draft Waterloo Industrial Park District Structure Plan

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Shire of Dardanup

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Chairman of the WAPC – Foreword

In April 2016 the Western Australian Planning Commission (WAPC) published the draft *Wanju District Structure Plan* for consultation. Now the WAPC, together with its partner the Shire of Dardanup, is releasing the draft Waterloo Industrial Park District Structure Plan for public comment.

The South West is one of the fastest growing regions in Western Australia and the WAPC recognises the need to help facilitate its economic growth. We must plan for making available adequate industrial and commercial land into the future — while taking into account the lead times required to provide such land to the market.

This district structure plan, together with the draft *Wanju District Structure Plan*, represents an important stage in the planning process. It sets out the WAPC and Shire's key planning aspirations, objectives and principles for the area which will act as a primary economic driver for the urban growth planned for at Wanju, and further afield throughout Greater Bunbury and the South West.

The proposed Waterloo Industrial Park comprises a gross area of industrial land of 1285 hectares and is strategically located on the eastern outskirts of Bunbury with excellent access to the proposed Bunbury outer ring road and the Bunbury Port. It is immediately south of the urban expansion area of Wanju and east of the proposed Picton Industrial Park Southern Precinct.

The proximity of the existing Bunbury to Perth railway line along the district structure plan area's northern boundary provides the opportunity for a future rail spur into the area. It is important that land adjacent to the potential spur is safeguarded for uses that would be benefit from rail access. Provision is also made for the opportunity for an agri-food processing precinct in the south east of the district structure plan area.

I encourage you to take this opportunity to have your say on the future economic growth of Greater Bunbury. Submissions for the draft Waterloo Industrial Park District Structure Plan close on 11 July 2017.

Eric Lumsden PSM
Chairperson

Shire President – Foreword

The release in April 2016 of the draft *Wanju District Structure Plan* for Western Australia's newest city, Wanju, marked an unprecedented step in the future development of our Shire.

With a projected population of 50,000 residents and 20,000 homes, the development is one of the biggest urban developments to be undertaken in regional Western Australia over the next decade.

Separate to the Wanju project, but very much interrelated, are plans for the 1285 hectare Waterloo Industrial Park. This document is the park's draft district structure plan and is presented jointly by the Shire of Dardanup and the Western Australian Planning Commission for your review.

The Waterloo Industrial Park will provide an important economic driver for growth in neighbouring Wanju and the greater Bunbury region as a whole.

It is positioned in the heart of our Shire with excellent access to the proposed Bunbury outer ring road, only five kilometres to the Bunbury Port plus proximity to the Bunbury to Perth railway line.

Our enviable regional lifestyle is driving strong population growth. We need to cater for that growing population, not only with homes and facilities like those planned in Wanju, but with opportunities for economic development and ultimately jobs as well.

This draft Waterloo Industrial Park District Structure Plan represents an important step in the planning process towards achieving those objectives.

It is with interest and anticipation that I look forward to receiving your feedback and input.

Mick Bennett
Shire President

Executive Summary

The proposed Waterloo Industrial Park represents a significant medium to long-term economic development opportunity for Greater Bunbury. It is well situated within close proximity and with good road and rail linkages to the Port of Bunbury, and will have excellent access to the proposed Bunbury outer ring road, which will ultimately provide freeway standard road linkages around Greater Bunbury. The proposed Bunbury outer ring road will offer highway links to the existing Forrest Highway and access to Perth and Peel to the north, and to the rest of the South West region to the south. Proposed improvements to the South Western Highway in the vicinity of the district structure plan (DSP) area will also help provide good vehicle access to Waterloo from the north-east.

The existing Perth-Bunbury and the disused Manjimup-Bunbury railway lines are positioned immediately to the north and south-west of the DSP area, respectively. The existing railway provides the opportunity for multi-modal terminal facilities to be developed at Waterloo, potentially linking in with the Port of Bunbury, which is situated between 10 and 14 kilometres to the north-west of the area.

The site conditions, with a clay sub-soil resulting in a high perched water table, provide the opportunity for innovative and sustainable building construction techniques to be employed and the provision of sustainable energy and water management measures to provide for a resilient future.

The Waterloo Industrial Park will, in many ways, be inextricably linked to the proposed new community of Wanju, which is to be located immediately to the north of Waterloo. Without the economic development and new jobs arising from the development of Waterloo the urban expansion proposed for Wanju will be developed at a significantly slower rate than might otherwise be the case.

Foundations of the new community

Waterloo was initially identified in *Industry 2030 – Greater Bunbury Industrial Land and Port Access Planning* (WAPC, 2000) for long-term industrial development. The environmental constraints that have emerged over the past 10 years on the neighbouring Preston and Picton industrial estates, reducing their developable area, have further increased the importance of Waterloo as a long-term industrial development option.

The *Greater Bunbury Strategy 2013*, developed by the Department of Planning to interpret State planning policy at the local level and endorsed by the Western Australian Planning Commission (WAPC), considered several different alternatives for future growth of the Greater Bunbury sub-region.

The strategy highlighted significant opportunities for infill and redevelopment within the existing urban footprint including in the Bunbury central business district and the hinterland towns of Dardanup, Capel, Boyanup and Brunswick Junction. After consideration of the potential alternatives, one greenfield urban expansion area was identified in the Waterloo district, at what is now called Wanju, and a major industrial expansion area identified in the Waterloo / Paradise district south of the Bunbury-Perth railway line, north of the Ferguson River, and west of Waterloo Road.

The *2014 South West Region Economic and Employment Land Strategy* also highlighted Waterloo as having potential for transport, logistics, general industry and agri-food processing. The strategy recognised the potential for 'synergies between the Waterloo site and Bunbury Port should the port decide to diversify for containers in the medium to long-term.' (p.25).

Consultation draft district structure plan

This draft DSP represents an important stage in the planning for Waterloo Industrial Park. It sets out the key planning aspirations, objectives and principles that the WAPC and Shire of Dardanup, working in partnership, are seeking from the development and provides the opportunity for all stakeholders, including those not previously involved in the planning process to have their say.

It is important to emphasize that the final DSP will be an updated version of this document taking into account:

- the outcomes of the Department of Water's emerging drainage and water management plan for Wanju and Waterloo, planned to be completed by spring 2017
- the associated district water management strategy, scheduled for completion by late-2017
- further relevant background studies that will be finalised post May 2017
- comments received on this draft DSP.

Structure of the district structure plan

This document is divided into two broad sections:

- **Part 1 –** implementation
- **Part 2 –** explanatory section and technical appendices.

Regional position

The DSP incorporates the high-level principles outlined in the Greater Bunbury Strategy 2013 to guide the sub-region to a sustainable future. It creates a plan for the future Waterloo Industrial Park that is integrated with the rest of the sub-region, creative and innovative in its design, forward-looking and sustainable.

Figure A outlines Waterloo's position in its sub-regional context and highlights the existing regional and sub-regional activity centres, employment centres and movement networks within Waterloo's area of influence.

Principal planning requirements for the Waterloo Industrial Park

The development of Waterloo Industrial Park provides challenges and opportunities that will require consideration, resolution and delivery through its planning and development phases. Outlined below is an overview of the principal planning requirements in the implementation of development.

Swale network and wetland systems

Waterloo, and the neighbouring Wanju, will require a network of swales of varying widths and detention basins to accommodate surface water flowing across the DSP areas. In Waterloo the swales are likely to be predominantly within road reserves and situated 400 to 500 metres apart to minimise fill requirements and should be integrated where possible into the existing drainage system. The exact location of the swales is to be determined within the relevant local water management strategies taking into account the built form, land uses and road layouts.

Landscaped detention basins will be set aside for the storage and treatment of waste water for reuse in the reticulation of public open spaces in Wanju. Additional water efficiency measures will also be essential to manage the effects of an increasing demand for potable and non-potable water from a growing population in a drying climate.

Energy efficiency

An important feature of Waterloo will be the efficient use of energy in terms of the construction of the development, the way that individual buildings operate and reducing the need to travel by private vehicle. Technology is moving particularly quickly in this field, especially in terms of the use of solar energy, the storage of that energy by batteries and the creation of energy from waste. To be a sustainable development Waterloo will need to embrace this new technology.

Highway links

The successful development of Waterloo will require a high degree of connectivity to the rest of Greater Bunbury and the South West region. The construction of the Bunbury outer ring road will be a key impetus to the development at Waterloo by providing key inter-regional north-south and east-west highway links (via the junction with proposed westward extension of Harris Road and South Western Highway), including improved access to the Port of Bunbury.

Street network

The street network through Waterloo will need to be permeable and legible for all traffic. The streets will be orientated in a predominantly grid pattern, essentially north-south and east-west to maximise benefits for buildings from passive solar design. Well-established trees and other landscaping will be an important addition along all streets to provide amenity, shade and reduce the urban heat island effect.

While traditionally the scale and nature of industrial and business parks is such to discourage walking and cycling, Waterloo will be different in that it will provide an attractive streetscape which will make walking and cycling attractive options for workers and others moving about the area.

Safeguarding the opportunity for uses requiring rail-based access

Given the proximity of the proposed Waterloo Industrial Park to the Perth-Bunbury railway line and the linkages this rail line has with the Port of Bunbury, and further afield, it will be important to ensure that the opportunity for uses benefitting from rail-based access in the DSP area is safeguarded and not lost. A rail spur off the Perth-Bunbury railway line is proposed to run north to south through the area to maximise the opportunities for rail-based access.

Table A: Key statistics and planning outcomes

Item	Data
Total area covered by district structure plan	**1245 hectares**
No. of business hubs	**1**
Potential number of local jobs (in DSP area)	**4000** jobs
Areas identified as: • industrial • primary roads • rail • conservation area • public utilities	 1286 ha 56 ha 6 ha 6 ha 3 ha

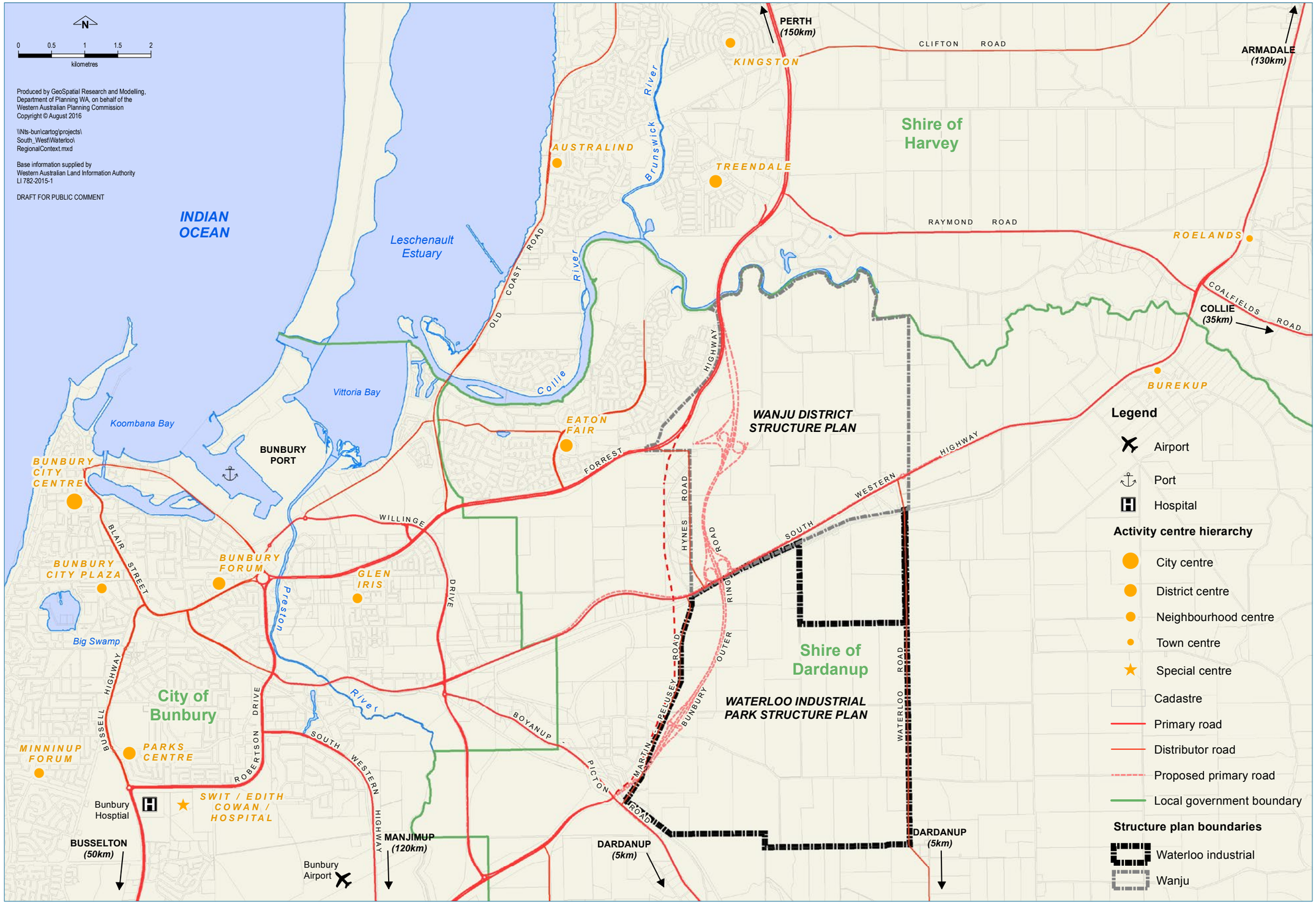

Figure A: Regional context of Waterloo Industrial Park

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Part One – Implementation

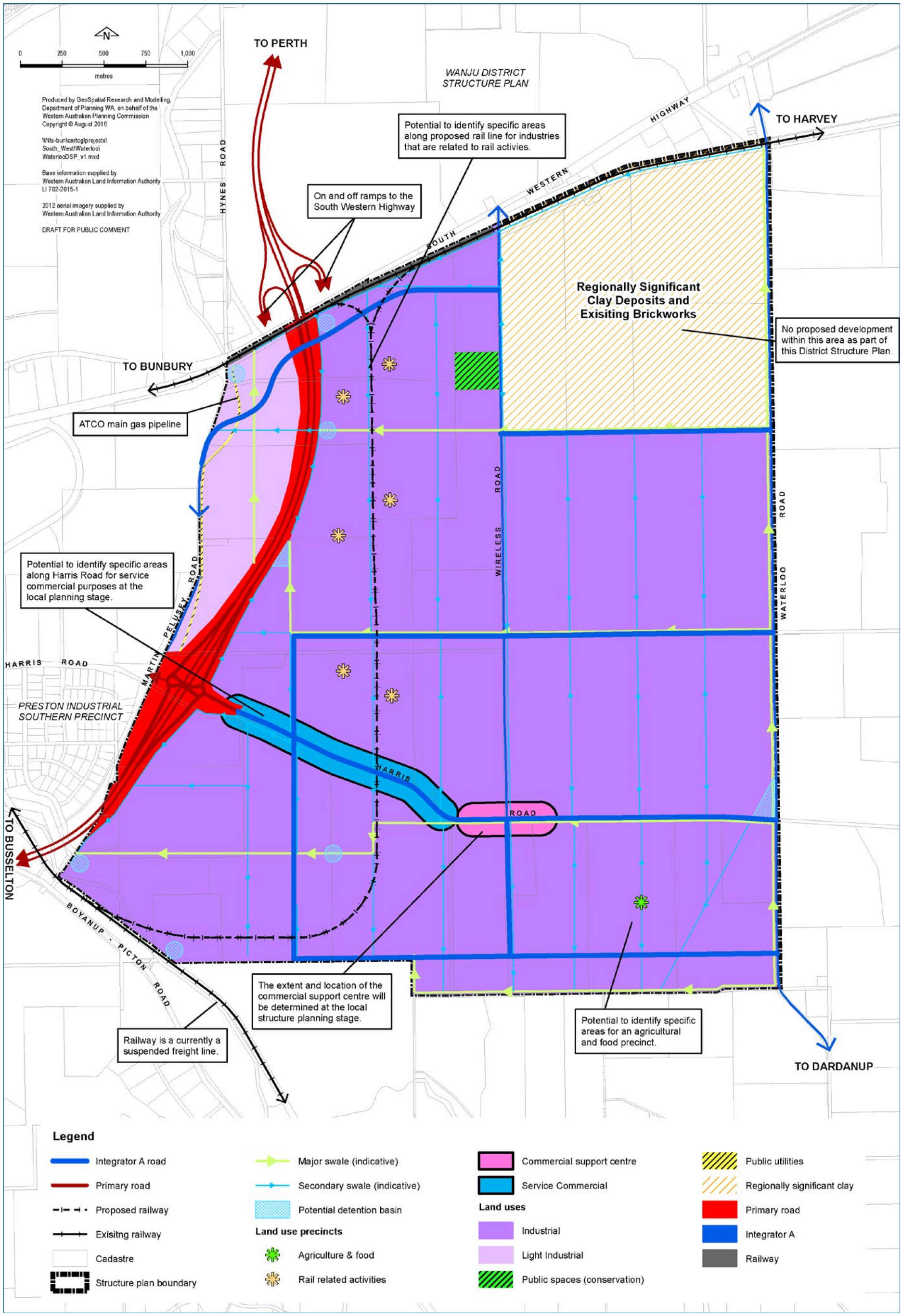


Figure 1.1: draft *Waterloo Industrial Park district structure plan*

1 District structure plan area

The Waterloo District Structure Plan (DSP) area is approximately 1356 hectares, bounded by:

- the existing Perth-Bunbury railway line to the north
- Waterloo Road to the east
- the original alignment of the proposed Bunbury outer ring road (as set out in the Greater Bunbury Region Scheme) to the west, and the Picton South Industrial Park
- to the south Damiani Italiano Rd, property boundaries (to lots 9, 3 and 273) and the disused Manjimup-Bunbury railway line.

The Wanju DSP area, located immediately to the north of the Waterloo DSP area, will be subject to the provisions of its own DSP, a draft of which was published for consultation in April 2016. The comments on the draft Wanju DSP have been analysed by the Department of Planning and reported to the WAPC. The amended versions of both the Waterloo and Wanju DSPs will be produced for endorsement by the WAPC and the Shire of Dardanup.

A further DSP for the proposed Picton South Industrial Park, situated immediately west of the proposed Waterloo Industrial Park (Figure 1.2 was recently published for public comment).

2 Operation

The Waterloo DSP will come into effect on the date that it is approved by the WAPC. This is expected to be in early 2018 once the respective drainage and water management plan and district water management strategy have been completed and their results incorporated into the final DSP.

3 Staging

Development of the size and scale proposed for Waterloo Industrial Park is likely to take several decades to be fully completed. Consequently, it is necessary to have a sufficiently adaptable planning framework that enables the development of a suitable range of industrial land uses while achieving an attractive and unified industrial area.

For development to take place within a particular precinct a local structure plan will be required to be prepared for that area and, once completed, approved by the WAPC. The proposed precincts within the Waterloo Industrial Park are set out in Figure 1.3. The local structure plans will set down specific design guidelines for the individual precincts, as opposed to the DSP stage.

The planning principles for each precinct will be used to guide the preparation of local structure plans, and any associated planning objectives and design guidelines.

Which areas are developed first will be a decision for the WAPC. However, those initial development areas will need to ensure that the infrastructure implications for other parts of the DSP area are resolved and implemented before development commences.

4 Subdivision and development requirements

4.1 Proposed land-uses

Waterloo Industrial Park will provide for a diversity of industrial space to give future industries the opportunity to develop and grow. The intention is that the area will complement existing industrial and business parks in the rest of the sub-region, while bringing additional development opportunities.

The close proximity and good accessibility to Wanju will also help provide a wide variety of skilled employees in the local area. It will also encourage a high degree of employment self-containment within the combined Wanju and Waterloo development areas.

Table 1: Proposed land-uses and approximate areas

Proposed land use	Area (ha)[1]
Industrial (gross)	1285
primary roads	56
rail	6
Areas retained as conservation areas	6
Public utilities	3
TOTAL	**1356**

[1] Areas have been rounded to the nearest whole number. Totals will sometimes differ marginally from the sum of individual parts.

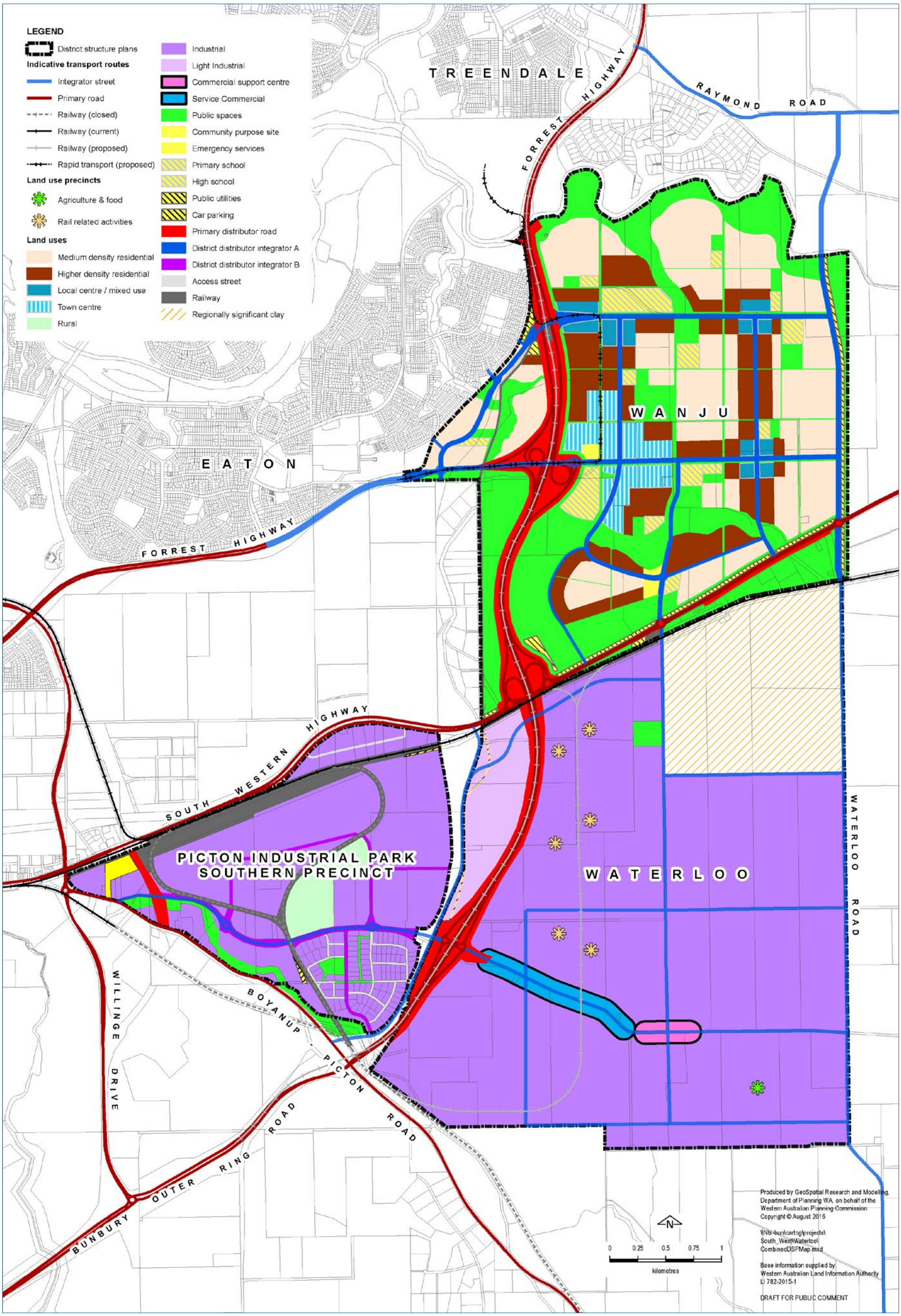


Figure 1.2: Composite district structure plans for Waterloo, Picton South and Wanju

4.1.1 Commercial hub

A local commercial hub will be provided within the DSP area to meet with the local day-to-day needs of the businesses and employees of, and visitors to, the Waterloo Industrial Park. The location of the commercial hub is proposed for the area around the junction of Wireless Road and Harris Road to allow good access to and from most of the area.

The provision of on-street and off-street car parking in front and close to the hub will be important. Mall-based retail centres and large individual retail units (over 500 square metres in size) will not be permitted and the overall retail floorspace should be restricted to less than 10,000 square metres.

4.1.2 Industrial

The bulk of the Waterloo DSP area will be devoted to industrial uses. Industrial uses are those where the premises are used for the manufacture, dismantling, processing, assembly, treating, testing, servicing, maintenance or repairing of goods, products, articles, materials or substances and including facilities on the premises for any of the following purposes:

(a) the storage of goods

(b) administration or accounting work

(c) the selling of goods by wholesale or retail

(d) the provision of amenities for employees

(e) incidental purposes.

4.1.2.1 Light industrial

Light industrial uses are those where the impacts on amenity of the area in which the premises are located can be mitigated, avoided or managed.

The DSP map (Figure 1.1) highlights that the area to the west of the proposed Bunbury outer ring road alignment is zoned for light industrial uses. Such uses will also be permitted in the remainder of the DSP area, generally located in more visually prominent areas, including along arterial streets. Areas identified for light industrial uses will normally provide for a range of generally smaller-scale light and service industries and related enterprises which by their nature will not adversely affect the amenity of the surrounding area.

Normally smaller, and thus more affordable, lots are to be provided for light industrial uses, generally lots of less than 4000 square metres.

4.1.2.2 General industrial

General industrial uses will commonly be situated in less visually prominent parts of the DSP area and will be provided for on larger lots, generally between 4000 square metres and up to five hectares, which allows for a degree of separation from other, more sensitive uses. Such lots will cater for either larger-scale industrial or related enterprises or for the accommodation of an appropriate buffer from more sensitive land uses.

4.1.3 Service commercial

Service commercial development refers to commercial activities which, because of the nature of the business, require good vehicle access and/or large sites. These businesses can provide for a range of wholesale sales, showrooms, trade and services which, by reason of their scale, character, operational or land requirements, are not generally appropriate in, or cannot conveniently or economically be accommodated in, the central area, shops and offices or industrial areas.

Service commercial development should be restricted to parts of the DSP area which have good highway access to residential areas in Greater Bunbury, including Wanju. It is proposed that service commercial uses be restricted to areas within close vicinity of Harris Rd between its junction with the proposed Bunbury outer ring road and the proposed commercial hub.

Direct access from service commercial lots onto integrator streets will be limited through the provision of reciprocal rights of access over driveway cross-overs and visitor car parking areas.

Buildings associated with service commercial uses will be required to have a suitable street frontage aspect, be of a high design standard and separated from more sensitive land uses to ensure the amenity of the area is not compromised.

4.1.4 Agri-food processing precinct

The most south-easterly precinct of the DSP area (precinct 9, Figure 1.3) has been identified as appropriate for an agri-food processing precinct following on from a study of potential sites in the South West carried out for the Department of Planning, Department of Agriculture and Food, Landcorp, and the South West Development Commission in 2013[2]. An agri-food processing precinct is considered to be a mix of industries relating to the processing of food co-locating to take advantage of the synergies of shared use of common infrastructure, supply-chain proximity or shared environmental buffers.

[2] Comparative Due Diligence South West Food Processing Precinct, prepared for the Department of Agriculture and Food WA, Landcorp, Department of Planning and South West Development Commission, Cardno, 2013.

Subject to the appropriate buffers a range of activities could be considered to come under the umbrella of food processing including dairy processing; cold storage; cannery; food manufacturing; fruit, vegetable and seafood processing; composting; and related transport uses. Many of these industries fall within the general industry definition and could be approved within that land use zoning.

Abattoirs could be permitted within such a precinct, subject to the appropriate buffering.

4.1.5 Surface water swales

A key characteristic of the urban form of Waterloo Industrial Park (as with Wanju) will be a network of linear surface water swales traversing the area. These swales will predominantly be in a north-south and east-west alignment, generally between 400 and 500 metres apart in an east-west direction and 1200 metres apart north to south. These distances are designed to minimise the amount of fill required. In contrast with Wanju, where the swales will be accommodated generally in multi-use corridors, in Waterloo the swales will be accommodated predominantly within road reserves.

The proposed location and width of the swales within the DSP area is set out on the DSP map (Figure 1.1). The final alignment will be subject to the findings of the water modelling exercises which are part of the drainage and water management plan and will be reflected in the district water management strategy. This data will confirm the swale widths required to cope with significant rainfall events.

The swales will be able to act as storage and conveyance for significant rainfall events. The streets adjacent to swales will provide additional stormwater storage capacity in the event of high rainfall.

4.1.6 Wetlands and detention basins

Some of the surface water which will flow across the Waterloo DSP area within swales at times of high and/or prolonged rainfall will be stored in detention basins. The largest of the detention basins will be situated within about 33 hectares on the western side of the Bunbury outer ring road north of South Western Highway, within the Wanju DSP area. Other smaller water features in the Waterloo DSP area will act as smaller storage basins for surface run-off water. These wetlands will act as detention basins and are required for the storage of stormwater and treated water before its re-use, predominantly on public open space elsewhere in Wanju, see the Wanju DSP for more detail.

4.1.7 Conservation area

Lot 310 (5.8 hectares) to the west of Wireless Road in the northern half of the Waterloo DSP area is to be conserved for its existing remnant vegetation value. The radio mast on the site has existed since the 1930s and the site has been fenced and largely untouched. This site is identified by the Waterloo Urban and Industrial Expansion Area Flora and Fauna Study (2014), carried out by GHD for the Shire of Dardanup, as the only extent of remnant vegetation classified as being between 'very good' to 'good' condition within the DSP area, although some parts of the site are identified as being degraded.

4.1.8 Areas safeguarded for regionally-significant mineral and raw material deposits

To prevent sterilisation and ensure the long-term security of strategic minerals and basic raw materials the Greater Bunbury Region Scheme identifies 233 hectares of land to the north east of the DSP area as a regionally significant clay deposit. As such this land will not be permitted for areas of hard standing or built development which is not intended to be permanent where such development would not prejudice future extraction of the clay deposits. The only exception is for redevelopment of the existing brickworks for a new brickworks facility. As a consequence this area has been excluded from the DSP area.

Approximately 45 hectares in the south-eastern corner of the DSP area are identified under the Greater Bunbury Region Scheme as part of the strategic minerals resource policy area, which is a relatively small part of a wider Strategic Titanium-Zircon deposit area. There is a one kilometre buffer to this area identified as a 'referral' area which extends further into the DSP area. The *Greater Bunbury Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy 2005* sets out a presumption against rezoning and development. Any proposed development in this area would need to demonstrate that the proposed use would not prejudice current or future mining of mineral resource or extraction of basic raw materials within the areas, subject to advice from the Department of Mines and Petroleum and any other planning or environmental considerations, including policies of the WAPC and policies in town planning schemes.

4.1.9 Movement and transport

It is recognised that in a primarily industrial environment such as Waterloo the motor vehicle will be the dominant mode of transport. However, Waterloo's streetscape will be designed in a manner to support and encourage walking and cycling as alternative modes of transport. For this to be achieved a significant and proportional investment will be required to ensure that walking and cycling are safe, enjoyable and practical experiences for as many trips as possible.

Shared paths will be required along both sides of all streets. The widths of such paths will allow for safe (both real and perceived) and pleasant pedestrian movement and will also allow for the space to be shared with cyclists. Appropriate street and footpath lighting, minimising crossovers, and dropped kerbs are other important elements in making walking an attractive option.

Streetscape designs, landscaping plans, urban design and planning in the local structure plans must ensure that walking and footpaths are given a high priority in the design of streets and public open spaces.

4.1.9.1 Cycling and other wheeled modes

Development at Waterloo will be required to provide for the needs of cyclists to make cycling an attractive option for those trips to and from Waterloo that can be undertaken by bicycle.

Strategically placed end-of-trip facilities including bicycle parking, charging stations for electric bikes, toilets and change rooms, lockers, and water fountains will need appropriate investment and maintenance. Also, all cycle paths and lanes will need to be well lit.

4.1.9.2 Public transport

Given the relatively low-densities of development and employment and the widespread catchment of the workforce it is likely to be difficult to justify the introduction and maintenance of public transport within the Waterloo Industrial Park.

4.1.10 Proposed highway network

The strategically-located Waterloo Industrial Park will be well served by the existing and proposed extensions to the highway network. Further transport modelling is being undertaken for the Greater Bunbury area and will help inform the final DSP.

The development of the proposed road network will be undertaken in a staged manner with the expectation that single-lane carriageways and roundabouts at key junctions will be sufficient for the road network in the short to medium term, apart from the Bunbury outer ring road and South Western Highway.

All roads will be built to standards specified by the Shire of Dardanup. This includes major intersections being designed to accommodate the turning circle of B-double vehicles. Proposed four-way intersections of integrator roads will be planned as roundabouts in the first stage with traffic signals being considered in the longer-term should they be considered more beneficial.

4.1.10.1 Bunbury outer ring road and rail reserve

The proposed alignment of the future Bunbury outer ring road, and the safeguarded railway line within the median of the highway for the fast train to Busselton, is identified to run north-south through the western edge of the DSP area. Once completed the Bunbury outer ring road and its junction with Harris Road will provide the Waterloo Industrial Park with excellent road access both north and south.

Its alignment will, however, effectively segregate approximately 75 hectares of the DSP area to the west of the Bunbury outer ring road alignment from the rest of the Waterloo Industrial Park. It is proposed that this area be reserved for light industry.

Main Roads proposes a junction with the Bunbury outer ring road within a relatively central part of the DSP area, in the vicinity of the existing Harris Road, which will provide excellent vehicle access from Waterloo Industrial Park to the rest of Greater Bunbury, the South West region, to the Perth metropolitan area and Peel region. A second junction, with South Western Highway, will provide an additional access to the outer ring road for traffic from Waterloo accessing South Western Highway immediately to the north of the DSP area.

Landscaped buffers will be required along edges of the Bunbury outer ring road. Cycle paths alongside the road, and cycle and pedestrian access across the junctions of the road will be important criteria in its detailed design.

4.1.10.2 South Western Highway

In the vicinity of the Waterloo DSP area, and westwards into Bunbury, South Western Highway will, subject to appropriate funding, be upgraded to a dual carriageway. Its role as a key inter-regional road linking Greater Bunbury with inland hinterland towns will be enhanced. It will provide the main highway access to Waterloo from the north.

Two junctions are proposed into the Waterloo DSP area from South Western Highway, at Wireless Road and Waterloo Road, where there will be full access junctions with South Western Highway.

4.1.10.3 Waterloo Road

Waterloo Road will provide highway access to the Waterloo Industrial Park from the east, south and north. The road will run the full length of the DSP area's eastern boundary from the southern boundary and beyond to Dardanup townsite, to the northern boundary and further north to the junction with South Western Highway. Existing rural properties and roads to the east of Waterloo Road will need to retain access.

Waterloo Road will be one of the two north-south integrator A[3] roads through the development providing direct access to South Western Highway. It may need, in the longer-term, to become a four-lane dual-carriageway road, however, the integrator A classification and the extent of the road reserve required (up to 50 metres) may be reviewed in light of further traffic modelling. A road bridge over the Bunbury-Perth railway line will be required when traffic levels dictate this is necessary.

The eastern-side of Waterloo Road will encompass a multi-use drainage corridor which is also proposed to accommodate a cycle path. Only a limited number of highway accesses (a maximum of four) are to be provided from Waterloo Road into Waterloo Industrial Park.

A road bridge over the Collie River, as part of a further northern extension of Waterloo Road beyond Wanju, is identified as a longer-term aspiration in the Wanju draft DSP, subject to future needs and requisite funding becoming available. The construction of such a bridge will make Waterloo Road a significant regional road.

4.1.10.4 Wireless Road

Wireless Road will be the principal north-south integrator road running through the heart of the Waterloo Industrial Park. Ultimately the road could be constructed as a four-lane dual-carriageway with a surface-water swale running in its median; however for the short to medium term a two-lane single carriageway will be sufficient to cater for the levels of traffic foreseen. The current road reserve width is 20 metres and this will need to be extended up to 50 metres to allow for a four-lane dual carriageway, swale in the median strip and dual cycle and footpaths.

Wireless Road will ultimately require, when traffic levels dictate, a bridge over the Bunbury-Perth railway line to supersede the existing level crossing.

4.1.10.5 Harris Road

Harris Road will represent the most important east-west integrator A road through the Waterloo Industrial Park. It will connect Waterloo Road on the eastern boundary with the proposed junction of the Bunbury outer ring road on the western side of the industrial park. Ultimately Harris Road will be constructed as a four-lane dual carriageway with limited highway accesses onto it.

The existing road reserve is 20 metre wide and it is proposed that the road reserve will be required to be extended to up to 50 metres to allow for a four-lane dual carriageway, swale in the median strip and dual cycle and footpaths.

4.1.10.6 Link road

An integrator B road[4] will be required to provide access between Martin-Pelusey Road and the DSP area to the west of the Bunbury outer ring road with the bulk of the DSP area situated on the east of the outer ring road. As the Bunbury outer ring road will pass over South Western Highway by means of a road bridge there will be scope for the link road to pass under the road bridge adjacent to the railway line.

4.1.11 Public utilities

For the Waterloo Industrial Park to be successful it will be necessary for local structure plans to identify land and ensure other necessary provisions are met for the provision of essential public utilities and government services. These often need to be placed strategically within the site to provide appropriate accessibility whilst minimising the impact on surrounding land-uses.

Currently there are three 132 kilovolt Western Power transmission lines traversing the site:

- one running north-south parallel to and west of Wireless Road;
- one running south-west to north-east parallel to the Perth-Bunbury railway line; and
- a third running north-west to south-east through the middle of the site.

While in the Wanju DSP area a public utility infrastructure corridor has been identified adjacent to Waterloo Road and South Western Highway to relocate existing transmission lines within Waterloo, the intention is that the development will accommodate the existing transmission lines without the requirement for relocation due to the cost involved.

A public utility corridor is identified running north-south through the western side of the DSP area which contains the local ATCO 200 mm gas pipeline, and this corridor will need to be reflected in the local structure plans for those areas which the pipeline passes through.

4.2 Local structure plan areas

The Waterloo DSP specifies precinct boundaries which local structure plans should follow (Figure 1.3). These precinct boundaries are proposed to coincide with the integrator A road and major swale networks. Separate precincts are identified for the service commercial zone along Harris Road and the commercial support centre at the junction of Wireless Road and Harris Road.

[3] An integrator A road acts as an arterial road with connections to local streets. Generally integrator A roads are four lanes, have between 15,000 and 35,000 vehicle movements per day, a speed limit of 70 km/hr and a road reserve width of up to 50 metres.

[4] An integrator B roads also act as an arterial road with connections to local streets. Generally integrator A roads are two lanes, have between 7,000 and 20,000 vehicle movements per day, a speed limit of 60 km/hr and a road reserve width of up to 38 metres.

As Waterloo Industrial Park is likely to take in excess of 30 years to be developed it will be necessary to ensure an adaptable planning framework that enables the development of a suitable range of industrial land uses while offering and achieving a suitable range of industrial uses.

Local structure plans will need to demonstrate that they are informed by local water management strategies and more detailed site-specific surveys, where required, and that internal roads will be built to a standard specified by the Shire of Dardanup.

5 Other requirements

Significant standard infrastructure will have to be provided upfront, including realignment of existing power transmission lines, bridges and the provision of arterial drainage infrastructure. Staging and pre-funding of this infrastructure will need to be successfully managed for development to proceed in timely fashion. These details will need to be determined once a developer is involved and a development contributions plan finalised to ensure the costs are shared fairly and reasonably between the developer, landowner, investors, local, State and federal government.

These elements are extremely difficult to implement in a piecemeal fashion. Some site and drainage remediation works may cross ownership boundaries, which will require a coordinated approach between landowners and government agencies. Given the level of fragmented ownership and the extent of infrastructure requirements for the development, implementation will need to be closely coordinated.

Significant up-front costs will be essential for infrastructure including drainage and power lines. Further information will be available from the servicing needs assessment and in the final version of the DSP based on this assessment.

6 Additional information

The final DSP will be informed by additional background studies that have yet to be completed, including the drainage and water management plan (DWMP) and district water management strategy.

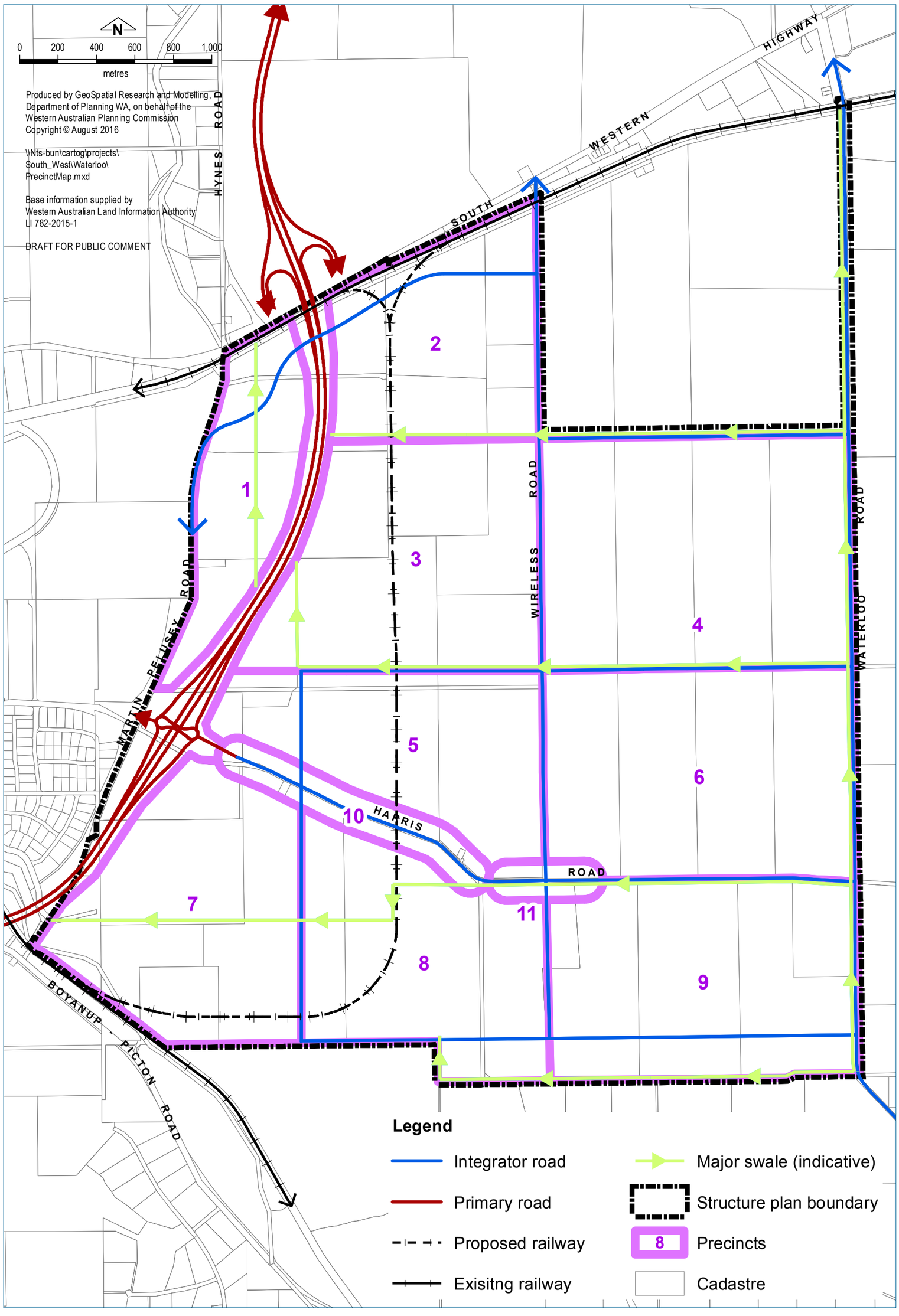


Figure 1.3: Proposed precincts and local structure plan areas

Part Two – Explanatory section

1 Planning Background

1.1 Introduction

This draft *Waterloo Industrial Park District Structure Plan* (DSP) has been produced by the Department of Planning, on behalf of the WAPC, and in partnership with the Shire of Dardanup. It has been written to be in line with the *Planning and Development (Local Planning Schemes) Regulations 2015* and associated *Structure Plan Framework* (August 2015).

It is designed to provide the strategic planning context for the industrial expansion area originally identified in the *Greater Bunbury Strategy 2013* and *Greater Bunbury Structure Plan* (see Figure 2.3) in the Waterloo and Paradise districts east of the Picton area of Bunbury.

The DSP endeavours to:

- set out an overarching guide and key planning principles and development requirements for future planning and local structure plans; and
- facilitate efficient and effective future development and amendments to the Greater Bunbury Region Scheme (GBRS) and the Shire of Dardanup local planning scheme.

It follows on from the draft *Wanju District Structure Plan* which was published for consultation in April 2016 for a 1250 hectare urban expansion area situated immediately to the north of the Waterloo DSP area.

District structure plans, by their nature, are not intended to address detailed planning and design matters. Instead they provide the strategic context by which these matters can be appropriately addressed as part of further planning and design. They help provide a framework for the coordinated provision and arrangement of future land use, subdivision and development that incorporates a report, structure plan map, and additional technical supporting documents and plans.

1.2 Land description

1.2.1 Location

The Waterloo Industrial Park DSP area is located between nine and 14 kilometres east of the Bunbury central business district and six and 11 kilometres south-east of the Port of Bunbury. The area identified for the proposed Waterloo Industrial Park lies wholly within the Shire of Dardanup, and immediately to the south of the proposed urban expansion area of Wanju, while the Picton South Industrial Park lies immediately to the west. To the east and south of the DSP area are rural paddocks and properties, with some rural residential properties south of the Boyanup-Picton Road.

1.2.2 Area and land use

The DSP area includes a total area of 1356 hectares of largely flat and cleared farmland (see Figure 2.1) that is prone to seasonal inundation due to the high perched water table. It is serviced by a network of rural and irrigation drains and ditches managed and operated by the Water Corporation and Harvey Water, respectively.

1.2.3 Legal description and ownership

The DSP area is made up of a number of private landholdings, see Figure 2.2. There are 42 major landholdings within the developable DSP area.

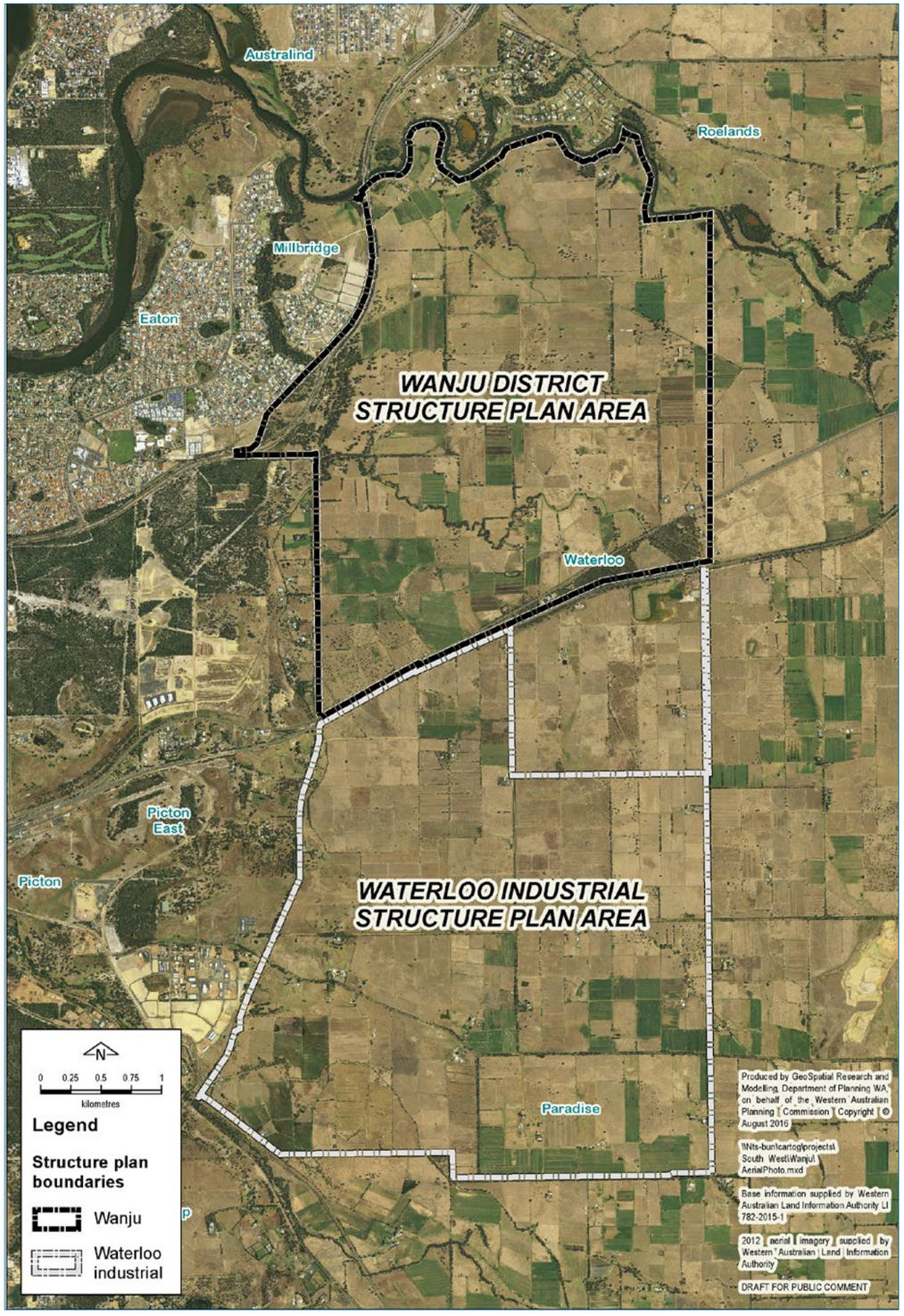


Figure 2.1: Aerial photograph of Wanju and Waterloo DSP areas

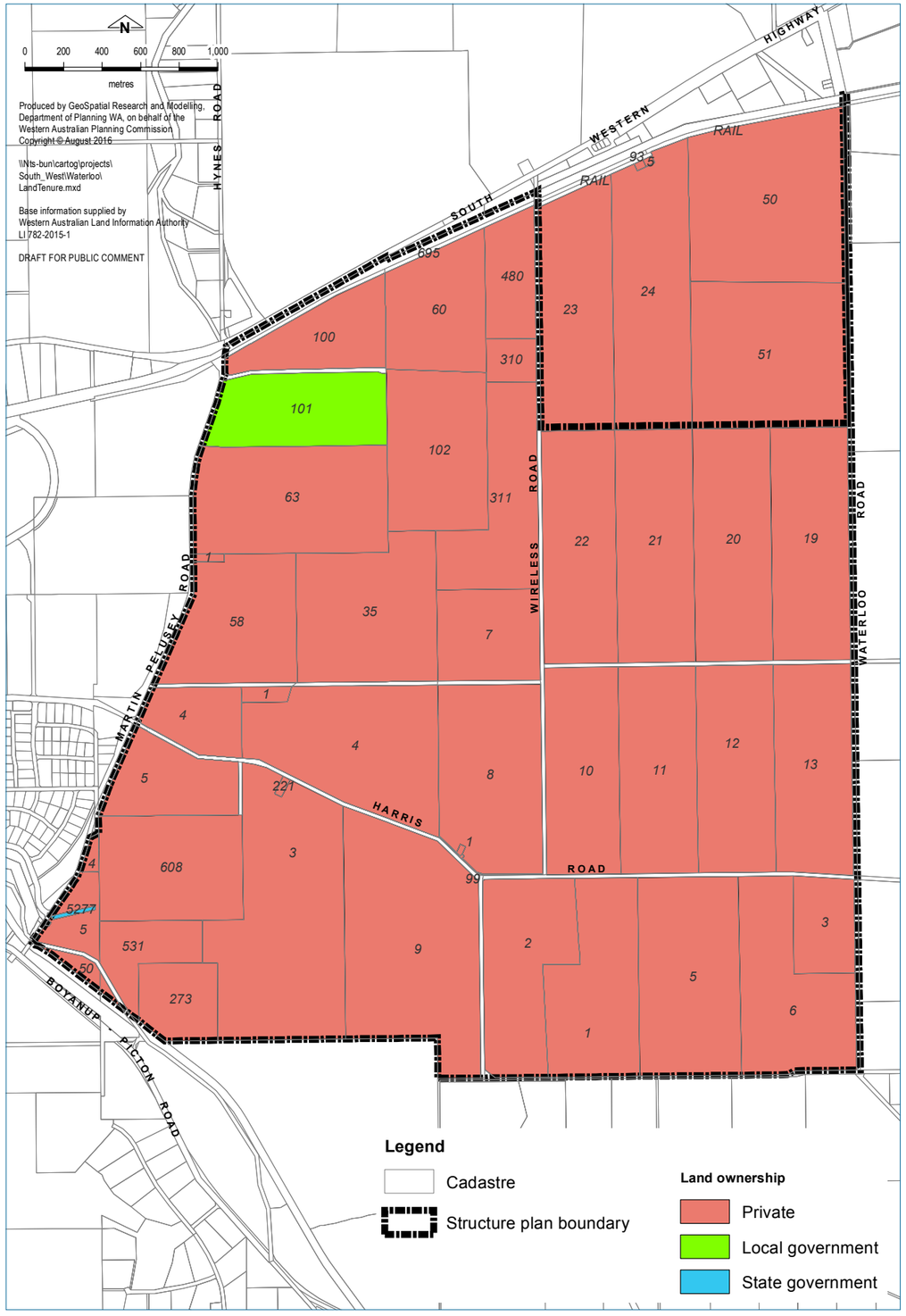


Figure 2.2: Cadastral plan

1.3 Planning framework

1.3.1 Zoning and reservations

The DSP area is currently zoned rural in the Greater Bunbury Region Scheme and the Shire of Dardanup Town Planning Scheme No.3. The entire DSP area is part of a wider Strategic Agricultural Resources Policy Area and there is a minor encroachment in the south-east corner under the *Greater Bunbury Region Scheme Strategic Minerals and Basic Raw Materials Resource Policy*.

1.3.2 Regional and sub-regional structure plan

The Greater Bunbury sub-regional structure plan identified the Waterloo area as an industrial expansion area (Figure 2.3).

1.3.3 Planning strategies

The WAPC's *Greater Bunbury Strategy 2013* identified Waterloo as the preferred industrial expansion area for Greater Bunbury based on detailed investigations carried out as part of the *South West Region Economic and Employment Land Strategy*.

1.3.4 Planning policies

State Planning Policies and the State Planning Strategy have been taken into account in developing this DSP. These are set out in more detail in Appendix One.

1.3.5 Other approvals and decisions

There are no other approvals or planning decisions significantly affecting this DSP area.

1.3.6 Pre-lodgement consultation

The Department of Planning, on behalf of the WAPC and in conjunction with the Shire of Dardanup, has prepared the Waterloo DSP. The preparation of the DSP has been overseen and coordinated by:

- a project team, with representatives from the Shire of Dardanup's development and engineering directorate and Department of Planning's South West region office, and
- a working group, also with representatives from the Shire, together with other key stakeholders, including the South West Development Commission, Department of Water and LandCorp.

The DSP has been produced following meetings with, and input from, key government agencies and specialist consultants working on behalf of the Department of Planning and the Shire of Dardanup. Information collected at these meetings, as well as from site visits and analysis, has been combined to enable the identification of opportunities, constraints and key issues affecting each area.

In formulating the DSP alternative scenarios were tested and revised. The DSP has been refined through discussions with the project team, working group and the councilors from the Shire of Dardanup. The DSP will be further refined based on the outcomes of the statutory consultation.

In developing the DSP, the following have been taken into account:

- the Greater Bunbury Strategy (2013) themes
- the Shire of Dardanup Local Planning Strategy (2015)
- views of State and local government authorities and agencies, to gain a clear insight of the likely local needs and aspirations for Waterloo
- learning from development proposals around Australia and other parts of the world
- environmental, heritage, transport, engineering, and socio-economic investigations specific to Wanju and Waterloo
- current State Planning Policies and the State Planning Strategy (Appendix One).

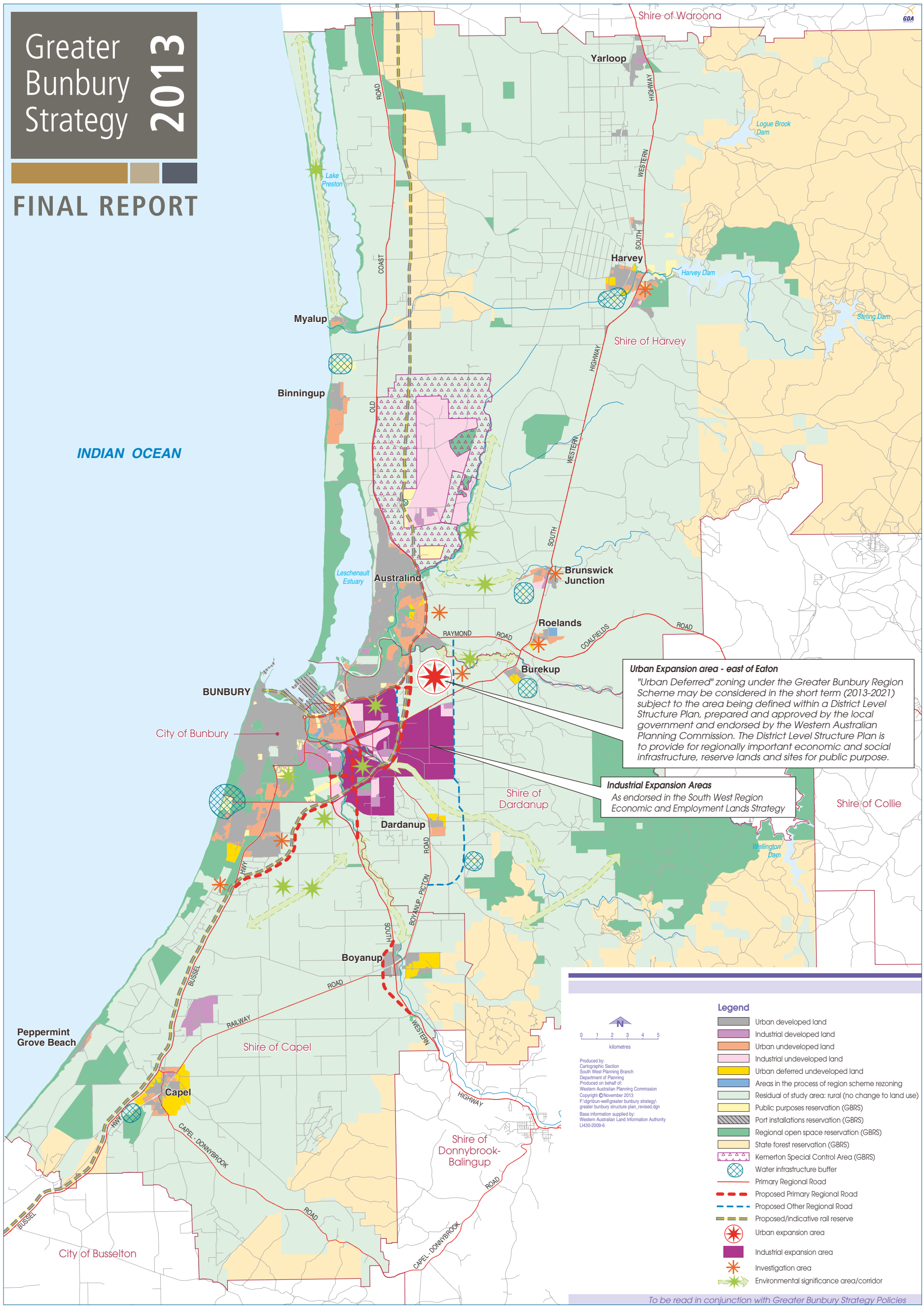


Figure 2.3: ***Greater Bunbury Structure Plan 2013***

2 Site conditions and constraints

2.1 Biodiversity and natural area assets

Being predominantly cleared farmland the DSP area offers relatively little biodiversity and few natural assets. There are no Ramsar listed sites or wetlands of national importance within the site or immediate surrounds. However, surface water from the site does ultimately drain into Leschenault Estuary, between five and 11 kilometres to the north-west of the site, which is an important bird habitat and is recognised for its ecological importance under international migratory bird agreements.

Due to the lack of biodiversity those natural assets that do exist in and around the DSP area take on even greater significance than they might otherwise and will need to be conserved and enhanced. The area of most significant environmental value in Waterloo is lot 310 (6 hectares) to the west of Wireless Road and this is proposed to be retained for its conservation value.

The area immediately north of the DSP area's northern boundary, between South Western Highway and the existing Perth-Bunbury railway line, is also of high environmental value.

A flora and fauna survey was produced for Wanju and Waterloo by consultants GHD in 2014.

2.2 Landform and soils

The landform and soils of the DSP area are particularly significant for the future development of Waterloo. The topography is a very gently sloping plain (one in 750 slope), falling from 25 metres Australian height datam in the south-east to 15 metres Australian height datam in the north-west corner. The area has a few topographic depressions and small isolated rises.

To assess the potential geotechnical risks and issues associated with soil conditions that may impact on the proposed development of Wanju and Waterloo a geotechnical report was commissioned by the Shire of Dardanup and compiled by Soilwater Consultants in 2014. The report identified that due to heavier soils and high groundwater levels, this area is considered to have wetland characteristics. In winter and spring considerable surface water is present in the area, with low-lying areas and drainage lines consistently filled with water. This perched system is ephemeral and will need to be managed appropriately with the proposed urban development.

The soils of Waterloo and Wanju have high moisture contents and Soilwater Consultants' report classifies them as Class P, with footings having a greater propensity to damage. Footing design must take these conditions into account. However, the assessment suggests that the classification could be improved to Class M with the utilisation of some fill material.

The geotechnical report has been supplemented by a detailed geotechnical survey.

Acid sulphate soils occur throughout the Swan Coastal Plain, including the Waterloo DSP area. The acid sulphate soil risk mapping indicates the DSP area has a 'moderate to low risk'. Future detailed studies may be needed to determine the status of the soils in particular areas, especially in any peaty wetland systems or where coffee rock/iron hardpan is found. Sand dune rises are unlikely to have a significant acid sulphate soil risk; however this has not been delineated in the broad-scale mapping.

Acid sulphate soils do occur in deeper sediments but these are unlikely to be influenced by any surface development, including deep sewage lines.

2.3 Groundwater and surface water

The Waterloo DSP area lies within the Ferguson and Millars Creek river catchments.

In addition, there are a number of irrigation channels operated by Harvey Water and other rural drains managed by the Water Corporation.

In the south-east corner of the Wanju DSP area Millars Creek connects to the Victory Drainage system, which runs adjacent to Waterloo Road. The Victory drain takes much of the surface flow upstream of the Waterloo DSP area into Millars Creek. On the western boundary of the DSP areas, the Vindictive Drains also discharge into Millars Creek.

2.3.1 Flooding and inundation

The effect of the concentration of the area's rainfall in the winter and spring is that the waterways and wetlands tend to be seasonal in nature, apart from the areas irrigated by Harvey Water drains.

The flat nature of the area means there is sheet flooding across it after extended rainfall, especially in late winter once the soil is waterlogged; meaning the ability for water to permeate into the soil profile is greatly reduced. Under these conditions, the water tends to sheet across the site until it reaches the constructed rural drainage network.

Large portions of the plain also receive shallow seasonal inundation in late winter and early spring. The inundation is largely due to the duplex soil holding groundwater close to the surface. This inundation was historically more widespread however the creation of the rural drainage network has allowed the water to be moved downstream more quickly and thus reduced the area and depth of inundation.

2.3.2 Confined aquifers

Two groundwater systems exist in this area:

- Perched system – this is ephemeral and only occurs during winter and spring (may extend into early summer)
- Yoganup Aquifer – this is the regionally significant superficial aquifer.

The Yoganup Aquifer occurs within the sands of the Yoganup Formation. It is considered a confined aquifer as it is constrained by the clayey sediments of the upper Guildford Formation and lower Leederville Formation. Due to this confined nature piezometers in the Yoganup Aquifer generally have a potentiometric surface one to two metres below the surface, whereas this only reflects the pressure that the overlying Guildford Formation (that is, overburden pressure) on the aquifer. The actual water table in the Yoganup Aquifer is located at the contact between the Guildford and Yoganup Formations, generally between 10 and 15 metres below the surface.

The groundwater levels largely follow the general slope of the land (Figure 2.4). This has produced contours that fall in a north-westerly direction, except for localised drawdown due to the incised waterways. Over much of the site, the groundwater is likely to be between the surface to one metre below in the winter/spring peak, due to the clayey/loamy nature of the underlying soil and flat landform. Some small sand rises are likely to have over 1.5 metres of separation to groundwater with the biggest separation to the maximum recorded groundwater depth being 2.46 metres.

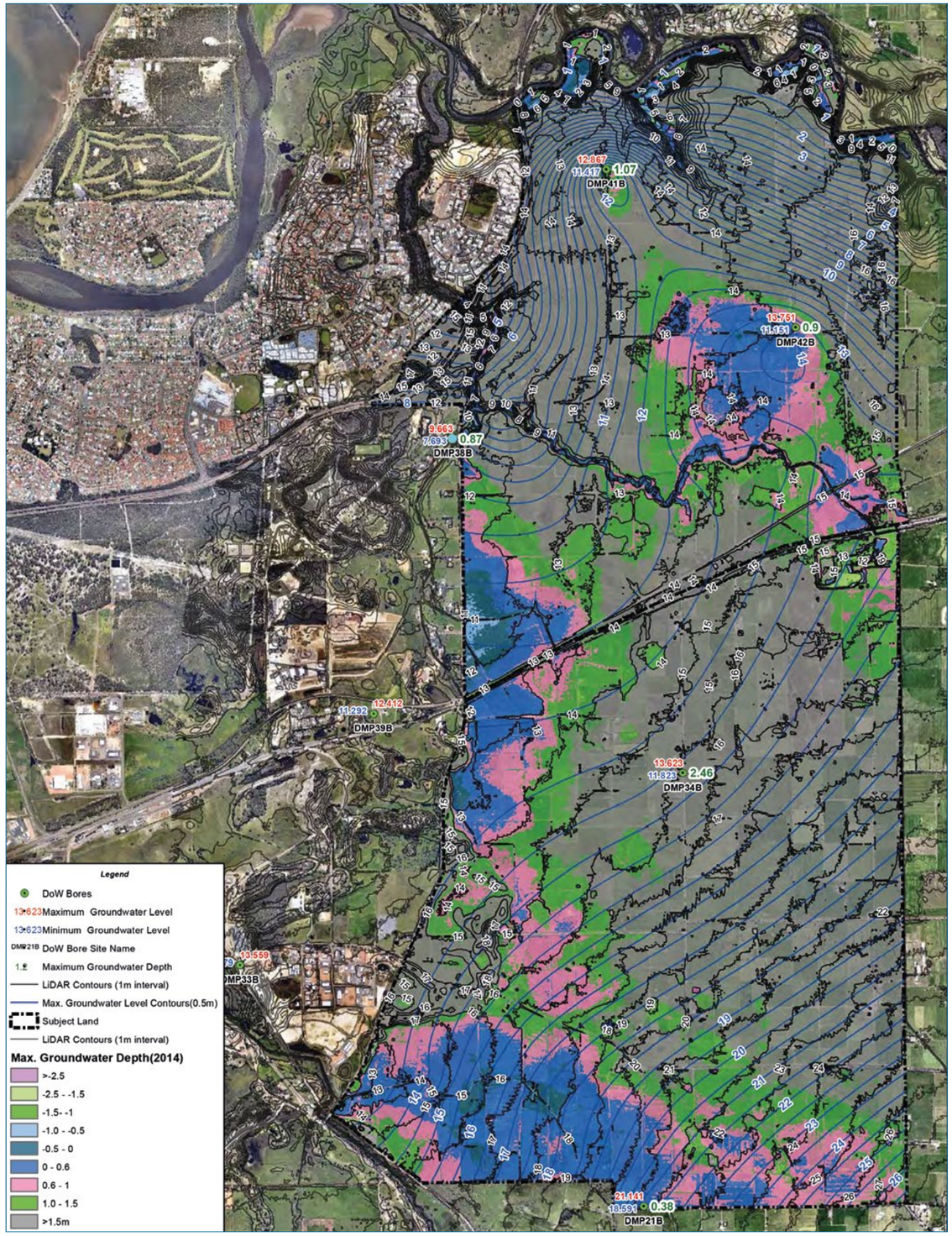


Figure 2.4: Depth to groundwater

2.4 Bushfire hazard and risk management

As part of the background work for this DSP (and the Wanju DSP), RUIC Fire carried out a strategic overarching bushfire risk management plan for the urban and industrial expansion areas (see Figure 2.5). A bushfire hazard level assessment was commissioned by the Department of Planning in March 2017 and the findings from the assessment will be incorporated into the final DSP.

This assessment outlines that the DSP areas (both Waterloo and Wanju) and their surrounds contain limited areas of vegetation which would facilitate extended bushfire. The areas identified by the bushfire risk management plan are all contained within the Wanju DSP area, that is outside the Waterloo DSP area, namely:

- along the Collie River foreshore
- along the Millars Creek foreshore
- in the vicinity of the existing Forrest Highway
- the area south of South Western Highway and north of the existing railway line, immediately north of the Waterloo DSP area boundary

The report states that the bushfire-related risk for Waterloo is not prohibitive of development but, as part of a precautionary approach, both existing and proposed revegetation areas warrant the adoption of precautionary design measures.

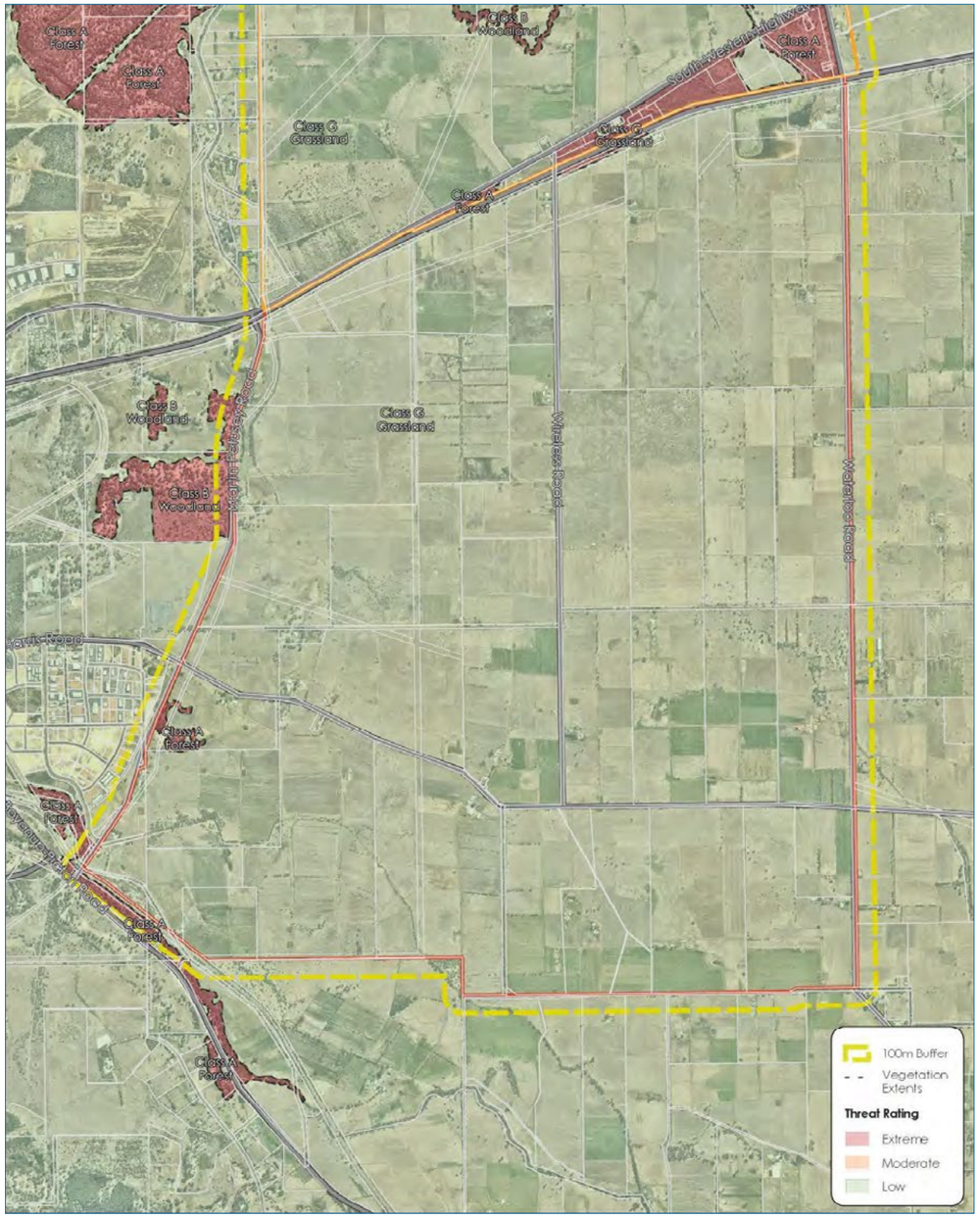


Figure 2.5: Bushfire hazard assessment plan

2.5 Heritage

2.5.1 Aboriginal heritage

Archaeological evidence confirms that Aboriginal people have inhabited the Swan Coastal Plain and the adjoining Darling Scarp for more than 40,000 years. Archaeological sites around Bunbury include historical sites, man-made structures, skeletal materials/burials and stone artefact scatters.

Ethnographic and historical documents highlight the importance of watercourses to Noongar land-use patterns, ceremonial cycles and mythological tracks. As part of the background evidence for this DSP, an ethnographic and archaeological heritage assessment report was compiled by Big Island Research in 2014.

The report shows that there have been some limited archaeological finds to the western side of the Waterloo Industrial Park DSP area but these are not considered significant. Two Department of Aboriginal Affairs' sites are recognised along water courses within the Wanju DSP area: the Collie River (DAA 16713) and a portion of Millars Creek (DAA 4865) (see Figure 2.6).

The wedge-shaped Benang precinct in Wanju (DAA 17775) is a well-known former Aboriginal camping/community/residential site. The value of the land to the local Aboriginal people warrants it being protected from unsympathetic development. Any disturbance within this area would require ministerial consent via S.18 of the *Aboriginal Heritage Act 1972*.

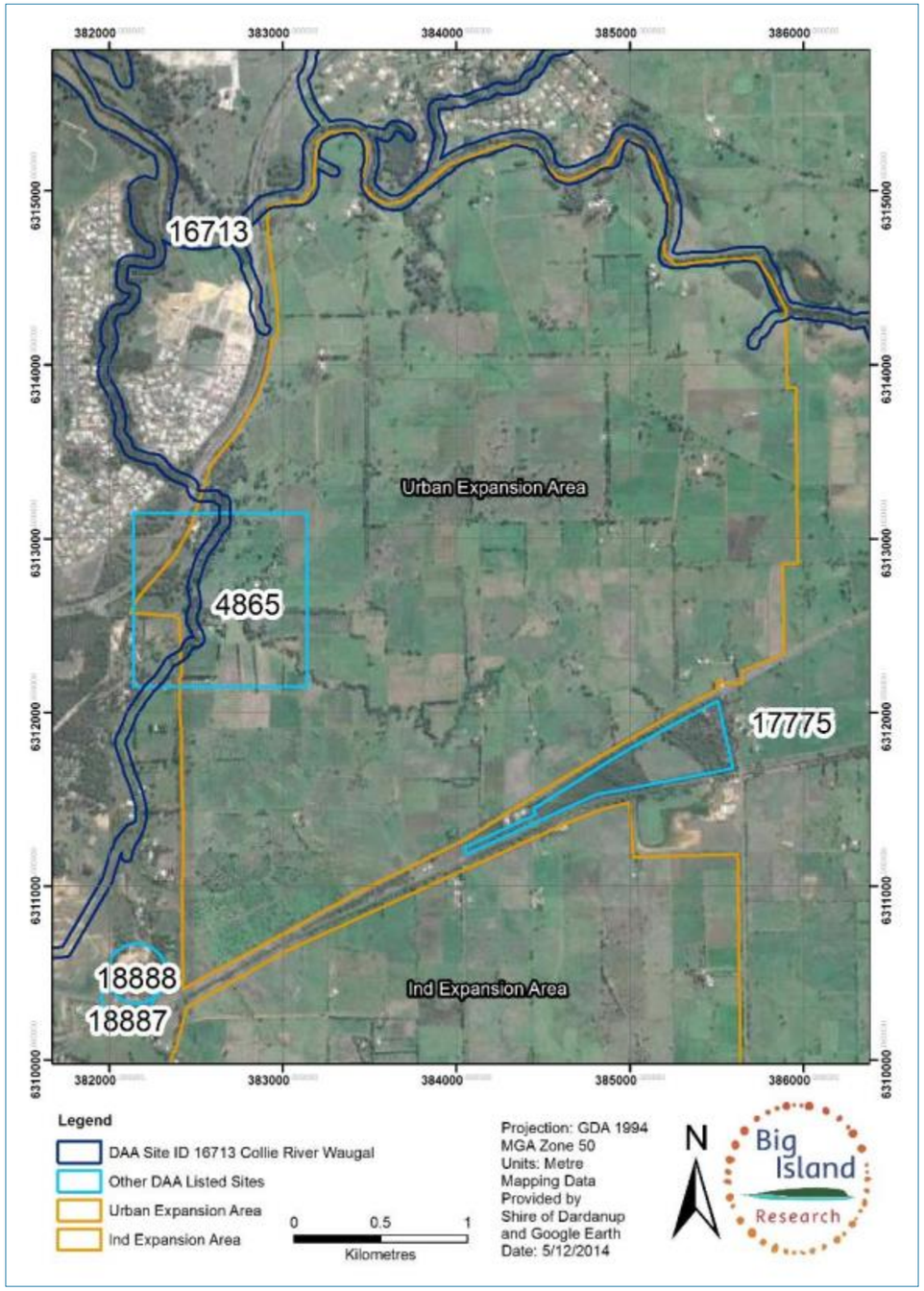


Figure 2.6: Aboriginal heritage sites

2.5.2 European heritage

The Greater Bunbury area was originally settled by Europeans in the 1830s with the DSP areas settled from the 1890s and subsequently cleared for agricultural use. In the 1890s the Perth- Bunbury railway line was completed and in 1933 the Wellington Dam completed, allowing irrigation of the area.

Just north of the Waterloo DSP area the Waterloo State School, off South Western Highway, operated from 1926 before closing in 1971 while the Waterloo Uniting Church, off Railway Road, has also closed but the building remains and is on the Shire of Dardanup local heritage listing.

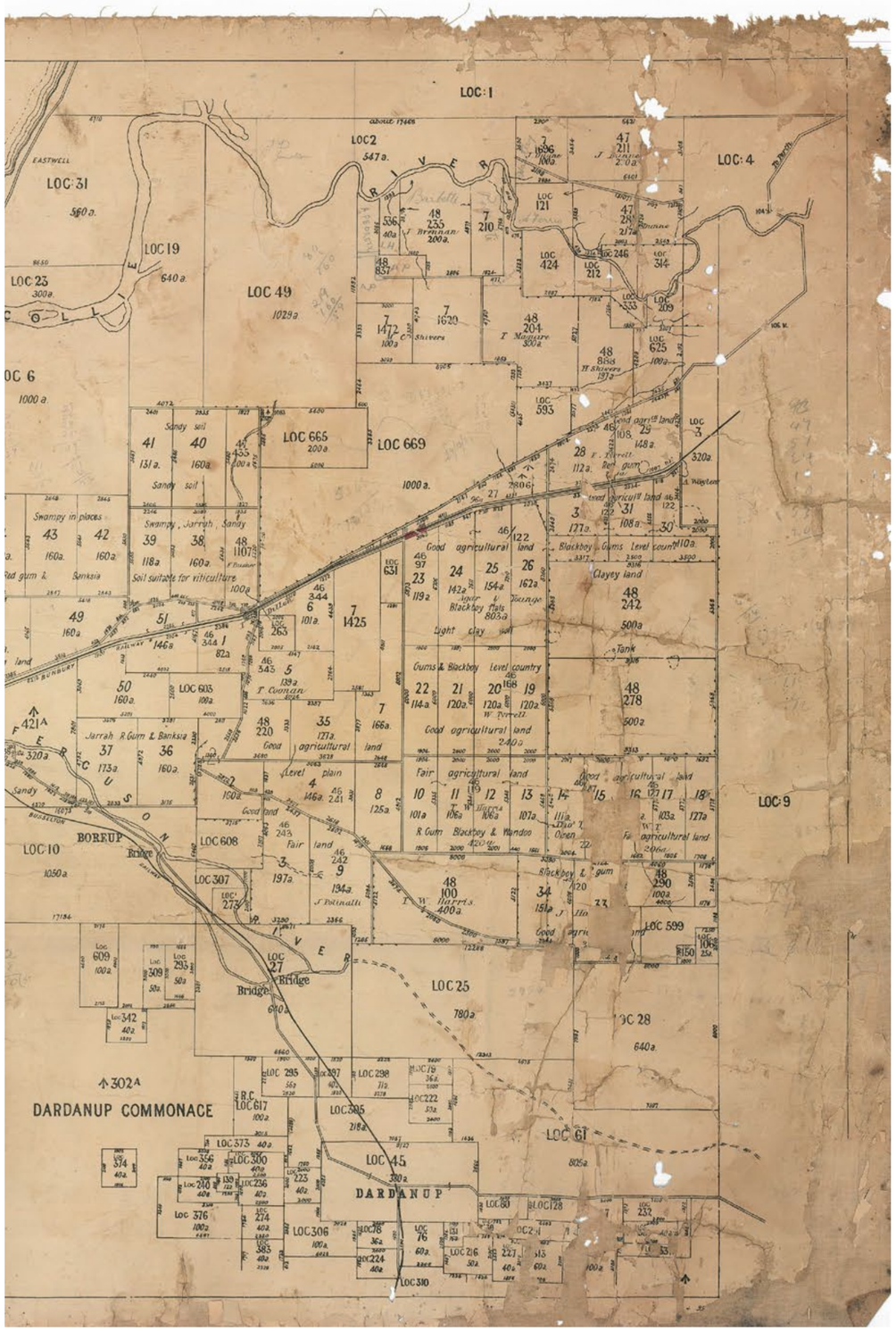


Figure 2.7: Historic cadastre boundaries in the Waterloo area

2.6 Strategic mineral resources

Approximately 48 hectares of the south east corner of the DSP area is identified as part of the strategic mineral resource policy area for titanium-zircon, as referred to in the Greater Bunbury Region Scheme's Strategic Minerals and Basic Raw Materials Resource Policy 2005. Given the scale and extent of the titanium-zircon policy area locally – some 4200 hectares in the immediate vicinity, of which the area within the Waterloo DSP area represents 1.1 per cent, it is considered that the proposal for rezoning to industrial uses would not significantly prejudice the overall future mining potential for titanium-zircon.

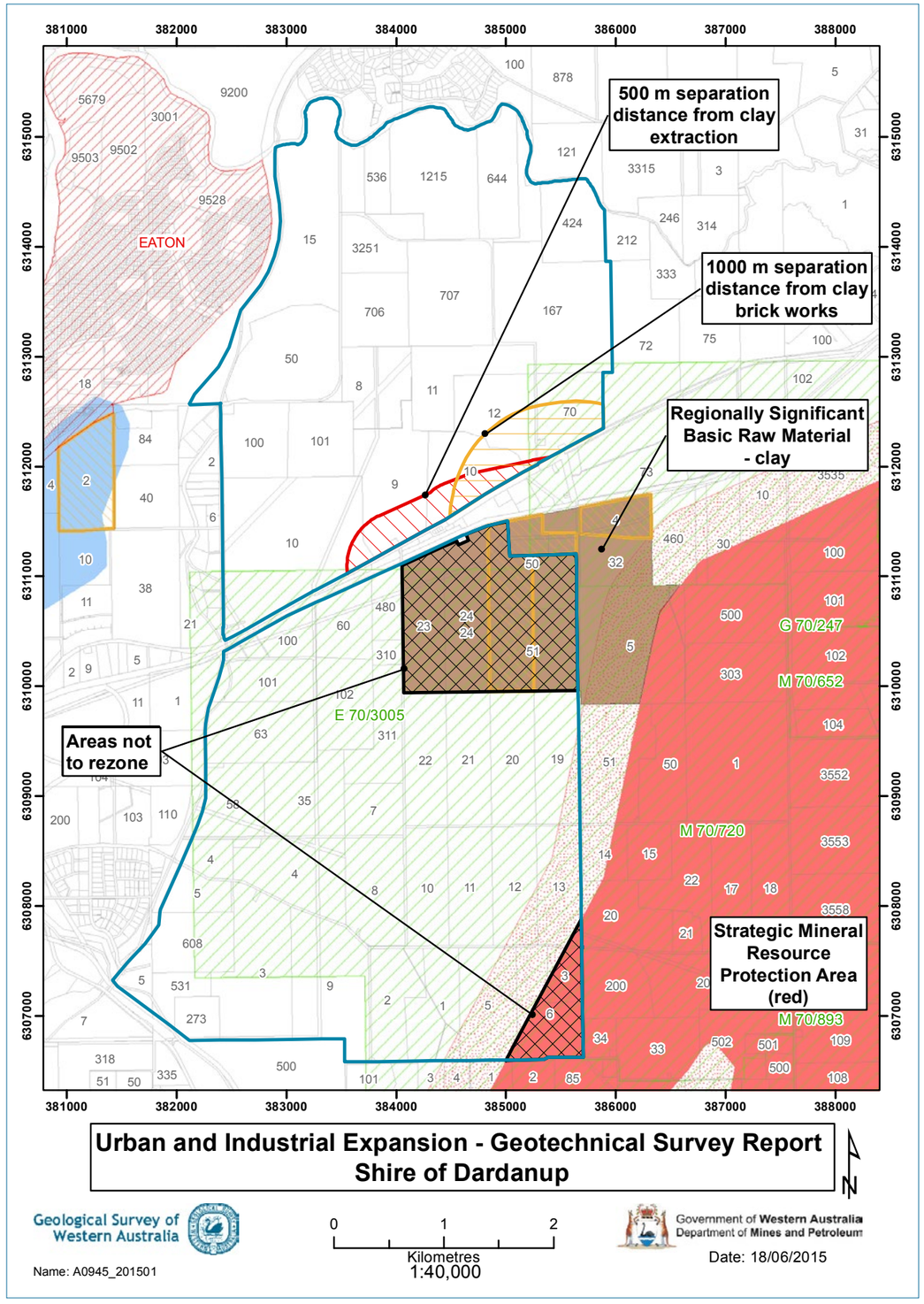


Figure 2.8: GBRS strategic agricultural resource policy

2.7 Strategic priority agricultural land

The majority of the DSP area and the upstream catchments are identified as strategic priority agricultural land by the *Greater Bunbury Region Scheme Strategic Agricultural Resource Policy (2005)*, Figure 2.8. Much of this area is irrigated by Harvey Water and drained by Water Corporation drains. The effectiveness and efficiency of water management in the whole catchment cannot be detrimentally affected by the development proposed in the DSP area.

The loss of the strategic priority agricultural land was recognised as a constraint by the Greater Bunbury Strategy in determining that Wanju and Waterloo were the most appropriate locations for strategic greenfield urban and industrial development, respectively, in the sub-region. However, there is the opportunity for additional agricultural land outside the DSP areas to be irrigated to offset the loss of the irrigated farmland in the DSP areas.

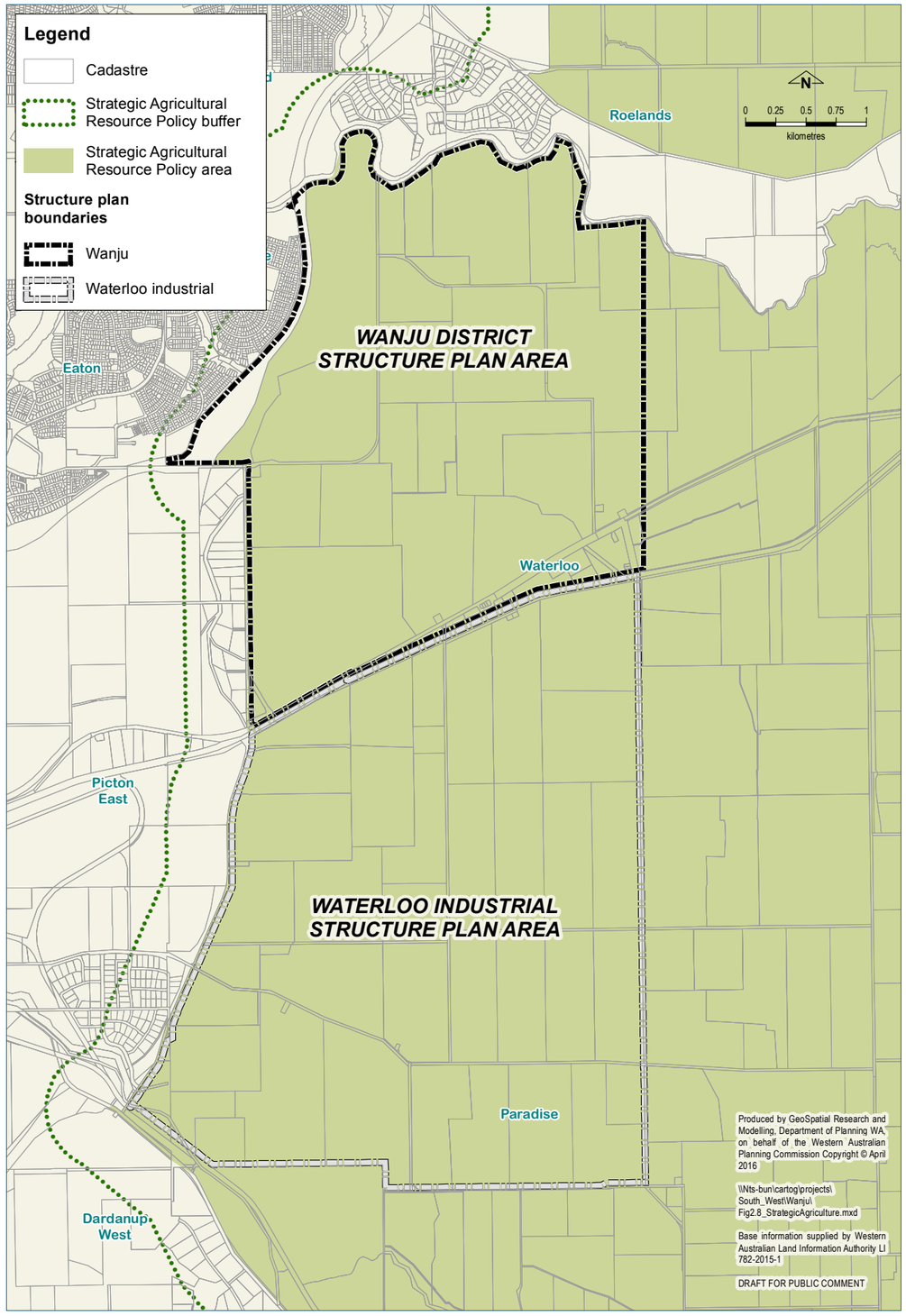


Figure 2.9: GBRS strategic agricultural resource policy

3 Land Use and subdivision requirements

3.1 Land use

The Waterloo Industrial Park is proposed to be a water and energy sensitive industrial business park designed to provide a major new focus of economic activity, employment growth and service delivery for the Greater Bunbury region for the long-term.

It is proposed that Waterloo will accommodate a diverse range of industrial activities and associated supporting land uses and a high level of amenity and built form outcomes expected to be found in a modern, well-planned industrial business park estate.

3.2 Industrial

The main element of the DSP is the identification of 1285 hectares for industrial uses (gross), which includes land required for major and minor roads and drainage infrastructure. Given the size and scale of the DSP area development will take several decades to complete. It will be critical for the success of the Waterloo Industrial Park that the DSP and subsequent local structure plans are sufficiently flexible and adaptable to enable modern businesses to thrive. The requirements of businesses in the future may urban design aspirations for Wanju, the intention is that the centres will be mixed-use with retail and commercial uses occupying buildings that are predominantly street-based in their built form, with other uses, including residential, above.

3.3 Movement networks

For industrial parks to be successful and thrive it is essential that they are well served by access to the strategic highway network. There are five highway accesses onto the wider strategic highway network for Waterloo Industrial Park:

- Waterloo Road (north) onto South Western Highway
- Wireless Road onto South Western Highway
- Proposed link road onto Martin Pelusey Road
- Harris Road junction onto the proposed Bunbury outer ring road
- Waterloo Road (south) onto Ferguson Road and Boyanup-Picton Road

Within the DSP area a broad network of integrator-A roads has been identified (Figure 2.1). Further transport modelling for the Waterloo Industrial Park, and surrounding area, will need to be undertaken and the nature of the internal road network may need to be altered for the final DSP.

The development of the proposed internal road network will be undertaken in a staged manner, with the expectation that single-lane carriageways will be sufficient for the integrator roads in the short to medium term. Integrator road intersections will be built as roundabouts in the first stage with the need to upgrade to traffic signalised junctions as traffic volumes dictate.

3.4 Water management

The intention is that Waterloo Industrial Park and Wanju will be water-sensitive developments with an emphasis on recycled water.

A key issue for development at Waterloo, and Wanju, will be the management of surface water. Being a comparatively flat area with high perched water table, surface water is inclined to pool over the winter and spring months with the lack of gravitational force required to move the water further down the catchment. To counteract this inundation of the area a network of interconnecting drainage corridors traversing both DSP areas, together with detention basins, are proposed with development.

The drainage corridors are proposed predominantly in a north-south and east-west alignment, and generally 500 metres apart and varying in width from 20 metres up to potentially a maximum of 50 metres in some corridors. The corridors are designed to contain stormwater swales, most of which are likely to be about 15 metres wide, and which will carry stormwater across the DSP area. The largest detention basin is proposed in the Wanju DSP area

Much of the public open space in Wanju, including the district sports fields and school playing fields, will require significant amounts of water throughout the dry summer months. Other areas of open space can be landscaped with water-wise plants or left as natural bushland, and therefore will require little or no additional watering during summer. Given the shortage of potable water in the local area it is essential that landscaping and reticulation is done as cost effectively and efficiently as possible.

Development in Waterloo and Wanju will need to provide for mechanisms which allow large areas of open space to be reticulated by recycled and/or non-potable water such as from the wetland systems.

3.5 Standard infrastructure

Existing infrastructure

Water supply

Mains water to the Waterloo DSP area is currently serviced by Aqwest with a water mains pipe running through the north-western part of the area. The Water Corporation operates the potable water supply to the residential areas of Eaton, to the west of Wanju, and to the townsite of Dardanup. Existing businesses and residents rely on their own individual systems to provide potable water.

Sewerage

The DSP area is currently not serviced by a reticulated sewage system and existing residents and businesses rely on their own individual systems to provide wastewater treatment.

The Water Corporation operates schemes in the urban areas of Eaton and Millbridge immediately to the west of the DSP area. Wastewater from these areas is sent to the Dalyellup treatment plant.

Electricity

Western Power currently owns a 40 hectare site in the Wanju DSP area which they have identified to include the future provision of an electricity sub-station to accommodate new development in the area. Due to the location of this site in close proximity to area set aside for the town centre a new site will need to be found for a sub-station. The draft Wanju DSP identifies two hectares in the south western corner of the DSP area as an option while another option is that it could be located within the Waterloo Industrial Park DSP area or adjacent to it.

Currently three Western Power 132 kilovolt overhead transmission lines traverse the DSP area on wooden poles:

- the Picton-Pinjarra/Busselton line, running north-south from South Western Highway to the west of its junction with Wireless Road
- the Picton substation to Worsley transmission line running almost parallel to South Western Highway and the railway line in the northern portion of the DSP area
- the Muja to Picton substation transmission line running in a north-west to south-easterly direction across the mid portion of the DSP area.

Unlike Wanju the transmission lines through Waterloo are unlikely to require relocating as development proceeds as the density of development will be much lower and their presence is not an incumbent to the design.

Natural gas

The ATCO high-pressure gas pipeline runs north-south alongside the western boundary of the DSP area, parallel to the alignment of the Bunbury outer ring road (Figure 1.1) and through the proposed light industrial precinct. The pipeline has the potential to supply gas to the Waterloo and Wanju DSP areas. A mains extension is not required but a network pressure reducing station on the trunk main will be required to supply the distribution network within the DSP areas.

High-pressure gas mains will be located within the distributor road reserves and infrastructure corridors with reticulation systems of underground pipes in individual precincts.

Telecommunications

Most of the DSP area has a national broadband network service currently available via a fixed wireless connection.

Future infrastructure

Site works

The site works at Waterloo will be largely dictated by the type and scale of industrial development that occurs in the DSP area. Major infrastructure within the DSP area that will require significant engineering will include:

- the Bunbury outer ring road and Harris Road junction, and associated cycleways, culverts and noise attenuation
- the Perth-Busselton fast train railway line in the median of the outer ring road
- urban water management infrastructure, including stormwater collection and disposal, water quality management, responsive drainage and establishing stormwater and/or groundwater re-use opportunities

Wastewater

Sewer reticulation will be designed and installed to serve all lots to the current standards. The Wanju and Waterloo developments will require additional wastewater treatment works. Determination of the sewer pump station requirement and alignment of sewer line routes and easements will take place at the next phase of planning.

Waste management

The management of waste from Waterloo and Wanju will be a significant issue and opportunity for the developments. An integrated waste and resource recovery system will provide the opportunity to effectively manage the expected mix and volume of waste and minimise the amount of material being put into landfill, while minimising health and environmental impacts and creating local jobs and investment.

Stormwater

On-site infiltration

Taking into account drainage from roofs and hard-standing within lots as well as drainage from roads, the total quantity of stormwater is expected to increase once the site is developed, although not as significantly as in the Wanju development area.

The general requirement in Western Australia for stormwater systems is that rainfall events up to the one in 100 year storm events should be managed within the development area to pre-development peak flows. Flows to waterways should ideally be limited to pre-development flows.

Due to the nature of the local soils and topography within the DSP area stormwater currently saturates the top soil and pools on the surface or passes off-site via the Water Corporation's rural drains and Vindictive Drain. Therefore, for the post-development scenario, stormwater needs to be managed and stored for slow release once the storm and flood event has passed, or used for shandying for water re-use back on-site.

Stormwater infrastructure measures

Future stormwater management should be viewed as a series of linked components, including structural and non-structural components which collectively meet water quality and water conservation objectives. These measures should include consideration for stormwater swales, infiltration and nutrient stripping basins, storage basins or infiltration tanks, and non-structural measures to minimise nutrient and pollutant loads.

Water supply

There are various options for non-potable water uses, water reticulation will be designed and installed to serve all lots to the current Water Corporation standards.

Reduction in the actual use of the scheme water, such as the installation of water-wise fittings and appliances, can be applied through planning conditions and education campaigns. Costing and feasibility studies for alternative water supplies, including negotiations with regulators, is required at the next phase of planning to determine the preferred water management strategies, such as a third pipe system. In accordance with *State Water Strategy* (2007) and the South West Water Forever targets, total water usage should aim to be reduced to 100 kilolitres per person per year, with 40 to 60 kilolitres of this usage being potable water.

Electricity

The development of Waterloo will require supplying of electricity from the existing system, although the capacity is limited and will need upgrading. Internal or local power reticulation will require a sub-station of approximately two hectares. The location of the sub-station will be dependent on the alignment of the transmission lines across Wanju, however, an area in the south-east corner of Wanju has been identified in the draft Wanju DSP. Unlike Wanju the proposal for development at Waterloo is that the existing alignment of overhead 132 kilovolt transmission lines along their current alignments will be retained.

Sustainable energy alternatives

A sustainable infrastructure strategy should be undertaken at the next phase of planning to investigate incorporating alternative sustainable energy supplies, such as wind and solar.

One alternative energy supply approach is to operate a grid connected photovoltaic cell network to generate electricity. Photovoltaic cells convert solar energy into electricity and can be installed on the rooftops of buildings. The power from the photovoltaic cells can be used directly by the local residential households or businesses, and any unused power can be fed back into the network and generate a revenue for the owner or Wanju community. Photovoltaic cells have a relatively high upfront installation cost, especially in comparison to fossil fuel energy. However, the cells have few running and maintenance costs once installed. The advantage of a grid-connected photovoltaic cell system is the significant reduction in greenhouse gas emissions and a substantial step forward in establishing Wanju as a leader in innovation and sustainability best practice.

Gas

An existing 200 millimetre ATCO gas pipeline runs north-south through the western part of the DSP area and will be able to be accessed to help service the new lots and premises. High-pressure gas mains will be located within the distributor road reserves and infrastructure corridors with reticulation systems of underground pipes within each development precinct.

IT and communications

The provision of a high-speed broadband and mobile phone network will be critical to the economic success of Waterloo. A local system of cellular services antennae and optic fibre network cables will be connected to switching stations with all cables being underground within road reserves. Exchanges and switching stations will be housed in buildings located within the town or local centres, with such buildings being designed and constructed to integrate with neighbouring buildings.

Sustainable built form

For Waterloo to achieve the sustainability it aspires, attention will need to be paid to provision of infrastructure and built form which actively reduce resource consumption, at the more detailed phases of planning. Consideration will need to be given to improving the efficiency and sustainability of infrastructure at every level of planning, from district headworks upgrades to appliances used in buildings. To this end, the

built form guidelines required for the redevelopment will need to clearly outline expectations in regards to building orientation, thermal mass, appliances, on-site renewable energy generation, water and wastewater harvesting and re-use systems, among other sustainability initiatives.

3.6 Infrastructure coordination, servicing and staging

Much of the significant standard infrastructure will have to be provided prior to industrial development, including the provision of arterial drainage infrastructure. Staging and pre-funding of this infrastructure will need to be successfully managed for the development to proceed in a timely fashion. A development contribution plan will need to be finalised to ensure the costs are shared fairly and reasonably between the developer, landowner, investors, local, State and federal governments.

These elements are extremely difficult to implement in a piecemeal fashion. Some site and drainage remediation works may cross ownership boundaries, which will require a coordinated approach between landowners and government agencies. Given the level of fragmented ownership and the extent of infrastructure requirements for the development, implementation will need to be closely coordinated.

The provision of the infrastructure will be set out in detail in a future implementation and staging strategy and further information will be available on this for the final version of the DSP from the servicing needs investigation report.

3.7 Development contribution arrangements

Development contributions can be sought for items of infrastructure required to support the development of an area. These can include the standard infrastructure requirements of:

- land contributions for public open space, foreshore reserves, schools and roads
- infrastructure for water, sewerage, drainage works, electricity supply infrastructure and other public utilities
- all roads, footpaths, shared paths and traffic works within a subdivision
- monetary contributions for standard water, sewerage and drainage headworks for off-site major infrastructure works
- community infrastructure such as libraries, community halls and sports facilities

A development contribution plan will be produced to outline the development contribution arrangements for Wanju. This will be formalised as an amendment to the local planning scheme and, once approved, effectively forms part of the local planning scheme hence ensuring statutory compliance.

The local authority will have responsibility as custodian and administrator of the development contribution plan, including the formal collection of contributions and their expenditure, in accordance with the plan. This work could be outsourced by the council. A key component of the development contribution plan will be the infrastructure cost schedule.

Acronyms and abbreviations

DSP	District structure plan
GBRS	Greater Bunbury Region Scheme
ha	hectares
SPP	State Planning Policy
WAPC	Western Australian Planning Commission

References

Background reports

Ethnographic and Archaeological Heritage Assessment Report 2014 (Big Island Research)

Flora and Fauna Survey 2014 (GHD)

Geotechnical Survey Report 2014 (Soilwater Consultants)

Integrated Water Strategy 2016 (Calibre Consulting)

Integrated Transport Plan 2016 (Sinclair Knight Mertz) *(to be prepared)*

Servicing Needs Investigation Report 2016 (Integran)

Strategic Overarching Bushfire Risk Management Plan 2015 (RUIC)

South West Region Economic and Employment Land Strategy 2014 (WAPC)

Appendices

Appendix 1 – Existing Planning and Regulatory Framework

Planning history

The DSP area is currently zoned rural in the Greater Bunbury Region Scheme and the Dardanup Local Planning Scheme. Various options were considered in terms of accommodating additional new development within the Greater Bunbury sub-region. The endorsed *Greater Bunbury Strategy 2013* identified the DSP area as a medium to long-term industrial expansion area.

Planning policy analysis

Waterloo was selected as the preferred urban expansion area by the WAPC, in the endorsed *Greater Bunbury Strategy 2013*. It was selected as the preferred location due to a number of factors including:

- its proximity to Bunbury central business district
- good transport links to Bunbury central business district and other employment areas
- area is contiguous to established residential area of Eaton and the employment areas of Picton and Preston
- the development of the Waterloo Industrial Park and Wanju are expected to facilitate co-servicing and produce a number of synergies in terms of infrastructure
- the provision of efficient and safe transport options can be provided to adjacent residential and employment areas
- it can provide a high degree of urban containment and provide for up to 28,600 dwellings
- infrastructure providers have supported this location
- the development area is clearly bounded
- Waterloo has relatively few environmental constraints, such as remnant vegetation, flood risk, bushfire, mosquitos and storm surges.

State Planning Strategy 2050

The *Western Australian State Planning Strategy 2050* (WAPC, 2014) aims to guide sustainable development of the state for the next four decades. It supports the draft *Perth and Peel@3.5 million* (WAPC, 2015), *Directions 2031 and Beyond* (WAPC, 2010), *State Planning Policy* (SPP) *3 Urban Growth and Settlement* (WAPC, 2006) and the various recent planning reform initiatives of the WAPC. One of the fundamental goals is to facilitate co-ordinated and sustainable economic development. To achieve this goal a suitable and affordable supply of land needs to be made available for development to meet the long-term needs of people across the State.

Planning and Development (Local Planning Schemes) Regulations 2015

The Regulations were gazetted on 1 September 2015 and came into effect on 19 October 2015. They replaced the Town Planning Regulations 1967 (as amended). The Regulations govern the way local planning strategies and local planning schemes are prepared, consolidated and amended. To assist with the implementation of the Regulations.

Relevant State Planning Policies (SPPs)

SPP 1 State Planning Framework Policy Variation 2 (WAPC, 2006)

State Planning Framework unites existing State and regional policies, strategies and guidelines within a central framework which provides a context for decision-making on land use and development in Western Australia. It informs the WAPC, local government and others involved in the planning process on those aspects of State level planning policy which are to be taken into account, and given effect to, in order to ensure integrated decision-making across all spheres of planning.

SPP 2 Environment and Natural Resources Policy (WAPC, 2003)

The objectives of this overarching state planning policy are:

- to integrate environment and natural-resource management with broader land-use planning and decision-making
- to protect, conserve and enhance the natural environment
- to promote and assist in the wise and sustainable use and management of natural resources

SPP 2.9 Water Resources (WAPC, 2006)

SPP 2.9 requires land use planning to contribute to the protection and wise management of water resources by ensuring planning takes into account total water cycle management and water sensitive urban design principles.

SPP 3 Urban Growth and Settlement (WAPC, 2006)

The objectives of this policy are:

- to promote a sustainable and well planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space
- to build on existing communities with established local and regional economies, concentrate investment in the improvement of services and infrastructure and enhance the quality of life in those communities
- to manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints
- to promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand while ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community
- to coordinate new development with the efficient, economic and timely provision of infrastructure and services

SPP 3.6 Development Contributions for Infrastructure (WAPC, 2009)

SPP 3.6 sets out the principles and consideration applying to development contributions for the provision of infrastructure required to accommodate new development.

SPP 3.7 Planning in Bushfire Prone Areas (WAPC, December 2015)

SPP 3.7 sets out the planning hierarchy and information required at each stage of the planning process in relation to development in bushfire prone areas.

SPP 4.2 Activity Centres for Perth and Peel (WAPC, 2010)

SPP 4.2 specifies broad planning requirements for the planning and development of new activity centres in Perth and Peel. However, for regional centres where it is applicable and relevant, such as in Greater Bunbury, the policies set out in the SPP can be used.

Shire of Dardanup Local Planning Strategy (2015)

The Shire of Dardanup's Local Planning Strategy was adopted by the council on 12 March 2014 and published in April 2015 within the Shire of Dardanup. The main objectives of the local planning strategy are to set out the Shire's broad vision and longer-term directions for land use and development, and to provide a strategic direction for the preparation of Local Planning Scheme No.9.

Statutory Planning Context

Greater Bunbury Region Scheme

The *Greater Bunbury Region Scheme* (GBRS) came into effect on 29 November 2007 applying to the area comprising the City of Bunbury and Shires of Capel, Dardanup and Harvey. It sets out the proposed land-use zoning for uses within the region and provides the legal basis for planning in the Greater Bunbury sub-region. The current GBRS zone for the DSP area is rural, the exception being the primary regional road reserve for the initial alignment for the Bunbury outer ring road and South Western Highway.

Shire of Dardanup Town Planning Scheme No.3

The Town Planning Scheme for the Shire of Dardanup looks to zone land in the Shire for the purposes set out in the Scheme. It looks to consolidate the urban areas of Dardanup, Burekup and Eaton and control the building in those areas of new structures between or adjacent to existing buildings. The scheme will need to be reviewed following the endorsement by the WAPC of the DSP.

Appendix 2 – Strategic Environmental Impact Assessment

Introduction

Waterloo was selected as the preferred option for strategic industrial development for Greater Bunbury by the *Greater Bunbury Strategy 2013*, alongside Wanju as the urban expansion area, due to its comparatively minimal environmental constraints. The strategy recognised that while land already zoned urban will be the most appropriate for development due to its minimal environmental impact there will continue to be a need for greenfield development in the long-term.

Among the key criteria in the selection of Waterloo and Wanju as the preferred greenfield options for industrial and urban development included:

- Protect and enhance biodiversity, air quality, heritage and waterway health. Maintains or improves areas of regionally-significant terrestrial and aquatic biodiversity. This includes regionally significant vegetation communities, critical habitat, threatened species, population, ecological communities and their habitats
- Maintain or improve existing environmental condition for air quality
- Maintain or improve existing environmental condition for water quality so that it is consistent with community water quality objectives for recreational water use and river health
- Catchment and stormwater management planning

Environment

As an area of farmland that has been largely cleared and used for agriculture for 100 years or more there are minimal environmental constraints in the DSP area. There are no Ramsar listed sites, or Wetlands of National Importance within the site or immediate surrounds. The site does, however, drain to the Leschenault Estuary located between five and 10 kilometres to the north-west of the DSP area and is an internationally important bird habitat.

The DSP area is predominantly composed of a gently sloping plain which gradually falls in a west/north-westerly direction from 28 metres (Australian height datam) in the south-east corner of the DSP area to 15 metres along the northern boundary. The slopes in the area between Millars Creek and the Ferguson River generally vary between a 1 in 300 slope and 1 in 500 slope. The entire DSP area is classified as a wetland by the Geomorphic Wetland Dataset.

There are some small, low sand rises located along the western edge of the DSP area which rise approximately two to three metres above the surrounding plain.

Climate

Greater Bunbury is subject to a temperate Mediterranean climate of cool and wet winters, and hot and dry summers. The annual mean rainfall is about 734 millimetres (median 698 millimetres) for the nearest Bureau of Meteorology weather station at Carey Park in Bunbury. About 80 per cent of this rain falls on average in the five months between May to September. Average winter temperatures range between a minimum of seven degrees Celcius and 17.3 degrees Celcius maximum, and summers ranging from a minimum of 15.4 degrees Celcius and a maximum average of 30.1 degrees Celcius. There are regular extremes outside of these average temperatures.

The effect of this climate is that the subject land's waterways and wetlands tend to be seasonal in nature apart from those paddocks that benefit from irrigation. The groundwater also is influenced by the seasonality of the rainfall and temperatures and commonly there is in the order of a two metre variation in vertical groundwater levels.

Ferguson River catchment

The Ferguson River catchment covers approximately 460 hectares of the southern part of the DSP area. Within this catchment the land generally falls north towards the Collie River. The area within the Ferguson River catchment in the DSP area represents only a small proportion of the total river catchment.

The Ferguson River skirts just south of the southern boundary of the DSP area. The Ferguson River is very different in nature to the Collie River system and more akin to Millars Creek, in that it does not have large incised banks cutting into the surrounding plain.

Millars Creek catchment

The Millars Creek catchment comprises the majority of the DSP area, covering approximately 900 hectares. Within this catchment all surface water feeds through to Millars Creek which joins Collie River approximately one kilometres downstream of the western boundary of the Wanju DSP area.

The entire catchment of Millars Creek extends eastwards into the foothills of the scarp. Small waterways, originating on the scarp, flow into the DSP area where, prior to farming, they would have dispersed out across the flat plain, with no defined channel. A series of drains, part of the Water Corporation Rural Drainage Scheme, has been installed to allow surface movement of this water by acting as localised waterways, directing flows across flat paddocks and sometimes through slight sand rises that may previously have held water back.

In the south-east corner of the Wanju DSP area Millars Creek is connected to the Victory Drain which runs adjacent to Waterloo Road for the length of the Waterloo DSP area boundary and takes much of the surface flow upstream of the DSP area into Millars Creek. On the western boundary of the DSP areas, the Vindictive Drain also discharges to Millars Creek.

Harvey Water irrigation channels

Harvey Water's irrigation channels bring untreated water for summer irrigation from dams on the scarp. During periods of heavy rainfall, some of these channels also assist with moving surface water across the landscape. This irrigation water currently comes from the Wellington Dam. This water is generally of a good quality, although salinity levels are in the region of 1000 parts per million. The water is mainly used for flood irrigation of pasture, for which the salinity levels are acceptable.

Approximately 10 to12 gigalitres per annum are currently provided to the DSP areas. There is currently around 46 gigalitres allocated for irrigation within the system not being used.

Surface water

The effect of the concentration of area's rainfall in the winter and spring is that the waterways and wetlands tend to be seasonal in nature, apart from the areas irrigated by Harvey Water drains.

The flat nature of the area means there is sheet flooding across it after extended rainfall, especially true in late winter once the soil is waterlogged; meaning the ability for water to permeate into the soil profile is greatly reduced. Under these conditions, the water tends to sheet across the site until it reaches the constructed rural drainage network.

Large portions of the plain will also receive shallow seasonal inundation in late winter and early spring. The inundation is largely due to the duplex soil holding groundwater close to the surface. This inundation was historically more widespread however the creation of the rural drainage network has allowed the water to be moved downstream more quickly and thus reduced the area and depth of inundation.

Soils and geology

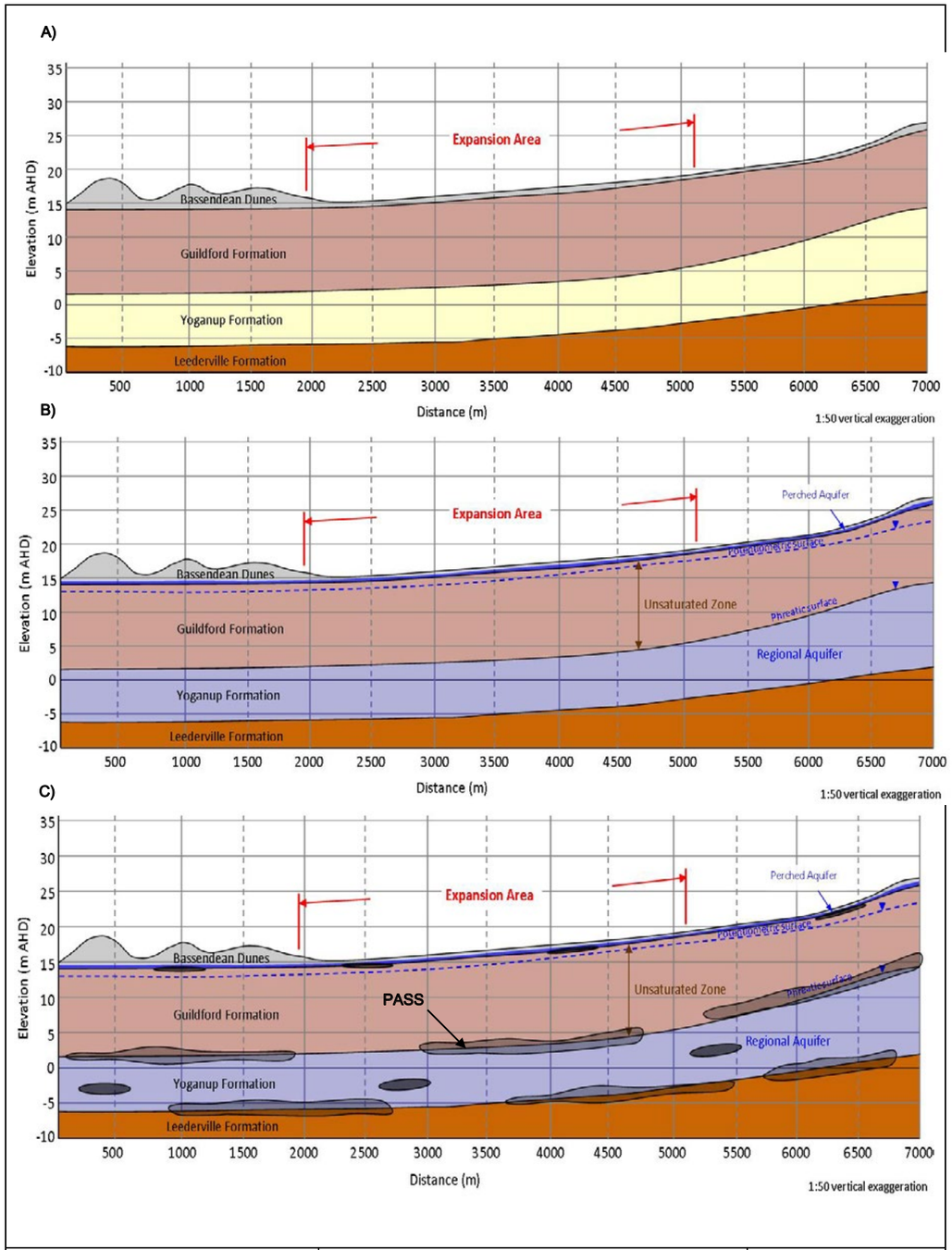
As part of the background for the Wanju and Waterloo DSPs a geotechnical report on soils was compiled by Soilwater Consultants in 2014 for the Shire of Dardanup. The study identified that due to heavier soils and high groundwater levels, this area is considered to have wetland characteristics, which is supported by the geomorphic wetland database. In winter and spring considerable surface water is present throughout the area, with low-lying areas and drainage lines consistently filled with water. This perched system is ephemeral and the proposed urban development will require a strong emphasis on the management of surface water across the site, particularly for extreme flood events.

These areas of perched water are created when the relatively thin layer of Bassendean Dunes become saturated and water sits on top of the relatively impermeable, underlying clayey Guildford Formation, see Figure A4.1. The areas generally drain rapidly and dry out when intercepted. The Bassendean Dunes and Guildford Formation sit on top of the Yoganup Aquifer, which is a confined aquifer located approximately 15 metres below the surface of the land, constrained by the clay sediments of the upper Guildford Formation and lower Leederville Formation.

Soil contamination

A detailed contaminated site analysis has not been undertaken. The Geotechnical report for Wanju states that for the majority of that area the risk of contamination, apart from increased nutrients associated with agricultural uses is likely to be low, and this is likely to be the case for Waterloo as well.

To the north-east of the DSP area on the Austral Brick site on Waterloo Road there is the potential for contamination associated with this land-use and an earlier refuse disposal area. This may include lateral movement of contaminates within the groundwater, which at that location flows in a north westerly direction.



SHIRE OF DARDANUP	Figure 3.2: Schematic cross-section showing A) Geology, B) Hydrogeology and C) ASS	soilwater GROUP
GEOTECHNICAL SURVEY REPORT		

Figure A4.1: Cross-Section of Geology

Acid sulphate soils

Acid sulphate soils occur throughout the Swan Coastal Plain, including the Waterloo DSP area. The acid sulphate soil risk mapping indicates that the DSP area is mapped as having a 'moderate to low risk'.

Future detailed studies may be needed to determine the status of the soils in particular areas, especially in any peaty wetland systems or where coffee rock/iron hardpan is found. Sand dune rises are unlikely to have a significant acid sulphate soils risk; however, this has not been delineated in the broad-scale mapping.

Acid sulphate soils do occur in deeper sediments but these are unlikely to be influenced by any surface development, including deep sewage lines.

Geotechnical considerations

The geotechnical report for the Waterloo DSP area (and Wanju DSP area) considered the potential geotechnical risks and issues associated with the conditions which may impact on the proposed development. To assess the geotechnical requirements for development land needs to be classified under the Australian Standard (AS) 2870-2011 *Residential slabs and footings – construction*.

The soils of Waterloo (and Wanju) have a high moisture content. The geotechnical report classifies them as Class P, with footings having a greater propensity to damage, and footing design must take this condition into account. However, the assessment suggests that the classification could be improved to Class M with the utilisation of some fill material. A more detailed geotechnical assessment has been commissioned and will provide more specific information and advice.

Groundwater

Groundwater responds to the seasonality of rainfall and temperature. There is commonly a two or more metre variation in the vertical groundwater levels, as water moves through to the site's drains and waterways, or is evapo-transpired over summer, without additional water entering the soil profile from rainfall.

Superficial aquifer

The groundwater levels largely follow the general slope of the land. This has produced contours that fall in a north-westerly direction, except for localised drawdown due to the incised waterways. Over much of the site, the groundwater is likely to be between the surface to one metre below in the winter/spring peak, due to the clayey/loamy nature of the underlying soil and flat landform. Some small sand rises are likely to have over 1.5 metres of separation to groundwater with the biggest separation to the maximum recorded groundwater depth being 2.46 metres.

The 'draw-down effect' on groundwater from the Collie River and Millars Creek means that the land close to these systems will have areas with more than 1.5 metres of separation to groundwater.

The Department of Water is currently undertaking a monitoring program to more fully understand the situation with the shallow superficial groundwater (as well as potential deeper aquifers) within the DSP areas. The results of this modelling will be available in mid-2017. Some raw data has been made available, from which consultants carrying out the integrated water strategy have developed a basic groundwater contour map. A depth to groundwater map has also been produced, Figure 2.3. This information is currently preliminary only to help guide decision making and is not to be used for detailed design.

As well as the bore data available, from which the seasonal peak was chosen to determine the maximum recorded groundwater contours, indicative data points within the on-site river systems have also been included, as these will influence how groundwater moves within the site.

Superficial groundwater quality

Groundwater quality data has not been collected; however, nutrient levels are likely to be high due to the long-standing agricultural activities. Salinity levels may also be an issue in areas where irrigation has taken place.

Confined aquifers

Two groundwater systems exist in this area:

- Perched system – this is ephemeral and only occurs during winter and spring (may extend into early summer)
- Yoganup Aquifer – this is the regionally significant superficial aquifer

The Yoganup Aquifer occurs within the sands of the Yoganup Formation. It is considered a confined aquifer as it is constrained by the clayey sediments of the upper Guildford Formation and lower Leederville Formation. Due to this confined nature piezometers in the Yoganup Aquifer generally have a potentiometric surface one to two metres below the surface, whereas this only reflects the pressure that the overlying Guildford Formation (overburden pressure) on the aquifer. The actual water table in the Yoganup Aquifer is located at the contact between the Guildford and Yoganup formations, generally between 10 and 15 metres below the surface.

Flora

As part of the DSP's background evidence a flora and fauna survey was produced by consultants GHD in 2014. The survey highlights that the area has been almost entirely cleared of native vegetation and is dominated by introduced species and agricultural pasture. The tilling of paddocks and grazing by cattle over most of the area over many years has removed or exhausted the native seed store and nutrients in the soil.

Some remnant vegetation remains intact, generally classed as 'degraded' to 'completely degraded'. Along the banks of the Collie River there are some areas of remnant vegetation classed as 'good' to 'degraded'. There is a small tributary that enters the Collie River approximately midway along the northern boundary of the site. This contains some over-storey native vegetation (*E. rudis* and *Melaleucas*), with a degraded weedy understorey. It is seen as having a moderate ecological value.

Millars Creek, which is predominately a Melaleuca woodland with a mix of sedges/rushes and weeds as understorey is also noted as having a moderate ecological value. There is also an area of high quality wetland vegetation found in the Department of Parks and Wildlife reserve in the Benang precinct between South Western Highway and the rail reserve. The Department of Parks and Wildlife has provided information on the values of this reserve and surrounds, including:

- The reserve is a conservation category wetland (1728) and there is a nearby resource enhancement wetland (1708)
- It includes a threatened ecological community – herb rich shrublands in claypans (SCP08), which is listed as endangered. The vegetation is largely intact and includes a diverse array of native flora species
- The area and surround is considered an Environmentally Sensitive Area

As the area is either classed as palusplain wetland or associated with waterways, the vegetation can be deemed to be either wetland or waterway dependent vegetation. The described vegetation complexes for the area include:

- very open woodlands of *melaleuca rhaphiophylla* over introduced pasture
- low woodland of *M. rhaphiophylla* and *eucalyptus rudis*
- shrubland of *melaleuca lateritia* over mixed sedgeland and heathland (in claypans)
- woodlands of *corymbia calophylla* and *Agonis flexuosa* over pasture
- open woodlands of *C. calophylla* over pasture/weeds
- scattered *E. rudis* over pasture
- mosaic of *M. rhaphiophylla, C. calophylla* and *E. rudis* woodland over weeds
- tall shrubland of *melaleuca viminea*

The development of Waterloo and Wanju provides an opportunity to treat legacy nutrients through drainage management and also rehabilitation and improve the overall environmental quality of the foreshores of the Collie River, Ferguson River and Millars Creek with the reduction in cattle movements as development progresses.

Fauna

The native fauna habitat on site is closely linked to the small areas of remnant vegetation. The value of these areas as habitat relates closely to their current condition. Some of this vegetation also performs an ecological linkage function for fauna movement.

The cleared areas provide little habitat for native fauna species. The on-site field survey found 91 species of fauna (with three introduced species). Five of the species have conservation significance:

- Carnaby's Black Cockatoo
- Red Tail Black Cockatoo
- Western Ringtail Possum
- Water Rat
- Carter's Freshwater Mussel

Detailed information on fauna is presented in the flora and fauna report.

Potential environmental improvements

Much of the area has been farmed since the early 1900s. Environmental values are largely limited to Lot 310 Wireless Rd and avenues of trees along some road reserves.

The development of Waterloo (and Wanju) represents an opportunity to significantly improve the environmental values of the area. Potential improvements include:

- management of surface and groundwater systems – reducing the rate for contaminants
- (nutrients and phosphates) to be discharged to the Leschenault Estuary via groundwater and surface water
- management of superficial aquifer extraction, limiting potential for salt intrusion into the superficial aquifer and use of contaminated groundwater for unsuitable purposes
- restoration of foreshore and ridge vegetation
- vegetated connectivity improved along the Ferguson River, Millars Creek and Collie River foreshores and in the Benang precinct of Wanju

Threatened ecological communities and Priority Flora

A flora and fauna study was undertaken in spring 2014 to determine the nature and condition of vegetation within and adjacent to the DSP area (and neighbouring Wanju). The study identified two federally-listed threatened ecological communities within the DSP area, in the Benang precinct of Wanju immediately to the north of the northern boundary of the DSP area:

- a number of examples of *Corymbia calophylla – Xanthorrhoea* preissii woodlands and shrublands of the Swan Coastal Plain, listed as endangered at a Federal level and critically endangered at a State level
- *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain, listed as critically endangered at a Federal level and vulnerable at a State level

Bushfire risk

As part of the background work for this DSP (and the Wanju DSP) RUIC Fire carried out a strategic overarching bushfire risk management plan for the urban and industrial expansion areas. This assessment outlines that while the DSP areas (Waterloo and Wanju) and their surrounds contain only limited areas of vegetation which would facilitate extended bushfire, and the bushfire-related risk is not prohibitive of development, as part of a precautionary approach to the risk to bushfire mitigation both existing and proposed revegetation areas warrant the adoption of precautionary design measures.

Urban water management

An integrated water strategy has been undertaken to guide water management in the DSP area. The strategy provides a detailed assessment of water management initiatives and identifies areas in which additional work is required to manage all aspects of the water cycle, from stormwater runoff to the provision of potable water. Much of the work will feed into district water management plan will be completed by the Department of Water by mid-2017, the results of which will be incorporated into the final DSP.

Water-sensitive urban design

Due to the potential constraints on groundwater use in Waterloo and Wanju opportunities to utilise as much stormwater runoff as possible should be included in the development. This should be through the consideration of water-sensitive urban design in the subdivision and drainage design to infiltrate rainwater to replenish the superficial aquifer (taking into consideration quality and contamination issues). Water-sensitive urban design seeks to incorporate stormwater drainage into the urban fabric in a manner that ensures the protection of surface and ground water quality and enhances opportunities for reuse of stormwater.

It is envisaged that the majority of stormwater from both roadways and private property will be feed into underground drains that will link to the surface swales in the multi-use corridors.

Water management recommendations

The following summarises the conclusions and management actions recommended in the integrated water strategy.

Groundwater

The aquifer is generally deep and therefore is not a constraint to development. There is a shallow perched water table due to a relatively impervious layer of clay across the area. In times of heavy rainfall, and for much of the winter and spring, this leaves most of the area with a high moisture content and a good deal of surface water. With development this perched groundwater and surface water will need to be managed effectively and the intention is for drainage swales to accommodate run-off.

Stormwater

Due to the constraints on groundwater use in Waterloo and Wanju, opportunities to utilise as much stormwater runoff as possible should be encouraged.

Drainage swales will be incorporated into road reserves in Waterloo. The location of the swales will take advantage of the natural catchments to minimise reworking of the area to achieve a suitable gradient.

Potable water use reduction

Development at the neighbouring Wanju will be medium to high density residential and few dwellings will have large private gardens. Thus, the potable water use per house is likely to be significantly less than for a conventional low density development. Potential sources for domestic 'third-pipe' systems for toilet flushing and washing machines include rainwater from roofs, grey water and recycled wastewater.

An area of about 33 hectares is set aside on the western side of the Bunbury outer ring road in the Wanju DSP area, north of South Western Highway, for the potential storage of stormwater from Waterloo and Wanju. Detention wetlands in this area are proposed to treat water before its re-use, predominantly on public open space in Wanju.

Monitoring

The principal planning themes which will need assessment and monitoring include:

- **environmental** - the sustainability of development and the potential impact on the surrounding remnant vegetation and proposed new community of Wanju, wetlands, scenic landscapes, natural resources, air and water quality
- **social** – the provision of local jobs and good access to the jobs, particularly from neighbouring Wanju
- **infrastructure** - the efficiency of infrastructure use into new areas, including its timely provision, cost effectiveness, opportunity for innovation, management and maintenance
- **economic** - the economic base to support the sustainable future of Waterloo and Wanju, including employment self-sufficiency within the two DSP areas, self-containment, diversity, opportunities for growth, innovation and enterprise

Sustainability context

Sustainable planning outcomes result from collaboration:

- understanding the regional and sub-regional context
- developing an acute sense of the individual characteristics of each development site
- a balanced approach to decision-making

Sustainable development acknowledges, and responds to, the inter-relatedness of our many actions; that land-use impacts on transport mode options used, which subsequently impact on people's health and potentially on job performance. Sustainable development looks for solutions that solve targeted problems without exacerbating or creating other problems.

The need to consider global issues, reflect State Government policy, appreciate and respond to its regional and sub-regional position, and respond to local conditions has been fundamental to the structure planning process. Achieving sustainable development demands a partnership approach with individuals and across communities, businesses, organisations and other government agencies.

Proper planning needs to involve positively shaping the places and communities in which we live, through sustainable development. It strengthens the leadership role of the community, businesses, State government agencies and local government as place shapers and sets out new ideas and opportunities for interconnected social, economic and environmental outcomes.

The DSP is committed to ensuring that sustainability initiatives are met in terms of:

- land and built form development
- resource efficiency
- encouraging business and employment opportunities that are integrated into the surrounding communities and existing business and employment area, including the port.

Four sustainability themes are recommended as cornerstones of Waterloo:

- to encourage current best practice design, technologies and concepts
- to create diversity in employment uses and businesses
- to foster innovation in the planning of industrial parks
- to generate an integrated, connected, efficient and exciting new industrial area that is able to benefit from the accessibility of the location