other agencies (i.e. Department of Water) with expertise in environmental issues.

The lack of coordination between approval agencies has been identified as one of the key constraints in the release of industrial land to the market. It is important that there is an improved and coordinated approach to the facilitation of these approvals. The EPA will consider environmental factors, but the planning system has to

take other social and economic factors into account. Strategic assessments must assess the triple bottom line, which would thereby reduce the issues being dealt with at the final stages of planning, the main cause of delays and frustrations to developers.

This strategy, supported by the Implementation Plan, will provide the added benefit of a targeted approach to achieving the necessary approvals and subsequent de-constraining of identified short and medium term sites. Through the implementation plan, all relevant agencies will ensure that appropriate priority is allocated to expediting the approvals needed for the efficient and timely delivery of industrial land to the market.

Provision of infrastructure

The importance of the linkage between infrastructure provision, access and industry decision-making on location and investment was often highlighted during the course of the study and in consultation with key industry stakeholders.

As a rule, the responsibility for providing infrastructure is borne by the owner of the land (with the exception of headwork charges for which a contribution may be required). However, this study also identified that the long lead times for industrial development, which are often directly associated with infrastructure provision, are also a consequence of inadequate forward planning in the staging, coordinating and budgeting by key infrastructure service providers.

Each key service agency has a rolling capital works program determining when it will deliver infrastructure (primarily for new developments). However, issues have been encountered by the development industry in recent times, which has hampered the delivery of land to the market including:

- Long lead times: agencies need time to roll out major infrastructure and need information as early as possible to be able to respond appropriately;
- Different funding models: each agency has costs to cover and targets to meet;
- Different regulatory pressures: whether they be imposed by a regulatory authority or political decision making;
- Data: all agencies need access to current, consistent data such as population projections and planning documents to be able to forecast demand more accurately;
- Location of services: there can be conflicts between installing services and finding the appropriate space; and
- The silo mentality operations of agencies.

Coordination of infrastructure provision with the urban development program will ensure that land is market-ready when it is needed, and that investment in infrastructure takes place in response to demand priorities, thereby avoiding the under-utilisation of land.

The EELS and studies that underpin the ultimate recommendations in this strategy will resolve many of the issues outlined for industrial development , particularly by forecasting demand and responding at an early stage to allow agencies to roll-out the major infrastructure required to service potential industrial estates.

Infrastructure delivery models

An issue consistently raised by developers, the private sector and local government, is the need for some form of delivery model for infrastructure that would enable its provision upfront, with an assurance that costs associated with infrastructure provision can be recovered at a later date. The impediment to the progression of industrial development caused by the lack of infrastructure provision has been highlighted throughout the strategy. The Hazelmere Industrial Area is a prime example where the absence of an infrastructure delivery framework resulted in significant delays to the ultimate development of the area, to the extent that the structure plan was adjusted to accommodate non-serviced lots, so that the development of the area as an industrial area could progress.

The two most common infrastructure delivery models are outlined below, together with the merits of each:

Common infrastructure delivery models

The principle means by which common infrastructure is provided is through the payment of development contributions when approvals to subdivide and develop are being sought.

In Western Australia there are two primary methods for implementing development contributions to common infrastructure:

- Development Contribution Plans which form part of a Town Planning Scheme; and
- Private Agreements.

These are introduced and described below:

Development contribution schemes

Development Contribution Schemes represent a comprehensive and statutorily enforceable model for equitable common infrastructure contributions to be determined and levied to participating land owners. Such schemes are provided for under *State Planning Policy 3.6 Development Contributions for Infrastructure* and the Model Scheme Text Provisions for Development Contributions (Planning Bulletin No.41). They may be incorporated and enforced under the relevant Local Authority's District or Local Planning Scheme.

Procedurally, the development contribution scheme process initially involves the preparation of a "Development Contribution Plan" (DCP) for the specific study area. Next, the DCP is formalised as an amendment to the Local Planning Scheme and once approved, forms part of the Scheme thereby providing statutory force and effect.

The process requires the local authority to become the custodian and administrator of the DCP as well as the "banker" for all of the funds collected under the DCP. Contributions are collected from developers by the local government and credited to a specific and individual account administered by the local government for the sole purpose of infrastructure works in the subject area.

Many local authority local planning schemes now contain provisions relating to the preparation of developer contribution schemes and the preparation of a subsequent DCP thereon. A number of standard provisions address the following development contribution scheme matters:

- Guiding principles;
- Establishment of a formal development contribution area/boundary;
- Incorporation of DCPs in a Schedule of the District or Local Planning Scheme;
- Content of the DCP;
- Expiry of Developer Contribution Plan;
- Areas to be excluded (deductions);
- Need to prepare a Cost Apportionment Schedule;
- Land valuation;
- Liability for cost contributions;
- Payment of cost contributions;
- Methods and timing of payments; and
- Arbitration.

The DCP requires the preparation of an Infrastructure Cost Schedule containing the itemised estimates of costs of all common infrastructure works and the contribution required from land owners. As the Infrastructure Cost Schedule would need to be modified in response to market forces (actual costs incurred, inflation, economies of scale etc.), it is separate from the DCP and not inserted into the Town Planning Scheme in order that it can be amended without the need for a formal Scheme Amendment. The Infrastructure Cost Schedule is usually reviewed at least annually.

DCPs are widely accepted as a successful and efficient method of managing developer contributions, particularly where there is a multitude of land owners. They represent a tested and proven process that has been utilised in many localities throughout Perth.

Private agreements

Legal agreements (also known as private treaties or Deeds of Agreement) represent a customised approach to establishing common infrastructure contribution arrangements. Such a model is particularly well suited to circumstances where there are only a few land owners involved. They may also be suitable where there is a degree of urgency involved with a development proposal and the relevant local planning scheme needs to be amended to introduce the provisions covering DCPs (which could take at least a year to come into effect). This approach to developer contributions requires the affected land owners to enter into a legal agreement between each other and with local and other government agencies (as required), to set out the common infrastructure requirements and the contribution arrangements. To operate successfully, a strong Heads of Agreement is essential. A private agreement is legally based, however, the cost sharing arrangements are agreed to via direct negotiation between land owners.

As implied by the title, private agreements are typically very formal in nature and are almost exclusively prepared by lawyers. The agreements would cover the same matters as those listed above for a DCP. This is essential to ensure that the process is accountable, transparent and includes processes for dispute resolution. In essence, the only difference between a private agreement and a DCP is that a private agreement is not attached to the Local Planning Scheme. In terms of specific content and format, the agreements typically define participating land owners, the overall project area, items for which contributions are required, the specific contributions for each land owner, methods for payment (including "works in kind"), administrative provisions, dispute resolution provisions and the procedure for periodic review of costs.

Additional surety can be achieved by inviting the corresponding local authority to also be a signatory to the agreement. Moreover, the local authority can be afforded the role of "Overseer" (usually for an appropriate fee) performing the important administrative duties of presiding over all required works and in some cases, collecting levies payable from the participating land owners. As the local authority will not normally have set aside any funding for this purpose and would otherwise have to borrow funds, it is usually necessary for contributing land owners to provide some up-front "seed funding". Additionally, an independent person or entity is required to be engaged by the developers to act as the manager, administrator and banker of the agreement.

Ideally, private agreements should be structured so that they are able to withstand challenge in a court of law, thus providing a level of certainty and comfort to all parties involved. While the private agreement is entered into and signed by the current land owner, it is essential that the agreement is attached to the land so that if the ownership changes, the private agreement "runs with" the land and remains valid. Specific clauses would be required in the private agreement in this regard.

As with a DCP, a private agreement would need to include an Infrastructure Cost Schedule containing the itemised estimates of costs of all common infrastructure works and the contribution required from land owners. The Infrastructure Cost Schedule would also need to be reviewed regularly, usually every 12 months.

Tables 3 and 4 below outline the perceived advantages and disadvantages of each method.

Development incentives

Development incentives have already been explored in the preceding chapter, however, it is important for the types of development incentives to be identified and further explored, in consultation with the private sector and developers and local authorities.

Table 3: Development contribution schemes

Advantages	Disadvantages
• Tested and proven process. • Council is an independent manager, administrator, banker and arbiter in the case of dispute resolution. • Process is more accountable and transparent due to incorporation into the Local Planning Scheme and Council management. • Includes clear dispute resolution processes with Local authority as independent arbiter. • Automatically runs with the land due to inclusion in the Local Planning Scheme.	• May require a Scheme Amendment (12+ months) to initiate and also requires a further Scheme Amendment should there be a need to modify any of the provisions in the future. • Can be very bureaucratic at all stages – including preparation and implementation. This invariably leads to some timing frustrations. • Places strain on Local authority staff and resources. • Council may have a different agenda to that of the land owners.

Table 4: Private agreements

Advantages	Disadvantages
• Some precedent exists – has been implemented successfully elsewhere (e.g. The Marmion Avenue Extension Agreement in the City of Wanneroo). • Works well when there are relatively few land owners. • Only a limited role for government (Locall) in the management, administration, dispute resolution and control of monies. Administration is resourced by the land owners themselves. This is particularly relevant given that many local authorities are under-staffed. • Process is less bureaucratic while still capable of being accountable and transparent. • Collaboratively prepared and negotiated directly between land owners.	• No existing process for dispute resolution (will need to be determined and incorporated into private agreement). • Appropriate person(s) need to be engaged to collect monies and act as the administrator and manager of the agreement. • Questions regarding ongoing costs need to be addressed. • Perceived to have less transparency and accountability. • Requires a very strong heads of agreement (legalistic). • Must ensure that the private agreement runs with the land.

Key implementation actions

1	Embed the EELS principles in all strategic planning initiatives across State Government.
2	Review the current statutory planning framework and amend as required to put in place appropriate measures to preserve, protect and prioritise industrial land uses from other competing uses .
3	Undertake key actions identified for each of the sub-regions.
4	Develop an Implementation Plan which outlines timeframes, costs and governance models, as they relate to the key actions for each short and medium term site identified in the Strategy.
5	Review current processes involved in environmental and planning approvals in order to create better integration between them.
6	Determine how infrastructure provision can be improved, including exploring different infrastructure delivery models.
7	Examine different options to provide incentives for developers and landowners to develop industrial land.

PART 15 - Key actions and recommendations

The key role of industrial land in the economic wellbeing of the Perth and Peel regions, and Western Australia as a whole, requires strategies and policies that will preserve and protect industrial land for the long term.

It is anticipated that the forecast demand for new industrial land will be 4726 ha between 2010 and 2031. The strategy has identified the following three principal objectives that will underpin the key actions required in order to meet forecast demand in the most efficient manner possible.

1. To provide and ensure the ongoing availability of a supply of industrial land, including a buffer of undeveloped industrial land to be available if demand increases.
2. To identify and protect a rolling 20-year "industrial landbank" to ensure a planned supply of industrial land is available to meet future demand on an ongoing basis.
3. To appropriately protect existing industrial land to sustain long-term industrial activities.

Based on the current shortfalls in industrial land supply in each of the sub regions and forecast demand for the Perth metropolitan and Peel regions in the next 20 years, it will be approximately 10 years before the market can achieve a balance between industrial land supply and demand. It is therefore crucial that priority be given to the release of all available land within existing industrial estates (representing 1758 ha supply) and all necessary feasibility studies and investigations be promptly completed to enable delivery of the short, medium and long term sites that have been identified in this strategy.

The following section outlines the key aims and actions required to meet these objectives.

Key Objective 1:

To provide and ensure the ongoing availability of a supply of industrial land, including a buffer of undeveloped industrial land to be available if demand increases.

Governance and coordination	
Key aim: **To provide suitable governance and coordination of the planning and delivery of land for future industrial use.**	
Actions	
1.	The ILS Taskforce be empowered with decision-making authority and is able to champion and monitor progress in the planning and coordination and implementation of critical infrastructure for the industrial sites.
2.	Extend the current membership of the ILS Taskforce to include key senior personnel from the Service Agencies - Water Corporation, Western Power and Department of Transport (Main Roads WA and Public Transport Authority).
3.	Establish a joint State Government, Local Government and private sector industry reference group to monitor industrial land supply, demand and utilisation issues and trends.
4.	Investigate the most effective way of sharing information and exchanging knowledge between government and the private sector, together with the formation of an Industrial Property Forecasting Group .
5.	Incorporate the EELS into the *Directions 2031 and Beyond* framework and the Urban Development Program, thereby enabling regular reviews.
6.	Investigate and determine the most effective and efficient governance frameworks for the delivery of each of the short to medium term sites, to fast-track implementation.

Forecast and monitor	
Key aim: **Develop and maintain a program to forecast and monitor the demand and supply of industrial land.**	
Actions	
7.	Monitor local, national and international trends in order to provide industrial land supply, location, land configuration and land use policies that will satisfy present and future industry requirements.
8.	Maintain a database, with input from State Government, local government and the private sector , to monitor industrial land supply, demand and utilisation.
9.	Benchmark the competitiveness of industrial development, land availability and land values with other major Australian cities.
10.	Institute formal engagement arrangements (a government/industry reference group) between the State Government and private sector to better understand the end user needs and requirements and to identify and develop strategies to attract key anchor tenants to future estates.
11.	Establish an Industrial Property Group comprising public and private sector organisations involved in industrial land development to provide for the sharing of information and the exchange of knowledge in order to assist with the timely provision of appropriately located and serviced industrial land.
12.	Undertake and complete an Industrial Land Use Survey every three years for the first ten years before reverting back to a planned five year review period.

Key Objective 2:

To identify and protect a rolling 20-year "industrial land bank" to ensure a planned supply of industrial land is available to meet future demand on an ongoing basis.

Land supply and delivery	
Key aim: **Maintain a rolling 20-year "industrial land bank" to ensure the availability of industrial land.**	
Actions	
13.	The State Government will work collaboratively with Local government, infrastructure and service providers and the private sector to identify appropriate mechanisms to facilitate strategic land banking for future industrial uses.
14.	Review the sustainability of the Assessment Framework as used in the South Australian Industrial Land Strategy (2007) for identifying prime industrial areas of economic importance to the State which must have protection from rezoning and major subdivision.
15.	Develop mechanisms to improve the coordination of supply of development-ready industrial land.
16.	Implement the action plans for each of the key medium term sites to progress them to development ready status.
17.	Coordinate the timely provision of public and private infrastructure to key industrial sites and locations.
18.	Incorporate the infrastructure requirements for key industrial sites and locations in the Urban Development Program and the State Government's capital works program.

Key aim: **Ensure the timely delivery of development-ready land.**	
Actions	
19.	Prepare an Implementation Plan for the key short and medium term sites identified within the Industrial Land Strategy, to assign appropriate priority to planning and technical studies and governance initiatives to progress these sites to development ready status.
20.	Incorporate the objectives of the EELS and the related infrastructure development programs for industrial land in the Urban Development Program and the sub-regional structure plans.
21.	Undertake and prioritise the timely development of key industrial sites in government ownership.
22.	Expedite the delivery of additional industrial land in the eastern sub-regions in close proximity to Perth Airport and the Kewdale rail freight terminal.

Key aim: **Maintain a significant Government role in industrial land supply and facilitate greater participation by the private sector.**	
Actions	
23.	The State Government, in consultation with local government authorities, servicing and infrastructure agencies and the private sector will explore and identify appropriate delivery models to increase private sector involvement in industrial land supply. Opportunities for Private-Public Partnerships will also be explored.
24.	The State Government will actively engage with the private sector to better understand the end user needs and requirements and to identify and develop strategies to attract key anchor tenants to future estates.

Continued next page

25.	Industrial development should be as sustainable as possible and can be assessed for its overall sustainability using techniques and measuring tools similar to those used in residential and commercial developments and the State government through Landcorp should develop a demonstration industrial project and measure its sustainability by using the Green Building Council of Australia (GBCA) industrial tool.
26.	Examine and evaluate incentives to attract key tenants and developers to facilitate agreed visions for industrial areas, and ways of activating engagement with the local business community by local government.
27.	Investigate options for Infrastructure Delivery Models including existing models such as Development Contribution Plans and Private Agreements.
28.	Minimise risks associated with industrial land financing by getting land development-ready. As there will be limited debt funding for long term land banking, purchasing options that are less reliant on debt funding, such as joint ventures and private-public partnerships, will need to be planned for when releasing new, larger scale industrial estates.

Key Objective 3:

To appropriately protect existing industrial land to sustain long-term industrial activities.

Planning	
Key aim: To protect and preserve industrial sites, particularly those considered to have State and regional significance and are located within the inner and middle sectors.	
Actions	
29.	Examine opportunities for reducing the regulatory approval timeframes and their duplication, associated complexities and costs.
30.	Encourage local authorities to adopt policies and zoning provisions within local planning schemes that protect existing and future industrial areas, and secure locations for future industrial activities .
31.	Undertake master planning and feasibility studies of existing and future industrial areas in conjunction with local government.
32.	Encourage local authorities to review their town planning schemes and associated development control policies to ensure that any current or future zoning protects and stimulates industrial and mixed use developments
33.	Evaluate and implement the means whereby large lots can be protected from subdivision in the long-term, including structure planning, notification on titles and caveats with sunset clauses.
34.	Structure plans for new industrial areas should include mixed use and retail opportunities. These developments could be established in buffer areas and act as noise barriers to residential areas.
35.	Incorporate buffer zones into estates to protect both adjoining land uses and industrial operations. With the increased diversity required in new estates, less intensive uses that do not require buffers themselves should be encouraged on the periphery of estates to provide a buffer from any adjoining sensitive land use.
36.	Review and update existing industrial land use planning policies at both State and local government level.
37.	Prepare a suite of planning controls and planning policies that better manage the protection of existing industrial estates and the expeditious delivery of future industrial estates.
38.	Encourage the consolidation of existing industrial sites through redevelopment of brownfield and infill of under-utilised sites.
39.	Incorporate the EELS, its recommendations and key findings into current and future strategic planning initiatives such as *Directions 2031 and Beyond*, sub-regional structure plans and the proposed economic and employment strategy recommended as a key action in *Directions 2031 and Beyond*.

Appendicies

Appendix A: EELS methodology - technical summary

The strategy was developed over a three year period, and an extensive amount of research undertaken to better understand current industrial market conditions and reasons behind the significant shortfall in, industrial land in the Perth and Peel markets in the early to mid 2000s. The preparation of these research documents and the strategy was underpinned by a number of key assumptions, namely that:

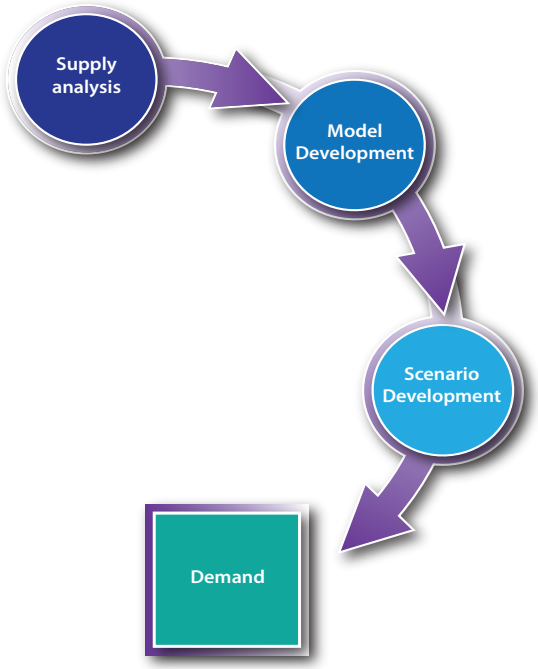
- There will be a continued need for general and light serviced industrial land driven by increased population growth independent of economic conditions;
- Despite the global financial crisis experienced in late 2008, the economic health of the Western Australian economy and related demand for industrial land would remain generally commensurate with demand levels experienced in the lead up to the resource boom of the early 2000s;
- The spatial and multi-criteria analysis undertaken to identify potential future industrial sites represents only the preliminary stages of a more involved and complex investigative process to determine the ultimate feasibility of these sites;
- The provision of a more robust and enabling planning framework for industrial land use planning will activate greater private industry involvement in industrial land development than presently being experienced;
- The State Government and its key servicing and infrastructure agencies will better understand and subsequently choose to adopt a more coordinated and proactive approach to assisting in the facilitation of industrial land use development; and
- A strategic landbank of industrial land is necessary and should be actively maintained.

Below is a summary of the approach and methodology of the preceding studies to the EELS that were undertaken, including stakeholder consultation.

Industrial Land Needs Study

The Industrial Land Needs Study (ILNS) was the initial study undertaken. This study was undertaken and completed by Syme Marmion and Co.

The objective of this study was to establish what the current industrial land stock in both the Perth and Peel regions comprised, and using historical consumption and population growth rates, develop a forecasting model that informed what the rate of future demand for industrial land can be anticipated by 2031. At the time this was prepared, it reflected a period of strong and healthy economic growth.



As a method of qualifying the information and recommendations that were being made in the ILNS, an Industry Reference Group comprising of key industry stakeholders was established and engaged to provide feedback on the findings. This approach ensured that the outputs of the ILNS were generally commensurate with industry knowledge and forecast projections.

The key outputs of the Industrial Land Needs Study were as follows:

- Trends in supply and demand in the Perth and Peel region were monitored, including:
  - The historic take up rate of industrial land
  - The historic floor space to land area and worker to floor space ratios per industrial sector
  - The correlation of take up rates with population growth and Gross State Product
  - Industrial typology, location and site requirements
  - Known environmental, infrastructure and planning constraints
  - Industrial land use strategic planning, policy and governance (with national and international comparisons).
- Future supply and demand scenarios for WA Tomorrow data and high-and-low annual growth patterns, as follows:
  - Perth and Peel working age population projections 2006-2030
  - State labour force participation rates
  - State employment rate
  - Perth and Peel employment self-sufficiency
  - Industrial estate employment share
  - Gross hectares per employee.

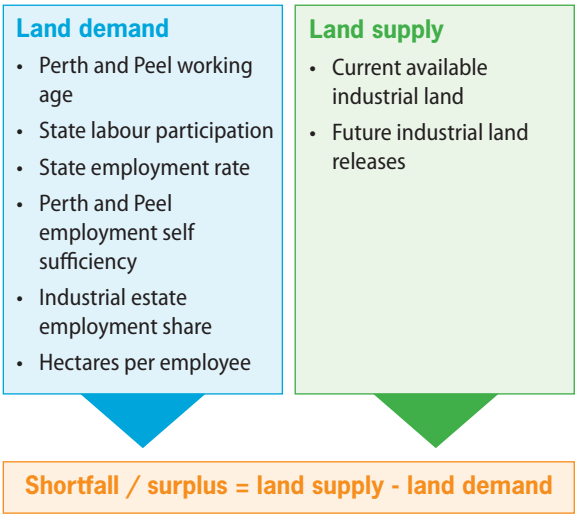
Within the Industrial Land Needs Study, expected demand was derived by applying a specifically formulated Industrial Land Needs model to a range of parameters. The purpose of the ILNS model is to use known relationships between the available data (both historical and projected) to develop long term forecasts for industrial land demand. The model also provides a process for comparing this demand against a known supply pipeline to identify periods where demand is in excess of supply. The main feature of the model is that it incorporates land area as a function of population growth. This relationship has been used as an increasing population is seen as the main driver of economic growth and hence the demand for industrial land. In research for the study, this was found to have a much stronger correlation with industrial land demand than other potential parameters, for example Gross State Product. A similar approach has been taken by other industrial land needs studies, for example Portland, Vancouver and Tasmania.

The ILNS model inputs and their sources are summarised in Table 5.

Table 5: ILNS Model inputs and sources

Model inputs	Source
Perth and Peel working age population projections to 2030	*WA Tomorrow (2005)*
State labour force participation rate	*ABS Labour Force Survey (2008)*
State employment rate	*ABS Labour Force Survey (2008)*
Metropolitan employment self sufficiency	*ABS Census (2006)*
Industrial estate employment share	*ABS Census (2006) and Industrial Land Use Survey (1997,2001)*
Ha/Employee (gross and occupied land)	*ABS Census (2006) and Industrial Land Use Survey (1997,2001)*
Current industrial land (occupied and vacant)	*Industrial Land Use Survey (1997,2001)*
Future releases of industrial land	*Industrial Land Development Program (2006)*

The structure of the model is shown below.



In essence, the model calculates the proportion of the total population who are expected to be working in industrial estates over the 30 year period of the study and, by estimating the amount of land each employee is likely to require, converts this population to a land area equivalent. This expected demand is then subtracted from the amount of land estimated to be available at that point in time and the difference between these figures indicates the land surplus or shortfall. The model has been disaggregated to examine industrial land demand in individual planning areas.

Three scenarios are considered in the Study with the parameter values identified in Table 6:

- **Scenario 1:** The "business as usual" case, using WA Tomorrow population projections and parameter values that remain consistent at current levels throughout the entire period of the study. This scenario reflects the view that current economic conditions will continue for the foreseeable future.
- **Scenario 2:** The high growth case where economic activity ramps up to a higher level and population growth is above the WA Tomorrow projections.
- **Scenario 3:** The low growth case where global issues with potentially long term influences, such as high oil prices and climate change, cause reduced demand for WA's raw commodities with the knock on effect of reducing economic activity in the Perth/Peel area.

It was agreed that for the purposes of this study, the Expected Demand (2006 – 2030) based on the WA Tomorrow Scenario 1 be applied to determine the capacity of potential industrial areas identified through the Site Assessment process. While this scenario reflects the view that current economic conditions will continue for the foreseeable future, and it is acknowledged that economic conditions have changed markedly since the commencement of this study, it is considered that these conditions are not yet expected

Table 6: Parameter values for each scenario

Parameter	Initial value (2006)	Scenario 1 Final value (2030)	Scenario 2 Final value (2030)	Scenario 3 Final value (2030)
Working age population	1,090,900	1,424,600	1,566,185	1,295,328
Participation rate	68.8%	68.8%	68.8%	65.3%
Employment rate	96.7%	96.7%	96.7%	94.7%
Employment self sufficiency	87.95%	87.95%	87.95%	90.7%
Industrial estate employment share	19.7%	19.7%	18.3%	19.7%
Gross ha/employee	0.082	0.082	0.073	0.085
Demand	10,311 ha	13,466 ha	12,242 ha	12,166 ha
Supply/demand differential		-2290 ha	-1067 ha	-991 ha

to have long term influences that will cause reduced demand for WA's raw commodities with the knock on effect of reducing economic activity in the Perth/Peel area. Also, as the model incorporates land area as a function of population growth, it is not predicted that the economic conditions have had an impact on the population predictions of WA Tomorrow, and this is seen as the main driver of economic growth and hence the demand for industrial land.

In order to re-assess some of the assumptions made about the release of industrial land in areas where the land is not currently zoned for industrial development, these assumptions were removed and these sites (e.g. Nambeelup) have been assessed alongside of new potential industrial areas. It was identified that 1572 ha of land had been accounted for in the ILNS which may not be developed for industrial purposes for various reasons and this land was removed from the supply parameters. As a result, under this scenario a demand for 4726 hectares of additional industrial land in the Perth and Peel region is predicted by 2030.

Incorporation of 2006 ILUS data

The Industrial Land Needs Study utilised 2001 industrial land survey data and accordingly assumptions have been made on land taken up since 2001. These assumptions have since been tested on estates for which updated data has become available and found to be robust, with measured land take-up rates and land use intensity within the assumed range, but towards the higher end of estimates, and possibly in excess of it with regard to land use intensity.

Partial data from the 2006 Industrial Land Use Survey was made available in late October 2008 and incorporated it into a "composite" spreadsheet which includes 2001 data for those complexes that are yet to be surveyed. The results show that the 'hectares per employee' ratio has decreased from the 0.082 ha/employee to 0.067 ha/employee, indicating higher intensity of land use. The ILNS modeling includes a scenario (Scenario 2) of higher population growth (higher than WA Tomorrow) which assumes that this ratio decreases to 0.0708 ha/employee, resulting in a lower demand for land in terms of total hectares. It is expected however, that with higher unemployment and less focus on intensification of land uses with the impacts of the recent global economic crisis that the "hectares per employee ratio" may again be increasing.

The implication of this data for the Industrial Land Capacity study is that industries that need well located large land areas will have increasing difficulty in finding sites. Vacant industrial land in this study is as estimated for 2006, based on extrapolation from 2001 Industrial Land Use Survey. This is estimated to be 22 per cent of total existing industrial land. This area is considered to be the buffer stock (and considerably less than the historical 30 per cent level of buffer stock identified in the ILNS) and therefore was not included in the land supply pipeline. It was noted that the buffer supply would not be able to be quantified more accurately until the 2006 ILUS data were available.

The supply of industrial land assumed in the ILNS is based on data from the Industrial Land Development Program (2006). These land areas were modified to reflect known constraints. The supply figures have been subject to review through the ILCA process, with modification of land area and yield as additional constraints are identified during the development of these sites. Of the 25 areas identified in the program, only 13 (including Perth Airport) were new sites that were not previously accounted for in the ILUS data.

Based on the above, and to ensure that a conservative approach is taken to ultimately meet industrial land demand, it is considered that the target demand figures identified under the ILNS WA Tomorrow Scenario 1 was the most appropriate scenario to adopt for forecasting future demand of industrial land.

Industrial Land Capacity Assessment Study

The Industrial Land Capacity Assessment Study (ILCA), formed the second component of the studies that informed the EELS. This study was undertaken and completed by a consortium of consultants comprising Aurecon and Syme Marmion and Co., with Aurecon as the project leaders.

The principal objective of ILCA was to identify potential sites for future industrial land development to cater for the forecast demand, and beyond within the Perth and Peel regions.

The Industrial Land Capacity Assessment Study integrated the key information and data outputs from the Industrial Land Needs Study and integrated the information with further assessment:

- Size of industrial area
- Amount of vacant land
- Constraints to expansion
- Likely capacity for additional land demand

As part of the ILCA study various methods of consultation with stakeholder groups and State Government agencies were undertaken. Recognising the need for a greater level of collaboration between state and local government authorities, servicing and infrastructure groups and stakeholders, consultation with these key groups assisted in informing the ILCA study of where current needs and challenges existed.

Following on from this consultative process, a geo spatial mapping analysis and the overlaying of opportunities and constraints, which identified areas within both the Perth and Peel regions, was undertaken to identify possible locations for future industrial land development. Upon identifying general locations for industrial development, a multi-criteria analysis of each of the possible sites identified was carried out.

Multi criteria evaluation

The development of the assessment criteria for the selection and comparison of potential sites was undertaken at two levels, as identified in the brief.

Review of land capability

The GIS modelling and analysis was based upon the degree of impact of opportunities and constraints.

The "degree of constraint" was defined using DPI Sustainability Branch terms, as follows:

- Inclusive essential (IE)
  - Characteristic must be present at the site e.g. proximity to urban growth areas, labour force and transport, access to infrastructure and services;
- Inclusive desirable (ID)
  - Characteristics that increase the potential of the site e.g. low development costs (drainage, soils topography);
- Exclusive desirable (ED)
  - Characteristics that decrease the potential of the site; e.g., the avoidance of environment and heritage values (Bush Forever, wetlands);
- Exclusive essential (EE)
  - Characteristic must not be present at the site; e.g. prime agricultural land and residential land uses.

The preliminary criteria against which sites were assessed are:

Primary assessment criteria

- Minimum developable area, not constrained by legislative and statutory constraints.
- Proximity to existing and proposed urban growth areas, labour force and transport.
- Suitable site conditions (with consideration for development costs, drainage, soils, topography).
- Access to infrastructure and services (water, sewerage and power).
- Avoidance of environmental and heritage values.
- Avoidance of prime agricultural land.
- Compatibility with existing and adjoining land uses and possible buffer requirements.

Based on the review of land capability, the model below summarises the "degree of constraint" approach used in the GIS modelling and analysis.

Table 7: "Degree of constraint" summary of criteria used in the GIS modelling and analysis

Inclusive essential (IE): Characteristics that must be present	Inclusive desirable (ID): Characteristics that increase site potential
MRS zones/reserves • Urban deferred; • Industrial; • Special industrial; • Rural; • Rural- water protection; • State Forest; and • Public purposes Infrastructure (roads, sewerage, power, water) and services provision Location near growth areas	Areas of fair/low/very low prime agricultural land Multiple use wetlands Favourable (flat) topography
Exclusive desirable (ED): Characteristics that decrease site potential	**Exclusive essential (EE): Characteristics that must not be present at the site**
Areas of high/very high agricultural land EPP wetlands, conservation wetlands and resource enhancement Wetlands Environmental constraints: • Threatened ecological communities (TEC) and their respective buffers; • Declared threatened fauna; • Declared rare and priority flora; • CALM specifically protected fauna; • Floodway and floodplains; and • Bush Forever sites Policy/Act constraints: • Basic Raw Material Resource Protection Strategy 2008 (draft) • Waterway Conservation Act area; and • Public drinking water source areas etc.	MRS zones/reserves • Urban; • Central city area; • Private recreation; • Parks and recreation; and • Civic and cultural

Detailed assessment criteria

The final criteria were developed in conjunction with the stakeholders. The criteria used in undertaking the multi-criteria analysis were as follows:

- Access to workforce
- Land status
- Compatibility/synergies with current land uses
- Transport linkages
- Serviceability
- Environmental issues
- Social impacts
- Strategic expansion potential

Criteria	Detailed considerations
Access to workforce	• accessibility to labour force • journey to work • location of existing and proposed subdivisions/developments • growth in workforce catchment • attractiveness of location to suitable workforce (availability of other facilities – child care, shopping etc.)
Land status	• land assembly / site acquisition • timeframe associated with existing constraint (e.g. basic raw materials – priority resource zones) • planning policy and/or strategy implications (e.g. Gnangara Sustainability Strategy) • zoning (MRS, PRS, TPS) • native title
Compatibility / synergies with current land uses	• relationship with existing land use (within and surrounding the site) • ability to incorporate buffers to different uses and distance to sensitive land uses
Transport linkages	• to transport and freight infrastructure • HWL routes (current and future) • access to public transport
Serviceability	• accessibility to services: water, power, sewer, telecommunications • capacity of service utilities infrastructure
Environmental issues	Having undertaken a detailed spatial assessment to first identify sites with development potential (i.e. a "fatal flaw" analysis) this criteria allows assessment and comparison of opportunity sites at a more detailed level to identify the "degree of constraint", considering: • topography • site conditions/constraints • soil condition • biodiversity • land capability • water quality / drainage
Social impacts	• impact of location on nearby communities: property values, visual impacts, noise/dust • impacts on cultural significance • human and support services for labour force
Strategic employment potential	• co-location with existing industrial sites and development of synergies (Located near client business or with where there is relevant physical infrastructure e.g. ports, airports) • access to skilled workforce with high level of education or training • developable site area and ability to expand into subsequent stages

The outcome of the multi-criteria analysis was the ranking of 40 sites, based on the weighted scores allocated.

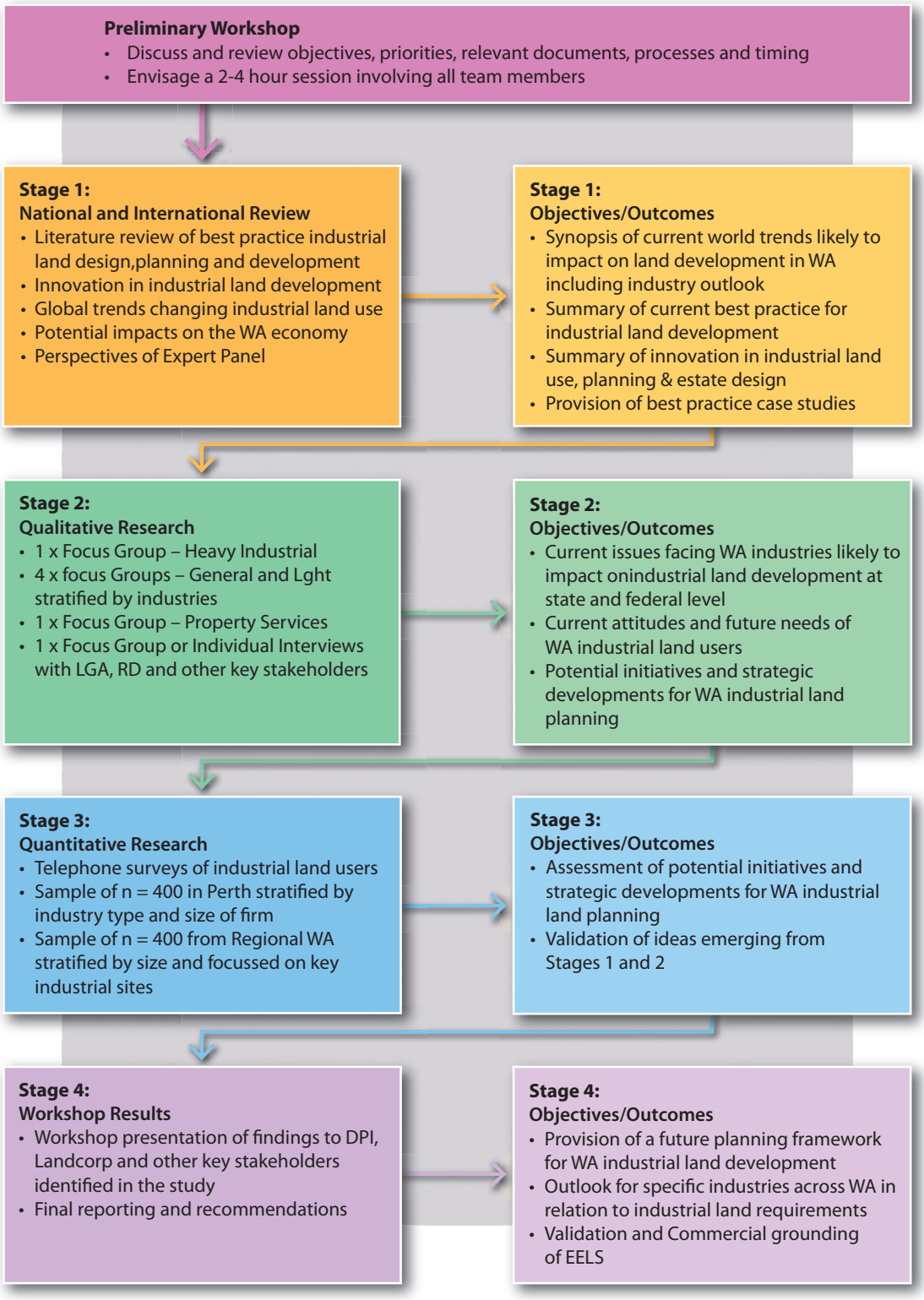
Industrial Land development research study

Planning for industrial land requires a strategic and holistic approach to a range of issues in order to ensure that the planning is responding directly to industry needs and community expectations.

The Industrial Land Development Research Study was the last study undertaken before preparation of the Industrial Land Strategy commenced. This final study was completed by a consortium led by JMG Marketing including Colliers International and Painted Dog Research.

The purpose and intent of this study was to gain a better understanding, through consultation with key industry stakeholders, government agencies and private sector representatives, of what the end needs of industrial occupiers are, or might be. Furthermore, the study aimed to identify any frustrations and challenges that industrial occupiers and developers may be facing, providing government with a good appreciation of areas where current processes and approaches may be able to be improved.

The methodology employed to undertake this study is described below:



Source: Industrial Land Development Study - Tender Request document, prepared by a consortium led by JMG Marketing including Colliers International and Painted Dog Research

Appendix B: Key planning strategies for Perth and Peel regions - 1955 to present

The following is a summary of the key planning strategies that have been prepared and adopted for Perth and Peel regions since the mid 1950s highlighting any indicative industrial land planning intended in each, where relevant.

***Stephenson Hepburn Plan* (1955)** *encouraged centralised planning and concentrated development*	• Broad vision for industrial development in the Perth metropolitan region was originally set through this plan. • Industry was recognised as one of the four main interrelated elements of the plan. • Planning process recognised that while employment opportunities were not a function of physical planning they could be influenced in terms of distribution, location and scale by planning measures. • Key industrial initiatives for the plan were new areas for large industrial expansion including Kwinana.
Perth Corridor Plan (1970) *promoted decentralised planning and urban expansion*	• Revised strategic framework to manage the growth of the 1960s. • Proposed radiating development corridors to channel development. • Plan assigned industrial land to the four corridors and urban core, most of which existed and included Subiaco, East Perth, Midland and Armadale. Each of these areas have since been redeveloped into residential and mixed business precincts which has resulted in a net loss of industrial land.
***Preferred Strategy* (1987)** *following a review of the Corridor Plan, this plan proposed a revised strategic framework to manage growth*	• Was the product of the Corridor Review Group which identified the trend toward diversification of industrial sites and potential for mixed uses in industrial zonings. • Proposed a more flexible, performance based planning system, placing less emphasis on segregation of commercial, business and general industrial uses. • Impacted on the diversification of industrial areas and further reduced the overall amount of industrial land in industrial estates in inner and middle metropolitan locations. • Strategy recognised need for outer fringe locations to accommodate larger uses. • Identified 7 key sites with a total of 2700 ha, including Wangara and Landsdale and extensions to five existing areas, primarily in the south.
***Metroplan* (1990)** *introduced a policy element to the principles of the Corridor Plan, creating a hierarchy of centres for* commercial and business activities	• Based upon corridor planning principles with a policy thrust to create a hierarchy of centres for commercial and business activities. • No significant new industrial areas were set aside as those areas already identified in the Corridor Review were considered adequate to cater for short to medium term demand.
***State Planning Strategy* (1997)** *the principle focus of this strategy related to economic growth opportunities presented by the mineral and extractive industries in the regions*	• Provides for land use planning until 2029. • Main focus was economic growth opportunity presented by the mineral and extractive industries in the regions. • Report includes strategies to provide strategic industrial sites, protect access corridors and buffer zones. • Strategic site south of RAAF Pearce was identified as a potential industrial site, as part of the North East Corridor Structure Plan. • Last annual review was in 2000-2001.

***Network City* (2004)** *promoted the intensification of land uses, mixed use corridors and employment centres*	• Reversion back to a more concentrated urban form, intensified densities and more self-sufficient employment framework. • The identification of land suitable for redevelopment and regeneration within existing urban fabric, serviced by transport corridors and key infrastructure was identified as being the key to its success. • Policy document, that needed an implementation plan. • Did not address importance of industrial land – focus was more so on activity centres and catering to population needs in a residential and amenity sense. Lack of economic focus.
***Building a Better Planning System* (2009)**	The intention of *Building a Better Planning System* is that it will deliver new and improved planning processes and instruments that will: • Clear the backlog of approval applications and reduce the time taken to obtain approvals; • Adopt a risk management based approach to development assessments to speed up approvals and simplify the processes; • Shift the focus away from statutory processes to the achievement of strategic outcomes; • Reduce complexities and inconsistencies through the adoption of standardised planning instruments such as Model Scheme Text and structure plans; • Enable better infrastructure coordination and give a spatial dimension to the State budget processes; • Focus on regional communities with particular attention being given to supporting economic development; • Develop a new vision for Perth and the regions of WA; and • Improve standards of governance through clearer and more effective accountabilities and responsibilities. Achieving these key outcomes will ensure that Western Australia remains a highly competitive and attractive place to live and do business.
Directions 2031 and Beyond *an augmentation of many of the themes identified in Network City, particularly the concept of structuring growth around a network of diverse and well connected activity centres*	• Encompasses the Perth and Peel Region Scheme areas. • Applies a hierarchy and spatial distribution of centres that will be the core focus of the city's growth over the next 20 to 25 years. • Recognises that maintaining a strong and regionally dispersed network of industrial centres is critical to the city's continued economic growth and prosperity. • It is also acknowledged that not all industry is the same and therefore an identified classification of industrial centres within the Activity Centres hierarchy is necessary: - Strategic industrial centres (*Kwinana, Hope-Valley Wattleup, Henderson, Kewdale-Welshpool, Oakley, Wagerup*) - Regional industrial centres (*Bayswater-Bassendean, Bibra Lake, Canning Vale, Forrestdale, Hazelmere, Maddington-Kenwick, Malaga, Nambeelup, Neerabup, O'Connor, Osborne Park, East Rockingham, and Wangara*).

Appendix C: Previous planning studies and reports: Key findings

Year	Study name and key fndings
1992	**Industrial Land Planning Study Part 1**
	Prepared for LandCorp. (Planwest) The objectives were to: • Provide an historical perspective of the evolution of industrial land planning in the region; • Provide an analysis of activity in the industrial sector; • Provide an analysis of demand in the sector from 1985-1990; and • Examine future demands and compare this with the existing supply data. Report findings: • Distribution of industrial land was heavily weighted towards the southwest sector, accounting for 60 per cent of the regional total; • Distance from the land to the city strongly affected industrial land values and property rentals; • Projections highlighted that the south-west and east sectors would have land stocks lasting into the next century, while remaining sectors would have short supply; • Land located in the outer sectors could help double the projected land supply if utilised correctly. • Between 1985-1990 the total land area zoned 'industrial' under local Town Planning Schemes or the Metropolitan Region Scheme decreased significantly except for the northwest sector, which increased by 40 per cent;. • Vacant industrial land decreased over the same period and land uses in industrial complexes had become more diverse over the five-year period of study as well. General comments: *Most characteristics of industrial land supply in 1992 are still existent today and in some cases have expanded into major issues. The scenarios mentioned above and detailed in the report are significant to the EELS study and should be examined intently.*
1996	**Strategic General Industrial Land Study - Stage 1**
	Prepared for the then Ministry for Planning and LandCorp in 1996. (BSD Consultants). General objective was to determine and detail the potential location of future general industrial land in or adjacent to the Perth Metropolitan Area. Study was in response to a growing recognition that many industrial areas were nearing capacity or were envisaged to be completely developed within the 10 years following the study. Report findings: Three sites identified as "preferred future industrial sites", including the Kwinana buffer, South Bullsbrook and Lakes Road, Barragup. Several conclusions and recommendations were made including: • Amendments to the Metropolitan Region Scheme and local Town Planning Schemes; • A deferred industrial land zone within the MRS to be investigated; • A demand analysis be undertaken for Perth over the next 25 years; and • The WAPC develop a best practice policy to determine appropriate uses and development criteria for future industrial estates. General comments: *This study comprised the first stage of a more detailed investigation, being the Stage 2 report, which is reviewed below.*

1997	Strategic General Industrial Land Study – Stage 2 Report
	Prepared for the then Ministry for Planning and LandCorp. (Sinclair Knight Merz, in association with the Economic Research Associates, Richard Pawluk and Associates (Masterplan) and Chesterton International). This Stage 2 Report examined: • General industrial land requirements; • Recent economic development; • Perth's regional economic activity; and • Future demands for general industrial land. The Ministry for Planning made projections for growth, which gave evidence that the sites could potentially fulfil the projected land requirements at the time. Report findings: • The preferred sites be preserved using the creation of a deferred industry zone in the MRS; • Buffers be monitored and responsive to changing technologies; • Current owners of the land be treated fairly and existing businesses relocated as necessary; and • Government act as a land bank, ideally LandCorp. General comments: This Strategic General Industrial Land studies and associated reports are an important source of background information for the strategy, not only with regards to data findings, but also with regards to the method of data collection.
1997	**General Industrial Land Needs Study**
	Prepared for LandCorp. (PlanWest) The study was commissioned to address the general industrial land needs of the Perth metropolitan area and was focused on achieving four major tasks: • The first study task was to look at previous reports dealing with industrial land in the Perth area, which gave projections for general industrial land demand; • The second task was to analyse Perth's industrial land demand by location and also by land use; This task used two different approaches to analyse the data, land take-up rates and population forecasts; • The third task was to determine the available supply (current and expected) of industrial land in Perth, identifying location and availability constraints within land use categories; and • The final task was to identify gaps between demand, forecast, contrast, and adjusted supply. General comments: The final stage of the report examines these different tasks as they relate to each sector of the Perth region and then gives brief recommendations and suggested actions, to compensate for lack of stock. An attempt similar to the EELS, to determine industrial land supply, demand and constraints. Therefore, a very relevant document.
1997 (ongoing)	**Industrial Land Use Survey**
	The Industrial Land Use Survey Program, prepared by DPI, is an ongoing survey program, which is aimed at providing quality information to support the Ministry for Planning's strategic planning process in turn assisting planners, government, non-government organisations and the general public. It was anticipated that eventually the information obtained would contribute to the development of a Metropolitan Industrial Land Supply Profile. The Survey outlines some general problems with statistical data. For example, vacant land statistics do not reflect the "real" circumstances or characteristics of a land parcel, i.e. environmental constraints are not realised, landowner intentions are not realised or established industrial land areas are not being utilised to capacity. These issues are detailed within the Survey and are also mentioned in other reports within this literature review. In order to make the current EELS study as successful as it possibly can be, these issues need to be examined in detail and solutions need to be implemented. Therefore, this survey is extremely important to the strategy.

1999	Perth Industrial Land Capability Assessment

Prepared for the then Ministry for Planning and LandCorp.

It follows on from the Industrial Land Use Survey, which reached the conclusion that there was an abundance of vacant industrial land available for immediate use within the Perth region. It was believed that this might not necessarily be the case, as there are several constraints that hinder industrial land development which were not considered within the Industrial Land Use Survey.

Report findings:

- The perceived abundance of land was not, as plentiful as predicted.
- Outlined how the amount of available land for immediate or imminent industrial development is difficult to determine, and in reality is far less than that calculated in the 1997 Survey.
- Outlined that there was minimal land available for sale and where lots were available, the landowners vacant owners were tightly holding onto them, waiting for increased value or for regulation changes allowing smaller minimum lot sizes.
- Smaller lots were becoming more attractive to the consumer, as mixed business and light industrial activity increased and proved to be more lucrative.

General Comments:

- *The study concluded that any calculations for the future provision of industrial land should factor in the unavailability of between 50 per cent and 70 per cent of vacant land to account for constraints such as unknown landowner intentions.*
- *The report also makes several recommendations regarding how the study could be done differently to gain more accurate results as well as how to deal with land constraints early on to prevent them becoming major issues.*

2000	Industrial Opportunities and Forecast Assessment Study

Series of reports prepared for Landcorp examining the future land area, location and supply of infrastructure for industrial land over a 50-year period.

The series consists of three reports, each with a different purpose.

- The first two reports reviewed past literature and studies, global economic trends, existing and potential industrial areas and constraints for industrial land generally.
- The second report examined the factors identified within the first report in more detail as they related to the Perth metropolitan region, also taking into consideration such issues as industry location and the implications of changing technologies.
- The final report collates the information gathered in the first two reports and using this information as a basis, determines the anticipated projected land and infrastructure requirements for future industrial development. The report examines determinants for industrial land demand in the State, Special Industry requirements, Heavy Industry requirements and the demand for future industrial land in each specific region.

Key findings:

The final report concludes that:

There is considered to be sufficient general and light industrial land vacant or proposed to service projected population growth;

The major challenge faced by planners will be within the Kwinana industrial area, in regards to the supply of heavy industrial land. (note: at the time of this report and recommendations, Kwinana had not yet been planned so that optimum use of the land could be achieved. Furthermore, at the stage at which the report was finalised, Breton Bay and Kemerton were still proposed as heavy industrial areas, so optimising the use of Kwinana land was not seen as necessary.)

General Comments:

This series of reports uses some analysis techniques that have proved useful in the development of the EELS.

2004	Demand for Industrial land in the Peel Region
	Prepared for the Peel Development Commission. (Worley Consultants and Economic Consulting Services) The study examined: • The current and future demand for industrial land within the Peel region; and • Factors influencing the demand of industrial land in certain locations. Key findings: • The report identified that there was a limited supply of vacant industrial land in the area, which was affecting demand opportunities for future industrial developments, and the expansion of existing industries; • Outlined that among many influential land characteristics, 'ease of access to transport' is the most attractive feature, as industry always locates close to good transport infrastructure such as ports, rail and roads; • Population, demographic changes and trends and employment are principal factors driving the demand for industrial land in the Peel Region; and • Other factors such as planning controls and approvals are also important, as demand can be further suppressed by the fact that land within the region is not suitably zoned for industry, is not suitably serviced for industrial needs or is zoned for industry but is occupied by other uses. General Comments: *The report examines different projected demand estimate scenarios for industrial land in the Peel region and is a useful resource.*
2008	**Industrial Land Needs Study**
	The current ILNS identifies a shortfall in industrial land of between **990** and **2300** hectares by the year 2030. This is based on projected additional demand and the estimated current and known future supply. It recommends that the higher end of the range initially be used as a basis for determining the additional requirement for industrial land supply for the purposes of planning and assessing the capability of the region to produce the required amount of industrial land.

Appendix D: Assessment framework from Adelaide industrial land strategy

The framework also provides a mechanism to identify prime industrial areas considered to be of economic importance to the State that must have protection from rezoning and encroachment.

The Framework is provided below.

Strategic Industrial Areas

Strategic Industrial Areas designated below should not be rezoned for non-industrial land uses.

(a) Le Fevre Peninsula/Gillman

(b) Lonsdale

(c) Edinburgh Parks/DSTO

These areas are economically important to the State on the basis of employment levels, significant exports or export function, infrastructure investment and future industrial land supply.

Prime Industrial Areas

Prime Industrial Areas should be retained for industrial activities. In determining a Prime Industrial Area, regard should be given to the following criteria:

(a) the land is contiguous to other industrial activities

(b) the land is well located in relation to supply chains and service providers

(c) the land offers potential for on-site expansion of existing industrial businesses

(d) the land is well located in relation to skilled labour pools

(e) the land is well located to take advantage of existing or proposed infrastructure or other economic development

(f) the land is well located in relation to freight connections and other important road and/or rail networks

(g) the land provides, or offers potential for the provision of, small industrial businesses serving the local area

(h) the land provides sufficient space for adequate parking and turning space for industrial vehicles

(i) the land offers potential for 24-hour operations

(j) the land has minimal or no adjoining use constraints

(k) the land provides unconstrained vehicle access and exit

(l) the land can be commercially developed with infrastructure and site preparation for future industrial activities.

Rezoning Industrial Land

Industrial land may be suitable for other uses if:

(a) the land does not form part of a Strategic Industrial Area or a Prime Industrial Area

(b) the site is no longer conducive to continued industrial activities and there will be compelling community or economic benefits through alternative uses

(c) the rezoning will not affect (individually or cumulatively) nearby industries by, for example restricting operating hours, delivery times, or the capacity of the local transport network.

The Statement of Intent (which is the formal starting point of an amendment to a Development Plan) should provide for the following investigations to be undertaken in the preparation of a Development Plan Amendment to rezone industrial land for non-industrial activities:

(a) an evaluation of the land against the Prime Industrial Land criteria (above)

(b) evidence that the land is without realistic prospect of industrial re-use

(c) an evaluation of the potential for other industrial- or employment-generating land uses (i.e. commercial, office, retail) on the site.

Un-developed sites

The Statement of Intent should provide for the following investigations to be undertaken in the preparation of a Development Plan Amendment to rezone un-developed land to industrial use.

Un-developed sites may be suitable for re-zoning to industrial use if they meet the following criteria:

(a) the land is adjacent to existing key industrial areas

(b) the land has minimal or no adjoining use constraints

(c) the land is able to take advantage of existing or proposed infrastructure

(d) easy access to freight routes and other road and rail networks is available

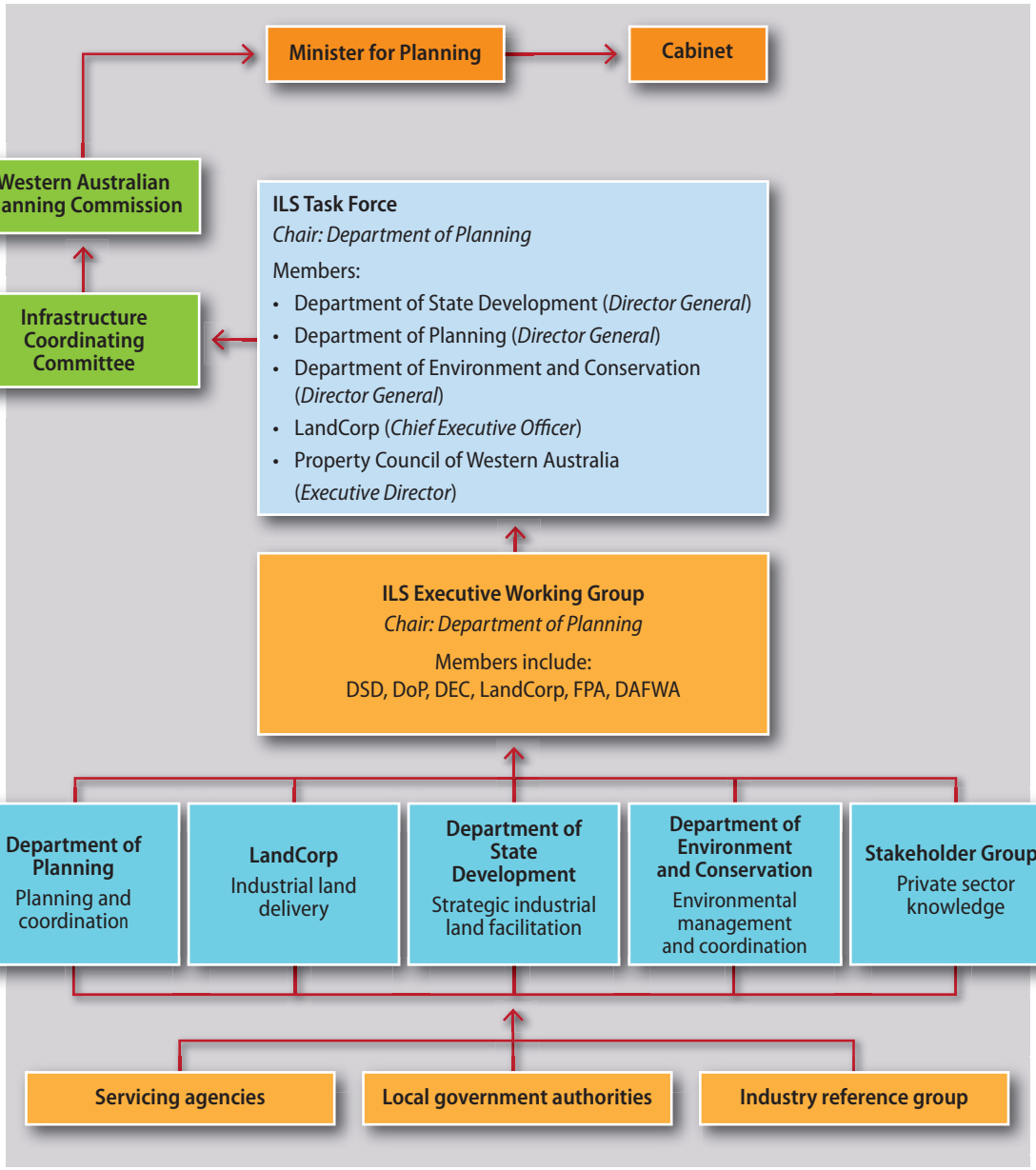
(e) the land can be commercially developed with required infrastructure and site preparation works

(f) the land provides a key strategic economic development opportunity for industry or sector development

(g) an evaluation of competing land uses and cost/benefit of zoning for industrial use has been undertaken

(h) zoning and policy area restrictions complement existing industrial activities in the area.

Appendix E:
Economic and Employment Lands Strategy non-heavy industrial governance structure



Appendix F: ILS Taskforce and Working Group Members

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Appendix G: Glossary

Accessibility

Refers to the extent to which people have access to employment, goods and services, either through proximity or transport links to connect places.

Acid Sulphate Soils (ASS)

Are naturally occurring soils and sediments containing iron sulfides. When ASS are exposed to air the iron sulfides in the soil react with oxygen and water to produce a variety of iron compounds and sulfuric acid. The resulting acid can release other substances, including heavy metals, from the soil and into the surrounding environment.

Activity Centres

Defines places which vary in scale, composition and character but in essence are commercial focal points which include a combination of activities such as offices, retail, higher-density housing, entertainment, civic/community, education and medical services.

The Activity Centres Policy is a state planning policy for the planning and development of activity centres throughout Perth and Peel.

Agri-Food Industry

Means beyond farm gate, manufacturing and value-adding of edible product. Food manufacturing consists of gathering ingredients from local and imported sources to process and package in WA to create products for either further processing or final sale at retail or food service outlets in local, national or international markets.

Amenity

The enjoyment of the environment, whether public or private lands, by individuals or the community. It includes the enjoyment of privacy, sunlight, views, quiet, access to local facilities and similar freedom from nuisance.

Basic Raw Materials (BRM)

This means sand (including silica sand), clay, hard rock, limestone (including metallurgical limestone), gravel and other construction and road building materials. These materials are produced relatively cheaply, with the major cost being transport to the construction site. A ready supply of basic raw materials close to established and developing parts of the metropolitan region is, therefore, essential in keeping down the costs of land development and contributing to affordable housing.

Better Urban Water Management (2008)

A State Planning document which has been designed to facilitate better management of WA's urban water resources by ensuring an appropriate level of consideration is given to the total water cycle at each stage of the planning system.

Broad Hectare Land

Refers to undeveloped land zoned for urban development outside the urban extent. These areas are generally used for rural purposes until residential subdivision takes place. This type of land is also referred to as greenfield.

Brownfield Development

Development on sites that have previously been used for other urban land uses, including industrial activities.

Buffers

These are the areas surrounding environmentally sensitive areas, and are managed for a combination of biodiversity conservation objectives as well as other resource management activities.

They may also include areas between potentially incompatible land uses such as rural and residential, and are managed to minimise impact on both resource productivity and amenity.

Bulky goods retail outlets

Larger premises used primarily for the sale of goods and items which are predominantly of a size, shape or weight as to require an extensive area for handling, storage or display.

Bush Forever

A State Government policy which identifies regionally significant bushland to be retained and protected forever and is one of the most significant conservation initiatives ever undertaken in Western Australia.

Capital Works Program

Refers to a whole of government funding program that manages capital expenditure on new infrastructure and improvements, provision of facilities and service infrastructure (including: transport, electricity, water, health and education and training).

Conditional Approval

Conditional approval is granted by the WAPC for subdivision development to begin subject to certain conditions being met. The approval is preceded by an assessment of the proposed subdivision plan by statutory referral agencies, including servicing authorities. On receipt of conditional approval, the proponent may commence subdivision development in accordance with the conditions of approval. A conditional approval remains valid for three years when five lots or fewer are approved and for four years when six lots or more are approved.

Consumption of zoned land

Refers to the amount of land developed as broad-hectare areas become built out over time. It does not include development within the urban extent.

Consumption Rates

In the context of the Industrial Land Strategy, this refers to the rate at which industrial zoned land is acquired.

Constraints

A constraint, in the context of land development is anything that prevents development from occurring. Constraints may be related to identified environmental sensitivities of a site, nearby incompatible land uses, policy framework (written or unwritten) for example.

Cottage Industry

An industry where the creation of products and services is home-based, rather than factory-based.

De-constraining

This relates to the removal of any known constraints or fatal flaws that may be encountered in the process of determining the feasibility of a land parcel for future development. This may involve working with relevant agencies to remove the known constraint - or determining a manner in which the constraint can be managed and the development potential optimised.

Demand Drivers

These are the key factors which are known to influence the level and type of demand for industrial land and land use types.

Developer Contribution Scheme

Refers to a cost sharing arrangement for common infrastructure, open space and community facilities required to provide services to a given project area or industrial estate. Such cost sharing arrangements are managed through a Development Contribution Plan (DCP) which may be administered by a local authority.

Development Incentives

This refers to a variety of incentives (rate reduction, land tax exemptions) that may be offered to a developer of industrial land to facilitate more prompt development.

Development ready land

Refers to land that is zoned and serviced and is thus fully prepared for built form development.

District Centres

District Centres generally serve the main weekly household shopping, service and community needs of a district. They are predominantly retail focused but many also include a limited mix of other uses.

Employment lands

Employment land is broadly defined as land that could be used for employment generating activities, including land zoned for industrial and commercial uses.

Employment Self Sufficiency (ESS)

Measures the quantity of jobs available in a given area as a proportion of that area's labour force.

Feasibility study

The undertaking of a range of studies that assist in determining the likelihood of a proposed product or development fulfilling the objectives of a particular investor or decision making body.

Final Approval

Final approval is the WAPC endorsement of the proponent's submitted plan/diagram(s) of survey describing the now complete subdivision; constructed in accordance with the conditions set down in a conditional approval. Final approvals are then registered with the Office of Titles where certificates of titles for the newly created lots can be issued.

Floorspace

This is the area of all floors (floorspace) as reported by an establishment to be confined within the internal finished surfaces of permanent walls but excluding the following areas:

- all stairs, toilets, cleaners' cupboards, lift shafts and motor rooms, escalators, tea rooms and plant rooms, and other service areas;
- lobbies between lifts facing other lifts serving the same floor;
- areas set aside as public space or thoroughfares and not for the exclusive use of occupiers of the floor or building; and
- areas set aside for the provision of facilities or services to the floor or building where such facilities are not for the exclusive use of occupiers of the floor or building.

Fragmented Land Ownership

An area identified for a potential singular development that has multiple landowners affected by the potential development.

Future Short Term Industrial Sites

For the purpose of this strategy, short term in this context refers to a period between 0 and 4 years to complete the planning process (involving relevant studies and investigations).

It represents sites that are likely to be delivered to the market shortly that have undergone significant planning.

General Industry

An industry other than a cottage, extractive, light, mining, rural or service industry. This is the main zone that applies to most industrial areas. It provides for manufacturing industry, the storage and distribution of goods and associated uses which by the nature of their operations should be separated from residential areas.

Governance

Governance is defined as the act of manner of governing. In the context of the Industrial Land Strategy, governance refers to the legal framework which will be required to allow delivery of the Strategy's actions. This includes definitions of responsibilities.

Greenfield Development

Development on land that has not previously been developed for urban land uses

Gross areas

This is the quantity of land allocated or denoted for potential future industrial development, including areas that may be later excluded from this area, due to known constraints or development limitations.

Groundwater

Groundwater is water occurring naturally below ground level in an aquifer or water pumped, diverted or released into an aquifer for storage underground.

Heavy Industry

This land use category is only denoted by State Government policy and expressed through its agencies. It does not appear as a specific zone in either the MRS or local government zoning regimes. Currently Perth's only heavy industry site described through planning and economic development policy is the Kwinana industrial area, which is split for the purposes of analysis into three complexes: Naval Base, Kwinana Beach and East Rockingham.

Infill Development

New development that occurs within established urban areas where the site or area is either vacant or has previously been used for another urban purpose. The scale of development can range from the creation of one additional residential lot to a major mixed–use redevelopment.

Intermodal

The movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes. By extension, the term 'intermodality' has been used to describe a system of transport whereby two or more modes of transport are used to transport the same loading unit or truck in an integrated manner, without loading or unloading, in a door-to-door transport chain.

Light Industry

An industry:

- a) in which the processes carried on, the machinery used, and the goods and commodities carried to and from the premises do not cause any injury to or adversely affect the amenity of the locality; and
- b) the establishment or conduct of which does not, or will not, impose an undue load on any existing or proposed service for the supply or provision of essential services.

Light industry traditionally provides for trade services such as mechanical repairs, construction and other light industry uses at an urban scale. These activities are the most plentiful in number (but not necessarily in terms of total area) and widest in distribution across the Metropolitan region.

Local Planning Scheme

Are detailed planning schemes developed by local governments to manage the range of permitted land uses within specified locations. Whether in respect to the MRS or PRS, local planning schemes must be consistent with the provisions identified within the relevant region scheme.

Mixed Use Development

Mixed-use developments incorporate complementary uses into a single parcel or development area. Mixed-use development allows more than one type of use in a building or set of buildings, which can mean a combination of residential, commercial, industrial, office, institutional, or other land uses.

Multi-Criteria Evaluation

This is the methodology employed to assess and determine the preferred industrial sites identified as part of this Industrial Land Strategy. A number of selected criteria were used to undertaken the Multi-Criteria evaluation of each identified site, which included:

- Access to Workforce, Land Status, Compatibility/ Synergies with Current Land Uses, Transport Linkages, Serviceability, Environmental Issues, Social Impacts and Expansion Potential.

Net developable areas

Measures the actual developable area excluding take-out for items such as local roads, open space, infrastructure and environmental considerations.

Physical Infrastructure

This term refers to the key infrastructure required to service a population or land use activity. Key infrastructure considered essential for enabling productivity in the economy includes roads, utilities (including gas, telecommunications, electricity), water, wastewater (including sewer). Developing infrastructure often requires large initial investment, but the economies of scale tend to be significant.

Planning and Development Act (2005)

The legal framework for the Western Australian planning system in Western Australia is the *Planning and Development Act (2005)*, providing for a system of land planning and development throughout the state. The WAPC is recognised under the Act as 'a body corporate with perpetual succession' and acts as the sole decision making body for the state, promoting orderly and proper planning in a single framework.

Potential Long Term Industrial Sites (Strategic Landbank Sites)

For the purpose of this strategy, long term in this context refers to a period 10 years or greater to complete the planning process (involving relevant studies and investigations).

The sites identified form a landbank that has been created as a result of the Industrial Land Strategy to ensure an adequate supply of industrial development sites to meet the future needs of industry in Western Australia.

Potential Medium Term Industrial Sites

For the purpose of this strategy, medium term in this context refers to a period between 4 and 10 years to complete the planning process (involving relevant studies and investigations).

These sites still require further investigative work and analysis; and de-constraining to be released to the market.

Public Drinking Water Source Areas

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission utilises policies for the protection of public drinking water sources that include three levels of priority classification of lands from most to least protected: Priority 1 (P1), Priority 2 (P2) and Priority 3 (P3).

Rationalisation

This refers to the reconfiguration and consolidation of existing land uses into a more effective and purpose related format, including the removal of inappropriate land uses within existing estates.

Region Schemes

Metropolitan Region Scheme (MRS) - a large planning scheme for land use in the Perth metropolitan area. The MRS defines future land use, dividing it into broad zones and reservations.

Peel Region Scheme (PRS) - a large planning scheme which guides land use in the Peel region. The PRS defines the future use of land, dividing it into broad zones and reservations. This plan has been in operation since March 2003 and provides the legal basis for planning in the Peel region.

Remnant native vegetation

Small areas of native plant communities that are found in otherwise cleared landscapes.

Residential Encroachment

The intrusion of residential land uses onto competing uses such as industrial or commercial land.

Scheme Amendment

The process of changing zones or reservations from one use to another. The amendment process requires proposed amendments to be advertised for wider community and government comment. The amendment process is regulated by the *Planning and Development Act 2005*, allowing for extensive community consultation to review the proposal before a final decision is made. Region schemes may be amended in one of two ways, either as a major (substantial) amendment or as a minor (non-substantial) amendment. Lifting of urban deferment (urban deferred to urban zone) are clause 27 amendments in the MRS and clause 13 amendments in the PRS. For more information see www.planning.wa.gov.au/The+planning+system/Region+schemes/default.aspx

Secondary Centres

Secondary centres provide for the main daily shopping needs of the community and typically include a supermarket grouped together with a small range of other uses and occasionally community facilities.

Separation distances

Separation distances between land uses and industry are provided in the Environment Protection Authority's Separation Distance Criteria. The separation distances are intended to address potential conflicts between residential and other sensitive land uses and industry due to industrial emissions such as particulates, odours and noise.

Shortfall

An amount that is less than an anticipated or expected amount. In this case, it relates to an amount of land that does not adequately cater for demand levels.

State Significant Development / major projects

Projects that are important in achieving State or regional planning objectives, or that are important in delivering the Government's infrastructure programs or development in places that are importance to the State's environment and/or economy. The Minister for Planning is the consent authority for State Significant Development.

Strategic employment

This refers to employment that relate to a range of industry types defined by the three-digit ANZSIC Industry classified as Export, Consumer Services (CS), Producer Services (PS), Knowledge-Intensive Consumer Services (KICS) or Knowledge-Intensive Producer Services (KIPS).

Strategic Landbank Sites

Parcels of land identified for future industrial land uses which should be considered of economic importance to the State and should be protected from rezoning and encroachment by competing land uses.

Structure Plan

Refers to a document including spatial plans that details the proposed layout of a future development area. In addition to illustrating details such as road configuration and the location of retail and community facilities such as shops, schools and public open space, a structure plan can also show details such as housing density, land use classifications and buffer zones.

Study Area

For the purposes of the Industrial Land Strategy this is the area represented by both the MRS and PRS Maps.

Sub-regions

Directions 2031 and Beyond has identified six sub-regional planning areas that will form the basis of future planning and policy development: Central, North-west, North-east, South-east, South-west and Peel.

Sustainability

Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Take Up Rates

Take up rates refer to the rate at which industrial land is purchased and developed on.

Threatened Ecological Community (TEC)

An ecological community is a naturally occurring biological assemblage that occurs in a particular type of habitat. A threatened ecological community (TEC) is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Urban Extent

Refers to the outer boundary of urbanised land.

Vacant Lots

Refer to those lots that are undeveloped (i.e. have no premises constructed on the lot) and that are located on residential or special zones as designated under the various local planning schemes in Western Australia. The base information is provided by the Valuer General's Office.

Wastewater

Wastewater is water which has been used for some purpose and would normally be treated or discarded as it often contains significant quantities of pollutants. There is a growing momentum favouring re-use of this water source where appropriate.

Wetlands

Wetlands Swamps, billabongs, lakes, salt marshes, mudflats, mangrove forests and virtually any land which is regularly or intermittently inundated with water that is static or flowing, fresh, brackish or salty, including areas of marine water.

Appendix H: Bibliography

Network City Community Planning Strategy for Perth and Peel
March 2006, Department for Planning and Infrastructure/ Western Australian Planning Commission

Statement of Planning Policy: Metropolitan Freight Network (Draft)
May 2005, Department for Planning and Infrastructure/ Western Australian Planning Commission

State Sustainability Strategy
May 2005, Department for Planning and Infrastructure/ Western Australian Planning Commission

DC 4.1 Industrial Subdivision
July 1998, Department for Planning and Infrastructure/ Western Australian Planning Commission

State Industrial Buffer Policy
May 1997, Department for Planning and Infrastructure/ Western Australian Planning Commission

Northeast Corridor Structure Plan
March 1994, Department of Planning and Urban Development

Inner Peel Region Structure Plan
December 1997, Department for Planning and Infrastructure/ Western Australian Planning Commission

Industrial Land Supply Profile (Draft)
2007/2008, Department for Planning and Infrastructure/ Western Australian Planning Commission

****Industrial Opportunities and Forecast Assessment Study*** (Series of 3 Reports)
1998-2000, The Planning Group, for LandCorp

Demand for Industrial Land in the Peel Region
2004, Worley consultants in association with Economic Consulting Services, for the Peel Development Commission

General Industrial Land Needs Study
October 1997, Plan West Consultants, for Land Corp

Industrial Land Use Survey Program
May 1999, The Planning Group in association with Economic Research Associates, for LandCorp and The Ministry for Planning

Perth Industrial Land Capability Assessment
March 1999, Richard Pawluk and Associates/Masterplan Consultants, for the Ministry for Planning and LandCorp

Strategic General Industrial Land Study – Stage 1
January 1996, BSD Consultants, for The Ministry for Planning and Landcorp

Strategic General Industrial Land Study – Stage 2
March 1997, Sinclair Knight Merz, in association with the Economic Research Associates, Richard Pawluk and Associates (Masterplan) and Chesterton International, for the Ministry of Planning

Industrial Land Planning Study
December 1992, Plan West Consultants, for LandCorp and The Department of Planning and Urban Development

Metropolitan Adelaide Industrial Land Strategy
April 2007, Planning South Australia

Urban Development Program 2003 Report (Victoria)
2003, Department of Planning and Community Development

Industrial Sites in the South West
September 1992, Industrial Sites Advisory Committee

Warren Blackwood Region Industrial Sites Study
June 2005, Thompson McRobert Edgeloe and ATA Environmental, for the Western Australian Planning Commission

* This series of reports is incomplete.

Abbreviations

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
ALT	Aboriginal Lands Trust
ASS	Acid Sulphate Soils
BUWM	Better Urban Water Management
CCW	Conservation Category Wetland
DAFWA	Department of Agriculture and Food Western Australia
DCP	Development Contribution Plan
DEC	Department of Environment and Conservation
DIA	Department of Indigenous Affairs
DoE	Department of Environment
DoP	Department of Planning
DoT	Department of Transport
DoW	Department of Water
DPC	Department of the Premier and Cabinet
DPI	Department of Planning and Infrastructure (now Department of Planning)
DRF	Declared Rare Flora
DSD	Department of State Development
DSP	District Structure Plan
EELS	Economic and Employment Lands Strategy
EPA	Environmental Protection Authority
ESC	Employment Self Containment
ESS	Employment Self-Sufficiency
FESA	Fire and Emergency Services Authority of Western Australia
FPA	Fremantle Port Authority
GSS	Gnangara Sustainability Strategy
ha	Hectares
HWL	High Wide Load
ICC	Infrastructure Coordinating Committee
ICT	Information and Communication Technology
ILCA	Industrial Land Capacity Assessment
ILNS	Industrial Land Needs Study
ILS	Industrial Land Strategy
ILST	Industrial Land Supply Taskforce
ILUS	Industrial Land Use Survey
kV	Kilo volts
MCA	Multi Criteria Analysis
MKSEA	Maddington Kenwick Strategic Employment Area
MRA	Metropolitan Redevelopment Authority
MRS	Metropolitan Region Scheme
MRWA	Main Roads of Western Australia
PCA	Property Council of Australia
PDWSA	Public Drinking Water Supply Area
PRA	Metropolitan Redevelopment Authority
PRS	Peel Region Scheme
RAAF	Royal Australian Air Force
RAV	Restricted Access Vehicle
REIWA	Real Estate Institute of Western Australia
SRT	Swan River Trust
TEC	Threatened Ecological Community
TPS	Town Planning Scheme
UDP	Urban Development Program
WAPC	Western Australian Planning Commission
WC	Water Corporation
WWTP	Waste Water Treatment Plant