





NEERABUP INDUSTRIAL AREA

Structure Plan No. 17 | August 2020

NEERABUP INDUSTRIAL AREA AGREED STRUCTURE PLAN (As Amended)

Structure Plan No. 17 Adopted: 11 January 2005

This Structure Plan was prepared under the provisions of Part 9 of City of Wanneroo District Planning Scheme No. 2

ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Wanneroo District Planning Scheme No.2

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

11 JANUARY 2005

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the *Planning and Development (Local Planning Schemes)*Regulations 2015.

Date of Expiry: 19 OCTOBER 2027

August 2020

WAPC Reference: SPN/0813M-3

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Rev 13	20.12.19	DevelopmentWA/Urbis	DevelopmentWA/Urbis	20.12.19
Rev 14	10.08.20	Matt Raymond - element	Matt Raymond - element	

RECORD OF AMENDMENTS MADE TO THE NEERABUP INDUSTRIAL AREA AGREED STRUCTURE PLAN NO. 17

Amendment No.	Description of Amendment	Finally Endorsed by Council	Finally Endorsed by WAPC
2	Makes provisions for some design guidelines applicable to a portion of the Agreed Structure Plan known as Meridian Park and addition of Plan 6 to illustrate the Meridian Park area.	03.06.2008	18.08.2008
3	Realignment of 'Road B' and intersection with Pederick Road.	05.08.2011	12.10.2011
4	Deleting Plan 2 Neerabup Industrial Area Final Surface Contour Plan (Sept 2004) and replace with the updated Plan 2 Neerabup Industrial Area Final Surface Contour Plan (August 2015) - Drawing No.5920-00-SK128 Rev F. Plan 1 and Figure 8.1 being modified to delineate and annotate the 98ha area within the northern part of the site as "Proposed Conservation Areas Subject to Environmental Review" so as to match the delineation and annotation on the Final Surface Contour Plan. Plan 1 and the Final Surface Contour Plan being modified to delineate and annotate the 47ha area within the south eastern part of the site as "Reserve for Conservation". Deleting Figure 6.1 Neerabup Industrial Area Final Surface Contour Plan (Sept 2004) and replace with the updated Figure 6.1 Neerabup Industrial Area Final Surface Contour Plan (August 2015) - Drawing No.5920-00-SK128 Rev F. Amend Part 1 – Statutory Planning Section to align with the Planning and Development (Local Planning Schemes) Regulations 2015. Part 1 following section 11.0 the following section being added: 12.0 Bushfire and	19.12.2016	25 August 2017
5	include Appendix 9 – Bushfire Management Plan (Strategen, June 2017) Make provisions for additional land uses applicable to Lots 1001 and 1021 Greenwich Parade.		20 December 2019

6	Rectify existing mapping anomalies of LSP 17 Map and Figure 8.1 where the 'Service Industrial' and 'General Industrial' designations do not correctly align with the lot cadastral boundaries.		
	Modify the LSP 17 Map and Figure 8.1 to replace the 'Service Industrial' designation for portions of Lot 9006 abutting future Pinnacle Drive (south of Avery Street) with the 'General Industrial' designation such that it is consistent with the City of Wanneroo District Planning Scheme No. 2 zoning map.	9 October 2020	
	On the LSP 17 Map and Figure 8.1, reinstate the 30 metre wide road reserve for the full length of Warman Street.		

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FIGURES

Plan 1	Structure Plan
Plan 2	Final Surface Contour Plan
Plan 3	Indicative Movement Network
Plan 4	Cell Works
Plan 5	Collector Roads
Plan 6	Meridian Park Location Plan

PART 1 - IMPLEMENTATION

1.0 STRUCTURE PLAN AREA

The Structure Plan applies to the land contained within the inner edge of the broken black line shown on the Structure Plan map.

Subject Area

The Structure Plan area comprises approximately 1,000 hectares.

2.0 STRUCTURE PLAN CONTENT

This Structure Plan comprises:

- Implementation (Part 1)
- Explanatory and Technical Appendices (Part 2)

3.0 INTERPRETATION

"LandCorp" means the Western Australian Land Authority.

"The City" means the City of Wanneroo.

"The Scheme" means the City of Wanneroo District Planning Scheme No. 2.

"Deemed Provisions" means Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015'

Unless otherwise specified in this Structure Plan, a word or expression used in this Structure Plan should have the same respective meaning given in the Scheme.

4.0 OPERATION DATE

In accordance with clause 28 of the Deemed Provisions, the approval of the Structure Plan commenced on 19 October 2015.

5.0 RELATIONSHIP WITH THE SCHEME

In accordance with clause 9.8 of the Scheme:

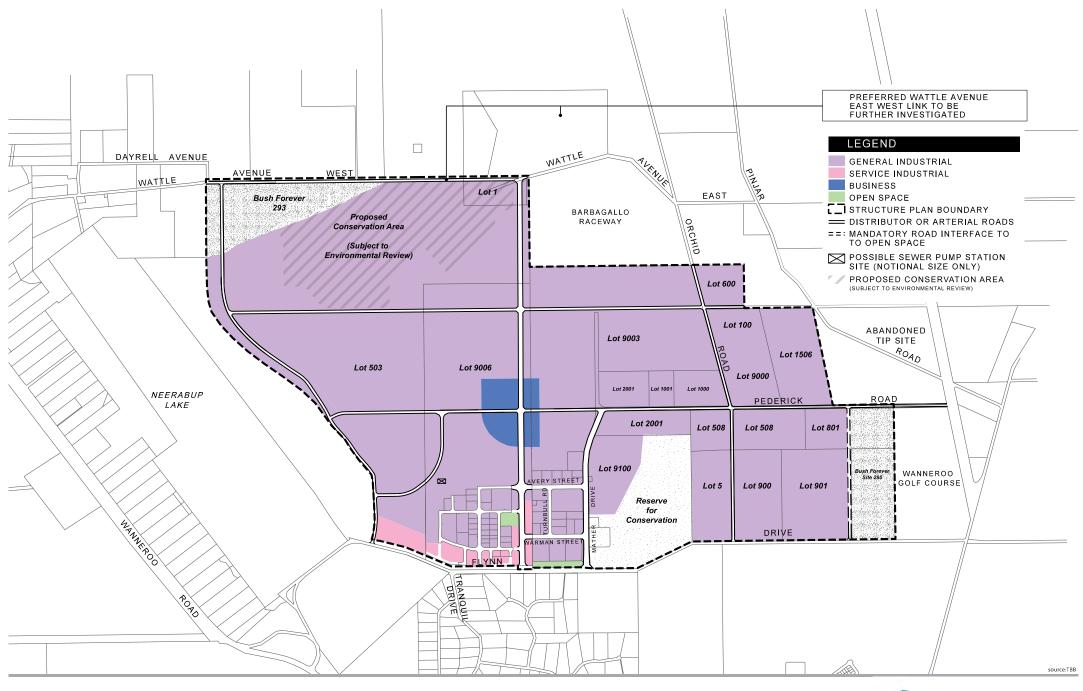
- a) In accordance with clause 27 of the Deemed Provisions, a decision-maker for an application for development approval or subdivision approval within the Structure Plan area is to have due regard to, but is not bound by, the Structure Plan when deciding the application.
- b) Land use permissibility, subdivision and development is to be in accordance with the corresponding Zone under The Scheme, except for the land use Shop in the Business area as per Clause 8.2.3, Part 2 and Lots 1001 and 1021 Greenwich Parade additional land uses as outlined in Clause 14.2, Part 1.

6.0 LOCAL STRUCTURE PLAN MAP

Plan 1: The 'Structure Plan' illustrates the road structure and land use precincts proposed for the Structure Plan area. The map defines the following precincts:

- General Industrial
- Service Industrial
- Business

In addition, an area of $5,000 \, \text{m}^2$ of open space shall be located in or near the Business Park on either Lot 22 or Lot 4.



Plan 1 - Local Structure Plan Neerabup Industrial Area

Date: 15 Sep 2020
Scale: 1:20k @ A3
Drawing No. 715-341 CP-1 A
Staff: MR GW





7.0 SURFACE CONTOUR LEVELS

Plan 2: The 'Final Surface Contour Plan' illustrates the final surface levels which must be achieved prior to subdivision and/or development on-site. Where any resource extraction is undertaken within the Structure Plan area, these levels must be complied with at the completion of extraction.

Council may approve a variation to the Final Surface Contour Plan, if it is satisfied that such a variation:

- complies with the design criteria contained in section 6.5 of the Explanatory Report; and
- will not adversely affect the ability of adjoining properties to conform to the Final Surface Contour Plan.

Council shall not approve any extraction where the proposed final surface level has a vertical separation distance of less than:

- 1.2 metres from Average Annual Maximum Groundwater Level; or
- 2.0 metres from groundwater contours shown in the Water and Rivers Commission Groundwater Atlas: or
- such other distance as approved or required by the Department of Environment Water and Rivers;

whichever is the greater distance.

8.0 MOVEMENT NETWORK MAP

Plan 3: 'Indicative Movement Network', illustrates the internal road structure proposed within the Structure Plan area. This map is indicative and provides a guide to the detail road design. The movement network may be varied subject to Council and Western Australian Planning Commission approval through either the Structure Plan or subdivision process where consistent with principles of **Plan 3**.

9.0 LAND CLEARING

Prior to the clearing of natural vegetation and habitat, Council may require flora and fauna surveys to be undertaken.

If priority or threatened species are identified, the proponent will be required to liaise with CALM to ensure that appropriate management strategies are developed.

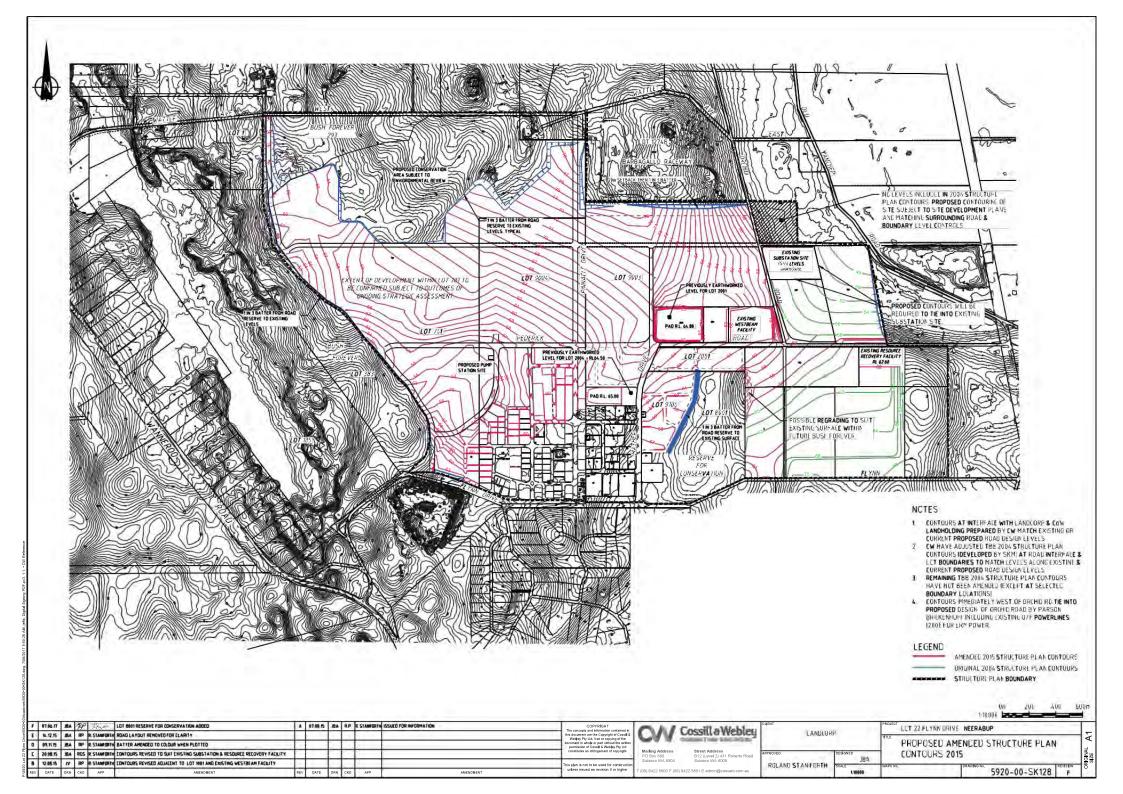
10.0 PINJAR TIP SITE LEACHATE PLUME

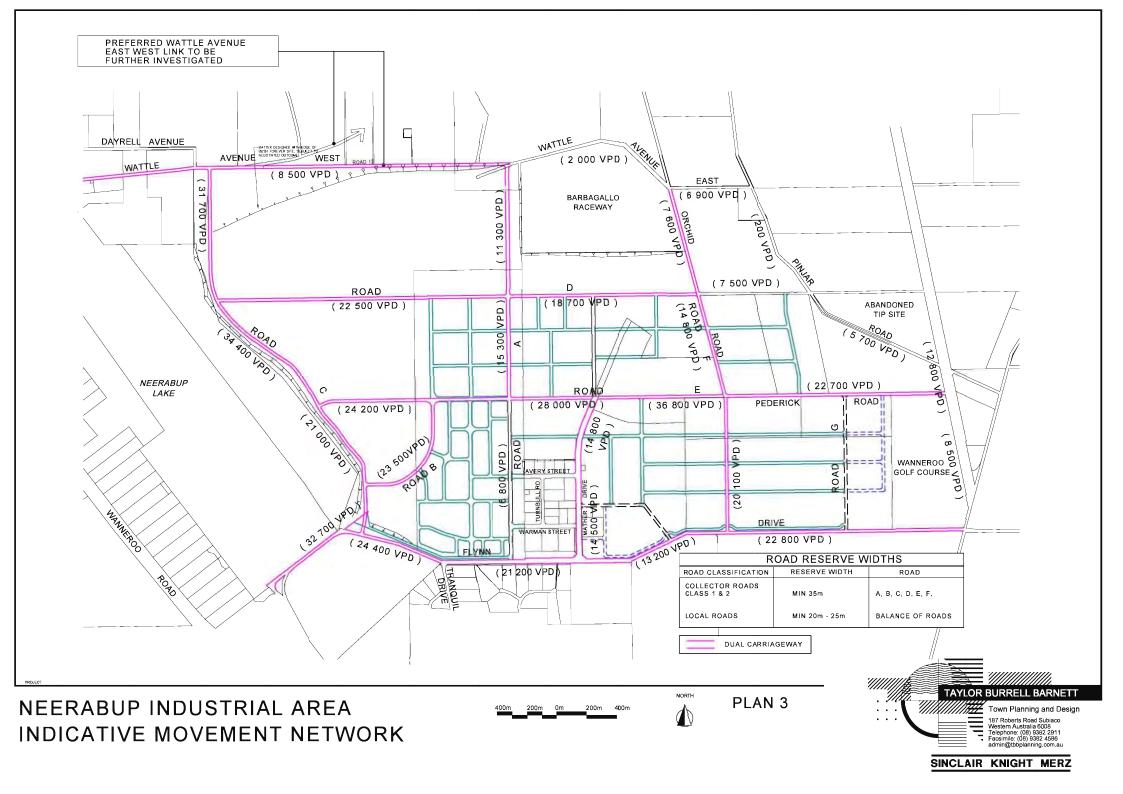
Within the land identified as being affected by the Pinjar Tip Site Leachate Plume in Figure 5.1 of the Explanatory Report, or by such other subsequent study as may be undertaken by Council, conditions will be imposed on any development approval, and recommended on any subdivision application, to ensure that prospective purchasers of land or development are appropriately informed of the potential impacts of the plume.

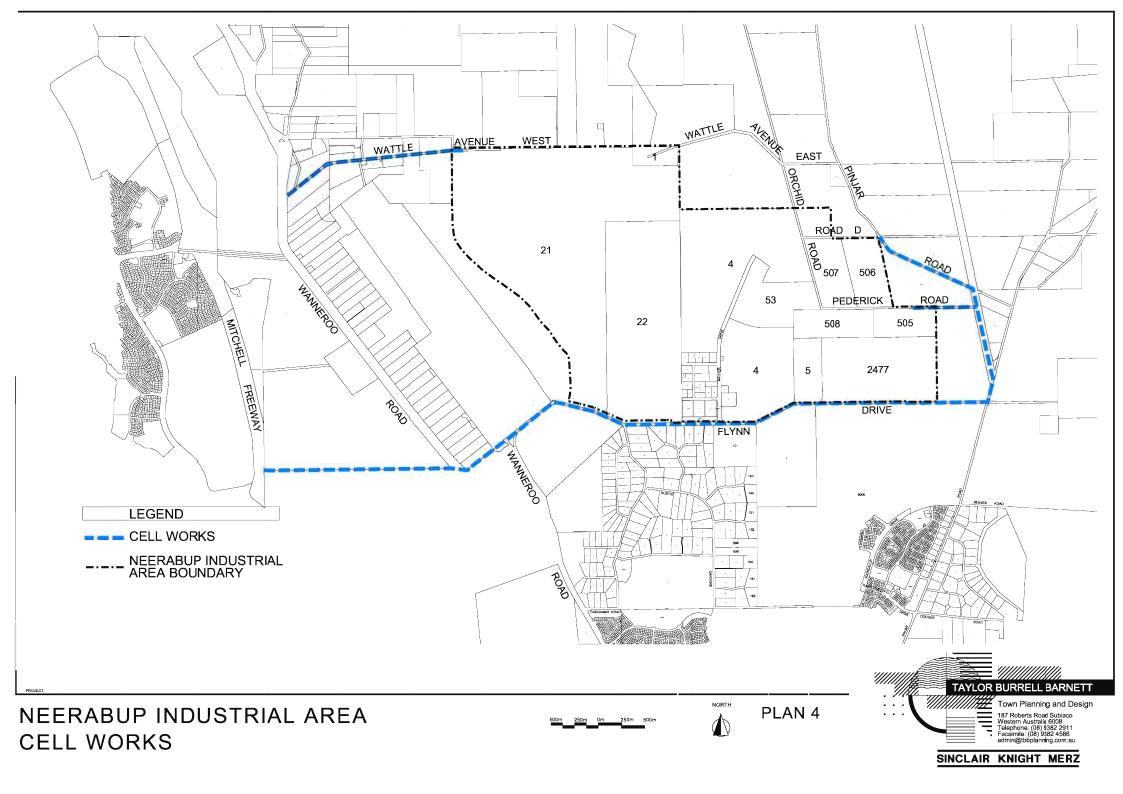
11.0 CELL WORKS

Each owner within the Structure Plan area shall be responsible for contributions towards shared infrastructure costs, referred to as Cell Works. The final details of those infrastructure items for the Cell Works, for example road upgrading and engineering standards and the actual costs shall be determined through a separate Scheme Amendment process, in consultation with the landowners, Council and the Western Australian Planning Commission. Generally however, the contributions shall be in accordance with the principles of this part of the Structure Plan, as outlined below.

- In accordance with the City of Wanneroo DPS the method of apportionment shall be on the basis of each owners proportion of the gross subdividable area.
- 2. The Cell Works shall generally include contributions to:
 - External and internal roads and upgrading as illustrated on Plan 4, including land, earthworks, construction costs and drainage.







- Major road intersection treatment i.e. lights or roundabout.
- Public Open Space.
- Cost of Structure Plan preparation and associated studies and Scheme Amt including Design Guidelines and Landscape Master Plan, Service Concept Plan, Drainage and Nutrient Management Plan and Flora and Fauna Study for strategic roads.
- Administration costs.

In relation to the Flynn Drive extension to the Freeway, Council considers a one-third contribution to be appropriate. The detail of the percentage contribution will be determined in more detail through the Scheme Amendment process.

12.0 BUSHFIRE

An updated Bushfire Management Plan is to be provided with the lodgement of subdivision applications demonstrating compliance with the Bushfire Protection Criteria set out in the WAPC Guidelines for Planning in Bushfire Prone Areas, and having regard to the outcomes of the Bushfire Management Plan (Strategen Environmental, August 2016) provided at Appendix 8 of this Structure Plan report.

13.0 ADDITIONAL PLANS AND GUIDELINES

13.1 Design Guidelines and Landscape Master Plan

Prior to subdivision commencing within the Structure Plan Area, Design Guidelines and a Landscape Master Plan should be prepared, addressing the key elements of the Structure Plan, including, but not limited to:

- Main estate entries;
- The core business area;
- Areas adjacent to the Lake Neerabup Parks and Recreation reserve; and
- Service Industrial areas fronting Flynn Drive.

The cost of preparing the Design Guidelines and the Landscape Master Plan shall be included as a Cell Work under the developer contribution arrangement.

13.2 Service Concept Plans

Prior to subdivision or development commencing within the Structure Plan area service concept plans should be prepared for sewer, water, electric power, drainage, gas and communication services, and such plans should be endorsed by the appropriate government authorities. The concept plans should be based on a total development philosophy and provide a basis for integrating individual developments.

The cost of preparing the concept plans and achieving government endorsements shall be included as a Cell Work under the developer contribution arrangement.

13.3 Drainage, Nutrient and Water Management Plan

Prior to subdivision or development commencing within the Structure Plan area, a Drainage, Nutrient and Water Management Plan should be prepared, and such plan should, if considered necessary by Council, include a contingency plan to ensure the protection of Lake Neerabup.

The cost of preparing the Drainage and Nutrient Management Plan shall be included as a Cell Work under the developer contribution arrangement.

13.4 Dieback Hygiene Plan

Prior to subdivision or development commencing within the Structure Plan area, a Dieback Hygiene Plan should be prepared.

14.0 PROVISIONS

14.1 General Industrial

The permissibility of uses and development shall be in accordance with the provisions of the General Industrial Zone. Notwithstanding the uses permitted under the Scheme, Industry - Hazardous will not be favoured within this precinct.

14.2 Service Industrial

The permissibility of uses and development shall be in accordance with the provisions of the Service Industrial Zone.

If not included elsewhere in this Structure Plan, the permissibility of uses and development should be in accordance with the provisions of the Service Industrial zone.

Lots 1001 and 1021 Greenwich Parade are landmark sites at the entry of the Meridian Park and NIA Stage 1. Recognising the sites' prominence, there is capacity to support a range of complimentary business uses, which are conducive to servicing the Structure Plan area.

In addition to those land uses permitted within the Service Industrial zone under the Scheme, the following land uses are permitted as discretionary uses for Lots 1001 and 1021:

- Office
- Restaurant/Café
- Shop
- Medical Centre
- Take away food outlet

To ensure development is of a scale sympathetic to the local amenity, delivers a local focal point that provides for the daily needs of complementary industrial workforce activities, and does not detractfrom neighboring retail centres, planning decision makers are to have due regard to Table 1 development standards and Clause 16.1 of this Structure Plan, together with Scheme requirements, as well as the relevant matters outlined in Clause 67 of the Deemed Provisions.

Table 1: Additional Land Uses for Lot 1001 and 1021

Land Use	Permissibility	Development Standard
Office	D	Limited to no more than 700sq.m net lettable area (NLA) across both Lots 1001 and 1021 Greenwich Parade.
Restaurant/Cafe	D	Limited to a combined total of
Take Away Food Outlet	D	1,000sq.m NLA across both Lots 1001 and 1021 Greenwich Parade. Individual premises are not to exceed 500sq.m gross floor area per lot.
Medical Centre	D	Limited to no more than 4 health practitioners, and ancillary dispensary premise used to sell goods by retail of a personal and medical nature. The dispensary is to be ancillary to the medical centre and be limited to a total floorspace of 150sq.m NLA across both Lots 1001 and 1021 Greenwich Parade.
Shop	D	Restricted to premises that offers the service and/or retail of mail distribution/collection (post office), baked goods (bakery), hardware/trade supplies, costume and video hire, hire services, banking services (bank) and dry cleaning (laundry). Is not to offer the sale of goods, by retail or hire, unrelated to these services.

Where practicable, co-locating complimentary business services through horizontal and vertical integration, whose ground floor is directly accessible and can be seen from the street or public space which it faces is encouraged to ensure development creates an attractive facade to the street.

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14.3 Business

The permissibility of uses and development shall be in accordance with the provisions of the Business Zone.

14.3.1 Barbagallo Raceway Noise

In relation to land situated within the Raceway Noise Influence Area, as identified in Figure 5.1 of the Explanatory Report, it is possible that some noise sensitive uses may be affected by excessive noise levels if they operate on Sundays.

In the event that Council considers that a proposal involves a use which might be so affected, Council may require the proponent to prepare a suitable noise management strategy, or demonstrate that the use will not be adversely affected by the Raceway activities.

15.0 ROAD SUBDIVISIONAL REQUIREMENTS

All owners shall be required to construct Collector Roads A, C, D, E and F as illustrated in **Plan 3**.

Each owner's proportional contribution shall be generally as outlined in **Table 1** below; this may be in the form of a 100% contribution where it is wholly located on an individual's holding, or 50% where it is shared or merely a road upgrade and there is an existing carriageway and road reservation.

Table 1: Landowners Contribution to Collector Roads

Lot No.	Road (refer Plan 5)	Road Width or Road Widening / Land Required	Comment No.
	A2	35 m	
21	С	35 m	1
	D1	35 m	

Lot No.	Road (refer Plan 5)	Road Width or Road Widening / Land Required	Comment No.
	E1	35 m	
	A1	35 m	
22	D2	35 m	1
	E2	35 m	
	D3	35 m	1
	D4	7.5 m	2
4	E3	35 m	1
	F1	15 m	
	F2	7.5 m	2
	E4	35 m	1
53	E5	17.5 m	2
	F3	7.5 m	2
240	NIL		
5	F5	17.5 m	2
505	E8	7.5 m	2
505	E9	15 m	1
	E7	7.5 m	2
506	E8	7.5 m	2
	D5	15 m	1
	D4	7.5 m	
	E6	7.5 m	
507	F1	7.5 m	2
	F3	7.5 m	
	D5	15 m	1
	E5	17.5 m	1
508	E6	7.5 m	
	E7	7.5 m	2

9

Lot No.	Road (refer Plan 5)	Road Width or Road Widening / Land Required	Comment No.
	F4	17.5 m	1
2477	F5	35 m	2
1	A3	35 m	1

Comments:

- Contribution to land in accordance with the width specified plus 100% contribution to full earthworks, one carriageway and drainage.
- 2 Contribution to land in accordance with the width specified plus 50% contribution to full earthworks, one carriageway and drainage.

Notes:

- a) Refer to **Plan 5** for road numbers.
- All other internal roads will be required as part of standard subdivisional requirements.
- c) This table must be updated where landowners create and sell superlots.

16.0 PROVISIONS RELATING TO MERIDIAN PARK

The following sub-clauses apply to lots created within the area illustrated in **Plan 6** and known as 'Meridian Park'.

16.1 Landmark Sites

Landmark Site(s) shall be identified at the subdivision stage and be subject to a Detailed Area Plan as a condition of subdivision approval. Prior to the clearance of subdivision containing landmark site(s), Detailed Area Plans shall be submitted by the developer for the approval of the City. No development shall commence on a landmark site other than in conformity with an Agreed Detailed Area Plan.

16.2 Parking Provisions

On-street parking, where provided, can be offset against the City of Wanneroo District Planning Scheme No. 2 parking requirements for the adjacent development across the entire site and not for individual tenancies.

16.3 Rainwater Tanks

Rainwater tanks are to be located behind the setback area and integrated into the building or appropriately screened from view of the street or other public space.

16.4 Energy Efficiency

All buildings to comply with Section J (Energy Efficiency) of the Building Code of Australia.

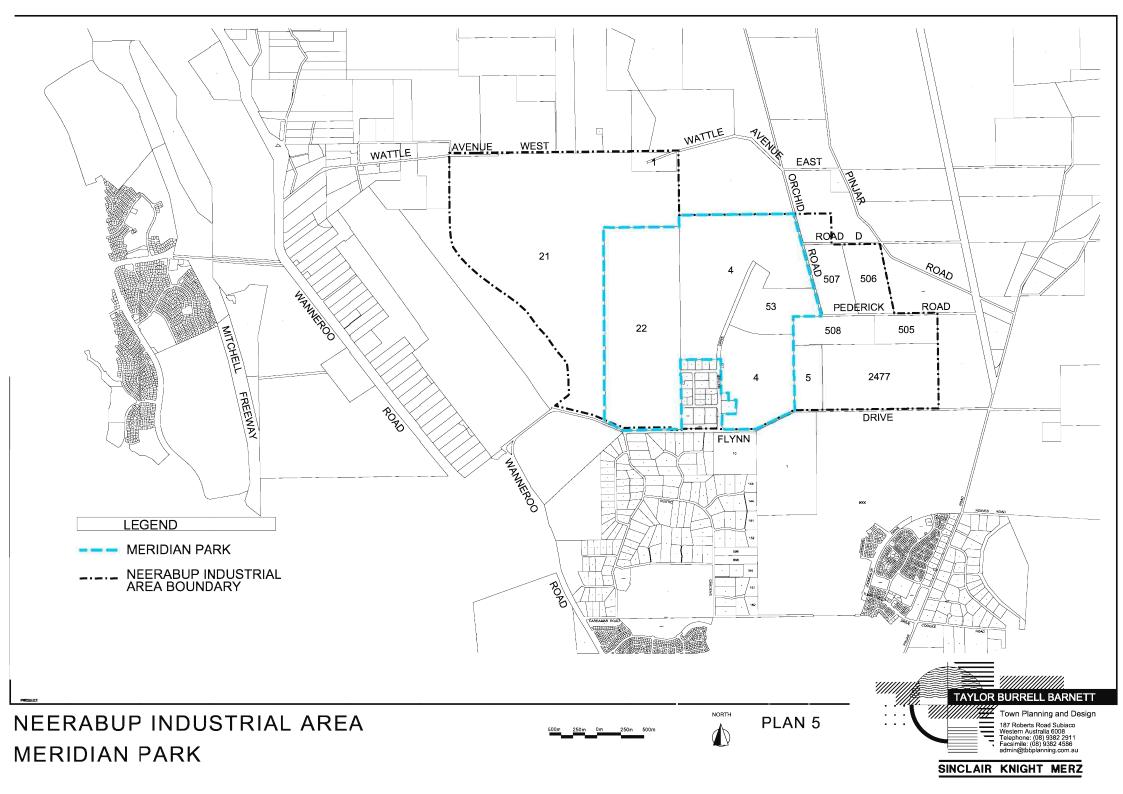
16.5 Fencing

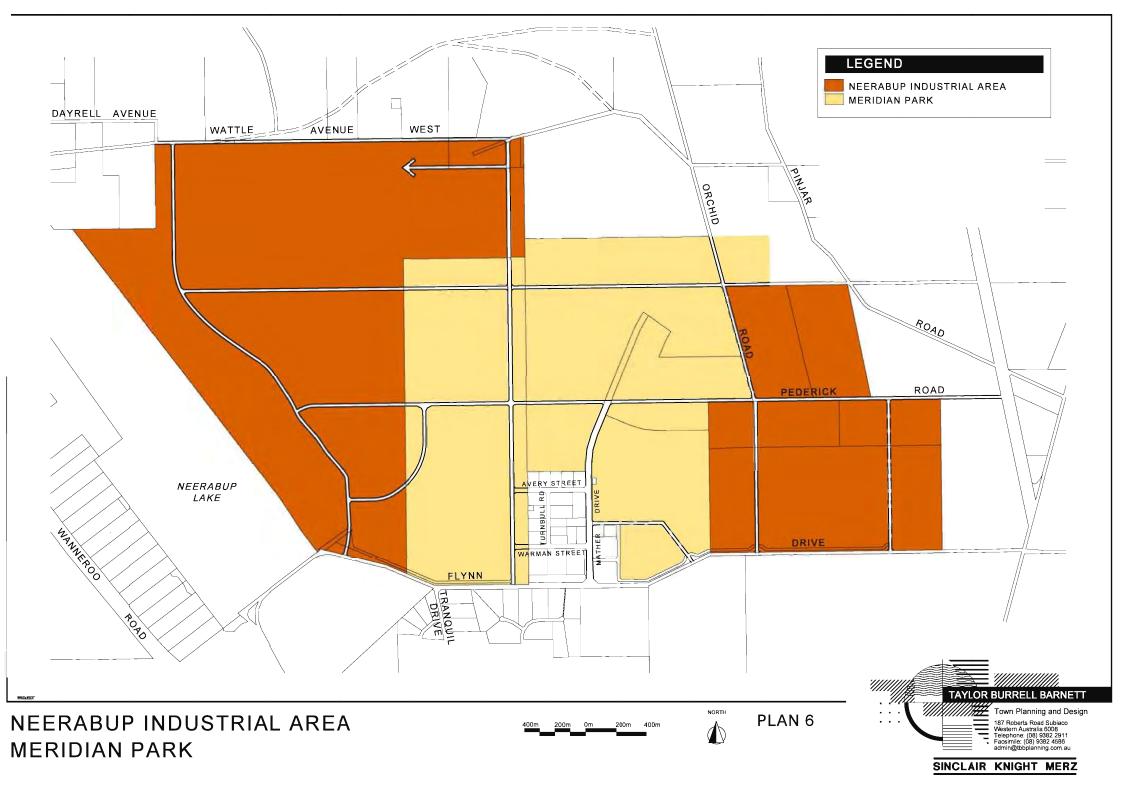
Front fencing shall be 'open style' and integrated with the building where possible.

16.6 Landscaping

Applications for Approval to Commence Development shall include a 'Landscaping Plan' which promotes the use of drought tolerant planting.

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16.7 Glazing

The street elevation of the proposed building is to include a high percentage of glazing to contribute to and activate the façade and complying with the Energy Efficiency provisions of the Building Code of Australia.

16.8 Natural Lighting

Subject to compliance with the Energy Efficiency provisions of the Building Code of Australia, natural lighting should be provided to the uppermost floor area of all buildings by incorporating strategically placed windows and light shelves, light wells and/or awning reflectors to capture light.

- Minimum 50% of the total floor area of all buildings to have access to natural light from skylights, light shelves, light wells and northern glazed windows.
- Minimum of 15% of the total roof area to be fitted with skylights designed, shaded and/or oriented to minimise heat gain during the summer months.
- Minimum 20% of the northern façade to be glazed or provided with openings to allow daylight to infiltrate internal floor areas. Provide awnings or other architectural elements to adequately shade direct summer light. Best Practice Recommendations.

16.9 Inclusion of Blade Walls

The inclusion of blade walls protruding a maximum of 3 metres into the 6 metre front setback area may be acceptable, subject to the main portion of the building being setback behind the 6 metre setback line.

16.10 Architectural Endorsement

All applications for planning approval within Meridian Park Industrial Estate shall be accompanied by an endorsement of LandCorp via its appointed 'Estate Architect'.

PART 2 - EXPLANATORY AND TECHNICAL APPENDICES

1.0 INTRODUCTION

The Neerabup Industrial Area (NIA) represents an opportunity for the development of a strategic General Industrial estate within the North West Corridor. Various proposals for Structure Plans including a Structure Plan review have been prepared for the site with varying outcomes and recommendations. This report represents a synthesis of the previous studies, and further consultation with key stakeholders, to determine the preferred structure for future development. Importantly, this study also assesses the resource extraction areas to determine the preferred ultimate site levels to facilitate industrial development.

The study therefore, produces two outcomes:

- 1. Structure Plan and Report
- 2. Final Surface Contour Plan

The Neerabup Industrial Area Structure Plan and report have been prepared to accord with the requirements of Part 9 of the City of Wanneroo District Planning Scheme No. 2 (DPS2).

The Structure Plan has been prepared by Taylor Burrell Barnett Town planning and design, in conjunction with Sinclair Knight Merz including engineering and environmental inputs. The preparation of the Structure Plan has been informed by consultation with existing landowners and key stakeholders. The consultation process and outcomes is discussed in **Appendix 1**.

1.1 Location

The NIA comprises approximately 1,000 ha of predominantly General Industrial land. The subject land is located approximately 30 km north of the Perth City Centre, and 4 kilometres north east of the Joondalup City Centre. **Figure 1.1** illustrates the location of the subject land.

The study area is bounded by Wattle Avenue and Barbagallo Raceway to the north, Lake Neerabup to the west, Flynn Drive to the south, and Orchid Road/Pederick Road/Wanneroo Golf Course to the east.

The site is strategically located within the North West Corridor with excellent existing and future road linkages.

Overall, the area shows attractive locational attributes for industrial land development within the short term 3-5 years and extending longer term 20-50 years.

1.2 Preliminary Consultation

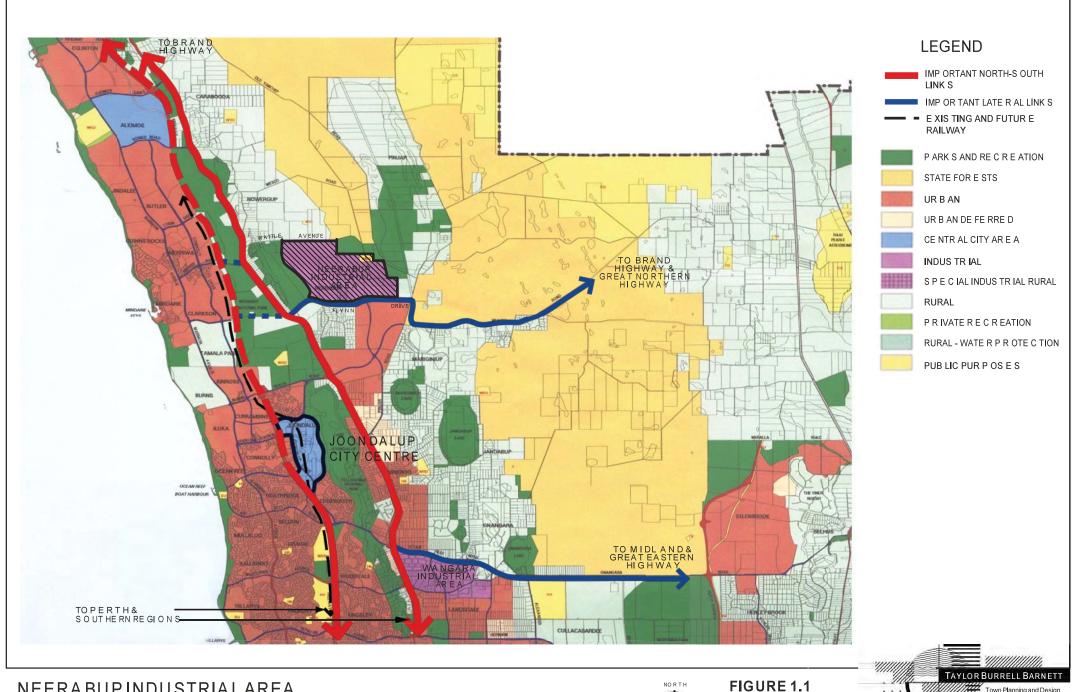
As mentioned, the preparation of the Structure Plan was preceded by a process of consultation with landowners and other stakeholders. Subsequently, a preliminary draft of the Neerabup Industrial Area Structure Plan was circulated to key stakeholders, including the City of Wanneroo, Department for Planning and Infrastructure (DPI), other state government authorities and landowners within the study area.

Some preliminary comments have been received from Council and state government stakeholders and, where appropriate, those comments have been further addressed in the final report.

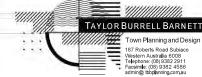
In addition, follow-up consultation with landowners indicated that some further review was required, particularly in terms of development staging, and total extraction volumes. The key outcomes arising from the preliminary consultation with landowners may be summarised as follows:

II) Cockburn Cement, the owner of Lot 21, proposes to develop a lime clinker plant to extract and process the lime resource from within its land holdings, (as well as other land holdings in the Nowergup area to the north). At this stage, Cockburn Cement has indicated that the proposed clinker plant is unlikely to be built within the next 10-15 years. Cockburn Cement have conducted site investigations to determine the extent of resource within their land and the Final Surface Contours reflect the advice received from their investigation.

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Lot 22 (adjacent to Lot 21) will be available for resource extraction for a longer period than originally anticipated (although the existing quarrying activities in the southern portion of the site have now been completed and this area is presently undergoing rehabilitation.

Some landowners in the eastern sector (particularly Lot 5 and Lot 2477) are willing to make land available for industrial development in the short term.

As a consequence of these outcomes, the following key changes were made to the Final Structure Plan:

- i) The detail currently shown over Lot 21 includes the minimum structural elements (in terms of land use, road layout and finished levels) necessary to ensure proper integration between Lot 21 and the balance of the Structure Plan area. The indicative internal road layout is only shown to the boundary of Lot 21 to ensure proper integration between Lot 21 and the balance of the Structure Plan area.
- ii) An increase in the minimum finished surface contours within the eastern sector to reduce extraction timeframes and enable the more timely release of land for industrial development.
- iii) Minor changes to the road structure and staging plan to reflect items i) and ii).

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STRUCTURE PLAN NO. 17 NEERABUP INDUSTRIAL AREA

2.0 RELEVANT STUDIES

2.1 Overview Strategic Planning Documents

Various strategic planning documents have been prepared which specifically address the significance of the Neerabup Industrial Area for Industrial Use. Of relevance is the North West Corridor Structure Plan (Department of Planning and Urban Development 1992).

The Northwest Corridor Structure Plan was prepared to accommodate part of the long term growth of the Perth Metropolitan Region in the North West Corridor. This included examining the need for future housing development, local employment, retail and commercial centres, efficient transportation networks and protection of areas of significant environmental qualities. The Structure Plan identified Neerabup as a strategic industrial area for larger scale industrial activities centrally located to serve the North West Corridor.

2.2 Basic Raw Materials Policy (WAPC July 2000) Statement of Planning Policy No. 10

The Basic Raw Materials Policy has been prepared by the Western Australian Planning Commission (WAPC) to facilitate the extraction of basic raw materials close to the major markets in the Metropolitan Region and to avoid sensitive development close to basic raw materials resources which could otherwise inhibit extraction of the resource. The objectives of the policy are to:

- Identify the location and extent of known basic raw materials resources;
- Protect Priority Resource Locations, Key Extraction Areas and Extraction Areas from being developed for incompatible land uses which could limit future land exploitation;
- Ensure that the use and development of land for the extraction
 of basic raw materials does not adversely affect the
 environment or the amenity in the locality of the operation
 during or after extraction; and

 Provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.

The central and western portion of the Neerabup Industrial Area is identified as a limestone/limesand resource and is identified as a Priority Resource Location being known areas of high resource potential which should be held available for current and future extraction as illustrated in **Figure 2.1**. The eastern portion fronting Flynn Drive is identified as sand resource, again a Priority Resource Location. The basic raw materials policy does acknowledge that this area is also partly constrained by Bush Forever.

Within the NIA, the Basic Raw Materials Policy recognises the need for staged excavation to prepare the site for future industrial use.

2.3 Structure Planning

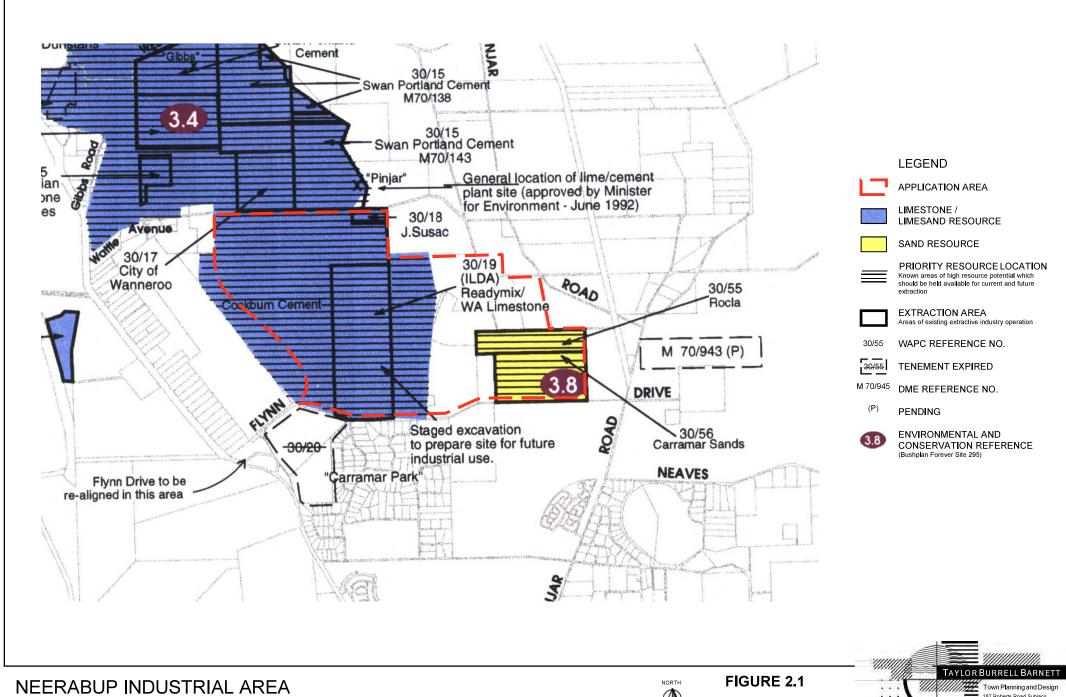
Since 1995, the NIA has been the subject of two separate Structure Plan proposals, and a Structure Plan review. The following is a brief summary of those studies.

2.3.1 Flynn Drive Industrial Area District Structure Plan

The first Structure Plan proposal, the Flynn Drive Industrial Area District Structure Plan (FDIADSP) prepared by Richard Pawluk and Associates et al, comprised a comprehensive overview of the physical environmental characteristics of the site and its environs and proposed a broad Structure Plan identifying the following key elements:

- Strong east/west links to the regional road system, complemented by north/south link roads between Flynn Drive to the south and the extension of Wattle Avenue to the north;
- A relatively permeable notional internal road layout; and
- A variety of land uses, with a predominance of General Industry, complemented by "Garden Industry" Light Industry, Mixed Business and Commercial.

A copy of the FDIADSP is illustrated in **Appendix 2**.



The FDIADSP addressed the key environmental issues, in particular buffer requirements from surrounding residential development as well as the Barbagello Raceway, and the wetland reserve requirements associated with Lake Neerabup.

The FDIADSP also addressed the potential of the area for the extraction of limestone and sand resources. The project engineers for the study, Sinclair Knight Merz, provided indicative finished surface levels, aiming to achieve an optimum between maximising resource extraction, and achieving appropriate surface grades for industrial development.

The report also addressed, in very general terms, the possible staging and servicing of the next stages of development in the short term.

2.3.2 Flynn Drive Structure Plan

In 1998, the City of Wanneroo commissioned the preparation of a new Structure Plan, Flynn Drive Structure Plan (FDSP) encompassing the NIA, and Nowergup and parts of Carabooda to the north, an area encompassing approximately 2,426 hectares, (refer **Appendix 3**).

This plan was prepared by Planwest (WA) Pty Ltd, in association with Bowman Bishaw Gorham and Ewing Engineers. The Structure Plan, as it related to the NIA, proposed a substantially different design philosophy to that promoted by the FDIADSP. In broad terms, the fundamental differences were:

- A stronger north/south emphasis in the road system, which appears to have the disadvantage of encouraging regional industrial traffic through residential areas to the south with less direct movement of such traffic onto the surrounding regional road system;
- The internal road system which, whilst only notional, was not as permeable and efficient for industrial traffic as the original FDIADSP: and
- Proposed less General Industrial land to be created.

2.3.3 Neerabup Industrial Area Structure Plan Review

An independent review was commissioned by LandCorp and undertaken by SMEC Australia, with the primary aim being to review the two previously mentioned Structure Plans, and to present recommendations on the most appropriate direction to progress planning to the next stage. A copy of the plan is illustrated in **Appendix 4**.

In presenting recommendations, the SMEC report indicated a clear preference for the original FDIADSP based on the following reasons:

- It provided a legible and regular road circulation system that discouraged the potential intrusion of industrial traffic into adjoining residential areas.
- The reliance on the use of existing roads such as Flynn Drive and the extension of Wattle Avenue provided further efficiencies for the development of the area.

It offered a pragmatic approach to one of the key objectives for the area, being the facilitation of the early release of industrial lots.

The SMEC report also identified a number of emerging issues which were significant to the NIA Structure Planning exercise. These included:

- The State Government's Bushplan initiative (now Bush Forever);
- Changing philosophies for regional road planning which encouraged permeability at the risk of introducing industrial traffic into residential areas;
- Management of noise and risk issues associated with development abutting motor sport venues; and
- The reduction of the reserve of General Industrial land held in estates through the region by the intrusion of Commercial and Mixed Business type uses.

The SMEC report recognised the ongoing importance of Basic Raw Materials policy as an interim factor in achieving the end objective of creating a high quality and modern industrial estate.

3.0 EXISTING ZONING & TENURE

3.1 Metropolitan Region Scheme Zoning

The Neerabup Industrial Area is predominantly zoned Industrial under the provisions of the Metropolitan Region Scheme (MRS). The only exception to this is a Public Purposes reserve in the north-eastern corner. It has now been determined that this reserve is no longer required (refer Section 5.8). The WAPC has recently initiated an amendment to the MRS to rezone the land to Industrial. The proposal is contained in Amendment No. 1037/33 North West Districts Omnibus No. 5, which commenced advertising on 11 December 2001.

Flynn Drive, forming the southern boundary of the Structure Plan, is an Other Regional Road Reservation. Lake Neerabup abutting the site to the west is included within Parks and Recreation Reservation, as is the western part of Lot 21. To the northeast abutting the site, there are various motor sports venues, which are also contained in Parks and Recreation Reservation.

The zoning and reservations for the land are identified within Figure 3.1.

3.2 Local Zoning

The land is subject to the provisions of the City of Wanneroo District Planning Scheme No. 2 (DPS 2), under which it is predominantly zoned Industrial Development. **Figure 3.2** shows existing zoning under DPS 2.

This zone is intended to facilitate future industrial development and provide for the comprehensive planning of larger areas for industrial and employment purposes.

A key feature of the zone is the requirement that a Structure Plan be prepared and adopted, prior to any development or subdivision, to form the basis for consideration of all future subdivision and development proposals.

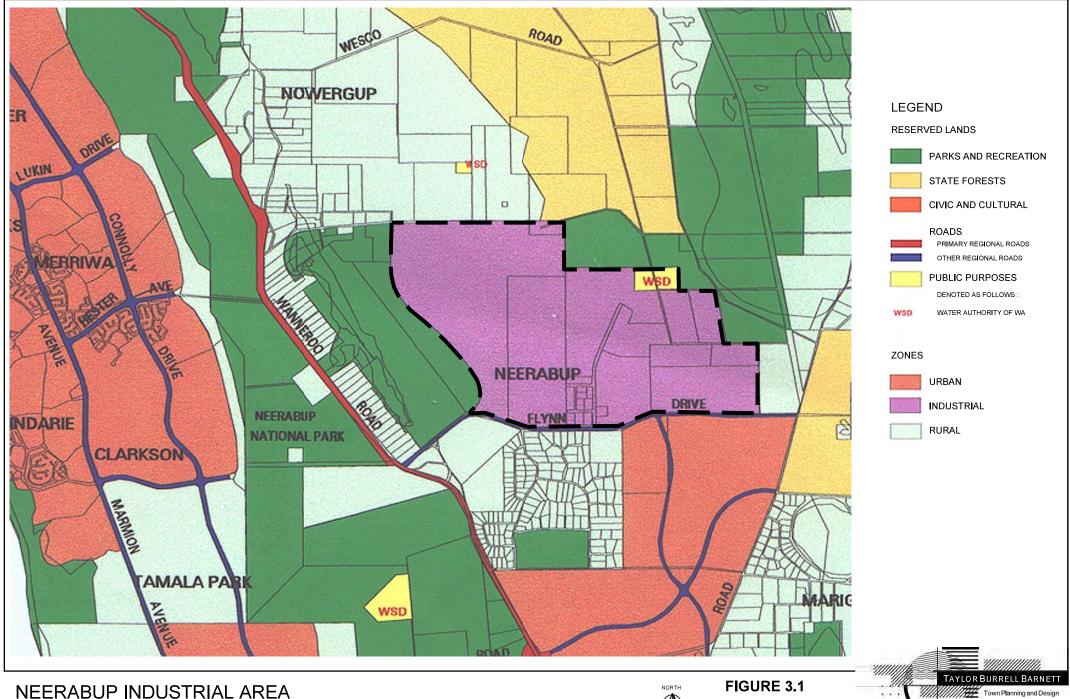
The major part of Lot 22 and the existing Mather Drive industrial area is zoned General Industrial, which is a continuation of a similar zoning under the previous Town Planning Scheme No. 1.

Consistent with the MRS, there is a Public Purpose reservation in the north-eastern corner of the site. When the MRS amendment (referred to in Section 3.1) is completed, the Public Purpose reservation under DPS 2 will be automatically removed, leaving the affected land unzoned. It will be necessary to undertake a subsequent amendment to the local scheme to apply a zoning consistent with the MRS. Given the zoning already applying to the balance of the study area, it would be appropriate to rezone the land to Industrial Development zone.

3.3 Current Land Ownership

The most recent land ownership is illustrated in **Figure 3.3**. The majority of the land is under private ownership although about 40% is owned by LandCorp and the City of Wanneroo.

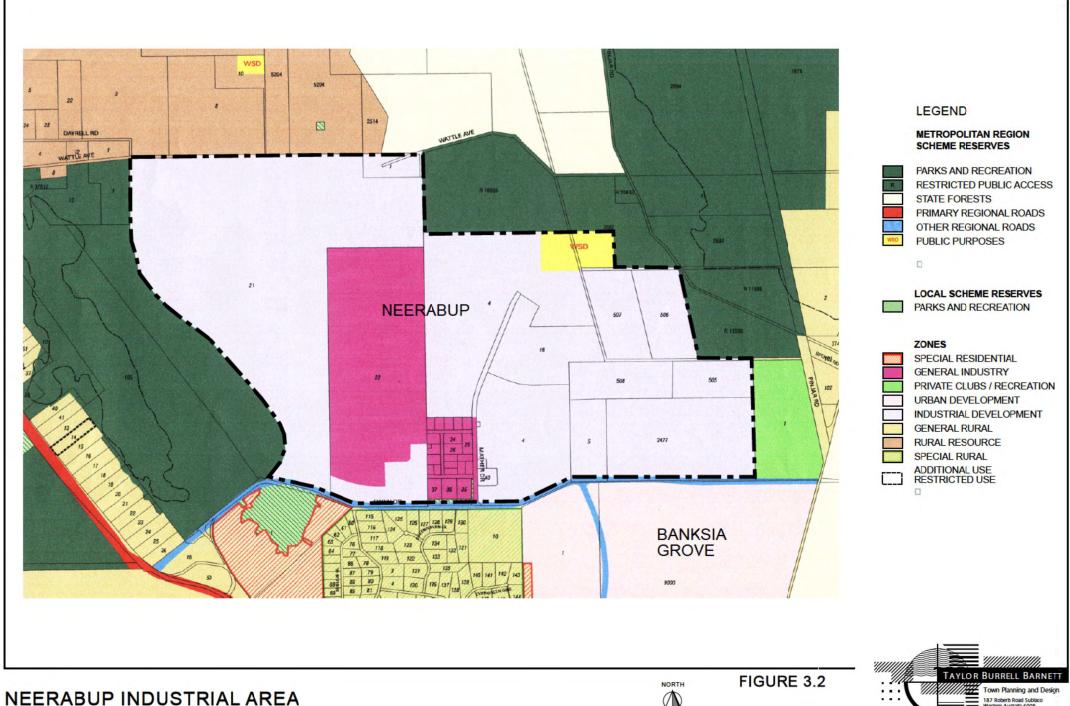
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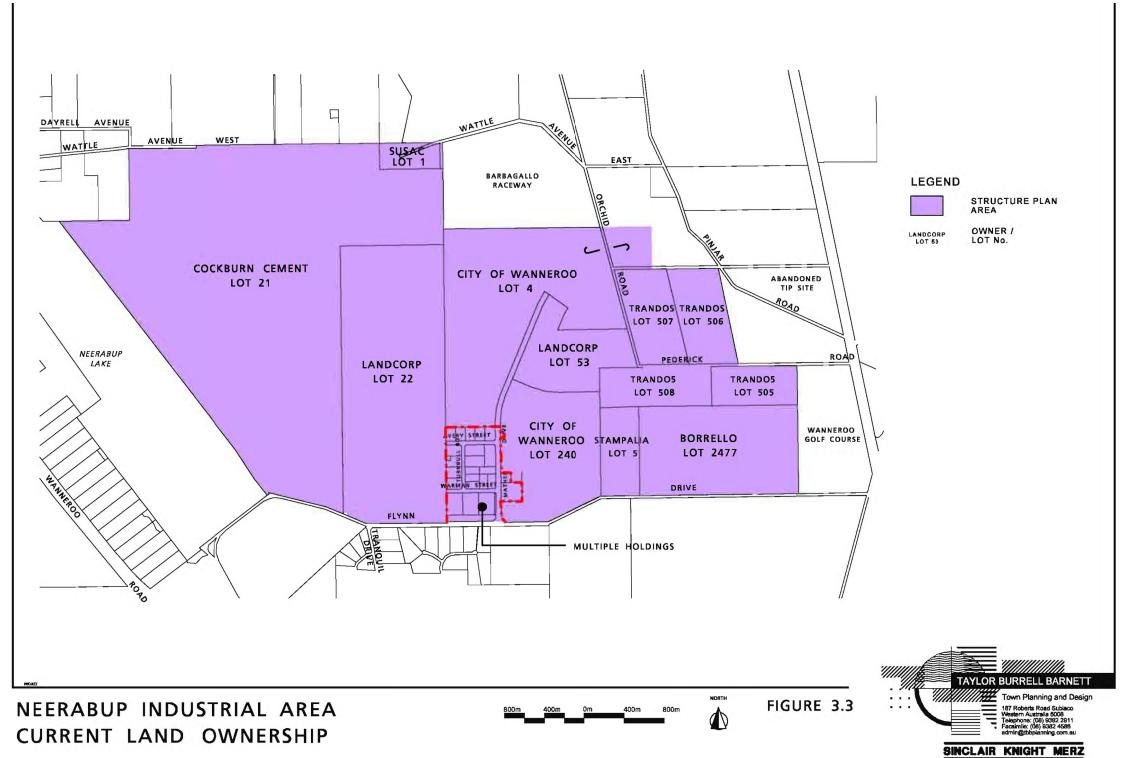
MRS ZONINGS











4.0 SITE DESCRIPTION

4.1 Overview

The Neerabup Industrial Area is strategically located in close proximity to existing and future transport routes.

To the southeast of the NIA, significant future residential development is proposed within the urban cell known as Banksia Grove. Residential estates along the coastal strip of the North West Corridor (including the suburbs of Clarkson, Merriwa, Kinross, Mindarie) are currently developing approximately 3 km to the west of the Industrial Area (refer **Figure 1.1**).

4.2 Movement Network

4.2.1 External Road Network

4.2.1.1 Existing Road Network

The Neerabup Industrial Area is bounded to the south by Flynn Drive, which links Wanneroo Road in the west to Pinjar Road in the east. Pinjar Road in turn links to Neaves Road, which provides the most direct link to the east and the Great Northern Highway at Bullsbrook. Access to the south and north is currently provided by Wanneroo Road, which in turn also provides access to the Mitchell Freeway either at Hodges Drive or Ocean Reef Road.

To the west, indirect links to Marmion Avenue are via Quinns and Hester Roads and Burns Beach Road to the south. The Mitchell Freeway currently ends at Hodges Drive.

Wattle Avenue East and West currently provide access to north of the site from Pinjar Road and Wanneroo Road respectively. Wattle Avenue, however, does not connect to provide through access from Pinjar Road to Wanneroo Road. Whilst previously contemplated, the connection of Wattle Avenue East and West is not considered to be a requirement of the Structure Plan as Road A will provide better permanent access arrangements for the Barbagallo Raceway which has been experiencing traffic congestion problems during major events. At present the only permanent public road access to the

Raceway is from Wattle Avenue East; however, the City has recently permitted the Raceway to construct a temporary access road from Mather Drive, which alleviates, at least temporarily, the existing traffic problems.

4.2.1.2 Future Road Network

A number of road proposals have been identified in the Metropolitan Region Scheme and North West Corridor Structure Plan. Of relevance to this Structure Plan are the following:

Metropolitan Region Scheme Roads

- An east-west regional road connection between Neaves Road and Burns Beach Road south of Flynn Drive (classified as an "Other Regional Road").
- ii) A north-south regional road connection between Pinjar Road (at Clarkson Avenue) and Flynn Drive east of Mather Drive (also an "Other Regional Road").
- iii) A realignment of Flynn Drive at the western end and the inclusion of Flynn Drive on the MRS as an Other Regional Road.
- iv) An MRS amendment was prepared for the following:
 - Mitchell Freeway extension from Burns Beach Road to Romeo Road (as a Primary Regional Road)
 - Neerabup Road between Wanneroo Road and Mitchell Freeway ("Other Regional Road")
 - Hester Avenue between the Mitchell Freeway and Wanneroo Road ("Other Regional Road")

North West Corridor Structure Plan Roads

- A connection of Wattle Roads East and West to create an "Other Regional Road", between Wanneroo Road and Pinjar Road (forecast to carry 5,000 vpd).
- A north-south link on the western boundary of the Neerabup Industrial Area.

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- An east-west link through the centre of the Neerabup Industrial Area, linking the previous proposal and Pinjar Road.
- A north-south road through the centre of the Neerabup Industrial Area between Flynn Drive and (ultimately) linking into Wanneroo Road just south of Pipidinny Road (forecast to carry 15,000 vpd).

These last four proposals are viewed as probable long term roads in the North-West Corridor Structure Plan.

The suitability of the above roads was outlined in the traffic report for the FDIADSP. These reasons are still valid and discussed further below:

Neaves Road - Burns Beach Road

Provides an important east-west strategic link between the future Mitchell Freeway and future development in the North-East Corridor.

Neerabup North-South Road

Provides a district distributor road connection at an appropriate offset from and parallel to Wanneroo Road for residential and industrial traffic accessing Joondalup (an important commercial and employment centre) via Burns Beach Road and destinations to the south-east via Wanneroo Road, Hepburn Avenue and the Tonkin Highway.

Wattle Avenue

Wattle Avenue west forms a district distributor road link facilitating movements between the northern part of the industrial area and the Mitchell Freeway via the proposed east-west link (Hester Avenue). It is intended to extend Wattle Avenue West to the north along the edge of the Bush Forever site to then ultimately link with Orchid Road or Wattle Avenue East. This will primarily facilitate access to developments north of Wattle Avenue. As previously mentioned in section 4.2.1, Mather Drive and Road A will provide alternate access to the Barbagallo Raceway which is of considerable concern to the Western Australian Sporting Car Club.

Neerabup Road - Flynn Drive Connection

This link is considered important as the main access link from the industrial area to the Mitchell Freeway. It also provides a link to the east and to the Great Northern Highway via Pinjar Road and Neaves Road.

4.3 Geology

Existing geological knowledge of the Neerabup Industrial Area (NIA) is limited to surface geological mapping by the Geological Survey of Western Australia (Yanchep and Muchea 1:50,000 Environmental Geological Series). In addition, bore logs provided by the Water and Rivers Commission for the Flynn Drive Structure Plan identified one borehole in the southern portion of the study area and two at the northern edge. At the southern bore, karstic limestone was encountered at heights of 20-70 metres AHD and depths of 0-65 metres below ground level. Karsts were recorded at up to 35 metres above the water table.

The geology map divides the area into two types of Tamala limestone:

- Ls1 A light yellowish brown, fine to coarse grained, sub-angular to well-rounded quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of Aeolian origin.
- Ls2 As Ls1, abundant karstic phenomena including caves, dolines, swallows.

The Tamala limestone is a sandy limestone deposited in the Pleistocene and of Aeolian origin. It was probably laid down in dunes and resolution of shell fragments caused it to become variably cemented. Generally the surface above the Tamala limestone is characterised by a deeply leached sand from which the carbonate has been removed often to be deposited on the underlying limestone surface as a hard calcrete layer. In some cases the solution of carbonate may continue to depth creating karstic cavities particularly where the limestone has more carbonate cement. This effect is unpredictable.

The division in the mapping appears arbitrary and based purely on surface expression. It is unlikely that there are separate units with one liable to developing karst and one without karst features. The Tamala limestone is likely to develop karstic cavities and the most likely areas for these to have developed are where there are other cavities/caves in the local area.

Therefore, the presence of caves in the vicinity of the NIA is considered to indicate that there may be further undiscovered caves within the study area. Some 15 kilometres to the north extensive caves are developed into similar rocks in the Yanchep National Park. In the Margaret River area caves again in similar material have remained undiscovered until relatively recent times.

4.4 Surface Hydrology/Wetlands

There are two wetlands mapped within the vicinity of the NIA, Lake Neerabup and Lake Pinjar. Both are protected by the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* refer **Figure 4.1**. The EPP protects these wetlands from mining, drainage, effluent disposal and filling (SMEC 1999). Both of these lakes have multiple management categories prescribed by the Water and Rivers Commission (WRC) and each category will cover different areas around each lake.

Lake Pinjar is located to the east of the NIA with only a small area contacting the boundary of the Structure Plan area. The open water of the lake and its adjacent bushland cover an area of approximately 735 ha. The WRC management objectives include some areas that have been set aside for Conservation and others for Multiple Use. The Australian Heritage Commission lists Lake Pinjar as an Indicative Place.

Neerabup Lake, the smaller of the two, is situated along the western boundary of the site. It covers an area of 242 ha, bushland inclusive. The WRC management objectives are for Conservation and also for Resource Enhancement, that is, the restoration and enhancement of natural attributes and functions through maintenance and management.

Previously a 250m buffer zone was recommended between the eastern shore of the lake and the NIA (Pawluk & Associates et al, 1995). This buffer zone lies within the existing MRS alignment, which was confirmed as adequate for the protection of Lake Neerabup and its representative habitats (SMEC, 1999).

4.5 Hydrogeology

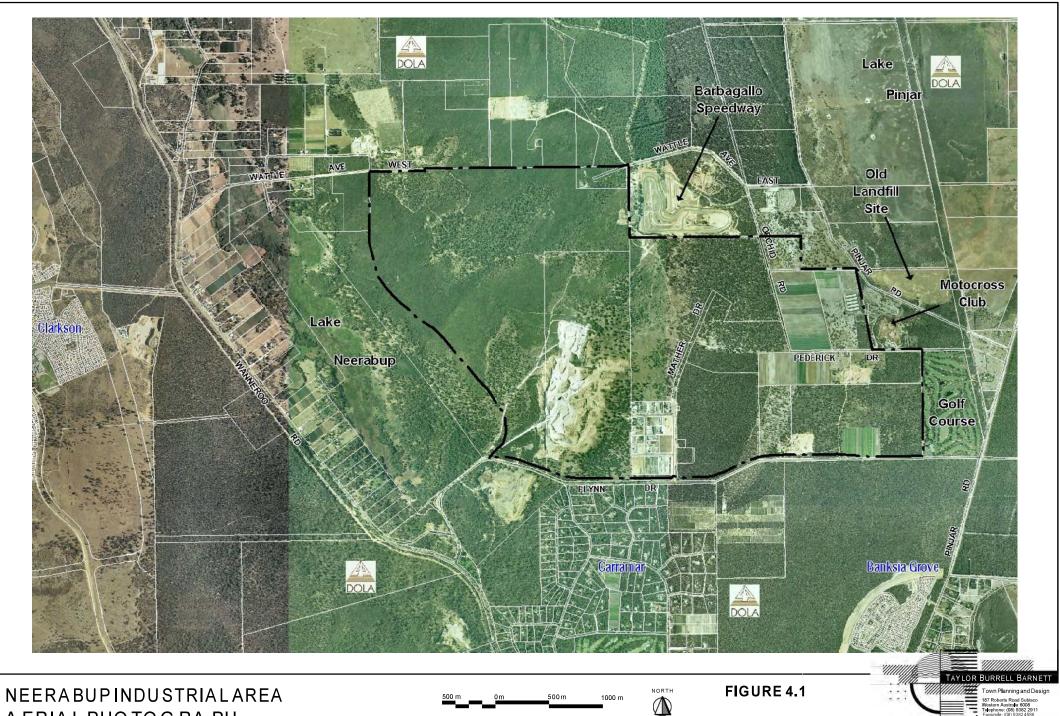
It is estimated that there is a strong westerly flow of groundwater beneath the NIA, due to the high transmissivity of the limestone soils and also the relatively steep gradient in Average Annual Maximum Groundwater Levels (AAMGLs) (Planwest et al., 1999).

The NIA falls within a proposed Priority 3 Protection Area of the Perth Underground Water Pollution Control Area (refer **Figure 4.2**). General and light industry are compatible land uses within Priority 3 Protection Areas, however heavy industry and power stations are not (Planwest *et al.*, 1999). Under the Priority 3 requirements, the NIA would need to be provided with deep sewerage (Planwest *et al.*, 1999). To the north-east and east of the NIA are existing Priority 1 and 2 Source Protection Areas, which prohibit any industrial land uses.

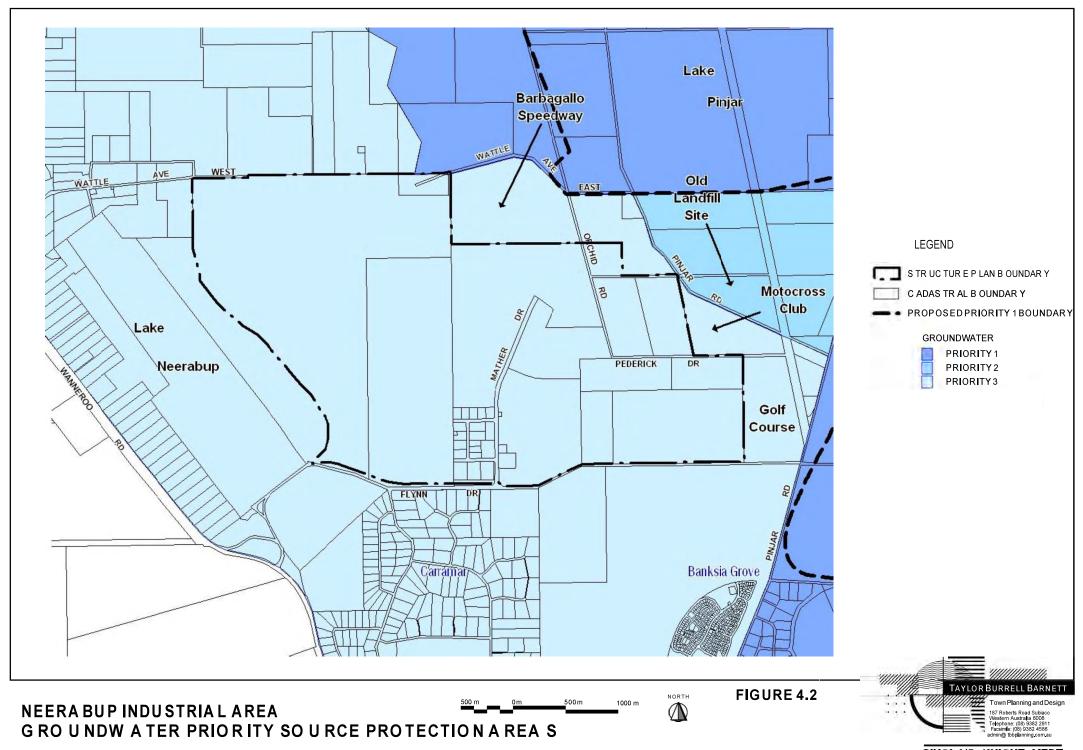
The Draft Gnangara Land Use and Management Strategy (1999) proposes a change in the boundaries of the Priority 1 Source Protection Area, however this does not affect the proposed Priority 3 status of the NIA.

There is an abandoned putrescible landfill site located immediately east of Pinjar Road (refer **Figure 5.1**) below which a plume of leachate is spreading west towards the NIA (City of Wanneroo, pers. comm.). The landfill was previously operated by the City of Wanneroo and has been closed since the mid-eighties. Sampling of groundwater quality has been undertaken, and it is estimated that the leachate plume may extend as far west as Orchid Road (City of Wanneroo, pers. comm.). The presence of the plume should not prevent most industries from operating within the NIA, as the estate should be serviced with reticulated water, however it does present an issue of future liability for the future industries. This liability will need to be fully disclosed between the industries, landowners/developers and the City of Wanneroo.

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SINCLAIR KNIGHT MERZ

STRUCTURE PLAN NO. 17 NEERABUP INDUSTRIAL AREA

5.0 OPPORTUNITIES & CONSTRAINTS

The site is characterised by a number of issues which are relevant in the Structure Plan formulation process and may ultimately influence the design outcome. The following is a summary of the key issues, many of which are also graphically depicted in **Figure 5.1**.

5.1 Air Quality

Air quality constraints are related to the potential impacts of industry on nearby areas in terms of emissions from stacks, odours and also the generation of dust. Given the typical industries to be established within the NIA, emissions should not be an issue (this is more related to heavy industry). Similarly, most general and light industry should not create odours. The soils in the area are typically medium to coarse grained sands, thus the potential for dust generation is low (Pawluk & Associates et al., 1995). Dust may still be generated from on-site stockpiles, unpaved access roads, and also stack emissions.

In the event that an industry is proposed that is likely to generate potential impacts due to emissions, modelling of the emissions or odours would occur as part of the approvals process, and an acceptable placement of the particular industry determined from the results. Emission reduction measures may also be required to satisfy air quality standards.

5.2 Noise

5.2.1 Noise From Barbagallo Raceway

The issue of potential noise impact from the Barbagallo Raceway has been the subject of ongoing consultation with the Department of Environmental Protection (DEP). Under the Environmental Protection (Noise) Regulations 1997, noise levels considered tolerable for industrial land uses should not exceed 65 dB(A). DEP advice indicated that acoustic modelling based on a major raceway event (Australian Touring Car Championships) placed the 65 dB(A) noise contour at approximately 1500m from the Raceway Boundary. The most recent written advice from the DEP in this respect is contained in **Appendix 5**.

In summary, the DEP acknowledges that most land uses proposed to be accommodated within the NIA will not be adversely affected by noise from the Barbagallo Raceway, primarily for two reasons:

- General Industrial uses are not considered to be noise sensitive premises; and
- The main high noise generating events at the raceway occur on occasional weekends, when most of the industrial and associated uses are closed.

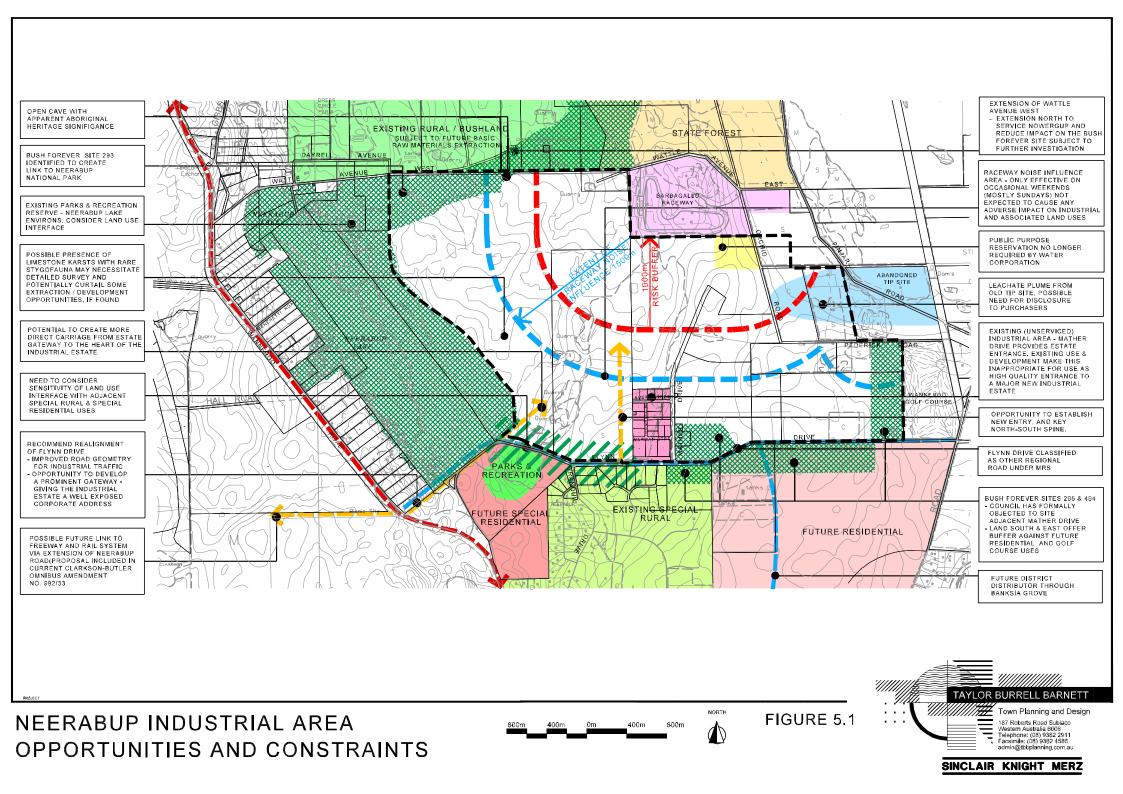
The DEP advice listed some land uses which may be regarded as noise sensitive and therefore possibly not suitable within 1,500 metres of the raceway; those uses included auction rooms, landscape supplies, vehicle sales/hire, convenience stores, service station etc. These uses are, in any case, generally considered inappropriate within the General Industrial area, however they may be suitable within the Service Industrial areas or the Business core. Parts of these precincts are proposed to be located closer than 1,500 metres from the raceway.

If the DEP advice were strictly applied, therefore, there are some uses within the Service Industrial, and Business precincts which could be considered unsuitable within 1,500 metres of the raceway, if such uses operated on the weekends.

Recent enquiries with the management of the Barbagallo Raceway have indicated that, apart from the Australian Touring Car Championship, the other events likely to generate high noise levels are club meetings which are generally held on one Sunday per month, with a total of eight events per year.

Based on this advice from the Raceway, it appears that the potential for conflict between the raceway and possible noise sensitive premises within the NIA is likely to be primarily confined to Sundays, and only on nine occasions per year. Whilst some businesses may be operational at sometime during the weekend, few would be open on Sundays, and therefore the frequency of potential conflict is minimal.

In summary, it is considered that a 1,500m noise contour may be overly conservative. Furthermore, given that the potential impact would generally be confined to eight Sundays per year the possibility of a noise conflict occurring at any distance is likely to be negligible.



More recent discussion with the DEP indicates that the Department agrees that even noise sensitive uses are likely to be permissible at a closer distance from the Raceway (eg, within the Service Industrial and Business Precincts) in view of the special factors noted above.

If this is accepted, it would also give continued flexibility for the raceway to occasionally exceed the 65 dB(A) noise limit specified by the DEP.

5.2.2 Noise from NIA Industries

Industrial noise has the potential to cause an adverse impact on residential amenity in circumstances where industrial and residential developments are placed in close proximity. It is therefore important to ensure that this issue is properly addressed through the planning process so that the development potential of strategic industrial areas such as Neerabup is not constrained by urban development. The onus of protection should, in some part, fall upon the urban developer to minimise potential land use conflicts in the future.

Given the strategic importance of the NIA, suitable separation needs to be maintained between the future northward expansion of the Neerabup Urban Cell (Banksia Grove) and the Industrial Development zone. This would be partially achieved through the retention of Bush Forever site 295 which would preserve a buffer of approximately 300 metres. In addition, consideration should be given to the use of memorials on titles notifying residential purchasers of their proximity to a strategic industrial area.

There is also merit in exploring the potential of applying for a Regional Factor under the Environmental Protection (Noise) Regulations 1997, following the precedent set by the Kemerton Industrial Park south of Perth. The Kemerton Industrial Park, in accordance with Schedule 3 clause (5) of the Regulations, has a Regional Factor assigned that allows noise emissions to be 5 dB(A) above the assigned noise levels under the Regulations.

5.3 Risk

Certain industries may pose a health or safety risk to the public, and the DEP has advised that this is of particular concern considering the numbers of people attending the Barbagallo Raceway (DEP, 1999). The DEP has advised that industries which pose an off-site risk (eg through storage of dangerous or hazardous goods) should be established at least 1,000m away from the raceway (DEP, 1999).

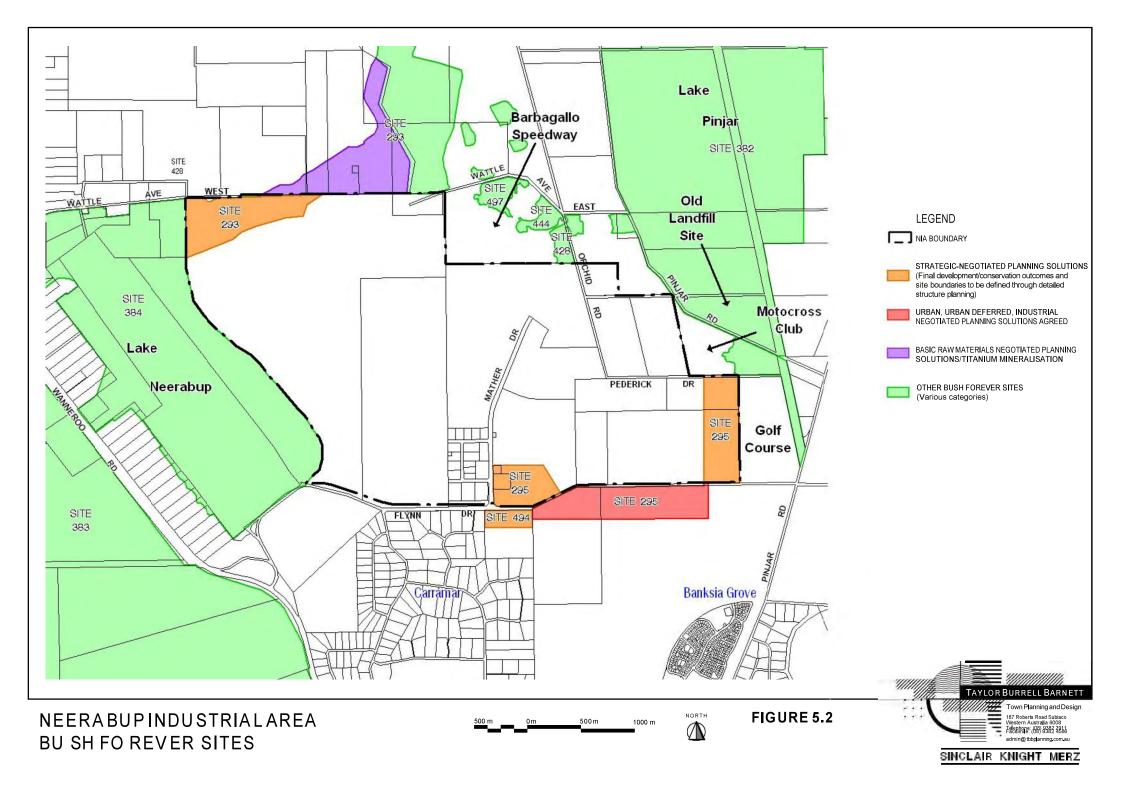
This is not considered to present any significant constraint as industries which pose such levels of off-site risk would, in any case, typically be unacceptable in a general industrial estate.

5.4 Flora, Fauna and Vegetation

5.4.1 Bush Forever Sites

In response to advice from the Minister for the Environment, the EPA has endorsed the Bush Forever strategy as a way forward for the Government to preserve regionally significant native vegetation within the Swan Coastal Plain area of the Perth Metropolitan Region. Two Bush Forever sites have portions that lie within the proposed NIA (Figure 5.2) site 293 in the north-west corner, and site 295 along the eastern and southern boundaries. The combined area of the two sites within the NIA is 89.82 hectares, or approximately 9% of the total area of the NIA. Bush Forever suggests that both sites represent significant conservation values in terms of biological diversity, ecological patterns, processes or communities, and are also representative of rare vegetation complexes.

• Site 293 in particular is in conflict with the linking of the east and west parts of Wattle Avenue, which is of strategic importance not only to the NIA but also to provide a vital alternative access route for the Barbagallo Raceway. Only 14.7% of this Bush Forever site's area (39.6 hectares) lies within the NIA. The linking of Wattle Avenue East and West, however, will need to recognise the site's function as a corridor between Lake Neerabup (site 384), a threatened flora community located north of the NIA, and State Forest areas located north-east of the NIA (Planwest et al., 1999; SMEC, 1999). This may be achieved through sensitive road design, including grade separated fauna links.



Site 295 includes areas identified as habitat for the rare bee
 Hylaeus globuliferus (see section 5.4.3 below). 42.5% of this
 site's area (50.2 hectares) lies within the NIA.

Both of the sites are identified by Bush Forever as containing areas intended for development, either through zoning or leases. Bush Forever recommends that conservation of the two sites be encouraged through consultation with the landowners.

In addition to sites 293 and 295, there are a number of Bush Forever sites adjacent to or near the NIA:

- i) Site 384, comprising Lake Neerabup and the bushland immediately west of the NIA, which connects to site 293;
- ii) Site 382, comprising Lake Pinjar and Site 494 West Flynn Drive Bushland, which connects to site 295; and
- iii) Sites 428, 444, 457 and 455, comprising remnant bushland in the vicinity of the Barbagallo Raceway.

5.4.2 Rare flora

Searches of the Department of Conversation and Land Management (CALM) Rare and Priority Flora Database and the WA Herbarium Specimen Database found no listing of declared rare flora within the NIA (Pawluk & Associates *et al.*, 1995).

5.4.3 Rare Fauna and Habitat

There are several issues relating to rare fauna:

• There is the potential for communities of troglobitic fauna to be present within the cave system in the vicinity of the NIA. This includes the open caves immediately west of the NIA, as well as possible subterranean areas below the NIA itself. Troglobitic fauna have been found within limestone caves in Yanchep, and will likely be assigned a high conservation value by the EPA (Planwest et al., 1999; SMEC, 1999). Fauna surveys of the caves and groundwater are recommended at the subdivision and development stage (Planwest et al., 1999) and management of groundwater levels is a critical issue in

- maintaining the conservation values of any existing communities in the area (SMEC, 1999), however threatened ecological communities may exist within the NIA, and flora and vegetation surveys are recommended prior to development.
- The population of the rare bee *Hylaeus globuliferus* identified within the NIA is one of twelve populations known to exist (CALM, pers. comm.). The habitat of the bee, *Adenanthos cygnorum* (Wooly bush), appears to be restricted mainly to the area between Mather Drive, Flynn Drive, Wanneroo Golf Club and Pederick St to the north (Pawluk & Associates et al., 1999). Part of the habitat area is covered by Bush Forever site 295. Conservation of site 295 enables appropriate protection for the bee.
- There are five threatened and priority fauna species recorded generally in the Neerabup and Nowergup area (Planwest et al. 1999). According to CALM, these species and their conservation status are:

Schedule 1 (Fauna which is Rare or likely to become Extinct)

Carnaby's Cockatoo (Calyptorhynchus latirostris)

Schedule 4 (Fauna which is Otherwise Specially Protected)

- Peregrine Falcon (Falco peregrinus)
- Carpet Python (Morelia spilota imbricata)

Priority Taxa

- Quenda or Southern Brown Bandicoot (Isoodon obesulus fusciventer) P4
- Bee (Hylaeus globuliferus) P3

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5.4.4 Dieback Prevention

During the public advertising of the Structure Plan CALM submitted that a Dieback Hygiene Plan should be prepared; Council supported this submission and resolved that an appropriate provision should be included in Part 1 of the Structure Plan requiring this work to be undertaken prior to subdivision and/or development. Discussions with the landowners in September 2004 indicated that they will prepare a Dieback hygiene Plan to suit either their extraction objectives or their development objectives prior to any activity on the individual sites.

5.4.5 Implications for Structure Planning

Where land is earmarked for industrial development, Bush Forever will seek to enter into Strategic Negotiated Planning Solutions (NPS) with landowners to achieve a balance between the needs of conservation and legitimate development expectations by acknowledging the full range of social and economic values attached to the land. Strategic NPS promote the protection of Bush Forever sites (in their entirety where possible) from proposals that would result in the direct loss of bushland through statutory planning and environmental approval processes.

Within the NIA, Bush Forever sites 293 and 295 are currently recommended for Strategic NPS by the Department for Planning and Infrastructure. The implementation status of these sites is 'To be determined', which requires further discussion and liaison between the affected landowners and State Government to establish the desired protection approach/mechanism to be adopted to secure the Bush Forever objectives for the defined sites. This may involve the development of planning and design solutions at detailed design stage, to achieve the core conservation values of the Bush Forever site, while still allowing some development to proceed.

As summarised in Section 5.4.3, there are five priority and threatened fauna species that reside within the NIA boundary and migrate to outer areas. These species need to be considered in the holistic planning and management strategy associated with Bush Forever sites 293 and 295 and the native vegetation within the boundary of NIA. The most significant issue associated with this proposal, which may affect the long-term survival of faunal populations in the area will be the fragmentation of ecosystems as a result of clearing native vegetation. Factors that need to be considered include:

- Implementation of bushland sensitive design techniques within Bush Forever sites to reduce fragmentation and maintain contiauous linkages between vegetated areas; and
- Liaison between individual landowners and CALM as to their development time frames, so that, if priority or threatened species are found to exist in a development site, there is ample opportunity to develop appropriate management and/or preservation strategies, prior to the clearing of native vegetation.

Given the existing conservation reserves in the region and Bush Forever strategy, these factors are considered to be manageable in the context of industrial development in the NIA, provided liaison is staged effectively between landowners and authorities prior to development.

5.5 Karstic Features

Karstic geology is extremely complex, difficult if not impossible to model and thus prediction of the location of cavities is not an exact process. In locating karst cavities in other areas detailed drilling even at 5 metres centres has proved to be expensive and of limited use. One hole may intersect a large cavity whereas the next may be in solid rock.

Most geophysical methods will only locate cavities when they are large and/or close to the surface. Resistivity, electromagnetic surveys, radar and/or micro-gravity have all been used with some success in location of cavities. However, they all work better where the cavity is in a more uniform medium than karstic limestone. This is because the limestone has varying resistivity and density changes that may be greater than that provided by a void.

The use of these test processes to locate large near surface cavities will provide some degree of safety. From such studies combined with detailed mapping and test drilling an estimation of the likely extent of cavities could be established and this testing should be conducted in conjunction with building design.

This information could then be used in building design to compensate for likely extent of cavities by over-engineering structures. Thus if the likely extent of cavities is estimated to be 10% then 10% of the foundations should be considered expendable. The best approach is a best guess.

If karstic formations are identified, certain issues may arise as a result. The porous nature of soils associated with karst topography and their direct connection to groundwater through cavities and solution channels provides a susceptibility to groundwater contamination. Certain industry activities that produce potential contaminants would be subject to normal environmental approvals and management controls. Proposals for such industries would warrant detailed geotechnical investigation to demonstrate site suitability.

A further downstream monitor of groundwater quality could also be undertaken, on an ongoing basis, by the Water and Rivers Commission through the installation by the Commission of monitoring bores within the Parks and Recreation reserve between Lake Neerabup and the industrial area.

In addition, the karst topography (caves in particular) located in and around the NIA may be of conservation significance due to the presence of rare fauna and to the recreational, ethnographic and palaeontological attributes they might possess.

5.6 Summary of Spatial Constraints

5.6.1 Buffer zones

The following buffer zones are of relevance to the NIA:

- 250 m buffer from eastern shores of Lake Neerabup, which is already provided by the MRS zoning and Bush Forever site 384; and
- 1,000 m risk buffer between the Barbagallo Raceway and industries with the potential for off-site risk impacts.

With regard to the impacts of specific industries on residential areas, the DEP recommends buffer distances based upon the pollution footprint of the industry. The DEP are currently reviewing their industrial buffer distances, and plan to release a new guidance document. The current recommended buffer distances are in **Table 5.1**.

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Table 5.1: Industrial Buffer Distances (DEP, 1997)

Type of Industry	Buffer Distance (m)		
Abrasive blasting works	Case by case		
Artificial textiles & fibres	200		
Automotive spray painting	150		
Bakeries (night time)	500		
(day time)	100		
Carpet backing	500		
Timber treatment plants	Case by case		
Dry cleaners	100		
Fibreglass works (LSE resins)	200		
(non-LSE resins)	500		
Joinery & wood working	100-200		
Metal fabrication	500		
Metal	500		
finishing			
Motor body works/panel beaters	200		
Other food or beverage products	Case by case		
Paints & inks (blending & mixing)	300		
(manufacture)	1,000		
Pharmaceutical production	300-1,000		
Quarry (non blasting)	500		
Recycling waste facility	200		
Rubber products	500		
Service station (normal hours)	50		
(24 hours)	200		
Smallgoods (not abattoir or rendering)	100		
Synthetic resins & rubber - other	1,000		
Textiles (dyeing)	200		
(treatment/production)	up to 500		
Transport vehicles depot	200		
Used tyres storage	1,000		
Wreckers	300		

5.6.2 Other zones

The following policy zones are of relevance to the NIA:

- Bush Forever sites 293 and 295;
- Groundwater Pollution Protection Area Priority 3;
- The western boundaries of the Gnangara Park Concept Plan (CALM, May 1999) are in the vicinity of the eastern boundaries of the NIA. According to the GPCP, a park entry statement and recreation site (significant pine plot) is planned in the vicinity of the intersection of Neaves and Pinjar Roads. The Park boundaries do not clash with those of the NIA, and given the presence of other land uses between the two areas (eg Golf course, old landfill, raceway), there should be minimal constraint, if any, to the NIA. Consultation should still be undertaken with CALM, however, to resolve any outstanding issues regarding the Park and the NIA;
- There exists a zone of groundwater contamination approximately 1,000m long extending from the abandoned landfill east of Piniar Road; and
- There exists an area of noise influence around the Barbagallo Raceway as shown on **Figure 5.1** (refer Section 5.2.1).

5.7 Key Road Linkages

5.7.1 Connections to Freeway

The current road connections to the Mitchell Freeway are indirect. Access is via Wanneroo Road and either Joondalup Drive to the Hodges Drive interchange or via the Ocean Reef Road interchange further south. The Mitchell Freeway currently ends at Hodges Drive.

A direct link to the proposed freeway extension at Neerabup Road (from a westerly extension of Flynn Drive) has been proposed in the North West Corridor Structure Plan, and was the subject of an MRS Amendment (No. 992/33).

This connection would be highly beneficial to the NIA in terms of the substantial improvements in accessibility to regional transportation infrastructure which would result. This is an important consideration given the scale and regional significance of the NIA.

5.7.2 Wattle Avenue

Wattle Avenue, to the north of the NIA, is a discontinuous road providing access to Wanneroo Road (Wattle Avenue West) and Pinjar Road (Wattle Avenue East). Wattle Avenue West does not currently serve any major land use. Wattle Avenue East is the main access for the Barbagallo Raceway.

5.8 Public Purpose Reservation

There is currently an existing Public Purpose reserve within the study area, reserved for water supply purposes under the provisions of the Metropolitan Region Scheme. This land, which is owned by the City of Wanneroo, is now surplus to requirements and is currently subject to an MRS Amendment to modify the zoning to Industrial (refer Section 3.1).

It is logical that this land now be incorporated into the NIA for industrial development. The City also owns the western portion of Bush Forever site 295; this presents a possible opportunity for Council to negotiate to achieve industrial potential on the Public Purposes site as a trade-off for the loss of the Bush Forever site. It is understood that this will be the subject of more detailed negotiations between the City and the Department for Planning and Infrastructure.

5.9 Existing Industrial Development

A small area of existing industrial development is located along the central frontage of the NIA along Flynn Drive at the intersection with Mather Drive. There is the need for the Structure Plan to recognise the existing industrial development in relation to both the extension of Mather Drive and linkages to future road and service infrastructure within the industrial area.

5.10 Cockburn Cement Land Holding

Cockburn Cement's land holding (Lot 21), in the western part of the site, contains a total area of 437 ha, of which approximately 300 ha is contained within the Structure Plan area. This represents approximately 35% of the total Structure Plan area. Cockburn Cement's primary objective for this land is to ultimately extract the valuable lime resource, after which they will make the land available for industrial development.

At the time of preparing this Structure Plan, the development intentions of Cockburn Cement, in terms of timeframes and anticipated resource extraction are not known. Cockburn Cement have completed additional site investigations and have determined an optimum final extraction surface which is included in this Structure Plan.

The discussions with Cockburn Cement have enabled the inclusion of Lot 21 in the Structure Plan area and have established a future development pattern encompassing the whole of the area, while allowing Cockburn Cement the greatest flexibility in their future operations.

5.11 Future Residential Development

It is important for the Structure Plan to recognise the surrounding land uses, particularly future residential development (Banksia Grove) proposed to be located to the south east of the NIA.

As illustrated within **Figure 5.1** Bush Forever site 295 extends south of Flynn Drive. The retention of this site provides a substantial advantage by forming a buffer of over 300 metres to the future residential development.

Also of relevance is the existing Special Rural and proposed Special Residential areas to the south of Flynn Drive, which will be potentially sensitive to any industrial uses at the interface with the Neerabup Industrial Area boundary.

In particular, the proposed Special Residential area, which carries a subdivision approval, will place approximately 150 Special Residential lots (ranging between 2,000m² and 5,000m² in area) in close proximity to the southern end of the Cockburn Cement land. This will have implications, not only for future industrial land uses, but any interim resource extraction activities.

5.11.1 Other Regional Road Link

The north south road link through the Banksia Grove urban cell, which intersects with Flynn Drive, presents the potential for industrial traffic from the NIA to be attracted to use that route through the heart of the urban cell. It will be important to ensure that the road pattern proposed for the NIA is designed to encourage industrial traffic to use alternative routes to reach the main arterial system.

STRUCTURE PLAN NO. 17 NEERABUP INDUSTRIAL AREA

6.0 RESOURCE EXTRACTION & SITE WORKS

6.1 Basic Raw Materials Policy

The Government of Western Australia through the offices of the DPI and the Department of Minerals and Petroleum Resources (DMPR) has adopted the Basic Raw Materials State Planning Policy No 10 (SPP 10) the aim of which is to preserve resources for future use at reasonable costs.

The policy was refined and upgraded, being gazetted on 28 July 2000. The City of Wanneroo is one of the local government areas included in the policy.

Within the NIA Structure Plan area the two materials are sand and limestone as illustrated in **Figure 2.1**. Limestone can be in cut block or rubble form.

Limestone and sand are not defined as minerals so that the DMPR do not have an extractive licensing function but have an operational safety function.

SPP 10 provides for the issue of extractive industry permits by combination of DPI and the Local Authority and every applicant must submit a management plan for the operation, final form and condition of the land. Control of these issues remains with the Local Authority and in this instance Council will also be the administrators of the Structure Plan.

Within SPP 10, WAPC Plan No. 1 5038 Sheet 3 identifies the bulk of the Structure Plan area and the area extending northwards in Nowergup as Resource Area.

6.2 Resource Extraction Objectives

6.2.1 Compliance with Policy

The existing extractive operations and the proposed final levels following extraction, provide for resource extraction complying with the State Government Policy, SPP10.

6.2.2 Forward Planning

The final surface contours shown on **Figure 6.1** will guide the forward planning of the extractive industry operators and the regulatory authorities in issuing licences for land within the Structure Plan area.

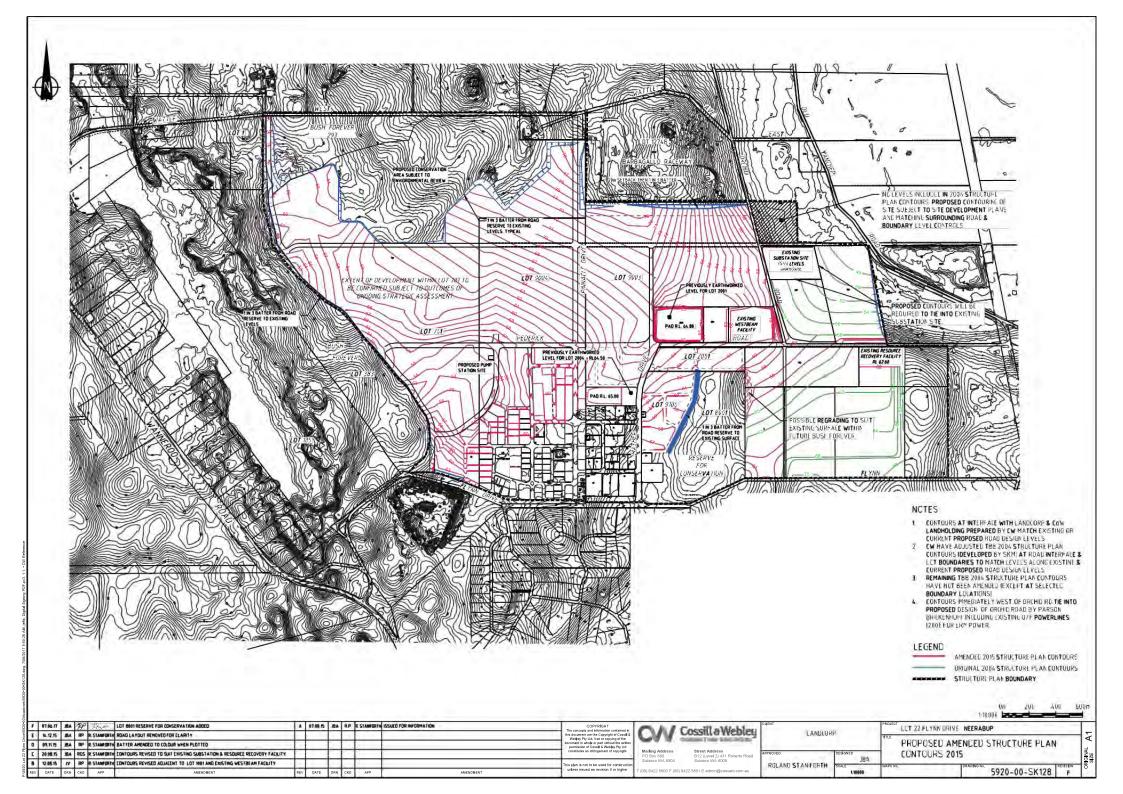
An operator may consider that alternative levels, or greater extraction and backfilling may provide an economic return and seek a variance to the levels shown. Any proposed variance should be considered on its merits and whether the resulting surface achieves these proposed guidelines in a manner which is compatible with the overall final surface contours adopted in the Structure Plan. Any significant variations would be required to be undertaken as a modification to the Structure Plan.

6.2.3 Liaison Across Land Ownership Boundaries

A significant issue is the possible extraction by one landowner to levels that create a discontinuity of the final surface across a common boundary. This could arise from differing rates for extraction and development of adjoining landowners. The finished levels shown on **Figure 6.1** form a basis for resource extraction and should only be varied where later changes in landowners planning require a review of the levels.

6.2.4 Final Surface Levels

The proposed final levels have been designed with the objective of enabling the optimum utilisation of the raw material resources, but ensuring that the final landform provides an optimum environment for efficient industrial development. On this basis, the levels are intended to create a finished surface with grades approaching 1% and ranging up to 2.5%. These grades have been applied to achieve planar surfaces conducive to road design and road drainage and to minimise subsequent development earthworks. Within the Cockburn Cement land the finished surface grades vary and are up to 5% and these will require consideration at land development time with possible batters or retaining walls to achieve site levels suitable for industrial development.



The implementation of the final surface levels requires a strategy which provides for the variable extraction operations which will occur under the differing land ownership. The current situation where Cockburn Cement have indicated a preference to independently extract, LandCorp are proceeding with limestone extraction on Lot 22, City of Wanneroo are not extracting and two sand extraction operations are in progress, indicates the diversity of operation which must be accommodated, as far as is practicable given the strategic status of the NIA and the essential requirement to ensure that land is available to industry when needed to meet demand.

Landowners may wish to extract below the final surface contour levels with either refilling to level or proposing new levels. The levels can be influenced by project proposals for individual development sites.

The responsibility to ensure that adjoining landowners activities produce finished levels that will support and encourage integrated industrial development will be exercised by the City of Wanneroo through controls on the extractive industry licenses and permits. The NIA Structure Plan will provide Council with an appropriate framework for exercising that responsibility.

6.3 Current Extractive Operations

Several extractive businesses are currently operating in the Structure Plan area:

- Lot 22 Flynn Drive basically limestone extraction under a joint venture arrangement.
- Lot 508 Pederick Street an extraction operation by Rocla Industries.
- Loc 2477 Flynn Drive a sand extraction operation by Carramar Sands.

These operations are all controlled by Licences issued by the City of Wanneroo. Further applications for licences have been submitted to the City including proposals to refill with inert waste. These were still under consideration at the time of writing this report.

6.4 Maximum Extraction Within Industrial Estate

6.4.1 Finished Levels

The final surface levels have been derived from consideration of the resource extraction objectives, current developments and quarrying and the need to achieve optimum grades for industrial development. The plan also considers a reasonable balance between the rate of extraction and the rate of land development. The final surface levels recommended discourage excessive extraction which may otherwise retard the rate of land release for industrial uses.

The levels have also been designed to facilitate efficient design and construction of stormwater drainage and gravity sewer systems.

Where extractive operations are undertaken, the individual landowners will be responsible for ensuring that finished ground levels, after extraction, comply with the Final Surface Contour Plan. In the absence of extractive operations, compliance with the Final Surface Contour Plan will be achieved through bulk earthworks operations prior to subdivision and/or development for industrial use.

Where it is necessary to fill particular areas to comply with the Final Surface Contour Plan (either following resource extraction or in the course of bulk earthworks) only clean fill material should be used and must be imported in a manner suitable for industrial development in accordance with the requirements of the City of Wanneroo.

The final surface contour levels may be influenced by the projected demand timeframes for General Industrial land as well as the timing of special industrial projects. These may occur out of sequence with the completion of maximum resource extraction. The location of sites for special industrial projects needs to be carefully considered and sited to achieve a balance between optimum extraction and minimum servicing costs with an overall benefit to the industrial area.

A review of the adopted Final Surface Contour Plan may be warranted if resource extraction rates are not enabling the timely supply of industrial land or in the event that land supply is required to be brought forward to support specific industrial proposals of strategic significance.

6.4.2 Site Geology

The Environmental Geology Mapping Series Muchea sheet indicates that limestone material occurs in the western portion of the Structure Plan area with a varying thickness of overlying sand. The eastern portion is generally sand material.

6.4.3 Groundwater

The existing groundwater levels and profile have been taken from the Perth Groundwater Atlas. The water levels fall reasonably evenly from Pinjar Road at RL46 westwards to RL24 near the boundary of Lot 22 then fall sharply to Neerabup Lake with a water surface at approximately RL15. The groundwater contours are generally in a north south direction as part of a reasonably uniform water table falling westwards. The maximum extraction levels have been established to remain above the predicted groundwater levels.

There has been some discussion concerning the rate of extraction of groundwater from the Gnangara Mound and there is some possibility of reversing the groundwater gradient in the eastern part of the Structure Plan area. It is not considered that this will have any adverse impact on the Structure Plan or the finished levels.

6.4.4 Extent of Resource and Timing

A simplified bulk volume calculation, excluding the western portion of Lot 21, estimates that within the Structure Plan area the retrievable resource, based on the proposed finished levels, amounts to 57,700,000 cubic metres.

This is a combined sand and limestone resource volume.

Current extraction rates appear to average between 500,000 and 600,000 cubic metres per annum, which is mostly limestone rubble.

However, this does not account for the future resource extraction intention of Cockburn Cement in Lot 21, which is anticipated to remove in the order of 2,000,000 cubic metres per annum. That material will be used for different purposes and will therefore not impede existing extraction rates elsewhere within the estate. The calculated volume of resource in Lot 21 is approximately 65,000,000 cubic metres. This would mean that complete extraction of Cockburn Cement land would take approximately 32 years. The extraction area over the balance of the Structure Plan area (on current extraction rate) will take approximately 100 years to complete.

It is likely that the limestone resource, having greater value and demand, will be extracted at a more rapid rate than the sand resource leading to land development in two areas, commencing from Flynn Drive. It is also possible that industrial land demand will overtake the extraction of resources, based on an estimated development programme of approximately 25-30 years. Final surface contours in the sand extraction area (eastern sector) have been designed to balance optimisation of the resource with timely availability of industrial land. In the event that the ability to meet industrial land requirements is being impeded by the extraction rates, a review of final surface contours, and therefore ultimate extraction capacity, may be warranted.

6.4.5 Surface Condition

Within the Structure Plan area, it is desirable that, besides achieving finished levels in accordance with the adopted surface contour levels, the completion of extraction leaves the surface in a condition suitable for subdivision, sale and development. Testing and inspection for any Karst presence, if required, should be completed at this stage.

For the industrial area this should comprise of a minimum layer, 1.0 metre thick, of loose re-compacted material. This material could be sand or limestone broken up by ripping where necessary to facilitate development and building.

All surfaces should be compacted to a density suitable for building construction.

6.5 Design Criteria for Establishing Final Levels

Based on the comments and principles discussed in the preceding parts of this section, the following is a summary of the assumptions and criteria used in formulating the plan of recommended extraction levels.

6.5.1 Assumptions

- i) The timing/staging of industrial development will be conducive to enabling the complete extraction of basic raw materials to the levels proposed and given the projections available to date, this will be subject to ongoing monitor and review. BothbCockburn Cement and Landcorp have conducted site drilling to confirm the boundaries of the different materials and to define the extraction levels.
- ii) Final levels should attain an optimum balance between:
 - a) maximising resource extraction potential for individual landowners:
 - maintaining an integrated approach to the planning of final levels across the study area; and
 - c) ensuring that the level of resource extraction proposed does not compromise the ultimate industrial development objective.

The desirable gradient for the provision of optimum industrial land is 1% with a maximum acceptable gradient (without benching) of 2.5%.

Benching results in increased development costs and reduced effective land area and should be avoided where possible.

There are no environmental impediments to achieving maximum resource extraction.

6.5.2 Criteria

i) Desirable finished gradient is 1% with a maximum (without benching) of 2.5%. Some parts of Lot 21 have steeper slopes which will require detailed consideration at subdivision stage.

- ii) Benching (retaining or battering) should only be used where necessary to meet existing base levels, to achieve higher value industrial land, or for other reasons which will add value to, or not compromise, the industrial development objective.
- iii) The design should, as far as possible within the broader strategic planning objectives, meet the known extraction and development aspirations of individual landowners.
- iv) The design should ensure that the land can be efficiently serviced and staged for subdivision, sale and development for industrial use after extraction is complete, having regard for the principal road and land use layout contained in the NIA Structure Plan.
- v) Final surface levels should remain above predicted groundwater levels.

7.0 NEERABUP INDUSTRIAL AREA DESIGN CONCEPT

7.1 Philosophy

The NIA Structure Plan will provide the planning framework necessary to ensure that the development of the area for its ultimate industrial purposes occurs in the most orderly and integrated manner, fulfilling the primary objectives of maximising the yield of General Industrial land, in a high quality estate environment, whilst respecting the prior need to utilise basic raw materials, and recognising the various physical/environmental constraints of its location.

7.2 Objectives

The NIA Structure Plan should:

- Depict a robust design, providing the broadest possible opportunities to accommodate the varying demands for general industrial land in a fluid development environment.
- Produce a three dimensional planning structure having regard for the fact that sand/limestone extraction activities will mean that the framework needs to define landform (vertical) as well as land use and movement (horizontal), and recognising that individual landowners will have varying development aspirations.
- Recognise environment and heritage issues within and around the study area and recommend best management practices.
- Provide a development and staging strategy which will promote the NIA as a commercially attractive corporate address.
- Produce a movement network which ensures the most direct connectivity with the central business core and the regional network from all parts of the estate, notwithstanding the differing resource extraction objectives of individual landowners, and isolates, as much as possible, industrial traffic from the nearby residential and rural environment.

- Ensure that advantage can be taken of future regional transportation (public and freight) opportunities, particularly in terms of more direct future links with the freeway and passenger rail system.
- Ensure the protection of industrial uses from other established and proposed land uses on the periphery of the NIA.
- Facilitate the efficient provision of all necessary engineering services and support infrastructure in an efficient manner to accord with the adopted staging strategy.
- Provide adequate commercial services to meet the needs of the Neerabup Industrial Area's industrial community at company and workforce levels.

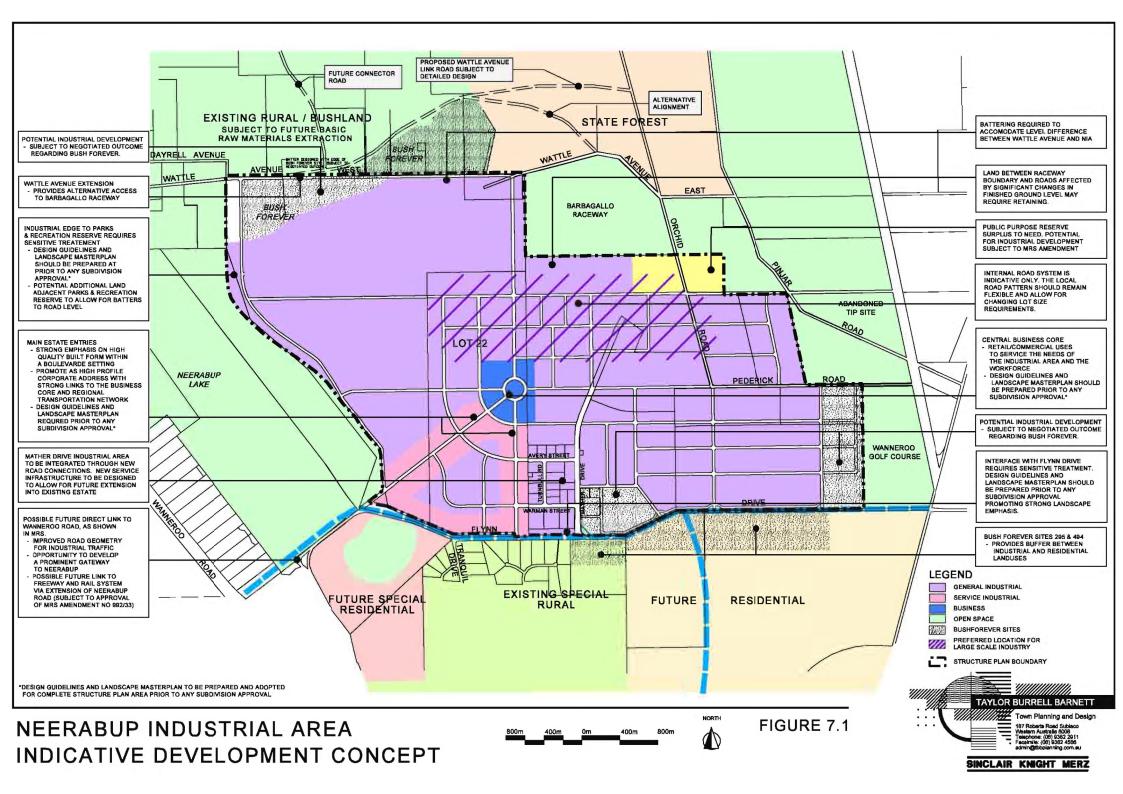
7.3 Indicative Development Concept

The NIA Indicative Development Concept provides a more detailed framework for planning and describes the many issues that must be taken into consideration when preparing detailed subdivision designs and development proposals (refer **Figure 7.1**). As the title suggests, this is an Indicative Concept and is for explanatory purposes.

It is anticipated that modifications will be undertaken at the detailed design phase; however, these must be assessed in accordance with the principles of the plan.

It should be noted that the Indicative Development Concept shows no detail, beyond the key structure planning elements, within Lot 21 (the Cockburn Cement land). In consultation with Cockburn Cement, it was agreed that the current lack of clarity about their future development objectives makes any meaningful detailed planning difficult.

It was, however, considered imperative that, regardless of the landowners eventual development intentions, a suitable standard of integration should be protected throughout the Structure Plan area by defining and enforcing the key planning elements embodied in the formal Structure Plan. This was reflected in the decision of the Western Australian Planning Commission to reinstate the need for the diagonal entrance road through Lot 21.



7.4 Movement Network

7.4.1 Principles and Objectives

The local road network has been structured in accordance with the following objectives:

- To maximise the general industrial land yield;
- To create a strong corporate address and direct access throughout the estate;
- To enable the development of a gridded road structure to ensure permeability and manoeuvrability for all movements throughout the industrial area;
- To maximise exposure to the regional roads by providing a series of service roads along the regional road system and prevent backing on;
- To provide a flexible and robust road system that provides for efficient movement throughout the estate and similarly provides the opportunity for alterations to lot patterns to accommodate changing land demands without the need for wholesale changes to the local road network;
- To recognise the fragmented nature of land ownership and provide for independent sub-division wherever possible; and
- To facilitate linkages to the existing Mather Drive industrial area.

7.4.2 Internal Road Network & Access

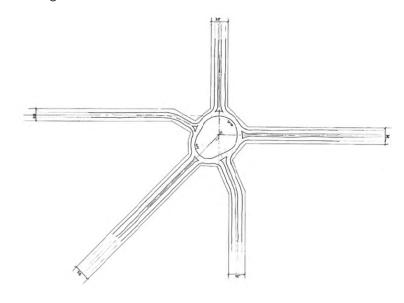
The road network is illustrated on **Figure 7.2**.

The internal road layout reflects a standard north-south rectangular grid pattern, apart from the south-west corner where a diagonal road is proposed. This is part of the "statement" planning for the Structure Plan area. As such the proposed layout provides good accessibility to all areas of the Structure Plan area while still maintaining a high standard of traffic management and safety.

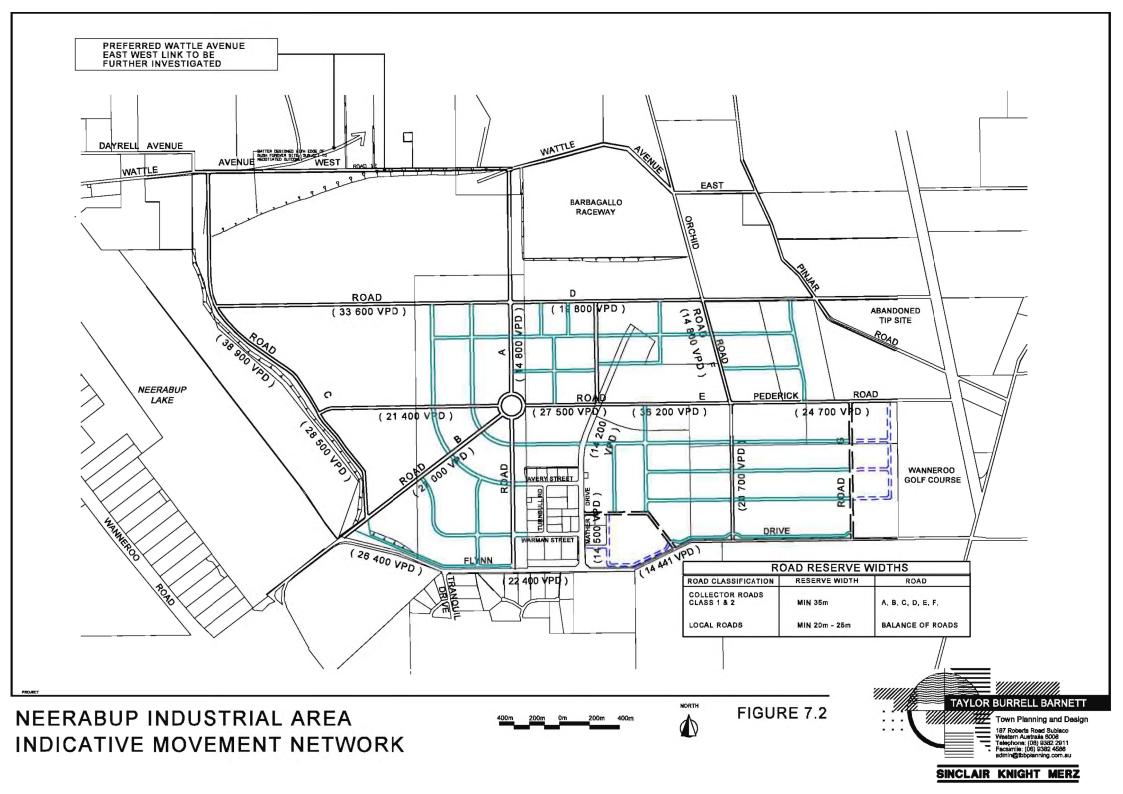
It is important to note that the Indicative Development Concept provides a guide to the broad concept of the road network. It is expected review and refinement will occur over time, at the subdivision stage.

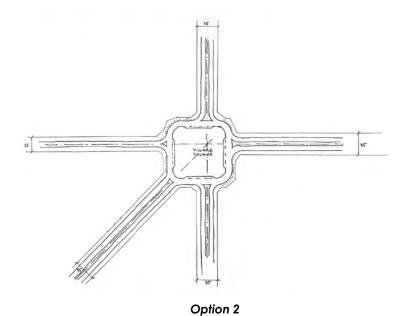
The Indicative Development Concept is characterised by a major north south central arterial spine linking into Flynn Drive (Road A). The diagonal road (Road B) and two other east west collector roads (Roads D and E) support this. It is envisaged that the major intersections on each of these roads will be either signal or roundabout controlled. The Concept Plan is cognisant of the high volume of heavy vehicles likely to use the road network; space will be provided for appropriate radii on roundabouts to accommodate articulated vehicles. Suitable intersection spacing has also been allowed between major intersections and the minor road network.

Two options for the central junction treatment are illustrated below. Option 1 is the design included within the Structure Plan and is based on a large roundabout.



Option 1





Option 2 includes the creation of a square roundabout and provides an alternative design. Importantly, both options will be subject to detailed design.

A separate traffic modelling exercise by Sinclair Knight Merz has recently been undertaken for this Structure Plan. This has determined indicative traffic volumes on the major roads, refer **Appendix 6**. This supersedes the previous traffic work undertaken for the City in 1996.

The complete Traffic Analysis is contained within **Appendix 6**, however, summarised below is a description of the road network proposed.

Road B is expected to carry a significant volume of traffic (approximately 27,000 vpd) with corresponding reduction on Road A (to approximately 14,800). This is due to the more direct access to the Mitchell Freeway via Flynn Drive provided by Road B.

Key road elements are discussed in more detail below:

Flynn Drive - Remains as the key southern east-west arterial road servicing the estate for the short to medium term. It is acknowledged as a defining edge between the Industrial Estate and Carramar Park and Banksia Grove to the south

Wattle Avenue - Forming the connection from the North West corner of the developed area to Wanneroo Road and the future urban development northwards along the coast. The portion of Wattle Avenue to be upgraded to a dual carriageway road.

The future development of the Nowergup area to the north will require a connection for east-west traffic and this is envisaged to be on an alignment along the northern side of the Bush Forever site connecting to a future distributor road northwards into the area and further east to connect to Pinjar Road.

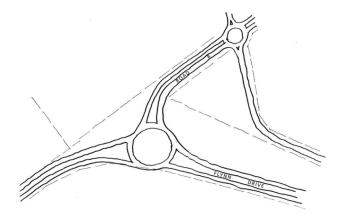
Road A – Forms the north south central arterial spine linking into Flynn Drive. It is proposed that Road A will be constructed in the short term to provide the main estate entrance.

At the centre of the industrial estate Road A intersects with Road E (east west connector) and the diagonal Road B. The surrounding land is proposed to be developed as the core business area around a central traffic roundabout. The roundabout will have five legs and will accommodate the large number of heavy vehicles expected. The roundabout will be subject to more detailed design, however, some options have been prepared, as illustrated earlier in this section. It will also be necessary to review access into the uses located at the centre of the roundabout.

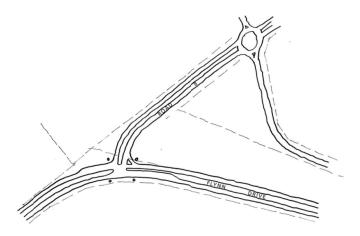
In the medium term, Road A will provide the sole connection to the extended Wattle Avenue, and one of the main connections to Flynn Drive. Other key connectors to Wattle Avenue and Flynn Drive (e.g. Road B, Road C and Road D) depend upon access through the Cockburn Cement land and may therefore not be available for development in the short- to medium-term.

Road B is expected to become the main access into the estate extending from Flynn Drive. The section of Road B adjacent to Flynn Drive is expected to carry volumes in excess of 27,000 vpd and adequate capacity will be provided at the intersection with Flynn Drive. Possible treatments for the management of the intersection (signals or roundabout) are illustrated below.

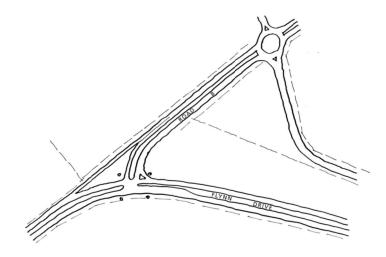
STRUCTURE PLAN NO. 17 NEERABUP INDUSTRIAL AREA



Option 1: Roundabout



Option 2: Light Controlled



Option 3: Light Controlled With Left Slip Lane

The diagonal alignment of Road B is deliberate. It is intended to provide a future entry road for the estate, and more importantly, preserve a path for any potential transport or transit corridor for a more direct link between the estate and the Mitchell Freeway/Northern Suburbs rail corridor.

Road C – Provides a road edge to the western boundary of the NIA and delineates the edge to Lake Neerabup. The northern end of road C extends into Wattle Avenue. Forecasts for Road C estimate up to 39,000 in the northern section to 28,500 in the southern section near Road B.

Roads D & E – Both roads D & E form important east west connectors extending though the estate. Roads D and E connect with existing road reserves including Pederick Road to the east which, in turn, connects with Pinjar Road.

Road F – It is proposed to extend Orchid Road to the south to connect with Flynn Drive. This provides a direct route to the centre of the Structure Plan area and may be used as an alternative to Road A. The FDIASP indicated that this would form a continuous link with the north-south connection between Pinjar Road and Flynn Drive (see section 2.3). Under the current Structure Plan this link will be discontinuous and traffic will be encouraged to use Road A (if indeed this north south link is connected). Also the current plan encourages numerous access points to the NIA off Flynn Drive, further decreasing the earlier traffic forecast for Road F.

Road G – Provides for north south connections to Flynn Drive and increases permeability and accessibility at the eastern end of the estate.

Local roads - A highly permeable minor road network complements the arterial road network. Because of this permeability and linkage to the arterial road network, these minor roads are expected to carry low volumes of traffic. This is similar to the Wangara industrial area, which is served by 3 key arterial routes in Ocean Reef Road, Prindiville Drive and Hartman Drive.

The Indicative Development Concept as presented provides a sound transport network which, with further detailed investigation, will adequately and safely manage the traffic demand.

7.4.2.1 Intersections

Priority control will exist at intersections within the minor road network, i.e. T-junctions and 4-way intersections. While the use of 4-way intersections has had some debate, they are considered an appropriate intersection control as long as certain issues regarding their use are addressed, as identified by the Department for Planning and Infrastructure Liveable Neighbourhoods Guidelines which are as applicable to an industrial estate:

• Clear priority at the intersection should be given which can be improved by; reduced minor leg approach distance, highly visible signage; threshold treatments; adequate sight distances.

- Establish traffic volume limits; as traffic volumes through the intersection increase, gap selection becomes more difficult and safety reduces. Rules of thumb suggest 2000 to 5000 vehicles per day (VPD) total intersection traffic. Traffic volumes at 4-way intersections in Neerabup are generally considered to be at or less than the lower end of this range. Clearly for intersections along the arterial roads where volumes are higher other traffic management techniques will be introduced such as left in-left out control. A traffic management plan may be developed as the minor road network is refined.
- Speed control on the major leg; approach speeds on the major approach should be assessed.

In relation to the proposed central roundabout, the design has been verified by preliminary traffic analysis and assignment of traffic volumes. The traffic assessment included the requirements for industrial traffic predicted for this area. The minimum outer diameter for the roundabout is 50 metres and the proposed reserve area is 100 metres diameter providing sufficient space for a final design in accordance with Austroads standards.

7.4.2.2 Road Reserves

Three broad categories (from the City of Wanneroo Land Development Standards) of road are present in the Structure Plan namely:

- Boulevard Collector road (Class 1) such as the north-south spine road (Road A) and the diagonal road (Road B and the western part of Road E);
- Major Collector roads (Class 2) such as the major east west collector roads supporting the north-south spine (Roads C, D, E and west F); and
- Local roads (balance of roads)

The Wanneroo requirements are shown in Table 7.4 below.

Table 7.4:	City of	Wanneroo	Road	Requirements
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Road Class.	Reserve Width	Pavement Width	Verge Width
Collector Roads			
Class 1 and Class 2	Min 32-35m	13.4m	Min 5.1m
Local Roads	Min 20-25m	10.0m	Min 5.1m

Given these requirements and the high proportion of heavy vehicles, it is recommended that, for the Class 1 Boulevard Collector roads and Class 2 Major Collector Roads, a 32 m road reserve is allowed, which provides a minimum of 2 x 5 m verges, 2 x 8 m carriageways and a 6 m median. A 35 metre reserve is proposed where there is the requirement for on road cycle lanes. These have been identified on Road C and the extension of Orchid Road.

The Local roads (Class 2) require a 20-25 m road reserve to accommodate 2x5 m verges and a 10m carriageway, with the option to include a median treatment or traffic management measures if required.

7.4.2.3 Public Transport

At this stage it is understood that there are no planned public transport routes for the area but it is considered that bus services could be developed on the proposed Class 1 and 2 collector roads in the Structure Plan, all of which have sufficient width to carry buses.

It is also noted that the alignment of Road B preserves the opportunity for direct dedicated transit links into the Estate should such be contemplated in the long term. It may be appropriate therefore to allow a wider median on Road B to accommodate this. An appropriate road reserve is 40 m, which would allow for a dedicated transit lane in each direction to be constructed either in the median or kerbside.

7.4.2.4 <u>Mather Drive</u>

The unconstructed northern section of Mather Drive (bordered by Lots 4, 53 and 240) would be superfluous in the context of the local road pattern shown in the Indicative Development Concept. If development is proposed in accordance with the Indicative Development Concept, the unconstructed section of Mather Drive should be closed and the land offered for acquisition by adjoining landowners.

Within the constructed southern section of Mather Drive, the road reserve width of 40m is excessive in relation to its local road function. The potential to reduce the reserve to a minimum 32-35 m, with the balance land being returned to adjoining owners, may be explored.

7.5 Lot Sizes

Within Business Park and Industrial Estates, land area demands vary considerably from a typical minimum of 2000m², to 2-5 ha, with major industrial uses sometimes requiring sites of 30 ha and larger. The Indicative Development Concept depicts a road network capable of sustaining this variety of lot sizes. Importantly, however, the lot pattern depicted is purely indicative and should be refined at the time of subdivision approval when consumer demand can be properly assessed.

The network is sufficiently robust to provide the opportunity for a range of different lot sizes. It may be necessary to add roads or remove others should lot sizes vary significantly from those shown in the Indicative Development Concept.

Such modifications should be entertained provided they are consistent with the Structure Plan and Policy Precinct objectives and demonstrate compatibility with the surrounding road structure.

The NIA Indicative Development Concept shows preferred locations for larger scale industrial sites. These areas are considered most appropriate due to the following factors:

- Separation from the urban cell;
- Proximity to raceway (less likelihood of land use conflict between raceway and larger industries); and
- Minimum impact on servicing efficiencies.

This should not, however, preclude consideration of large industrial sites outside of the depicted areas.

Siting of industries would also need to reflect their potential for off-site impact in terms of air quality, noise and risk (refer to **Section 5.0** and **Figure 5.1**).

7.6 Open Space & Drainage

Public open space within an industrial area shall be provided in accordance with clause 6.3 of the Commission's Policy DC4.1 Industrial Subdivision. There is also the opportunity to accommodate drainage within areas of public open space. These will perform both drainage and aesthetic functions and will provide some passive recreation opportunities for workers.

An area of $5,000 \text{ m}^2$ of open space is to be provided in the estate core (business park). This should be included on either Lot 22 or Lot 4. This may include seating areas, public art, etc.

The final detailed configuration of this open space and drainage would be depicted at the time of subdivision; however, indicative locations of the drainage are illustrated on the drainage plans.

During the public advertising of the Structure Plan the then DEP submitted that a Drainage and Nutrient Management Plan should be prepared. Council supported this submission and resolved that an appropriate requirement be included in Part 1 of the Structure Plan.

7.7 Landscape

The approach to be adopted for the landscape of the industrial estate is to create a low maintenance street tree scheme which will aid orientation within the site (by giving different avenues individual character) while helping integrate the area within the wider context. It is envisaged that streetscape tree planting will be determined as part of the preparation of design guidelines.

7.8 Interface with Surrounding Land Uses

7.8.1 Lake Neerabup

The western boundary of the Neerabup Industrial Area is defined by the existing Industrial Zoning under the Metropolitan Region Scheme. This abuts the Parks and Recreation reservation containing Lake Neerabup. As mentioned previously, the existing Parks and Recreation reservation adequately accommodates the lake and associated wetland buffer.

To delineate the Parks and Recreation boundary and industrial development, a road edge is proposed. To the south near Flynn Drive the road predominantly follows the edge of the industrial zoning.

Further north, additional land has been allowed within the NIA and adjacent to the Parks and Recreation reserve to allow for batters to the road level, given that the final levels proposed for industrial development (post extraction) will be substantially lower than natural ground level at the reserve boundary. The final position of the edge road will be determined after a Final Surface Contour Plan has been adopted for Lot 21, to ensure that any battering between road level and Parks and Recreation reserve is accommodated within the Structure Plan area

It is proposed that a Landscape Master Plan is prepared at the detailed design stage to ensure sensitive treatment of development adjacent to the Parks and Recreation reservation.

7.8.2 Residential

Residential development is proposed on the southern side of Flynn Drive at the eastern end of the NIA. Given the strategic significance of the NIA for accommodating future industrial growth in the Metropolitan Region, and as a major employment centre for the north Metropolitan Region it is important that the future residential development recognises the potential impacts of industrial land use, and plans for appropriate separation. Bush Forever site 295 abuts Flynn Drive to the south and is approximately 300m wide, providing a significant buffer between future residential and industrial development.

7.9 Staging

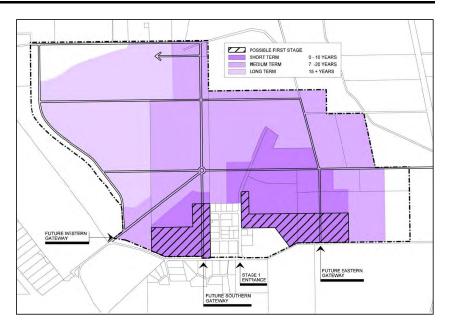
The timing for industrial development within the NIA will be primarily influenced by four factors:

- Fragmented land ownership, and the varying intentions of individual landowners;
- The substantial potential of much of the area for basic raw material extraction as an interim to the end industrial use:
- Proximity to service infrastructure; and
- Rate of industrial land demand.

It is important to consider the possible staging of the development to assist the servicing authorities to plan for future infrastructure development, and also to provide some guidance for landowners. At this early stage in the planning process, a staging programme will be highly speculative as it will be based on very generalised assumptions about resource extraction rates, landowner intentions, and industrial land demand.

The staging plan shows, in general terms, the potential staging of development. It is emphasised that this staging plan is basically a composite reflection of known landowner intentions, and development practicalities (such as proximity and accessibility to services). It should not be construed as a recommended development staging programme to be used in controlling the timing of development.

Due to its preliminary nature, the staging plan seeks only to distinguish between short, medium and long term development. The time spans applying to each of the stages overlap with each other, reflecting the fact that there should not be an absolute time delineation between stages at this point.



Staging Plan

Furthermore, it is acknowledged that the amount of land identified in each of the stages may provide sufficient industrial land supply for a period longer than the defined timeframe. For example, whilst the short term development timeframe is 0 - 10 years, the amount of land shown within the short term stage may in fact satisfy demand for a considerably longer period. The intent of the staging plan in this regard is not necessarily to indicate the amount of land required within a 10 year period, it is more intended to indicate those areas with potential for development within the defined timeframe.

In terms of short term stages, two areas have been identified as having the highest potential for development within the next 7-10 years.

1. Lot 22 - Southern Portion (57 ha)

This area abuts Flynn Drive and encompasses the southern part of the limestone quarry on Lot 22, where extraction has been completed. The land is therefore, ready to be reinstated at a suitable finished ground level for development; this factor, together with the lands abuttal with the primary road infrastructure and the industrial development objectives of the landowner makes this the most logical location for the first stage development. The Structure Plan also supports this through the placement of a main estate entry point within this area.

2. Land extending from Mather Drive fronting Flynn Drive (170 ha)

This land contains some sand quarrying activity (western end of Lot 2477) and some areas (particularly southern part of Lot 240) will have limited potential for resource extraction based on the proposed levels. The willingness of at least two major landowners to make land available for development and abuttal with Flynn Drive presents an alternative location for first stage development. This potential may be enhanced with the possible development of a major industrial enterprise (Laminated Veneer Lumber Plant) on Lot 53, which may generate some initial development impetus.

Given that the short term areas contain approximately 227 hectares, this is likely to satisfy short term demand assuming the land is made available during that period. The medium term areas mostly reflect remoteness from service infrastructure and likely first stage development areas, rather than the development intentions of the landowners.

The exception is the southern portion of Lot 21 (Cockburn Cement land). The location of this land is ideally placed for short term development, having close and direct linkage to Wanneroo Road via Flynn Drive. Its identification as medium term is a direct reflection of the stated intentions of the landowner to maintain the land in an undeveloped state in the short term.

8.0 NEERABUP INDUSTRIAL AREA STRUCTURE PLAN

8.1 Structure Plan

The Neerabup Industrial Area Structure Plan, shown in **Figure 8.1** provides the statutory framework for planning within the NIA.

The Structure Plan demonstrates the preferred land uses and movement network within the NIA. Any modifications to the Structure Plan will need to be undertaken in consultation with Council and the WAPC.

8.2 Zones

The zones for the NIA are as follows:

- General Industrial;
- Service Industrial; and
- Business

These zones will facilitate predominantly development of General Industrial land being the primary purpose of the estate and will also allow flexibility for a variety of activity in particular locations within the estate with differing development criteria to support the General Industrial activities. Design guidelines may be prepared for the various zones to control and guide particular aspects of development. For example development at key intersections may be encouraged to include reduced setbacks and promote particular architectural styles.

The zones applied are in accordance with the zoning classifications under DPS2. The scheme provisions for these zones will be applied to development with some exceptions and additions as specified in Part Lof the document as described below.

8.2.1 General Industrial

The General Industrial Zone encompasses the majority of the land within the Structure Plan area.

In accordance with DPS2, "the General Industrial Zone is intended to provide for industrial development which the Council considers would be obtrusive in, or detrimental to, the amenity of the Service Industrial Zone.

The objectives of the General Industrial Zone are to:

- a) accommodate a wide range of industrial activities, including those generally involving production, processing, storage, wholesaling or distribution processes; and
- b) minimise adverse visual and environmental effects of industrial uses on surrounding areas."

Specifically, the NIA General Industrial Zone is intended to provide attractive industrial sites harmonious with surrounding land uses.

The permissibility of uses and development provisions shall be in accordance with the General Industrial Zone. As mentioned within Section 5.3, there is the need to ensure that industries which pose an off-site risk through storage and handling of dangerous or hazardous goods are established at least 1,000m away from the Raceway. For this reason, it is proposed to exclude hazardous industry from the General Industrial precinct. This is not considered to present any significant constraint, as hazardous industries would not typically be desirable within a General Industrial estate.

8.2.2 Service Industrial

The Service Industrial Zone is generally located adjacent to Flynn Drive and the major internal spine roads connecting to Flynn Drive, to take advantage of the greater exposure in these locations.

Possible extensions along peripheral roads may be entertained, but this should be reassessed as development and demand unfolds. Extension of the Service Industrial land should not be allowed to detract from the principal purpose of the Neerabup Industrial Area as a location for General Industry.

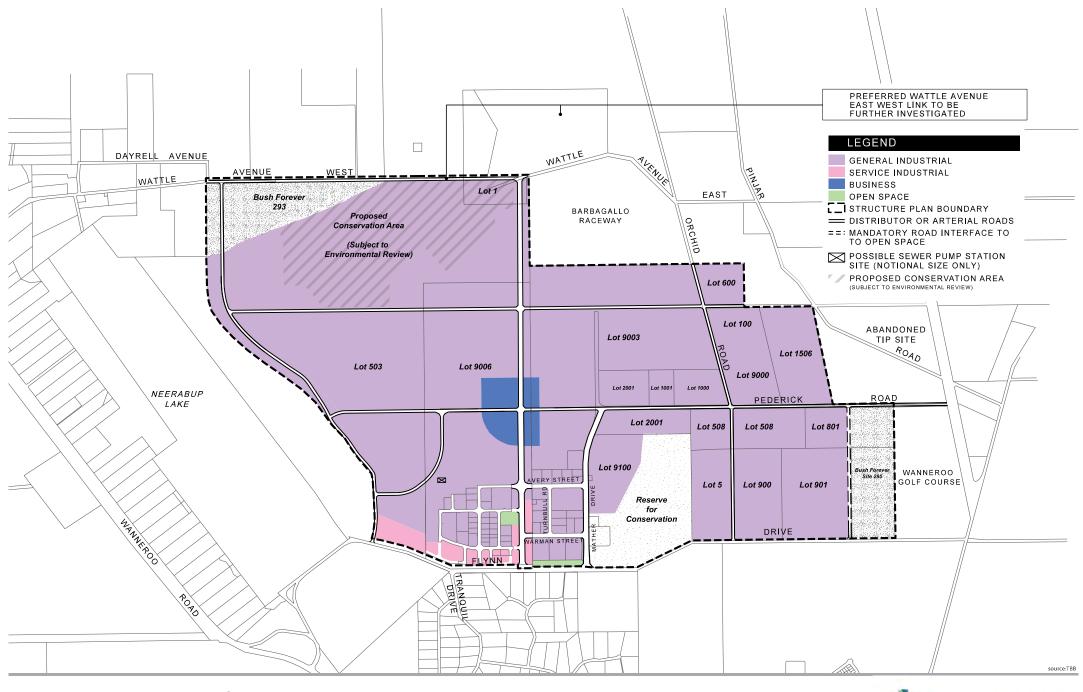


Figure 8.1 - Local Structure Plan
Neerabup Industrial Area





In accordance with DPS2 "the Service Industrial Zone is intended to provide for a wide range of business, industrial and recreational developments which the Council may consider would be inappropriate in Commercial, Business and General Industrial Zones and which are capable of being conducted in a manner which will prevent them being obtrusive, or detrimental to the local amenity.

The objectives of the Service Industrial Zone are to:

- a) accommodate a range of light industries, showrooms and warehouses, entertainment and recreational activities, and complementary business services which, by their nature, would not detrimentally affect the amenity of surrounding areas; and
- b) ensure that development within this zone creates an attractive façade to the street for the visual amenity of surrounding areas."

Specifically, the objectives of the NIA Service Industrial Zone are to:

- encourage high quality service, business and commercial activity at the entrance to the NIA to take advantage of greater exposure generated by the industrial park and passing trade at these locations; and
- b) enable the seamless transition of uses extending into the General Industrial Area

The permissibility of uses and development provisions shall be in accordance with the Service Industrial Zone of DPS No.2.

8.2.3 Business

The Business Zone is located at the centre of the Structure Plan on the major north south spine road. This precinct has been identified in recognition of its strategic location at the centre of the Structure Plan area to encourage more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, both businesses and employees.

In accordance with DPS2, "the Business Zone is intended to accommodate wholesaling, retail warehouses, showrooms and trade and professional services and small scale complementary and incidental retailing uses, as well as providing for retail and commercial businesses which require large areas such as bulky goods and category/theme based retail outlets that provide for the needs of the community but which, due to their nature, are generally not appropriate to or cannot be accommodated in a commercial area.

The objectives of the Business Zone are to:

- a) provide for retail and commercial businesses which require large areas such as bulky goods and category/theme based retail outlets as well as complementary business services; and
- ensure that development within this zone creates an attractive façade to the street for the visual amenity of surrounding areas."

Specifically, the objectives of the NIA Business Zone are to:

- facilitate the provision of community/commercial services to support business and the workforce within the industrial estate;
- b) minimise the need for local (work day) convenience retail and support business demand to leave the NIA and access centres in other localities (i.e. maximise sustainability); and
- ensure that development within this precinct creates an identifiable central place for functional and legibility purposes.

The permissibility of uses and development provisions shall be in accordance with the Business Zone of DPS No.2 to ensure that the necessary support activities are able to locate within the NIA. In addition to those uses permitted under the Scheme, it is considered appropriate to allow limited shop development in the Business precinct. This will ensure that uses such as a newsagency, chemist, delicatessen etc, which are entirely appropriate within the Business precinct, are allowed.

It is therefore, proposed to include Shop as an 'A' use and to limit the floorspace per shop to 300m² NLA. This will ensure development in scale with the NIA and in particular the Business Zone.

9.0 SERVICING

9.1 Sewerage System

9.1.1 Internal System

The lots created within the NIA Structure Plan area are proposed to be served by a gravity sewer system. The system will gravitate to two pump stations located at the west and east boundaries of the area.

The current developed area on Mather Drive is served with individual septic tanks and these lots would be connected to the system when constructed.

The system will be designed in accordance with the Water Corporation Sewer Design Guidelines and would cater for waste waters as permitted in their Industrial Waste Policy. This policy generally requires pre-treatment of waste where the waste characteristic exceeds allowable discharge quality. The policy is applied on an individual industry basis.

The system derived for this Structure Plan assumes that resource extraction will occur to the levels indicated in the Final Surface Contour Plan. Alternatives of temporary pump stations exist where extraction and development do not occur sequentially.

9.1.2 External System

The NIA Structure Plan area is immediately north of Carramar and Cockman areas which are serviced through the North West Special Headworks Agreement (1989). The northern limit of this agreement area is Flynn Drive. The sewer planning is in a very preliminary stage. The proposed two permanent sewer pump stations as described in the Internal Sewers section with pressure mains to the Burns Beach Main Sewer in Connolly drive to the north west is the Water Corporations preferred system. Part of the Burns Beach sewer is constructed in Connolly Drive but is dormant and not connected to an outfall. Depending on the rate of development required within the industrial area it may be necessary to construct the permanent pump station and temporary pressure mains to existing sewers in Carramar and Banksia Grove Estate south of Flynn Drive.

An economic analysis will be required to determine this alternative when development rates become apparent.

An economic analysis will be required to determine this alternative when development rates become apparent.

9.2 Potable Water

9.2.1 Internal System

The lots created within the NIA Structure Plan area are proposed to be served with a water distribution system constructed in accordance with the Water Corporation Design Criteria.

The existing developed area on Mather Drive is not serviced by a system but uses individual bores. It is proposed that these lots would be incorporated into the Water Corporation scheme.

To preserve potable water it is appropriate for individual lot owners to use superficial groundwater drawn from bores for fire and landscaping requirements where possible.

9.2.2 External System

The water supply for the study area will come from the Wanneroo Tank and large connecting main to a high level tank on land immediately north of Wattle Avenue. The Water Corporation has advised that a site has been secured and this is near the Fire Lookout. These are major headworks for which the Water Corporation has yet to derive a full scheme.

9.3 Electrical Power

Electrical power will be distributed by means of an underground power system throughout the study area in accordance with State Government Policy.

Power supply will come from a proposed 132Kv main to be constructed from the Pinjar Power site through the estate including a transformer site. Power will be fed from this system.

Initial supply into the study area is envisaged to comprise a series of feeders from existing aerial mains in Flynn Drive.

In an industrial estate there is considerable difficulty in determining ultimate power load requirements in a manner which enables economical construction and avoids reworking live cables. The rational approach is to develop the system in a piecemeal fashion to retain the greatest flexibility.

Western Power has implemented a cost sharing process to achieve equity between adjoining owners for the High Voltage network.

Western Power has provided confirmation of its proposal for the area, refer **Appendix 7**.

9.4 Stormwater Drainage

The stormwater drainage system will be constructed in accordance with City of Wanneroo Design Guidelines. This will entail a two part system.

The first part is within the individual lots where the lot owner will control and dispose of the stormwater from the lot, within the lot. This can be achieved by soakwells or open soakage sumps to suit the lot owner's planning. Care will be needed at the time of Development Application to control what is disposed into the soakage system to maintain the groundwater quality.

The second part is the management of stormwater from road reserves and public spaces. This is proposed to be managed with a series of fenced open soakage basins located throughout the Industrial Area. A preliminary assessment of locations and land area requirements has been made and these are shown on **Figure 9.1**.

With regard to the estate amenity it may be beneficial to convert some of these soakage structures from a fenced arrangement to an open landscaped style to create parkland settings which would permit passive surface use for most of the year. The locations for this type of drainage structure can be as shown for the fenced sumps or can be relocated to road intersections. Land area requirements are in the order of three times the land requirements for fenced sumps.

To ensure an appropriate level of environmental protection, a Drainage, Nutrient and Water Management Plan will be required to be prepared prior to any subdivision or development.

9.5 Gaseous Energy

Gas will be distributed by means of a reticulated system connected to the Alinta Gas suburban system.

The gas supply will be drawn from existing mains in Pinjar Road.

9.6 Waste Disposal

9.6.1 Solid Waste Disposal

Solid waste generated by industrial activity remains the responsibility of the lot owner to dispose of in accordance with relevant local and state regulations.

The lot owner has several options depending on the volume and nature of the waste either through the municipal system, waste recyclers or disposal to an appropriate facility.

Disposal of solid waste would be assessed at Development Application stage with the major consideration being health and protection of groundwater.

9.6.2 Liquid Waste Disposal

The provision of a sewerage system will provide for the disposal of sewage and wastewater. Wastewater will need to meet the requirements of the Water Corporation and their licensing provisions before discharge to the sewer system.

The disposal of other liquids such as oils, solvents, fats and hydrocarbon derivatives will be the responsibility of the creator of the liquids. The disposal of these liquids is governed by local and state laws and environmental legislation.

9.7 Forward Service Planning

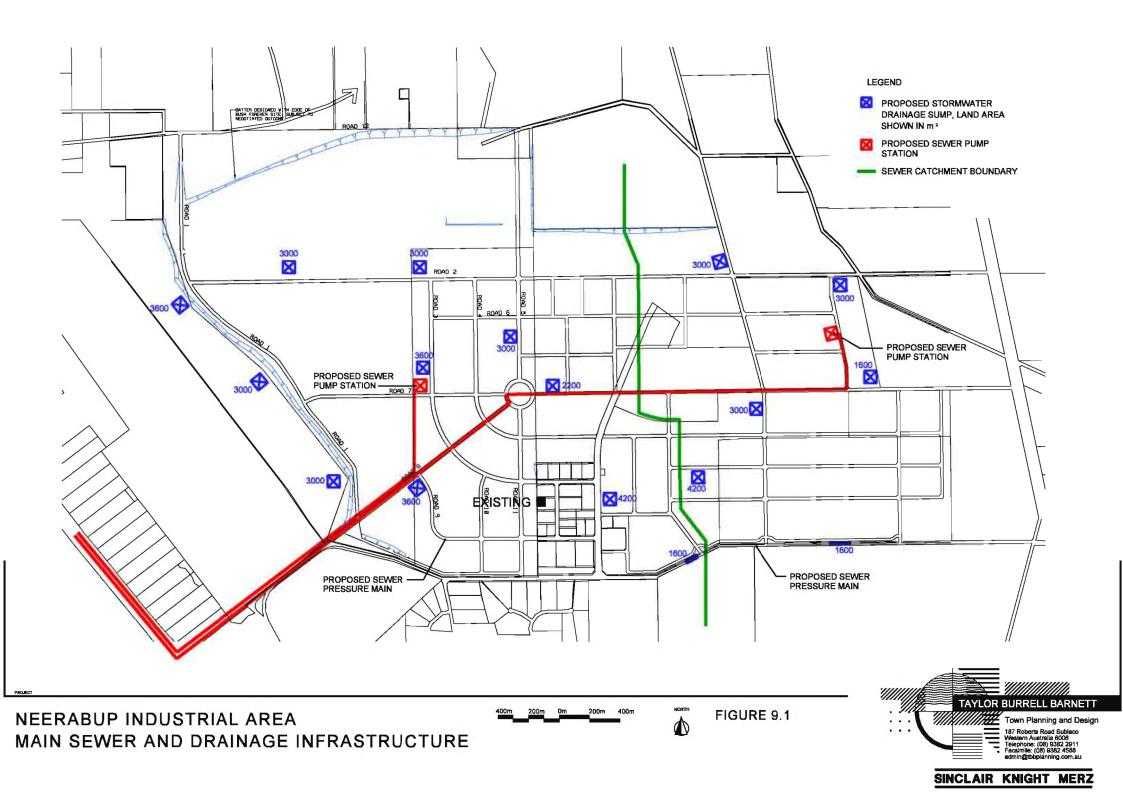
To achieve the proposed Structure Plan preliminary service layouts have been derived to establish broad service planning.

To achieve orderly development it is important that applications be made to service agencies, particularly the Water Corporation to determine service schemes and provide for construction under capital work budgets.

It is recommended that, prior to commencement or development commencing within the Structure Plan area, service concept plans be prepared for sewer, water, electric power, drainage, gas and communications services and submitted and agreed with the service authorities. These concepts will be based on a total development philosophy and will provide a basis to coordinate future individual lot owner developments.

The preparation of service concept plans at the initial development stage will ensure compliance with current standards. It should be noted that several design standards are under major review in 2002. For drainage and sewer preliminary concept plans have been prepared and are included in the Structure Plan document. Provisions for cost sharing are being developed by Water Corporation for minor works and Western Power have a system for sharing HV reticulation costs. Thus cost sharing under a development cell arrangement could be developed in conjunction with theses systems.

The adoption of service concept plans will also enable forward planning by the service authorities for capital works funding for the external site service connections.



10.0 IMPLEMENTATION

The primary objective of the NIA Structure Plan is to establish a planning framework that will enable the area to develop in the most orderly and integrated manner, meeting sound planning principles, and promoting high quality development solutions.

The statutory vehicle used to implement this objective is DPS2, which was promulgated in July 2001. DPS2 is important for two reasons:

- i) It applies an Industrial Development Zone over the majority of the study area. This zoning will facilitate all of the development objectives defined in this Structure Plan; however, it also requires that the Structure Plan be adopted by both the Council and the WAPC (pursuant to Part 9 of the Scheme) prior to the commencement of any subdivision or development.
- ii) The Scheme contains a comprehensive set of Structure Plan provisions which gives the Structure Plan the same force and effect as if it were a provision of the Scheme, once it is formally adopted.

In order for the Structure Plan to fulfil its function as a formal component of the planning framework a number of actions are required to be undertaken, or finalised. The following are the key actions required to complete the framework.

10.1 Structure Plan Adoption

Pursuant to Clause 3.15 of the Scheme, it is a prerequisite of subdivision or development that an Agreed Structure Plan has been prepared and adopted by Council and the WAPC under the provisions of Part 9 of the Scheme.

10.2 Infrastructure Cost Sharing

Some of the major infrastructure works necessary as part of the Structure Plan are likely to pose significant cost burdens on some landowners whilst others may derive the benefit of such works without contributing to their development.

There are three main methods of land development co-ordination and cost sharing:

- i) Development Town Planning Schemes:
 - a) Resumptive Development Schemes;
 - b) Guided Development Schemes.
- ii) Provisions incorporated into District Zoning Schemes (Generic Provisions);
- iii) Private Landpooling Schemes.

The incorporation of generic provisions into District Zoning Schemes is becoming an increasingly popular method, particularly within Local Authorities with considerable scope for land development.

This is the case in the City of Wanneroo, where infrastructure cost sharing provisions have been included in DPS2 (Parts 10 and 11). Whilst they are generic provisions, they are primarily tailored to the East Wanneroo area which is divided into a number of development cells, including the industrial development areas contained within Cells 7 and 8 (Wangara).

In considering the application of comprehensive cost sharing arrangements, such provisions add complexity to the development process, and should only be imposed where there are substantial inequities between landowners - typically where land ownership within the Cell is highly fragmented.

The NIA contains only 7 landowners in total (not including owners within the developed Mather Drive area), and three of those landowners LandCorp, Cockburn Cement and the City of Wanneroo occupy approximately 80% of the total area. However, notwithstanding the small number of landowners, it is reasonable that some method of cost sharing should be applied so that the major infrastructure works, such as upgrading and construction of the surrounding district/regional roads and major intersection treatments will be equitably funded by all landowners.

Given that Council's Town Planning Scheme is already structured around the use of generic cost sharing provisions, it is considered that this would be the most appropriate and straight forward manner of implementing a cost sharing arrangement for Neerabup.

STRUCTURE PLAN NO. 17

Unfortunately, the specific reference of the existing Scheme provisions to the East Wanneroo planning cells makes it difficult to simply extend their application to the Neerabup Industrial Area, notwithstanding that the provisions relating to Cells 7 and 8 (Wangara Industrial Area) would fulfil a similar function.

It is therefore recommended that new provisions be introduced into the Scheme, by way of a scheme amendment, to establish a cost sharing arrangement particularly related to, and suitable for, the NIA.

10.2.1 Structure of Scheme Provisions

To be consistent with other similar provisions in the Scheme, the Infrastructure Cost Sharing Provisions will be made up of three separate components:

i) Generic Scheme Provisions

Providing the statutory framework for requiring the payment of contributions; these provisions will be contained in the main body of the scheme text.

ii) Schedule to Scheme

Defines the actual infrastructure items (cell works) which are to be funded through developer contributions.

iii) Schedule to Local Structure Plan

Provides specific details of the actual/projected costs of the cell works, and the resultant developer contribution rates.

The relationship between these components is graphically illustrated in **Figure 10.1**. This figure also includes, for discussion purposes, infrastructure items which are likely to be included as cell works for the purpose of developer contributions. It is emphasised that the defined items are based on preliminary considerations at this time, and it will be necessary to undertake a more detailed assessment of infrastructure requirements in order to properly define the cell works.

10.2.2 Implementation Actions to Facilitate Infrastructure Cost Sharing

The facilitation of a cost sharing arrangement for the NIA will require the following actions:

1. Scheme Amendment

a) General Scheme Provisions

The Scheme will require amendment to introduce the statutory framework to empower Council to require Developer Contributions. This could be effected in one of two ways:

- Introduce new provisions specifically related to the NIA; or
- ii) Modify the existing generic provisions relating to East Wanneroo cells 1 to 8.

Given the structure of the East Wanneroo provisions, their modification is likely to be complex, and it is considered that the most straight forward method would be through Option (i).

b) Introduction of a new Schedule to the Scheme to define Specific Cell Works.

2. Introduction of Scheme Costs into Structure Plan

Under the City of Wanneroo Structure Planning provisions, the details of cell works and infrastructure costs are contained in a Schedule within the Implementation section of the Structure Plan. The schedule may be included in the initial Structure Plan documentation adopted by Council and the WAPC; alternatively it may be introduced at a later stage, as an amendment to the Structure Plan.

In the case of the NIA, it is likely that the actual cell works, and cost estimates, will not be sufficiently defined to include in the initial Structure Plan documentation. It may therefore be presented to Council at a later stage as an amendment to the Structure Plan.

NEERABUP INDUSTRIAL AREA STRUCTURE PLAN NO. 17

FIGURE 10.1: Infrastructure Cost Sharing Structure

Relationship between Scheme, Structure Plan and Precinct Contribution Arrangements

Generic Scheme Provisions

- Structure Plans
- Infrastructure Cost Contributions

Schedule to Scheme

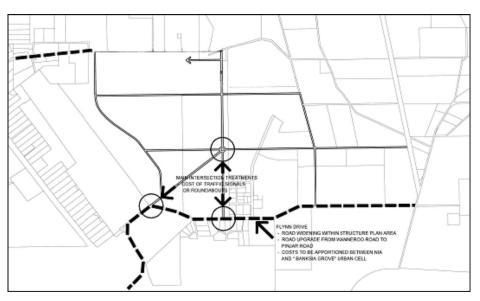
Neerabup Industrial Area Planning & Developer Contribution Arrangement Cell Works and Contribution Provisions

Suggested Cell Works

- Structure Plan costs (including specialist studies)
- Scheme Amendment costs
- Flynn Drive road widening (within site)
 - construction/upgrade from Wanneroo Road to Pinjar Road
- Major Intersection Treatments signals or round-a-bouts
 - main entrance west
 - main entrance east
 - central intersection
- Costs of preparing other strategies and management plans such as:
 - Landscape Master Plan
 - Design Guidelines
 - Service Concept Plans
 - Flora, Fauna, Karat surveys
 - Drainage, Nutrient and Water Management Plan
- Admin & other costs

Schedule to Local Structure Plan

Summary of actual/estimated infrastructure costs and contribution rate



Plan Showing Proposed Cell Works

Note:

The suggested cell works listed above are indicative only. A complete list of cell works will be identified in future following a more comprehensive assessment of detailed infrastructure requirements. The final contribution arrangement may include items not listed above and may remove some of the items listed above. In particular Section 7.0 Cell Works of Part I of the Structure Plan identifies the Cells Works contemplated at this Stage.

00/47 Rev: 14

STRUCTURE PLAN NO. 17

10.3 Additional Works Prior to Subdivision and/or Development

10.3.1 Preparation of Design Guidelines and Landscape Master

The visual amenity and design standards are important to ensuring quality industrial development. It is therefore, recommended that Design Guidelines and a Landscape Master Plan are prepared covering key elements of the NIA. These include:

- Main estate entries;
- The Core Business area:
- Areas adjacent to the Lake Neerabup Parks and Recreation reservation; and
- Service Industrial areas fronting Flynn Drive.

The Landscape Master Plan should address the opportunities for planting of the woolly bush to support the population of rare bees where possible.

10.3.2 Bush Forever - Negotiated Outcomes

It is necessary for individual owners affected by Bush Forever sites to negotiate outcomes direct with the DPI. The Structure Plan has been designed to allow for industrial expansion in the event that the sites are removed or reduced.

10.3.3 Karsts

Due to the potential for karsts (caves and channels) including communities of troglobitic fauna and stygofauna within the NIA there may be the need at the subdivision and development stage to liaise with the Department of Environmental Protection regarding appropriate management requirements.

10.3.4 Public Purpose Reserve

Completion of the MRS amendment to rezone the Public Purpose reserved land to Industrial zone, and subsequent amendment to DPS2 to effect a similar change to the local zoning.

10.3.5 Groundwater Contamination

It is recommended that the City of Wanneroo undertake a detailed assessment of groundwater quality to determine the extent of the leachate plume and undertake remediation where necessary.

10.3.6 Flora and Fauna

Prior to the clearing of natural vegetation and habitat, surveys of flora and fauna may be required to be undertaken.

If it is identified that there is priority or threatened species located within the NIA, it will be necessary for individual owners to liaise with CALM as to their development timeframes to ensure that there is ample opportunity to develop appropriate management and/or preservation strategies.

Prior to land clearing by individual owners, a Dieback Hygiene Plan should be prepared.

10.3.7 Stormwater Management

Prior to subdivision or development commencing within the Structure Plan area, a Drainage, Nutrient and Water Management Plan should be prepared, and such plan should, if considered necessary by Council, include a contingency plan to ensure the protection of Lake Neerabup.

The cost of preparing the Drainage and Nutrient Management Plan should be included as a Cell Work under the developer contribution arrangement.

APPENDIX 1 Consultation

DRAFT

Larger Landowners within the NIA Structure Plan

Consultation was undertaken with the larger landowners within the Structure Plan area. A. An information package, refer attached, was sent to tandowners who were also invited to attend a meeting on the 11th of October 2000. The purpose of the meeting was to discuss the purpose of the study and present the opportunities and constraints and obtain any comments from owners that may inform the preparation of the Structure Plan.

It was requested that owners complete a Landowners Intentions Survey to enable the consultants to include this information within the Structure Plan, particularly when determining issues such as staging. Those responses to the survey are attached.

Existing Industrial Landowners

A letter was sent to those owner of land within the existing industrial area fronting Flynn Drive at the intersection with Mather Drive, refer attached. The letter was to advise the owners of the study and provide an opportunity to phone the consultants to discuss any issues that may be relevant in the preparation of the Structure Plan.

There was a very minimal response to the letter.

Barbagallo Raceway

A meeting was held with the General Manager of the Barbagallo Raceway. The feedback from the raceway is summarised as follows:

- The raceway is urgently in need of a second access road into the facility. This is partly for safety reasons, but also to alleviate the major congestion currently occurring during major events.
- Whilst the connection of Wattle Avenue is seen as the ultimate solution to this problem, the raceway would be happy for an alternative
 access road as an interim measure. This need not be a fully constructed public as long as access is suitable for large freight vehicles
 carrying racing cars, and for emergency purposes.
- The raceway does not consider there to be any undue conflict between its operations and future industrial development within the NIA. In fact, the raceway considered that the NIA would open up opportunities for automotive industries, particularly related to car racing, to locate, in close proximity to the raceway facility.
- The raceway is progressively constructing earth bunding around the track to improve spectator visibility. In this regard, the raceway is looking for any excess landfill which may arise as a result of the earthworking for the industrial estate.

Government Stakeholders

The following government agencies were consulted during the research phase:

City of Wanneroo

DRAFT

- Ministry for Planning
 Department of Environmental Protection
 Water and Rivers Commission

- Water Corporation
 Department of Minerals and Energy

Summary notes of meetings with these agencies are appended.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting Held with the City of Wanneroo and Ministry for Planning

Venue:

Offices of City of Wanneroo

Date:

23rd August 2000

Attendance:

Lex Barnett Taylor Burrell
Nick Hodges LandCorp

Charles Johnson City of Wanneroo
Phil Thompson City of Wanneroo
Carlo Famiano Ministry for Planning

Lex Barnett (LB) opened the meeting by explaining the primary objectives and current status of the Structure Plan study, and that the meeting was part of the preliminary stakeholder consultation.

Carlo Famiano (CF) indicated that, whilst he was representing the MfP at the meeting, he was not familiar with the site or its history.

LB explained that he had invited Neil Foley from the MfP to the meeting, and had endeavoured on several occasions over the past week to secure confirmation that Mr Foley would be available, knowing that Mr Foley was familiar with the past history of the Neerabup Industrial Area. Despite having left several messages, and explaining that the meeting could be rescheduled if Mr Foley were not available at the allocated time, LB received no response from the Ministry until Mr Famiano rang on the morning of the meeting to obtain some details.

Previous Structure Plans

LB raised the matter of the 3 previous structure plan documents and the events surrounding those studies were generally discussed. LB queried the current status of the most recent structure plan review undertaken by SMEC.

Phil Thompson (PT) explained that Council had considered the report at officer level, and were generally in agreement with its conclusions and recommendations. Council had forwarded a copy of the report to the Ministry for its comments; however, no response had been received at this stage.

CF agreed to pursue the matter in the Ministry and advise Council in due course.

Zoninas

PT confirmed that, under the current TPS No. 1, the major part of Lot 22 (LandCorp land) as well as all of the existing Mather Drive Subdivision, is zoned General Industrial. The balance of the study area is primarily zoned Rural.

Under the proposed DPS No. 2, it is proposed that all of the study area will be primarily zoned industrial Development.

Key Issues

In considering design opportunities and constraints for an Industrial Structure Plan, the key issues were identified:

- The Barbagello Raceway is in desperate need of an alternative access road, which would logically be created by the future connection on Wattle Avenue west and east.
- BushPlan sites Council is not necessarily in agreement with the identified Bush Plan sites. In fact, Council has submitted an objection to the portion of site 295 that affects Council's own land on Flynn Drive.
- Council will be concerned to ensure that the Structure Plan discourages industrial traffic from using the future Blue Road link to Flynn Drive from the south extending through the Banksia Grove Urban Cell.
- It was agreed that Flynn Drive would form the major road connection between the NIA and the regional road system, with a possibility that a direct link to the Freeway and passenger rail system may ultimately be developed through the extension of Neerabup Drive through to Wanneroo Road. In this regard, the existing alignment of Flynn Drive, in the vicinity of Wanneroo Road intersection, is regarded as inadequate, both in construction standard and road geometry. A more direct route, consistent with the MRS Blue Road alignment, would be strongly preferred by Council.
- Basic Raw Material Extraction in addition to the Ilmestone extraction activity on LandCorp's site, there are a number of sand extraction operations at the eastern end of the study area. Council is currently experiencing some pressure to increase the extent of extraction operations; however, Council does not wish to entertain any additional extraction, until such time as the Structure Plan defines the desired finished levels. For this reason, Council is keen to see the structure plan progressed as quickly as possible.

Consultation

LB explained that it was intended to hold a meeting with landowners within the study area during the early stages of the study, to explain the study objectives, and obtain feedback prior to finalising the Structure Plan.

PT agreed to provide an up to date list of landowner contact details for this purpose.

Formal Approval Process

LB explained that, in contrast to the previous structure plan exercises, the objective of this study was to produce a Structure Plan and Report to a level of detail and in a suitable format for formal adoption by Council and the Ministry for Planning in accordance with the Structure Plan provisions of either TPS 1 or DPS 2. This would provide Council with a formal planning framework to consider, not just industrial land development proposals, but also future resource extraction proposals.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting with Department of Environmental Protection & Water and Rivers Commission

Venue: Offices of Department of Environmental Protection

25th August 2000 Date:

Darren Walsh DEP Attendance: DEP Cilla de Lacey

Marnie Leybourne WRC

Lex Barnett Taylor Burrell

Barbara Brown Sinclair Knight Merz

LB explained the purpose of the meeting and the general objectives of the NIA Structure Plan.

Key issues raised during the meeting were:

- Water Quality Management any contamination of groundwater within the NIA may impact upon Lake Neerabup. WRC and DEP are aware that Basic Raw Materials extraction may lower ground levels to within close proximity of groundwater in some areas. Treatment of groundwater quality will be an important environmental issue.
- It was acknowledged that Lake Neerabup and its environs are adequately protected by the existing MRS Parks and Recreation Reservation.
- BushPlan the Structure Plan will need to acknowledge the proposals contained in Bushplan. DW acknowledged that BushPlan is not yet ratified, however, the strategy is at an advanced stage, and has received general endorsement by Cabinet and all relevant government agencies. LB made the point that, if the BushPlan sites were currently to be shown as open space or conservation, then it would pre-empt the final outcome of BushPlan and diminish the ability of the affected landowners to negotiate an alternative outcome. DW agreed with this, and agreed that the acknowledgment of the Bushplan within the Structure Plan could be presented in a neutral manner, which simply identified the BushPlan sites as areas requiring further negotiation.
- Bee P3 LB noted that the southern BushPlan site (295) appeared to be primarily intended to protect the habitat (Woolly Bush) of a rare bee. LB questioned whether the particular type of Woolly Bush was also rare, or whether it was possible to relocate the bee given that Woolly Bush is generally a common species in the region. It was acknowledged that this was a valid question, which could not be answered at the meeting.
- Barbagello Raceway noise the previous written advice of the DEP was generally discussed. There was general acknowledgment that the potential for noise conflict with the raceway for businesses which will ultimately situate within a General Industrial Area is likely to be minimal; however, DW made the point that

if the DEP received a noise complaint which found the raceway to be contravening the noise regulations, then the DEP would be obliged to act against the raceway. It was agreed that the issue of potential noise conflict would need to be thoroughly addressed in the Structure Plan Report.

- Risk the DEP is concerned to ensure that the Industrial area does not allow potentially high risk Industry (ie industry which stores large quantities of hazardous materials) which may cause risk to the safety of raceway patrons.
- Karsts BB acknowledged the potential existence of karsts in the area, although it was agreed that the known formations are not actually within the proposed development area. There may be a need to examine the area for the existence of karstic formations at some stage during the planning process. Of particular concern is the potential existence of rare Stygofauna known to exist within such formations near the groundwater table.
- Process DW acknowledged that the Industrial Zoning of the NIA has been considered by the DEP as part of DPS 2, and this fulfils the statutory assessment responsibilities of the DEP. There would be no further statutory obligations to refer the Structure Plan to the DEP, unless new environmental issues are deemed to arise as a result.

Notwithstanding, it is possible for the City of Wanneroo to refer the proposal to the DEP for informal comment.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting with Water Corporation

Venue:

Offices of Water Corporation, Leederville

Date:

25th August 2000

Attendance:

Mike Hollett

Water Corporation

Lex Barnett

Taylor Burrell

Bruce Keay

Sinclair Knight Merz

LB explained the purpose of the meeting, and the objectives of the Structure Plan proposal.

BK asked for confirmation that the NIA would fall within the Special Agreement area for sewer and water provision, which applies to the urban development to the south. MH confirmed that the NIA has been factored into the Special Agreement area. This will mean that the Water Corporation will, subject to suitable notification, provide all main sewer and water infrastructure, and recover costs through a special headworks agreement with subsequent developers.

The issue of the Public Purpose Reservation in the north eastern corner of the study area (which was reserved for water supply purposes) was raised. BK advised that he had received conflicting advice about the future need for the site, and asked for confirmation.

MH was unable to confirm at the meeting, and agreed to investigate and advise at a later date. (subsequent advice from MH confirmed that the Water Corporation no longer required the reservation for Water supply purposes, and that it was no considered surplus to requirement).

MH requested that the Water Corporation be kept informed of the progress of the NIA Structure Plan, and in particular any future staging proposals, so that the corporation could continue to review its own infrastructure planning strategy.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting with Department of Minerals and Energy

Venue:

Offices of Dome

Date:

1st September 2000

Attendance:

Tony Smurthwaite

Lex Barnett Taylor Burrell

Bruce Keay

Sinclair Knight Merz

DOME

LB explained the purpose of the meeting, and the general objectives of the Structure Plan proposal.

TS welcomed the opportunity for input, and explained that DOME recognised the importance of balancing the need to protect Basic Raw Materials against the needs for the provision of land supply for various purposes (urban, industrial, etc)

TS also explained that the Basic Raw Materials Policy was reviewed about 12 months ago and the revised BRM Policy was promulgated as section 5AA Policy (SPP10), gazetted on the 28th July 2000.

One of the key distinctions between the revised policy and the original policy was that SPP10 recognises the influences of BushPlan.

TS acknowledged that there was a problem with landowners in some priority resource areas who were not utilising the resource in a timely manner, effectively "locking away" not only the Basic Raw Material, but also the potential subsequent use of the land. It is currently difficult to place any pressure on extraction licence holders, as the length of licences are typically 21 years plus 2 options. DOME is currently looking at the possibility of issuing reduced lease periods on a "use or it lose it" basis.

Rehabilitation

One of the problems currently experienced in limestone extraction areas, is the quality of land rehabilitation after extraction is complete. Rehabilitation to a natural state is difficult, after the limestone is removed, as many of the native species live only on limestone cap. In circumstances where the land is ultimately proposed to be developed for an alternative use (such as the Neerabup Industrial Area) this alleviates the rehabilitation problem.

Other Contacts within DOME

- Charles Newland Mining Operations Division (oversees Notices of Intent and Environmental Management Plans)
- Mark Cannon

187 Roberts Road Subiaco 6008 PO Box 503 West Perth Western Australia 6872 Telephone (08) 9382 2911 Facsimile (08) 9382 4586 Email planning@taylorburrell.com.au

Our Ref:

KW/kj00/47

Dear Sir

Preparation of Structure Plan for Neerabup Industrial Area RE:

We refer to the recent letter from Council advising that Taylor Burrell will be undertaking the preparation of the Neerabup Industrial Area Structure Plan. We are currently in the initial phases of the project, this includes collating and reviewing any relevant information and reviewing the previous studies.

We would also appreciate your input into the process and as such we invite your attendance at a meeting to be held at the City of Wanneroo Civic Centre, Civic Drive Wanneroo (located above the Wanneroo Library) on Wednesday the 11th of October at 4.30pm.

The purpose of the meeting is to introduce the study team, discuss your development intentions and present our initial findings including the opportunities and constraints to the site. These discussions and your input will then be used in the formulation of the Structure Plan for Neerabup. Attached is a draft agenda for your consideration.

Could you please confirm your attendance with Liliana Greco by Friday the 29th of September 2000.

Should you wish to discuss this correspondence please do not hesitate to contact Karen Wright of this Office on 9382 2911. We look forward to seeing you on the 4th of October 2000.

Yours faithfully TAYLOR BURRELL

LEX BARNETT Director



Neerabup Industrial Area – Landowners Intentions Survey

Name and Address				
Have your intention for your land altered since the release of the SMEC repor (refer attached) Yes / No				
If yes please complete the questions below.				
What is your likely extraction timetable?				
When is extraction likely to be complete?				
What is your timing for the ultimate industrial development of your land?				
Please complete and return to:				
Taylor Burrell PO Box 503 WEST PERTH WA 6872				
or				
Bring along to Landowners meeting on 11 th October 2000				

3 LAND OWNERSHIP

3.1 OVERVIEW

Figure 3.1 shows the land ownership within the study area. There are seven landowners within the study area with properties zoned industrial on the Metropolitan Region Scheme. These landowners are:

- Cockburn Cement
- City of Wanneroo
- LandCorp
- Trandos
- Borrello
- Stampalia
- Susac

The development and subdivision of the Neerabup Industrial Area for industrial uses will initially be dependent on the intentions of these landowners. Their intentions, documented in this section, reflect discussions held with each during the preparation of the structure plan review.

3.2 LAND OWNERS INTENTIONS

3.2.1 Cockburn Cement - Lot 21 Flynn Drive

Cockburn Cement owns approximately half the land in the study area. The company's holding lies in the western portion, bordering Lake Neerabup. The site represents a long-term limestone resource for the company. Representatives from the company estimate that the land will not be available for industrial development for the next 20-30 years.

3.2.2 City of Wanneroo - Lot 4 and 240 Flynn Drive

The City of Wanneroo's Lot 4 and 240 are available for industrial development.

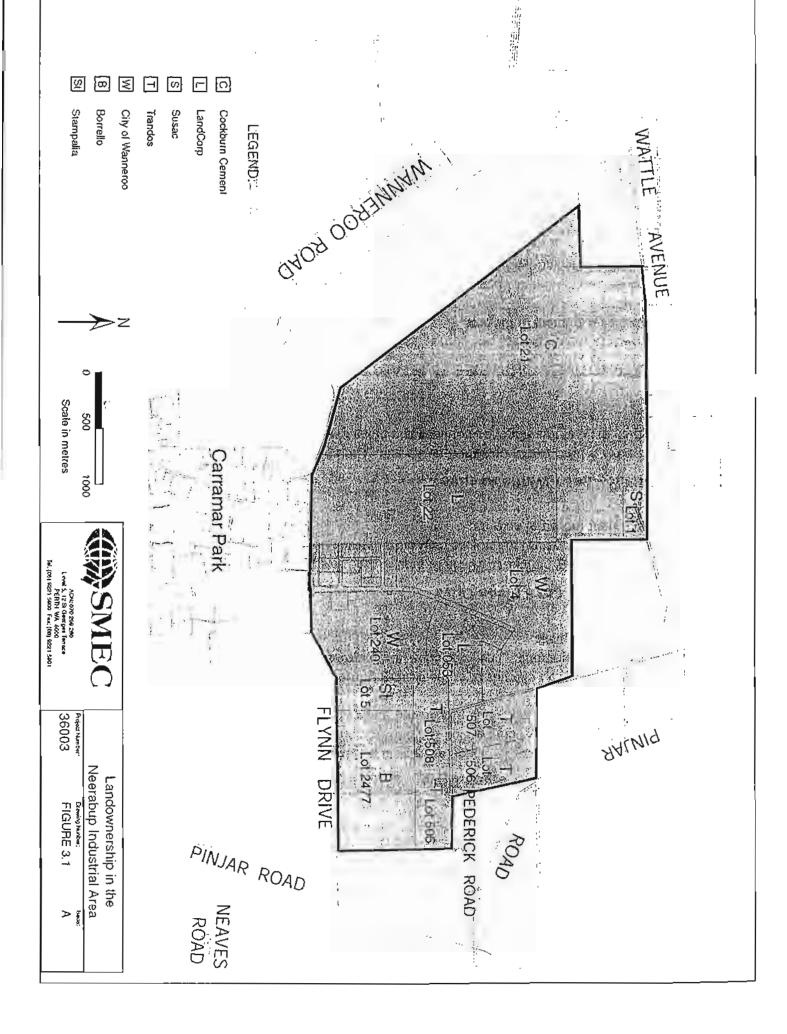
3.2.3 LandCorp - Lot 22 and 053 Flynn Drive

LandCorp is eager to commence the development of Lot 22 for general industrial purposes. The southern portion of Lot 22 is an active limestone quarry, due for completion within five years. The quarry face moves northwards. LandCorp anticipates commencing industrial subdivision and development in a staged manner, both temporally and spatially. Staged development can coincide with landscape rehabilitation of the quarry sites.

The second of LandCorp's holdings is Lot 053 which is available for early development, assuming the availability of necessary services.

3.2.4 Trandos - Lot 505, 506, 507 and 508 Pedric Street

A sand resource on the eastern three-quarters of Lot 505 is currently being extracted. The lease is due to expire in 5-7 years.



The Trandos' have a chicken farm in the north-west corner of Lot 506. A turf farm covers the remaining area with a life expectancy of approximately five years.

The Trandos sons have a five year renewable lease managing market gardens on Lots 507 and 508. However Mr Trandos does not see this as a limiting factor to this land being used for industrial activity in the short-medium term.

The family would like to see the land developed for industrial activity in seven to ten years.

3.2.5 Borrello - Lot 2477 Flynn Drive

The Borrello family holding is under a four-stage sand excavation programme. The western portion, stage 1, is currently being mined and due for completion within five years. Following this, the Borellos would like the land rehabilitated and made available for industrial development.

Bushplan site number 295 extends over the eastern portion of Lot 2477, covering stages 3 and 4 of their excavation programme. The Borrellos are currently examining the implications of the Bushplan site to their plans.

3.2.6 Stampalia - Lot 5 Flynn Drive

The Stampalias recently purchased 20 Ha of unused land from the Borrello family. They have short-term plans (within five years) to relocate their current truck depots services to the site and develop it for associated light industrial activity.

3.2.7 Susac - Lot 1 Wattle Avenue

The Susacs have a lime works operation at the site. The holding also contains untapped limestone resource which they, at this stage, do not have any plans to mine.

3.3 EXTRACTIVE INDUSTRIES TIMETABLE

Given the owners intentions set out above, Table 3.1 and Figure 3.2 document likely timing of industrial land development in the area.

As indicated by Table 3.1 and Figure 3.2 the staging of industrial development will be determined by the intentions of the various landowners.

Essentially this means:

- Cockburn Cement's land will not be available for industrial purposes for some time. The
 layout of the structure plan and development staging should be cognisant of this.
- The City of Wanneroo has no immediate development intentions for the properties.
 Council supports the industrial development of the area proceeding and would anticipate being involved in the earlier stages of development, with any viable basic raw material being extracted beforehand.

- LandCorps' holdings, particularly Lot 22, should be developed in a self sufficient way. This will allow early release without the complications of joint subdivision.
- Trandos' land will be available for industrial development in the medium-term but may have to rely on the provision of services from other areas within the estate.
- Borrello and Stampalia are looking forward to developing their land for industrial purposes in the near future. The eastern portion of Borrello's land is currently under negotiation with government conservation initiative, Bushplan.
- Susacs have long-term intentions for current limestone processing activity on their property.

Table 3.1 Extractive Industries Inventory and Land Owner Intentions

	TO THE SECOND	化产品加热等	EILS	[19] (S. 18) [1] [1] [2] [2] [2] [2] [2] [2] [2] [2] [2] [2	Lientionita//Lienses/Intailliens	Sheri	AVEURBURY Wedlem Voio	reliei Telei	
Landcorp	Lot 22	170.026 Ha	(30/19) To CSR Readymix, WA Limestone and Concept nominees until 2005	Limestone quarry.	Develop (or general industrial activity as soon as possible.	√	1		Services should commence and proceed eastwards.
	Lot 053	40,026 Ha			Available for early development.	1			Assumed availability
Cily of Wanneroo	Lot 4	203.916 Ha		Uncleared.	No immediate development intentions. Keen to develop for general industrial activity.	*			City of Wannergo considering developing for industrial lots.
	Lot 240			Uncleared.	No immediate development intentions. Keen to develop for general industrial activity.	1			City of Wanneroo considering developing for industrial fols.
Bonello	Lot 2477	83 Ha	Caramar Sands Stage 1 Being mined.	Commenced 4 stage sand excavation programme. 20 Ha In western extremity of lot has been excised.	Sand excavation for 3-5 years. Considering Industrial development once excavation complete	✓	1		Tap into servicing facilities developed for preceding industrial development.
Cockburn	Lot 21	437,498 Ha	(M70/345)	Leased for a horse riding school.	No development intentions for 20-30 year timeframe.			1	
Trandos	Lal 505	20.027 Ha	Eclipse resources	Sand excavation over entire Lot.	Sand excavation to continue.		1		Tap into servicing facilities developed for preceding industrial development.
	Lot 505	28,575 Ha		Semi cleared and accommodates a chicken farm and a turf farm.	Retain as a chicken farm. Turf farm, approximately 5 years remaining.		1		Assuming availability of necessary services.
	Łol 507	28.606 Ha		Market Garden.	3-5 year renewable lease remaining on market garden.				Assuming availability of necessary services.
	Lot 508	25.926 Ha	Eclipse resources	Market Garden.	3-5 year renewable lease remaining on market garden.		7		Assuming availability of necessary services.
Stissic	Lo1 1	8.806 Ha	30/18 Mr Susac	Small limeworks operation in south western corner, remainder unutilised.	Retain quarry and time production activities.		1		
Siampalia	Lol 5	20 Ha		Uncleared.	Relocate truck depot activity within 3 years.	1			

ATTENDANCE REGISTER

Neerabup Industrial Area Landowners Meeting 11/10/2000

Name	Interest / Address of property	Have your intentions for your land altered since the SMEC report Yes /No	Phone No.
NICK TRANDOS	3 SETOMA CAT JOONDALUP	YOS	93000321 FRX 93000228
SACK SUSAC	41 Bernedale Way Vuneraig 6023 LOT 5 PLYNN DRIVE	Mad	94481079
MARK STAMPALIA.	LOT 5 PLYNN DRIVE	YES.	9405-1077
FRANK BORRELLO	Pro Sum La 2417 FLYNN DR	YES	9402 02/1 9306 1155 FAT
PAUL ROKICH	CSR		
YONY DOBBE	COCKBURN CENENT	NO BUT HANEN'T SEEN THE REPORT	94111020
Genya Davies	Kright Frank for Cocksure Coursest		93252533
Mul Thompsen	City of Warmoros	No	94055469
Roman ZASLASKI	//	,,	\/
PAUL NEILSON	17	n	9405 5465



Neerabup Industrial Area - Landowners Intentions Survey SUSAC LIME SUPPLY PTV LIME Address

Name and Address

AN DERNEDALE WAY

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If yes please complete the questions below.

What is your likely extraction timetable?	
	l
When is extraction likely to be complete?	
NOT BEFORE 30 YEARS	
	١
What is your fiming for the ulfimate industrial development of your land?	
	١
Please complete and return to:	

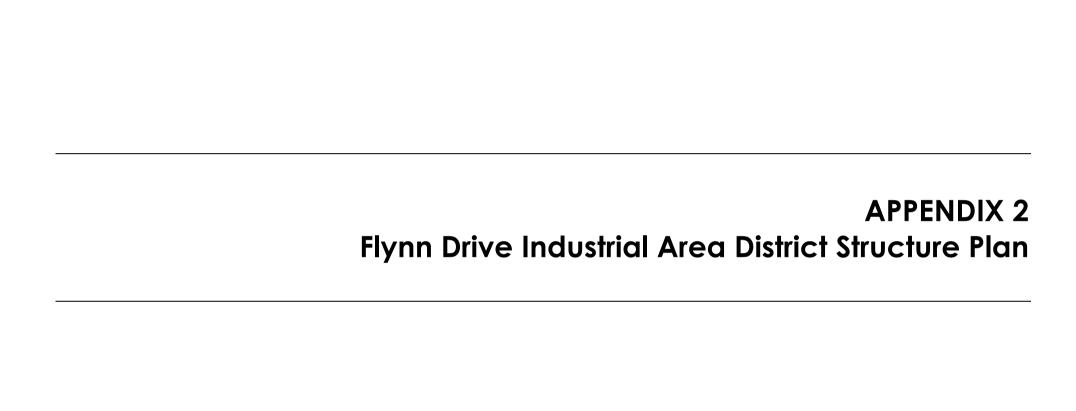
Bring along to Landowners meeting on 11th October 2000

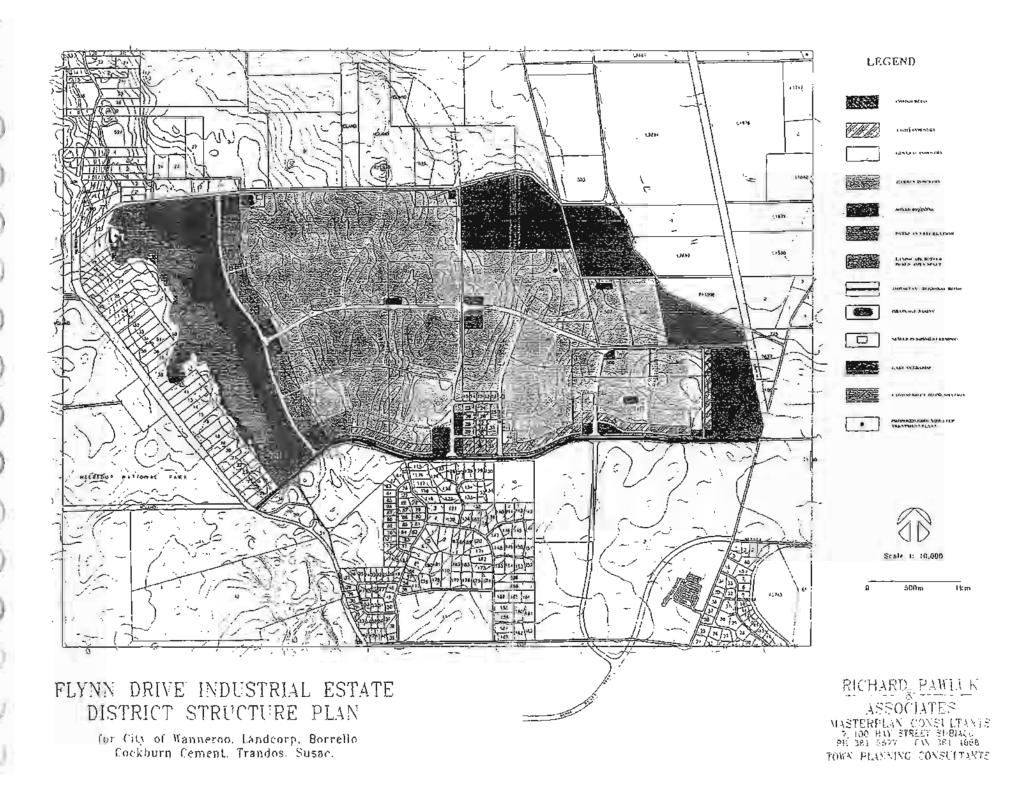
Taylor Burrell PO Box 503 WEST PERTH WA 6872

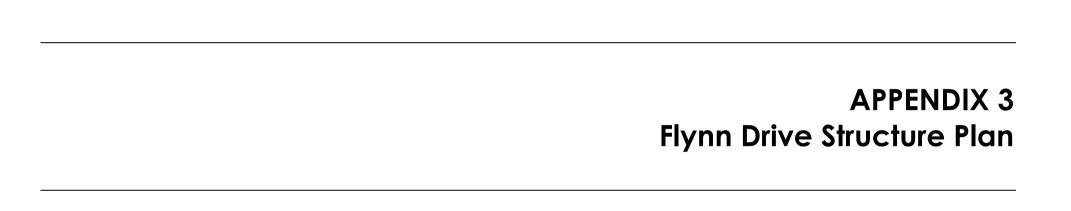


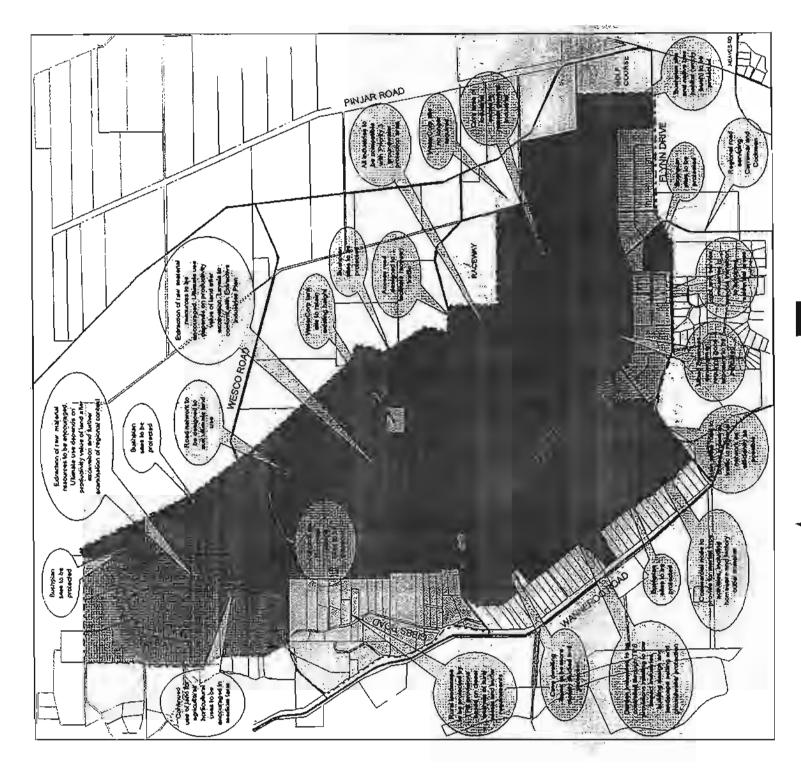
Neerabup Industrial Area – Landowners Intentions Survey

Name and Address -IRANDOD FAMILY 3 SETOMA COCKT
DOONTALUP 6027
Have your intention for your land altered since the release of the SMEC report (refer attached) Yes (No
If yes please complete the questions below.
What is your likely extraction timetable?
When is extraction likely to be complete?
What is your timing for the ultimate industrial development of your land?
Please complete and return to:
Taylor Burrell PO Box 503 WEST PERTH WA 6872
or
Bring along to Landowners meeting on 11 th October 2000











STUDY AREA BOUNDARY





GENERAL INDUSTRIAL



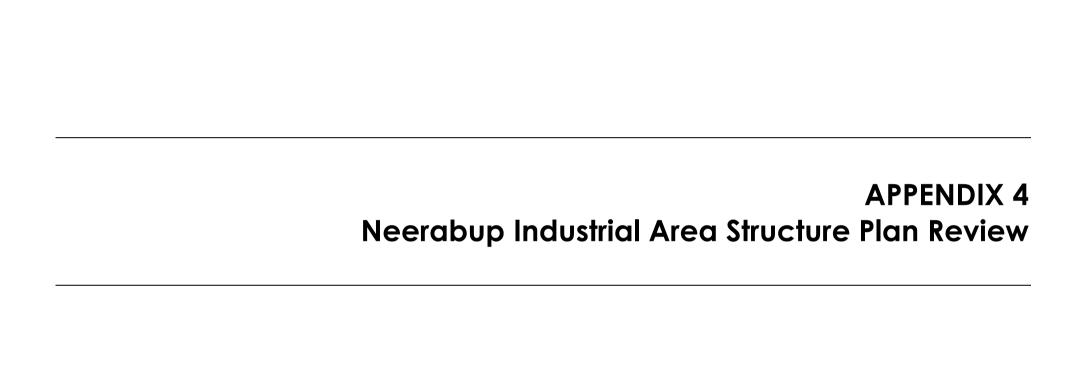


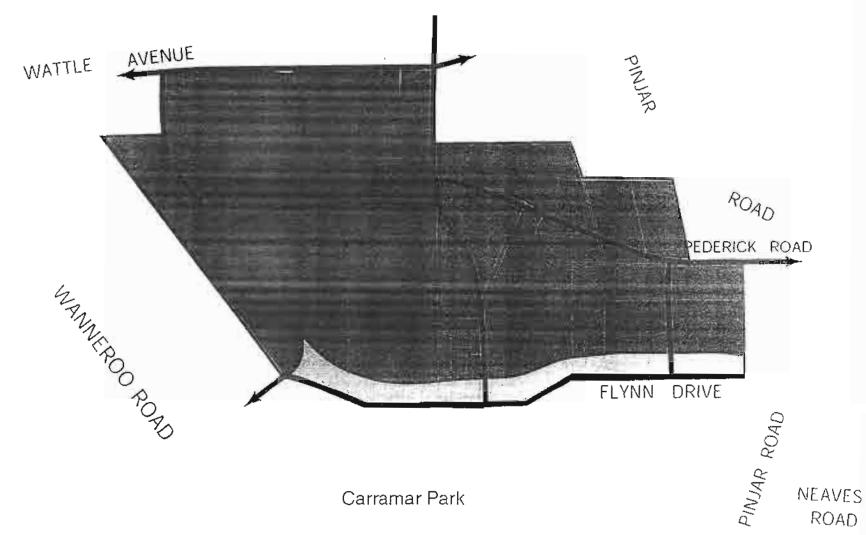






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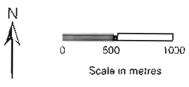


Carramar Park

LEGEND:

Parks & Recreation Reserve General Industrial

Light Industrial/ Mixed Business





4CN 070 260 260 Cevel 5-12 St Georges forface PERFH WA 6000 Tel 10e) 2621 5000 Fax 4081 0221 5701

Structure Plan for the Neerabup Industrial Area

FIGUR ! ! LANCE 36003

FIGURE 5 1

ROAD

APPENDIX 5 DEP Advice

Department of Environmental Protection

Head Office:
Westraina Saubre
141 St Geoliges Terrace
Perin Western Australia 6000
1et (08) 9222 1000 Fax (08) 9322 1598
http://www.environ.wa.gov.au

Postal Address: PO Box K823 Perth Western Australia 6842

Steve Wiencke Landcorp Locked Bag 5 Perth Business Centre PERTH WA 6849

Your Ref

99P490

Our Rel Enquiries TP96.005 Cilla de Lacy

NEERABUP INDUSTRIAL AREA

Thank you for your letter of 16 December 1999 in which you express concerns about the imposition of a 1500m buffer (to protect future industrial landusers from excessive noise) to separate general industry from the Wanneroo Raceway.

, p/ p2(-1

It is understood that the majority of the Neerabup Industrial Area (a portion of the Flynn Drive Structure Plan area) will be zoned for Industrial Development in the City of Wanneroo's new Town Planning Scheme (due for gazettal in March this year). The new Scheme states that permitted uses within this zone will be identified through the development of a Structure Plan agreed to by the relevant government agencies and the City.

As mentioned in your letter, the Department of Environmental Protection (DEP) has been liaising with your planning consultants, SMEC Australia, with regards to the types of industrial uses which would be suitable within the 1500m buffer. Firstly, a meeting was held on 29 October 1999 with representatives from SMEC and with Nick Hodges to ascertain the implications for industrial development adjacent to the Raceway. The outcomes of the meeting were as follows:

- The DEP was to properly define the 1500m buffer, where it came from and what it means;
- Landcorp and SMEC were to forward to the DEP a list of the industrial landuses which
 would most likely develop within the Neerabuy Industrial Area; and
- The DEP was to provide comments to SMEC and Landcorp on the issue of risk associated with industrial development adjacent to the Raceway.

SMEC promptly forwarded a letter to the DEP (see attached) providing information on the landuses which may establish within the industrial area. The DEP provided a draft response to this letter, which you already have a copy of. However, it appears as though there is still some confusion as to the DEP's position with regards to industrial development adjacent to the Raceway. Therefore, following on from our meeting of 28 January 2000 the DEP offers the following advice.



Noise issues

Definition of the noise buffer

Acoustic modelling was undertaken by Herring Storer Acoustics in 1995 to investigate buffer requirements for proposed landuses adjacent to the Wanneroo Raceway. The modelling was based on noise measurements made by the DEP during the Australian Touring Car Championships in July 1994. The results of the study indicated that the 65dB(A) noise contour was approximately 1500m from the boundary of the Raceway. Noise levels greater than this, ie within 1500m of the Raceway, would exceed the Environmental Protection (Noise) Regulations 1997 for industrial landuses. Therefore, noise levels for industrial landuses which are closer than 1500m to the Raceway are expected to be above the levels recommended by the DEP as tolerable by industrial landuses.

The DEP is not aware of any complaints relating to noise emissions from the Barbagallo Raceway affecting extractive industries already operating in the area. As discussed at the meeting, however, future industrial development will need to be in compliance with the regulations. To achieve this compliance an application for a Regulation 17 approval to vary the assigned levels will need to be lodged with the Minister for the Environment. However, to grant this exemption the Minister, on the advice of the Environmental Protection Authority (EPA), would need to be confident that the particular industrial landuse was not classified as a noise sensitive premises.

The DEP recognises that this may seem a little onerous because there are special circumstances associated with Raceways, in that they operate only on weekends and, in the case of Wanneroo Raceway, only a few times a year, whereas industrial activities are mostly operational on weekdays. However, the Regulations do not distinguish between weekend noise levels and weekday noise levels, therefore an exemption will need to be sought.

Industrial landuses which may and may not be permitted within the 1500m noise buffer

The DEP recognises that the noise conflicts may be overcome by different timing of the two landuses (ie the Raceway and the industrial landuses) with weekends for racing and weekdays for industry. Therefore, the particular types of landuses which may possibly be permitted include those, eg. Milk depot, which do not require sales and/or service to the public on the weekend.

Information provided in your letter describes the dominant class of industry as general industry (eg engineering workshops, structural steel fabrication, sheetmetal works, concrete products, plastics manufacture, food and beverage processing, transport depots, wholesale warehousing etc.).

The DEP considers that these uses are not noise-sensitive premises and, therefore, may possibly be suitable within the industrial area. The DEP has also been through the list of permitted and not permitted uses (but subject to council approval) taken from the Use class table within the City's new Scheme for General Industrial areas, and has identified uses which may possibly be permitted within the 1500m noise buffer.

Landuses which may possibly be suitable	Landuses which may possibly not be suitable				
Car park	Auction room				
Dry cleaning premises	Landscape supplies				
Fuel depot	Vehicle sales/hire premises				
Laundry supplies	Convenience store				
Milk depot	Equipment hire				
Motor vehicle repairs	Lunch bar				
Storage yard	Road House (service station and lunch bar)				
Transport depot	Service Station				
Wholesale warehousing					
Bakery					
Communication Antenna - Commercial					
Communication Antenna - Domestic					
Concrete Batching plant					
Industry - Rural					
Smash repair station					
Trade display					
Open Air display					
Salvage yard - industrial					
Vehicle wrecking					

Industrial activities involving distribution processes, storage, processing and production activities may possibly be suitable. Extractive and noxious industries may also possibly be suitable landuses within the noise buffer, provided they do not present a risk to Raceway patrons (see below). Therefore, a timber mill could possibly be acceptable.

The DEP is also aware that ancillary services (eg doctor's surgery) will be needed within the industrial area. These sorts of services are most likely to be noise sensitive premises, therefore, it is recommended that they be located outside of the 1500m buffer. To this end, the DEP supports Landcorp's intention to develop the Neerabup Industrial Area on a precinct basis as this will assist in the siting of noise sensitive premises outside of the 1500m buffer.

Risk issues

The issue of the level of risk associated with locating a Raceway adjacent to an Industrial area has been recently addressed by the EPA in its assessment of the proposal by the Western Australian Sports Centre Trust to build and operate a motorsport facility (Motorplex) adjacent to the Kwinana Industrial Area (KIA). The KIA includes a number of industries which store or process hazardous materials which may, if inappropriately managed, cause an industrial accident putting patrons of the Motorplex at risk from serious injury. The EPA concluded that there remains considerable uncertainty concerning the level of societal risk which would be imposed by locating a Motorplex facility adjacent to the KIA.

Certain types of industry which pose an off-site risk could possibly locate in the Industrial Development Zone. Examples include LPG storage and transfer depots, dangerous goods storages (chlorine drums), small chemical works (plastics).

Large chemical processing works, which are classified as major hazard facilities according to the Worksafe Standard for the 'Control of Major Hazard Facilities' (Worksafe, September 1996) should not be allowed in the Industrial Development Zone. The reason being the close proximity to the raceway and the urban development area.

Apart from major hazard facilities, there are two types of industry, as defined in the State industrial Buffer Policy (SPP No. 4); those industries which contain their impacts on-site, and those industries which have off-site impacts.

It is a good policy to keep those industries which have an off-site risk impact approximately 1000m away from residential areas and from areas where crowds gather (ie the raceway). However, the DEP recognises that the area in the northwest corner of the Industrial Development Zone, which is 1000m away from the Raceway, is held by Cockburn Cement who intend to mine the area for limestone, which may not be concluded for another 50 years. Therefore, whilst this area would result in a 1000m separation distance to the raceway and about the same distance to the rural-residential area to the west and the commercial node to the south it will not be available. In this instance, the DEP recommends that any development application for an industry which poses an off-site risk, and is lodged before the land held by Cockburn Cement has been mined, be referred to the EPA under Section 38 of the Environmental Protection Act 1986 for assessment.

Assessment

The DEP advises Landcorp that individual proposals for industrial development within the Neerabup Industrial Area will require referral to the Environmental Protection Authority under Section 38 of the Environmental Protection Act if, once implemented, they appear likely to have a significant effect on the environment.

K Taylor DIRECTOR

EVALUATION DIVISION

14 February 2000

Enc



Technical Report



Date 19 November 2004

Project No DE02660

Subject Neerabup Industrial Estate Traffic Review

1.1 Introduction

Sinclair Knight Merz was commissioned by Taylor Burrell Barnett on behalf of Landcorp to model the future traffic volumes predicted to be generated by the Neerabup Industrial Estate (fully developed) to determine an appropriate road network and road reserve requirements.

The purpose of this report is to outline the methodology used in the traffic model and the outcomes from the model including the proposed road network and road reserve requirements.

1.2 Existing and Future Road Network

The site is located south and west of Barbagallo raceway and is bound by Wattle Avenue to the north, Pinjar Road to the east, Flynn Drive to the south and Neerabup Lake to the west.

Wattle Avenue, Pinjar Road and Flynn Drive are classified as Access Roads under the *Perth Metropolitan Area Functional Road Hierarchy (November 1997)*. The most recent Average Daily Traffic (ADT) counts sourced from the City of Wanneroo are shown in **Table 1**.

Table 1 Traffic Volumes of Existing Road Network

Location	Year	Average Daily Traffic (vehicles per day)
Wattle Ave (east of Wanneroo Rd)	1993	200
Wattle Ave (west of Pinjar Rd)	1995	120
Pinjar Rd (north of Wattle Ave)	1995	150
Pinjar Rd (south of Wattle Ave)	1991	500
Pinjar Rd (south of Pederick Rd)	1995	300
Flynn Drive (west of Pinjar Rd)	2003	1,000
Flynn Drive (east of Tranquil Dr)	1991	1,000

Table 1 shows that the existing traffic volumes are appropriate for the current classification of roads.



The proposed future road network is shown in **Figure 1** of this report. From a review of the road network shown in the previous version of the Neerabup Industrial Area Structure Plan¹, it is considered that the majority of the road network is still appropriate.

There could be merit in providing a more direct road link between Flynn Drive (to the west of Tranquil Drive) and the north-south road (running along the eastern boundary of the site) to encourage traffic to travel on the perimeter of the site rather than through the industrial area.

However, such a proposal is subject to land considerations and needs to be further investigated at the stage of detailed sub-division design.

The traffic modelling of the future road network (discussed in the following sections of the report) has identified that Wattle Avenue West from Wanneroo Road to the north west corner of the site needs to be upgraded as the northernmost connection to the Neerabup Industrial Area.

The previous Structure Plan included the extension of Wattle Avenue West eastwards across the northern boundary of the site. As part of this assessment, the road network was modelled with the Wattle Avenue extension (Scenario 1) and without the Wattle Avenue extension (Scenario 2) to determine if the extension is necessary to cater for predicted traffic volumes.

The Scenario 1 traffic model indicates that the extension of Wattle Avenue along the northern boundary of the site is not necessarily required as the east west road parallel to and north of Pederick Road is expected to adequately cater for the traffic that otherwise would have used the extension.

For the purpose of the traffic modelling, it is assumed that the Mitchell Freeway will have been extended north of the subject area at the time of full development of the Neerabup Industrial Estate.

1.3 Future Traffic

1.3.1 Main Roads Traffic Model

For this study, Landcorp contacted the Main Roads WA Traffic Modelling Section to request 2001 and 2031 Standard Base Link traffic volume estimates and 2031 daily trips generated from the area bounded by Wanneroo Road, Flynn Drive, Wattle Avenue and Pinjar Road.

The traffic forecasts for 2001 and 2031 for Flynn Drive, Wanneroo Road and Wattle Avenue West (extracted from the Main Roads Transport Model using 24 hour Annual Average Weekday Traffic) are shown in **Table 2** (volumes have been rounded up to the nearest 5 vehicles).

¹ Neerabup Industrial Area Structure Plan, December 2001, prepared by Taylor Burrell and SKM



Table 2 Main Roads WA Traffic Forecasts 2001 and 2031

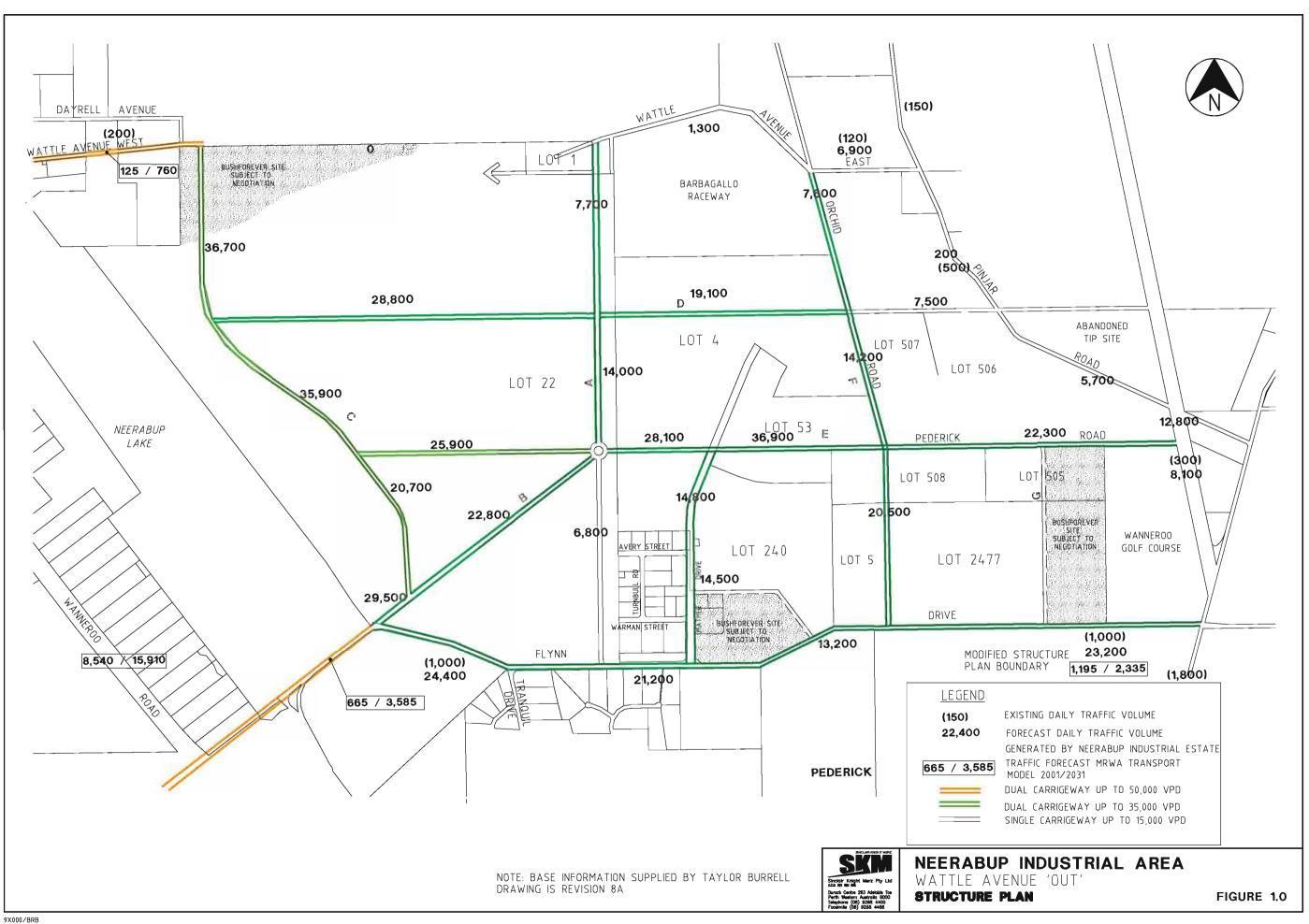
Road		Two way traffic volumes (veh/ day)		
		2001	2031	
Flynn Drive	East of Wanneroo Road	665	3585	
	West of Pinjar Road	1195	2335	
Wanneroo Road	North of Flynn Drive	8540	15910	
Wattle Avenue West	East of Wanneroo Road	125	760	

Main Roads note that the modelled forecasts for 2031 are unadjusted and that this should be taken into account for the analysis purposes. The 1998/1999 Annual Average Weekday Traffic Flow of 12,460 vehicles per day (vpd) on Wanneroo Road north of Flynn Drive (quoted by Main Roads WA in their memorandum) is higher than the 8,540 vpd indicated in **Table 1** above.

The traffic forecasts obtained from the Main Roads Transport Model are based on the 'trend case' land use as provided by the Department for Planning and Infrastructure (DPI) and differ fairly significantly from the predicted traffic forecasts indicated in **Figure 1** of this report. It is therefore duly noted that the 'trend case' land use data is not reflective of the proposed land uses for the Neerabup Industrial Estate.

In this case, the Main Roads WA traffic forecasts from the Transport Model are shown on **Figure 1** to provide an indication of forecast traffic movements through the area generated by other land uses outside of the industrial estate area. However, as these traffic forecasts include some element of traffic volume that is generated by the land uses in the Neerabup Industrial Estate Area (albeit significantly less than predicted by the SKM traffic model), these traffic volumes are therefore conservative.

A full copy of the memorandum from Main Roads WA is contained in **Appendix A** of this report.





1.3.2 Vehicle Trip Generation Rates

There are no accepted guidelines for trip rates for industrial areas specific to Western Australia.

The following details the sources of data that have been researched to determine appropriate trip generation rates for industrial areas and business parks for the traffic model.

Trip Rates for Industrial Areas

The NSW Roads and Traffic Authority (RTA) *Guide to Traffic Generating Developments* (October 2002) provides a trip rate of 5 trips per 100m² of gross floor area (GFA) for factories and 4 trips per 100m² (GFA) for warehouses.

SKM previously undertook a traffic review of the Pinelands Industrial Area in Darwin for the Department of Environment (DoE). As part of this study, a trip rate of 5 trips per $100m^2$ GFA for the industrial area was determined from an analysis of the existing traffic volumes entering and exiting the site and calculation of the building areas of operating businesses. To estimate the future traffic volumes, the trip rate of 5 trips per $100m^2$ GFA was adopted to represent standard growth in future development and, at the request of the DoE, a trip rate of 7 trips per $100m^2$ / GFA was adopted to represent a high growth in future development.

For this study, SKM reviewed the existing traffic volumes in the Osborne Park Industrial Estate to determine a trip rate for the area. It is estimated that the total GFA for Osborne Park (calculated to be 104 ha) generates in the order of 49,900 trips on a typical weekday (excluding through traffic) resulting in a trip rate of 4.8 trips per 100m² GFA.

Table 3 summarises the range of trip rate values. The range of values for Osborne Park industrial area reflects the different traffic volumes occurring on the local street network, taking into account an estimated percentage of through traffic.

Table 3 Trip Rates for Industrial Sites

Industrial Area	Daily Vehicle Trip Rate / 100 ² GFA
Guide to Traffic Generating Developments	4.0 – 5.0
Pinelands Industrial Estate	5.0 – 7.0
Osborne Park Industrial Estate	2.0 - 9.0

For the purpose of this study, a trip rate of 5.5 trips per 100m² GFA has been adopted to provide a conservative estimate of future traffic volumes generated by the general industrial and service industrial land uses.



Trip Rates for Business Parks

The NSW RTA Guide to Traffic Generating Developments does not provide a daily trip rate but provides a peak hour trip rate of 1.1 vehicles/ 100m^2 gross leasable area (GLA) for business parks.

From a review of the trip rates for business parks contained in the Institute of Transportation Engineers Trip Generation² the peak hour trip rate represents approximately 11.3% of the daily trip rate.

If we assume that peak hour trip rate of 1.1 vehicles/ 100m^2 GLA represents 11.3% of the daily trip rate, the resulting daily trip rate would be 9.7 trips per 100m^2 .

As such, a daily trip rate of 9.7 trips per 100m² has been adopted s the daily trip rate for the business land uses.

1.3.3 Vehicle Trip Generation, Distribution and Assignment

The assessment of future vehicle trip generation, distribution and assignment has been undertaken for the ultimate scenario assuming full development of the Neerabup Industrial Estate.

For the assessment, it has been assumed that the gross floor areas for the industrial land use is 30% of the measured land areas (excluding the indicative road reserve areas shown on the current structure plan).

For the business land uses, it has been assumed that the gross leasable area is 50% of the measured land areas (excluding the indicative road reserve areas shown on the current structure plan).

The areas of development were calculated for 33 different nodes and the resultant trip generation calculated for each of the nodes.

Adding the trip generation for each node, the Neerabup Industrial Estate (fully developed) is estimated to generate approximately 140,000 trips per day.

The generated traffic for each node was distributed onto the road network based on the distribution pattern shown in **Table 4**. The distribution pattern is based on the percentage of traffic generated by the site that is estimated to use the five major access points from the regional road network.

² Trip Generation – An Iinformational Report, 5th Edition, Institute of Transportation Engineers (ITE), 1991, Washington DC.



Table 4 Traffic Distribution Pattern

Origin/ Destination	Description	Traffic Distribution (%)
North-western suburbs and Mitchell Freeway north	Intersection of Wattle Avenue West and Dayrell Avenue	25
North-eastern suburbs and	Intersection of Wattle Avenue East and Pinjar Road	5.0
Brand Highway	Intersection of Pinjar Road and Spence Road	12.5
South-eastern suburbs	Flynn Drive and Pinjar Road	17.5
South-western suburbs and Mitchell Freeway south	Flynn Drive and Wanneroo Road	40

The assignment of trips on the road network for Scenario 1 (without Wattle Avenue extension) and Scenario 2 (with Wattle Avenue extension) are shown in **Figures 1** and **2** respectively.

Note that the traffic volumes shown in the figures indicate only those volumes predicted to be generated by the Neerabup Industrial Estate. Main Roads WA are to provide future forecasts for the external roads from their traffic model for year 2031.

1.4 Road Hierarchy and Road Reserve Requirements

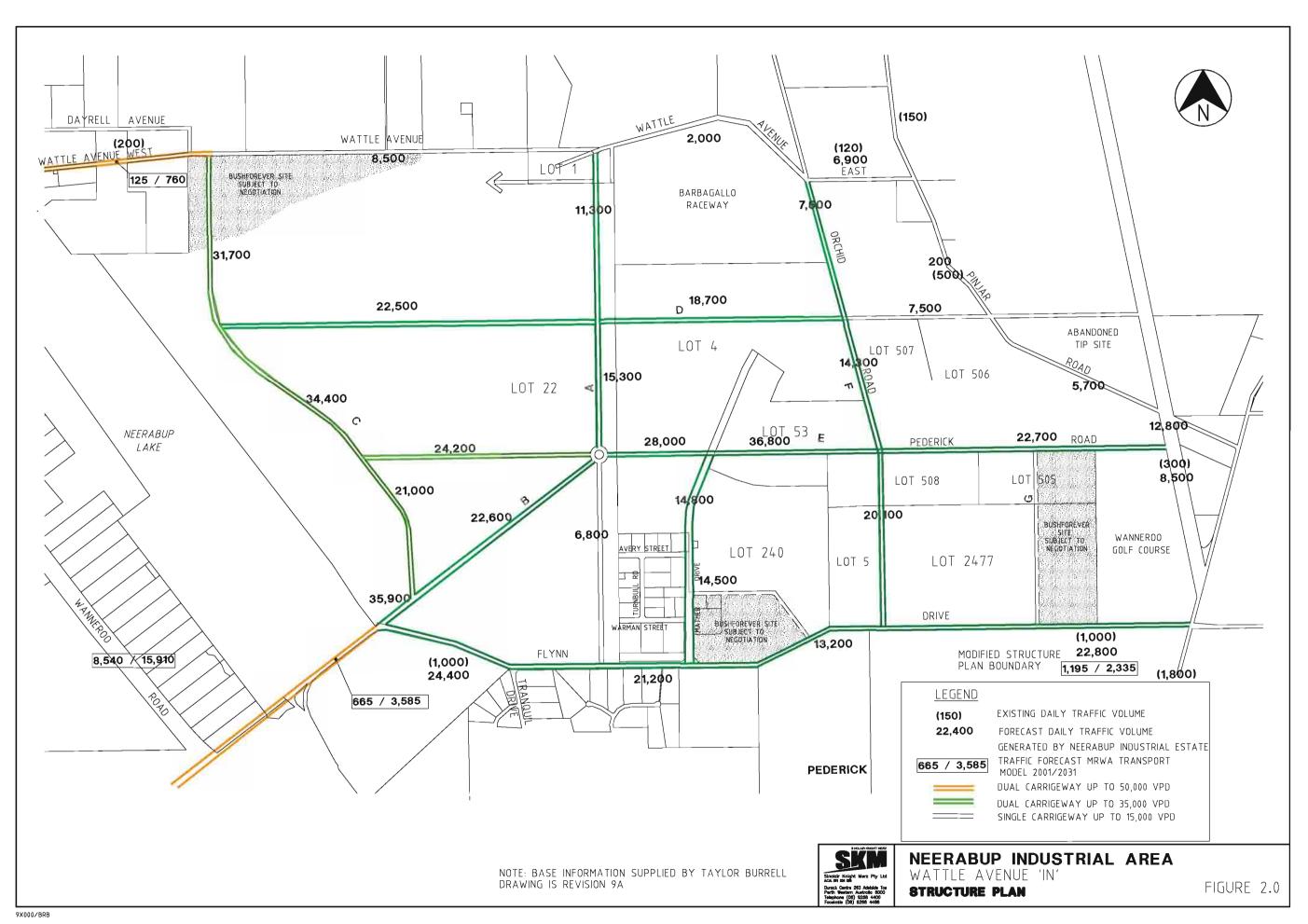
Figures 1 and **2** show the proposed road hierarchy and road reserve requirements outlined below. It should be noted that the outlined road reserves would be supplemented by local widening at intersections, the extent of which would be determined at detailed design.

Figure 3 shows the recommended cross sections.

Primary Distributors (Shown as Orange Roads)

It is considered that the sections of Wattle Avenue West and Flynn Drive to the west of the site should be designated as primary distributors as these roads are forecast to carry in the order of 50,000 vehicles per day.

It is recommended that the road reserve requirement and road pavement width for these roads should be determined by DPI in consultation with the City of Wanneroo.



1. ROADS WITH TRAFFIC VOLUMES 15,000 VPD TO 35,000 VPD

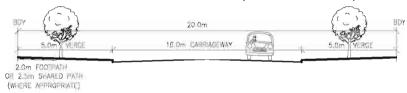


2.0m FOOTPATH

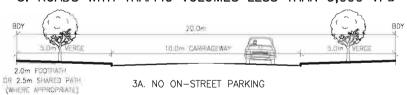
OR 2.5m SHARED PATH

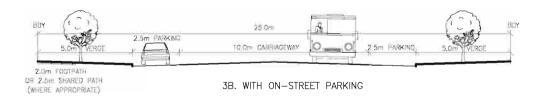
(WHERE APPROPRIATE)

2. ROADS WITH TRAFFIC VOLUMES 5,000 VPD TO 15,000 VPD



3. ROADS WITH TRAFFIC VOLUMES LESS THAN 5,000 VPD





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Roads with Traffic Volumes up to 15,000vpd to 35,000 vpd (Shown as Green Roads)

It is recommended that roads forecast to carry between 15,000 and 35,000 vpd ultimately be 4 lane dual carriageways with road reserve width of 35m and pavement width of 22m (2 x 8m carriageways, 6m median and 2 x 6.5m verges).

Although it is not expected that there would be a significant number of pedestrians and cyclists travelling through the industrial area, 1.5m of the 6.5m verge width can be allocated to the provision of 1.5m wide on-road cycle lanes, leaving 5m verge width. Shared paths (2.5m wide) can be provided within the verge width.

It is suggested that the provision of on-road cycle lanes and shared path provision be determined at the stage of detailed sub-division design.

From discussions with DPI, it was indicated that Orchid Road may in the future carry through traffic volumes from possible future developments to the north and north-east of the Estate, including the possible redevelopment of the Barbagallo Raceway.

In this case, Road A and Orchid Road have been shown as dual carriageways north of Road D. In the interim when traffic volumes are less than 15,000 vpd, or in the event that additional traffic volumes beyond the levels shown on Figures 1 and 2 do not eventuate, the road pavement width could be 16m (2 x 5m carriageway and 6m median).

It is not proposed to provide frontage access from the individual lots to the roads predicted to carry traffic volumes between 15,000 and 35,000 vpd. The City of Wanneroo has indicated that where frontage access is not being provided, it is not desirable to provide fencing along the entire road corridor. This matter should be considered at the stage of detailed sub-division design.

Although frontage access is discouraged on the major roads, in the case of larger sites, such as the proposed Mindarie Council Recycling Plant, it is considered that it would be appropriate to provide direct access to the site via a controlled access point.

Advice from the City of Wanneroo is that intersections should not be less than 250m apart and that it is preferable to achieve 500m spacing. The intersection spacing along the roads should be determined at the stage of detailed sub-division design.

The existing building at Lot 53 already has frontage access to Pederick Road via two access points. Through discussions with the City of Wanneroo, it is suggested that, in this circumstance, a right turn lane should be provided in the 6m median at both access points and

SINCLAIR KNIGHT MERZ



that a left slip lane be provided at the one access point which is predominantly used for entering traffic.

Roads with Traffic Volumes between 5,000 vpd and 15,000 vpd (Shown as White Roads)

For roads forecast to carry between 5,000 vpd and 15,000 vpd, it is recommended that these roads be 2 lane carriageways with road reserve widths of 20m and pavement widths of 10m (1 x 10m carriageway and 2 x 5m verges). These roads will not have on-street parking. It is recommended that 2.5m shared paths be provided on both sides of the sections of road servicing the business park. It is recommended that the design of these roads include traffic management measures to discourage speeding, such as providing roundabouts at some of the intersections with the access roads.

Frontage access will be permitted from the individual lots at appropriate spacing.

Roads with Traffic Volumes up to 5,000 vpd

The smaller access roads (not shown on the current Structure Plan) are expected to carry traffic volumes up to a maximum of 5,000 vpd. It is recommended that these roads be 2 lane carriageways with road reserve widths of 20m to 25m with the minimum road reserve being a pavement width of 10m (1 x 10m carriageway and 2 x 5m verges). It is suggested that parking embayments of width 3m be created within the verge to provide on-street parking in appropriate locations as desired. It is recommended that the long sections of access roads include traffic management measures to discourage speeding.

repared By:	
usan Kreemer Pickford, Senior Traffic and Transport Engineer	
Reviewed By:	
ruce Keay, Senior Engineer Development	



Appendix A Memorandum from Main Roads WA 9th August 2004

MEMORANDUM

Our File : T001-04-LVP\GOVT-DC Enquiries : Zarko Andjic
Date : 9 August 2004 Sect/Reg : Traffic Modelling

To : Daniel Chatley (LANDCORP)/Susan Kreemer Pickford (SKM)

Subject : Neerabup Industrial Estate Structure Plan

1. As requested, we would like to provide 2001, and 2031 Standard Base Link traffic volume estimates and 2031 daily trips generated from the area bounded by Wanneroo Rd, Flynn Dr, Wattle Ave and Pinjar Rd. These traffic forecasts are extracted from the Main Roads base year networks.

2. Traffic volume estimates for the three roads from your list are:

	2001	2031
	Two way	y volumes veh/day
Flynn Dr East of Wanneroo Rd	664	3585
Flynn Dr West of Pinjar Rd	1194	2336
Wanneroo Rd north of Flynn Dr	8540	15908
Wattle Ave West east of Wanneroo Dr	125	758

- 3. We advise caution be taken when interpreting traffic forecast figures on roads/links that carry mainly localised traffic such as Flynn Drive and Wattle Avenue West. The MRWA Traffic Model is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads.
- 4. Modelled traffic forecasts for 2031 are unadjusted and this should be taken into account for analysis purposes. We do not have 2001 observed traffic counts for Flynn Drive and Wattle Avenue West. The 1998/1999 Annual Average Weekday Traffic Flow extracted from Main Roads publication (Perth Metropolitan Area 1 July 1992 30 June 1999) shows 12,460 veh/day on Wanneroo Rd north of Flynn Dr.
- 5. The 2031 daily traffic generated from the area bounded by Wanneroo Rd, Flynn Dr, Wattle Ave and Pinjar Rd is 6773 (in and out combined). The generated traffic is loaded onto the network from zones 85, 91 and 89. Enclosed is also our model zone boundary definition overlayed on StreetSmart map to assist you with this project.
- 6. The traffic forecasts are obtained from the MRWA's Transport Model using 24 hour AAWT (Annual Average Weekday Traffic). We have used the 'trend case' land use forecast as provided by the DPI. Following the conversation with Daniel Chatley of Landcorp it appears that 2031 land use data from our model differs significantly from what is proposed by Neerabup Industrial Estate Structure Plan. According to this plan the area will be generating over 50,000 veh/day by 2031. This should be taken into account when interpreting the above traffic volume estimates.

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8. I trust that this information is satisfactory, however should you have any queries please do not hesitate to contact me on 9323 4173 at your convenience.

Zarko Andjic Transport Modelling Section¹ Main Roads WA

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¹ MRWA Traffic Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations. This data should not be used for any purpose other than the stated purpose for which it was requested from MRWA. The MRWA Traffic Model is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads. The MRWA Traffic Model includes local roads but this is to provide connectivity in the model. MRWA Traffic Modelling Data should be interpreted by an experienced/qualified person who understands transport modelling and the limitations of the data. This data should not be used in making decisions relating to the commercial or residential developments.



Our Ref:

CR/24/3(37)V1

Contact:

Eddie van Rijnswoud

Telephone:

9326 6522



I September 2004

Daniel Chatley Project Manager LandCorp Level 3. Wesfarmers House 40 The Esplanade PERTH WA 6000

Dear Daniel

Power Supply To The Neerabup Industrial Area (NIA)

Further to the meeting held on 24 August 2004 between yourself and our Mr Eddie van Rijnswoud, I would like to confirm that Western Power intends to construct a 132kV double circuit transmission line between its gas turbine generation site at Pinjar and the existing zone substation located at Clarkson Avenue, Wanneroo. It is also our intention to construct a 132kV/22kV zone substation somewhere in the NIA.

Ideally, the new Neerabup zone substation should be located adjacent to the abovementioned new 132kV transmission line so as to avoid the requirement for transmission line entries. Approximately 1.2 hectares of land will be required for this.

Planning data currently to hand indicates that the Pinjar to Wanneroo 132kV transmission line is required to be in service by December 2006 and the Neerabup zone substation is required to be in service by December 2008. This means that the site for the zone substation is to be acquired by Western Power by the end of 2005.

In the mean time the NIA can continue to be supplied by existing 22kV feeders.

Should you require to discuss this matter further, please do not hesitate to call Eddie van Rijnswoud on 9326 6522.

Yours sincerely

RUDY TEH

ENVIRONMENT AND LAND MANAGER

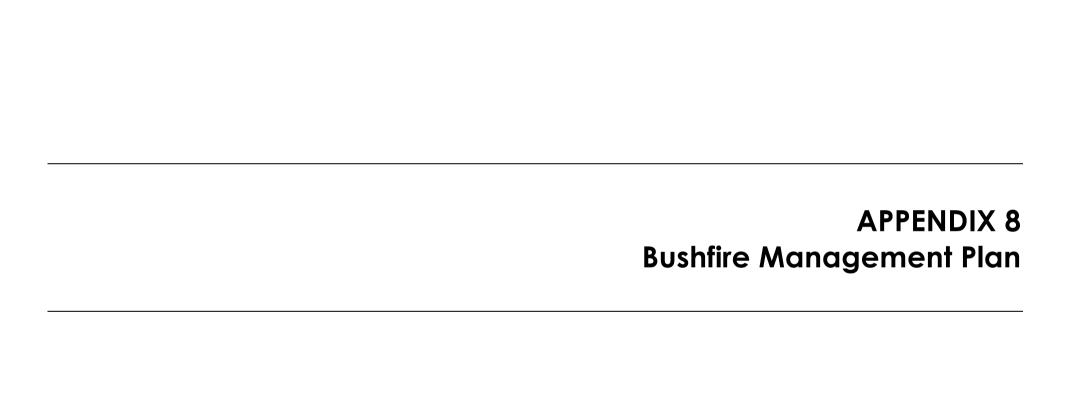
NETWORKS

Western Power Corporation

363 Wellington Street, Perth, Westorn Australia 6000 GPO Box 1921 Parth 6842

DMS#: 1,9954824 | 108 | 9326 4913 | Facsimile (08) 9326 4595 | Internet www.westernpower.com.ou File#: CIU24/3(37)018 | 108 | 9326 4913 | Facsimile (08) 9326 4595 | Internet www.westernpower.com.ou

ABN 38 362 983 975





Bushfire Management Plan

Neerabup Industrial Area

Prepared for LandCorp by Strategen

June 2017



Bushfire Management Plan

Neerabup Industrial Area

Strategen is a trading name of Strategen Environmental Consultants Pty Ltd Level 1, 50 Subiaco Square Road Subiaco WA 6008 ACN: 056 190 419

June 2017

Limitations

Scope of services

This report ("the report") has been prepared by Strategen Environmental Consultants Pty Ltd (Strategen) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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In preparing the report, Strategen has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen has also not attempted to determine whether any material matter has been omitted from the data. Strategen will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen. The making of any assumption does not imply that Strategen has made any enquiry to verify the correctness of that assumption.

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Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

Client: LandCorp

Report Version	Revision Strategen		Strategen	Submitted to Client	
neport version	No.	Purpose	author/reviewer	Form	Date
Draft Report	Rev A	For review by client	Z Cockerill / R Banks	Electronic (email)	15/07/2016
Final Report	Rev 0	Issued for use: for submission to CoW and DoP	Z Cockerill	Electronic (email)	3/08/2016
Final Report	Rev 1	Issued for use: to address WAPC modifications	Z Cockerill (BPAD37803)	Electronic (email)	2/06/2017

Filename: LAN16242_01 R001 Rev 1 - 2 June 2017

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Appendix 1 Photo points (refer to Figure 3 for spatial location of photo points)

Appendix 2 BAL contour assessment for Stages 1–5

Appendix 3 City of Wanneroo annual firebreak notice



1. Introduction

1.1 Background

LandCorp is progressing development approvals within the Neerabup Industrial Area (hereon referred to as the project area). The Neerabup Industrial Area Agreed Structure Plan No. 17 (ASP 17, first adopted in January 2005) provides the overarching planning framework that guides development over the industrial estate (Figure 1a). TPG, on behalf of LandCorp, has recently lodged an amendment to ASP 17 (Amendment No. 4) that proposes modifications to the Final Surface Contour Plan to reflect the revised earthwork design levels across the site (Figure 1b). The proposed Structure Plan Amendment does not propose any land use modifications outside of those approved under ASP 17.

A large proportion of the project area and adjacent land is designated as bushfire prone on the WA *Map of Bush Fire Prone Areas* (DFES 2016) due to the extent of on-site and adjacent vegetation. As a result, Strategen has prepared this Bushfire Management Plan (BMP) to fulfil the following key objectives:

- Accompany submission of the proposed Structure Plan Amendment to City of Wanneroo (the City) and Department of Planning (DoP) to meet requirements triggered under State Planning Policy 3.7 Planning in Bushfire-Prone Areas (SPP 3.7; WAPC 2015a).
- 2. Accompany Subdivision/Development Application to the City and DoP for Stages 1–5 to meet planning requirements triggered under SPP 3.7.

The following information is required in the form of a BMP to accompany the Structure Plan Amendment and relevant Subdivision/Development Applications under SPP 3.7 Policy Measures 6.3 and 6.4/6.5 respectively:

- results of a Bushfire Hazard Level (BHL) assessment determining the applicable hazard level(s) across the subject land in accordance with methodology set out in *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2015b) refer to Section 2.3 and Figure 5
- where the lot layout of the proposal is known (i.e. Stages 1–5), a Bushfire Attack Level (BAL) contour map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines refer to Section 2.5 and Figure 6
- identification of any bushfire hazard issues arising from the relevant assessments refer to Section 2.4
- assessment against the bushfire protection criteria contained in the Guidelines demonstrating compliance within the boundary of the development site refer to Section 4 and Table 3.

This BMP has been prepared in accordance with the Guidelines and addresses all of the above information requirements to satisfy SPP 3.7.

1.2 Purpose and application of the plan

The purpose of this BMP is to provide guidance on how to plan for and manage the bushfire risk to future assets of the project area through implementation of a range of bushfire management measures. The BMP outlines how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak. This is particularly relevant when existing fire appliances in the area may be unable to offer an immediate emergency suppression response; therefore, development planning and design should aim to provide mitigation strategies that protect future life and property from bushfire as a priority.



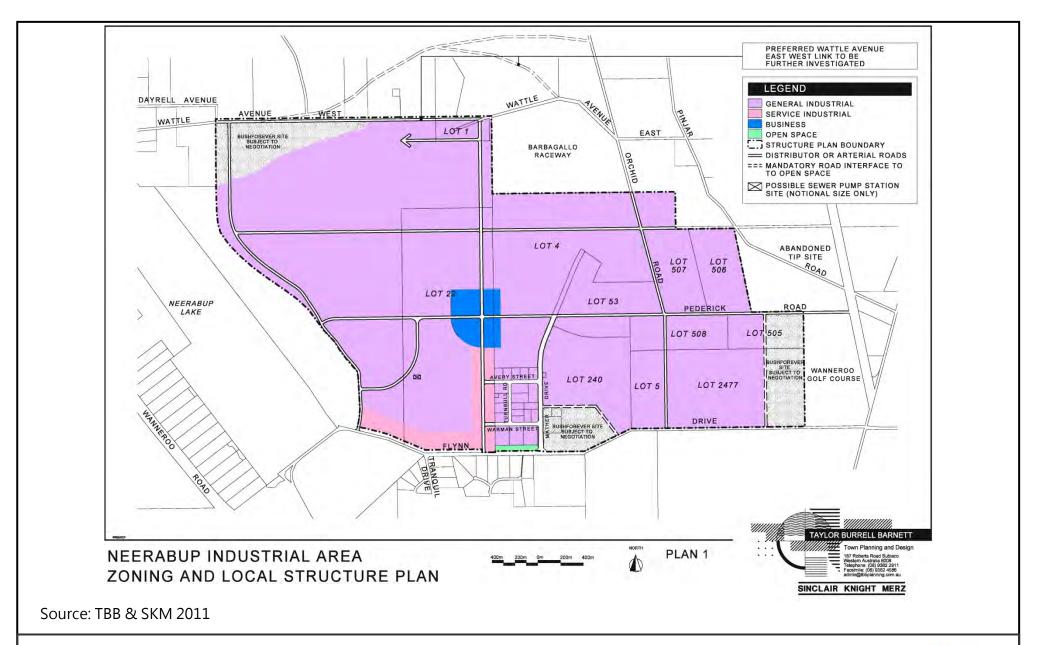
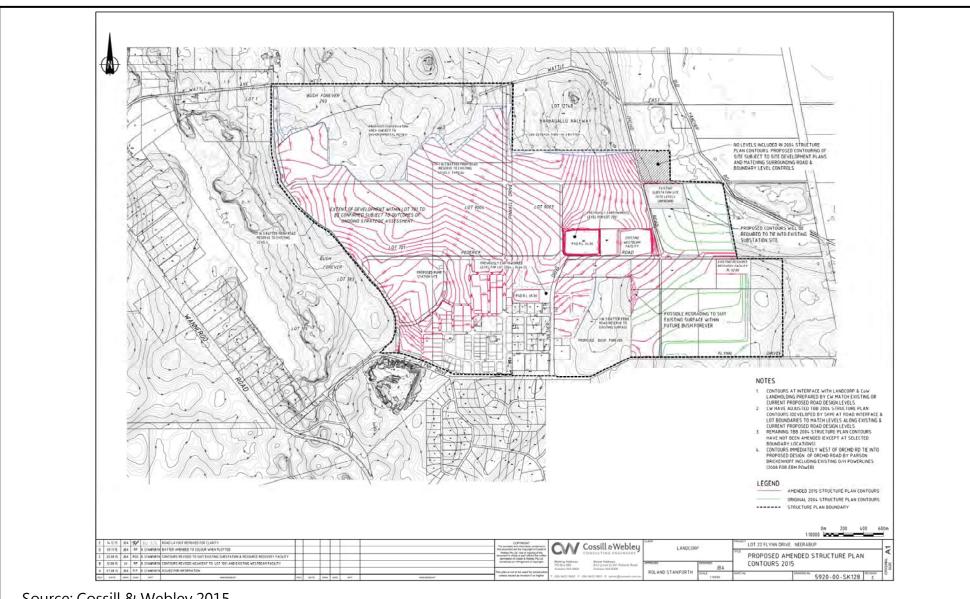


Figure 1a: Neerabup Industrial Area Zoning and Local Structure Plan





Source: Cossill & Webley 2015

Figure 1b: Proposed Amended Structure Plan Contours 2015



2. Spatial consideration of bushfire threat

2.1 Existing site characteristics

2.1.1 Location

The project area encompasses around 1000 ha of land located in Neerabup, City of Wanneroo and is situated approximately 32 km north of the Perth CBD and 6 km northeast of Joondalup. The project area is bound by the following, as depicted in Figure 2:

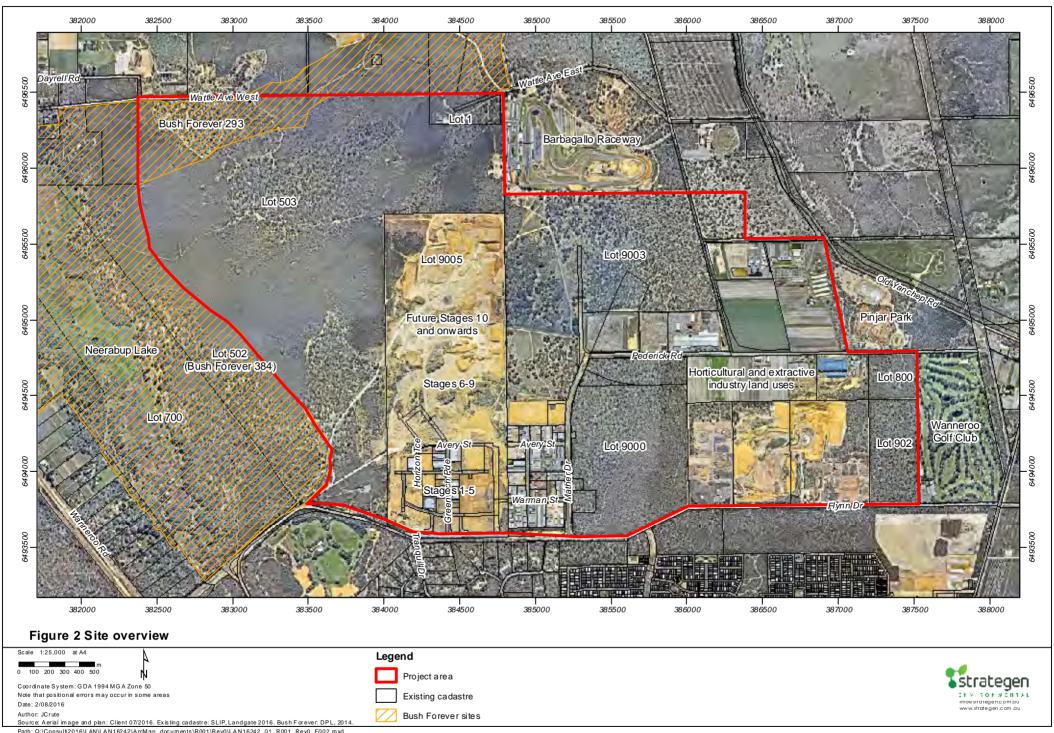
- Flynn Drive to the south
- Lot 700 (including Neerabup Lake) and Lot 502 (Bush Forever Site 384) to the west
- Wattle Avenue West/East and Barbagallo Raceway to the north
- Old Yanchep Road, Pinjar Park and Wanneroo Golf Club to the east.

The project area comprises the following, which are also depicted in Figure 2:

- Lot 503 Flynn Drive in the west (in accordance with DP 409677), which at this stage is the subject
 of precinct planning only pending detailed design (environmental approval for the initial 90 ha
 development area is in its final stages)
- 98 ha proposed conservation area within the northwest of Lot 503 (Bush Forever Site 293)
- Lot 1 Wattle Avenue East in the north adjacent to Barbagallo Raceway
- Lot 9005 Flynn Drive situated central to the site (in accordance with DP 409191), which comprises the following:
 - Stages 1–5 of Meridian Park Industrial Estate in the south, which are a mix of completed and constructed stages (i.e. Stages 1, 2A, 3A, 3B and 3C) and future undeveloped stages (i.e. Stages 2B, 4 and 5)
 - Stages 6–9 of Meridian Park Industrial Estate throughout central areas (currently extractive industry quarry)
 - future Stages 10 and onwards of Meridian Park Industrial Estate in the north (currently extractive industry quarry)
- · approved industrial subdivision situated central south within the site
- Lot 9003 Mather Drive in the northeast
- Lot 9000 Flynn Drive situated central south
- existing extractive industry and horticultural land uses in the eastern portion of the project area along Pederick Road, Trandos Road and the eastern extent of Flynn Drive
- Lot 800 Pederick Road and Lot 902 Flynn Drive in the southeast adjacent to Wanneroo Golf Club.



2-Jun-17



2.1.2 Zoning and land use

The project area is currently zoned 'Industrial' and 'Industrial Development' under the City of Wanneroo District Planning Scheme No. 2, with small pockets of local and regional 'Parks and Recreation' reserve. A large proportion of the site is currently undeveloped and vegetated, particularly in the west and northwest, whilst central and eastern portions of the site are subject to a combination of extractive industry, industrial and horticultural land uses, as well as undeveloped vegetated lots. Extractive industry is part of the sequential land development process, required due to 'Priority Resource' classification of a portion of land contained within the structure plan area.

Aside from Barbagallo Raceway, adjacent land to the north largely comprises undeveloped vegetated land. This is also the case to the west with regards to Lot 700 (including Neerabup Lake wetland vegetation) and Lot 502 (Bush Forever Site 384). Land to the south opposite Flynn Drive is a combination of larger rural residential lots and undeveloped vegetated land. Land to the east comprises a range of land uses including Wanneroo Golf Club, Pinjar Park (retained native vegetation), various motor-cross and go-kart tracks and undeveloped rural land, most of which comprises native vegetation.

2.1.3 Assets

The project area currently contains a range of assets, including life and property in the form of developed industrial, extractive industry and horticultural land uses. There is a distinct lack of high density overnight resident and visitor occupancy throughout the project area by virtue of the industrial zoning of the land.

The project area and adjacent land contains environmental assets in the form of large areas of intact native vegetation, particularly to the west and northwest in association with Neerabup Lake and Bush Forever Site 384. Lot 9000 and 902 Flynn Drive and Lot 800 Pederick Road in the south-eastern portion of the site are the other key properties that contain on-site native vegetation that are being considered for retention. Pinjar Park located east of the project area also contains retained native vegetation.

2.1.4 Access

The majority of industrial and extractive industry land uses that currently operate within the project area are accessed from the south via Flynn Drive and Mather Drive. Flynn Drive is a major connector between Wanneroo Road in the west and Old Yanchep Road in the east. Horticultural and industrial land uses located in the eastern portion of the site are accessed via Pederick Road and Trandos Road, which navigate west from Old Yanchep Road.

Connection to the west from realigned Flynn Drive and Neerabup Road to Mitchell Freeway Extension (Burns Beach Road to Hester Avenue) is currently under construction. Connection to the east from Flynn Drive to future realigned Neaves Road to Perth Darwin Highway is also currently under construction.

Access throughout western vegetated portions of the site is currently limited to firebreak access and informal tracks. This is also the case throughout the north and north-western portion of the site. Wattle Avenue West currently provides restricted access along the northern boundary of the site in the form of a limestone base track, which links to existing tracks servicing extractive industry uses and a Department of Parks and Wildlife (DPaW) monitoring station to the north. These tracks eventually link with Wattle Avenue East, which is a sealed road servicing Barbagallo Raceway to the north of the site, which in turn links with Old Yanchep Road to the northeast.

2.1.5 Servicing

The project area is connected to reticulated water and underground power supplies and these services will be expanded as staging progresses (Taylor Burrell Barnett & SKM 2011). This is also the case with sewer and gas services (sewer will be serviced by tankering prior to construction of the proposed wastewater pump station and pressure main).



2.2 Existing fire environment

2.2.1 Vegetation class

Vegetation class has been assessed for this site in accordance with methodology contained within AS 3959–2009 Construction of Buildings in Bushfire-Prone Areas (AS 3959; SA 2009). Strategen assessed vegetation class within the project area and adjacent 100 m through on-ground site investigation on 30 June 2016. Results of this assessment are depicted in Figure 3, which identifies the spatial extent of classified vegetation and the location/direction of site photographs depicting the relevant vegetation classes. A detailed summary of site photographs is contained in Appendix 1.

In general, the project area and surrounding land grades from Class B banksia woodland on white, sandy soils in the east; to a mix of Class A Jarrah-Marri forest and Class B banksia woodland at high points throughout central and northern areas; to Class A Tuart forest and Class D acacia scrub at low points, around wetlands and on limestone outcrops in the west. There are also areas of Class G grassland where native vegetation has been cleared and the understorey grasses and weeds remain unmanaged.

Further to the above, a large proportion of the project area and adjacent land is currently cleared, developed or subject to ongoing management. This includes remnant regrowth currently scattered throughout the Lot 9005 quarry site consisting of small regrowth saplings, scrub and shrubs, which have been cleared and re-cleared on multiple occasions and will be cleared again as quarry activities progress. These areas have been excluded from vegetation classification under the following clauses of AS 3959:

- Clause 2.2.3.2 (e): Non-vegetated areas including waterways, roads, footpaths, buildings and rocky outcrops
- Clause 2.2.3.2 (f): Low threat vegetation including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks (note minimal fuel condition means there is insufficient fuel available to significantly increase the severity of bushfire attack, recognizable as short-cropped grass for example, to a nominal height of 100 mm).

Aside from recurring clearing being undertaken within the Lot 9005 quarry site, the vegetation extent discussed above and mapped in Figure 3 demonstrates current site conditions and does not take into account vegetation clearance proposed as part of the development. Therefore, the mapped extent of Clause 2.2.3.2 exclusions within the project area will increase as industrial development is approved and constructed progressively throughout the site.

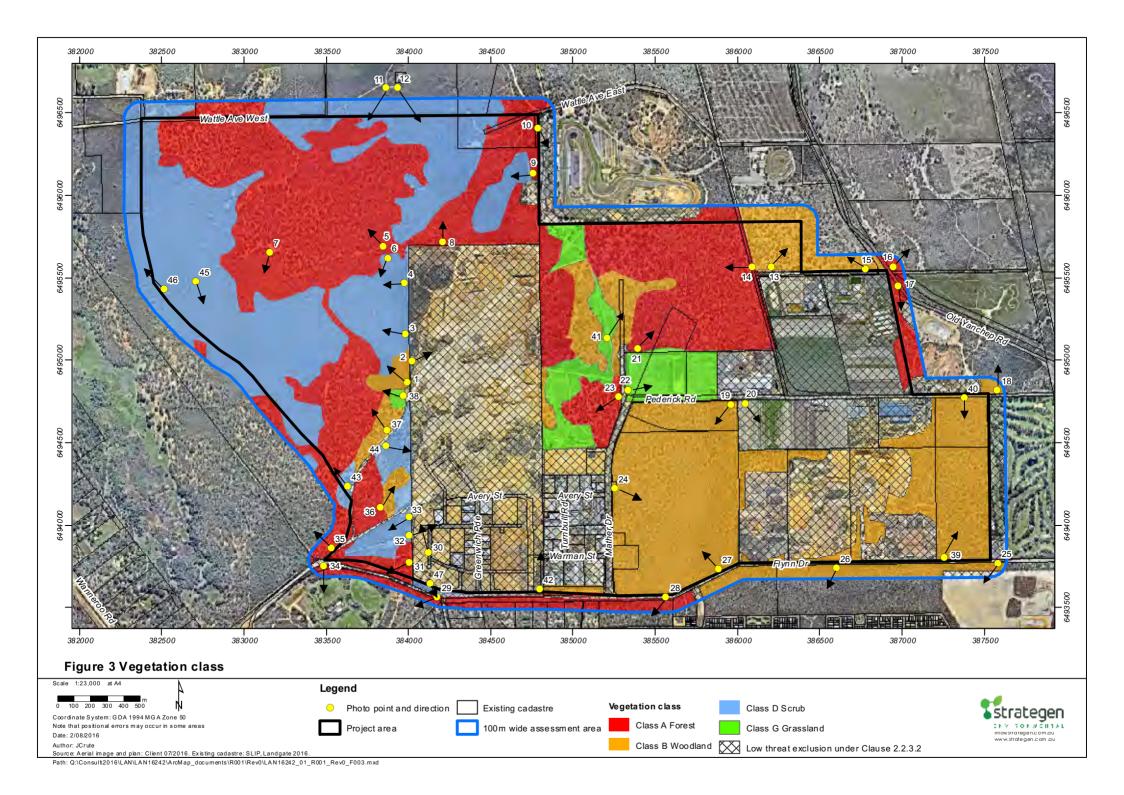
2.2.2 Effective slope

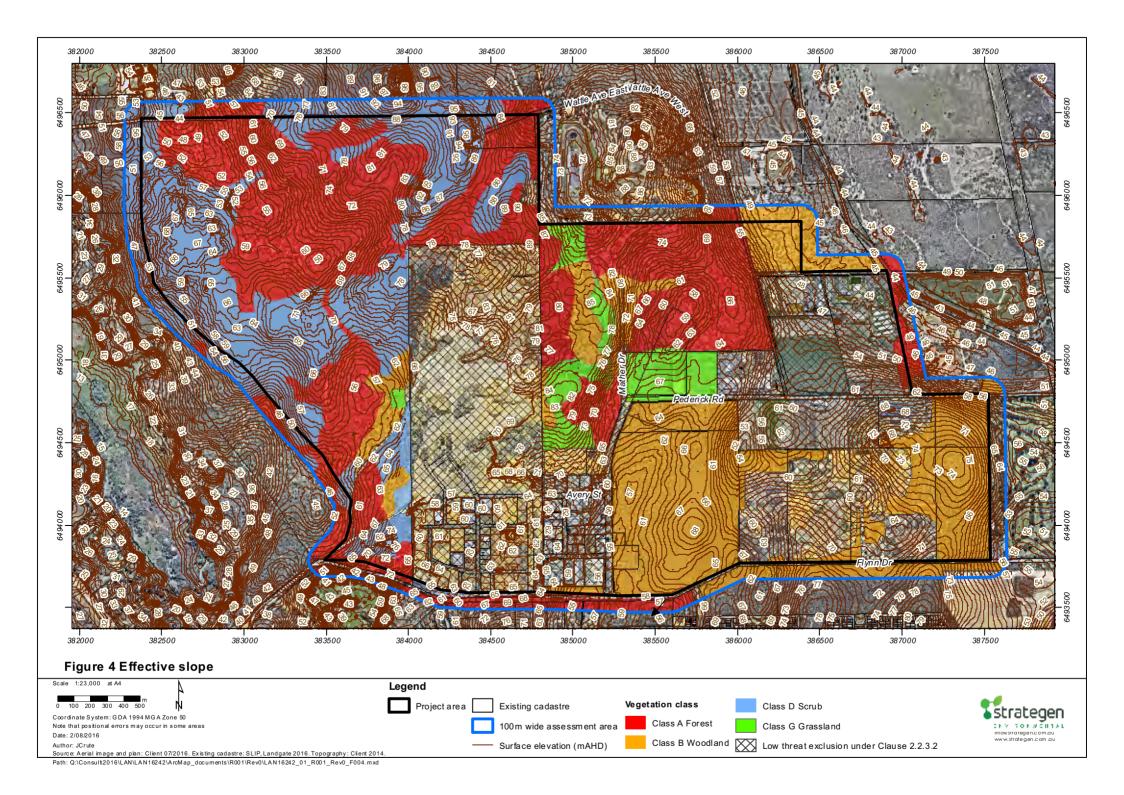
Effective slope has been assessed for this site in accordance with methodology contained within AS 3959. Strategen assessed effective slope within the project area and adjacent 100 m through on-ground site investigation on 30 June 2016. On-ground observations and measurements of effective slope have been validated through topographic mapping, as displayed in Figure 4, which identifies the feature survey topographic contours and surface elevation across the assessed vegetation classes.

Generally, the project area and adjacent land contains undulating topography. Effective slope varies from flat land (0 degrees) throughout low lying areas to the west and developed areas central to the site; to 0–5 degrees throughout gently undulating topography in the northwest, central south and east; to 5–10 degrees throughout steeper areas to the north.

The effective slope discussed above and mapped in Figure 4 demonstrates current site conditions and does not take into account post development site levels. Strategen emphasises that on completion of the development, the bulk of the project area will be built out subject to the amended contour plan outlined in Figure 1b and effective slope for the purposes of BAL assessment will only be relevant throughout areas of retained vegetation. The designed land gradient throughout the site will not exceed 2% post bulk earthworks and will result in the majority of proposed development being situated below (i.e. not up-slope of) retained vegetated areas.





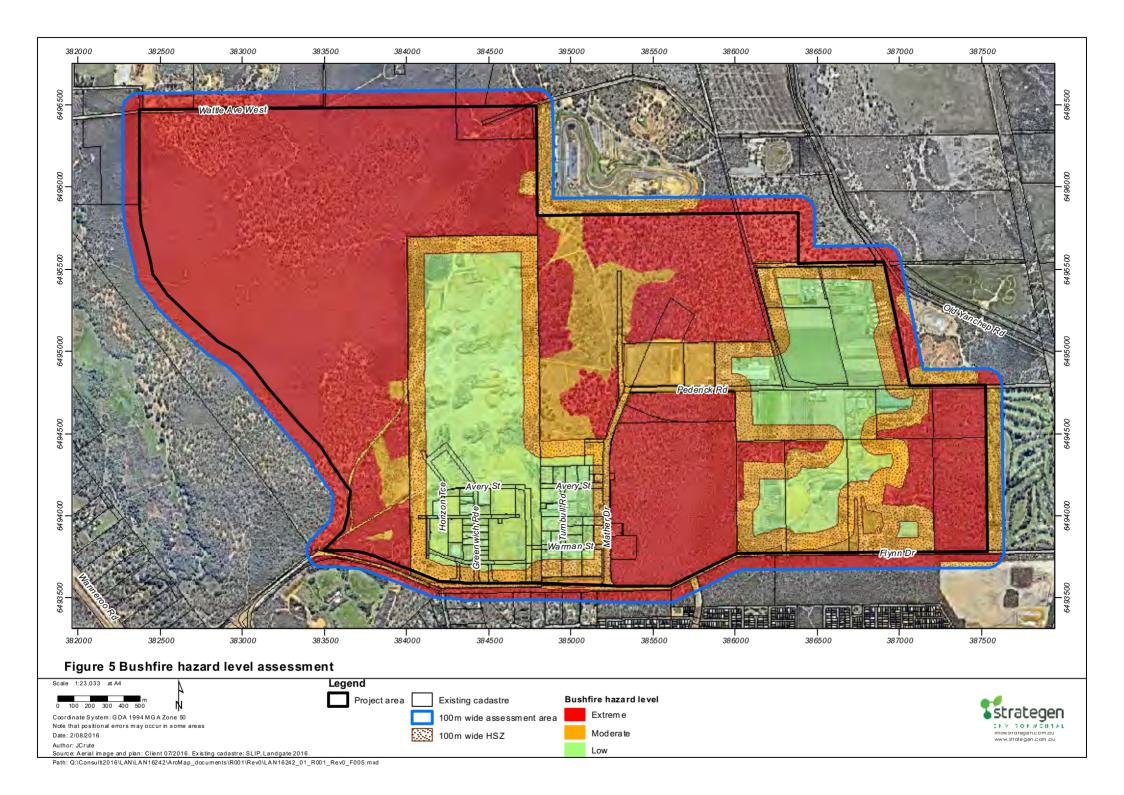


2.3 Bushfire hazard level assessment

Bushfire hazard levels have been assessed for this site in accordance with methodology contained within the Guidelines. Strategen has mapped the bushfire hazard levels within the project area and adjacent 100 m as per the conditions outlined in Figure 3 and Figure 4. A summary of results is provided below and depicted in Figure 5:

- all areas of Class A forest represent an extreme bushfire hazard level
- all areas of Class B woodland represent an extreme bushfire hazard level, except degraded areas
 of woodland, which represent a moderate bushfire hazard level where the fuel profile is less
 dense and the potential fire behaviour will be reduced
- all areas of Class D scrub represent an extreme bushfire hazard level, except degraded areas of scrub, which represent a moderate bushfire hazard level where the fuel profile is less dense and the potential fire behaviour will be reduced
- all areas of Class G grassland represent a moderate bushfire hazard level
- all non-vegetated areas and areas currently managed as low threat vegetation, which are both
 excluded from classification under Clause 2.2.3.2 (e) and (f) of AS 3959, represent a low bushfire
 hazard level (including areas of recurring clearing throughout the Lot 9005 quarry site)
- all areas located within 100 m of Class A forest, Class B woodland, Class D scrub or Class G
 grassland have been assigned a moderate bushfire hazard level by default to reflect the
 increased level of risk and 100 m wide Hazard Separation Zone (HSZ) requirements (WAPC
 2015b).





2.4 Identification of bushfire hazard issues

The project area in its pre-development state is subject to significant landscape scale bushfire risk as a result of the vast areas of vegetation within and adjacent to the site. This is particularly relevant to the north where a very long fire run exists through dense native vegetation including forest, woodland and scrub. A bushfire approaching the site from the northern quadrant under adverse fire weather conditions in summer (i.e. days of extreme or catastrophic fire danger) is expected to result in significantly elevated levels of radiant heat and ember attack if full fire escalation is achieved. Standard fire suppression under these conditions is not likely to be achievable, as experienced in January 2015.

The project area is also subject to significant landscape scale bushfire risk to the west in association with Lot 700 (including Neerabup Lake wetland vegetation) and Lot 502 (Bush Forever Site 384). This area contains dense forest, woodland and scrub vegetation, as well as vast areas of peat material, which can exacerbate fire behaviour and prolong bushfire impacts. A bushfire approaching the site from the western quadrant, particularly under predominant afternoon fire weather conditions in summer (i.e. in association with a prevailing south-westerly sea breeze) is expected to result in elevated levels of radiant heat and ember attack if full fire escalation is achieved.

In response to the abovementioned bushfire scenarios and landscape scale risk, LandCorp is actively working with the City and Department of Fire and Emergency Services (DFES) to undertake ongoing fuel hazard reduction works in the form of mosaic cell burning and the upgrade and maintenance of emergency access. The City and DFES have prepared a working Fire Management Plan document that outlines a proposed burn plan over the site to create low fuel areas at strategic interfaces and provide an increased level of bushfire risk mitigation to current and future life, property and environmental assets. The indicative cell burn plan is provided in Plate 1. Strategen emphasises that although low intensity prescribed fire reduces fuel loads and potential fire behaviour, it does not alter vegetation class.

On completion of the development, there will be a significantly reduced bushfire risk to future assets of the site as a result of the scale of vegetation clearing that will be undertaken to facilitate industrial development. Vegetation clearing throughout project staging will play an important role in managing the bushfire risk posed by on-site temporary vegetation during roll out of individual development stages. This is discussed as a key management measure in Section 3.1.

On this basis, Strategen considers the bushfire hazards within and adjacent to the project area and the associated bushfire risk to be readily manageable through standard management responses outlined in the Guidelines and AS 3959. These responses will be factored in to proposed industrial development early in the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.





Plate 1: Indicative cell burn plan for LandCorp-owned land at Neerabup (Source: City of Wanneroo 2015)



2.5 BAL assessment

Strategen has undertaken a Method 1 BAL assessment in accordance with AS 3959 for existing and proposed subdivision areas of Stages 1–5 Meridian Park Industrial Estate. The BAL assessment is based on post-development conditions in line with the existing and proposed subdivision lot layout for Stages 1–5. BAL assessment will need to be undertaken at the relevant subdivision stage for areas of the site where subdivision lot layout is yet to be confirmed.

The Method 1 procedure for calculating the BAL (as outlined in AS 3959) incorporates the following factors:

- state-adopted FDI rating
- · vegetation class
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

Based on the specified BAL, building construction/separation requirements for proposed buildings can then be assigned. A Method 1 BAL calculation for proposed development within Stages 1–5 is outlined in the following subsections.

2.5.1 Fire Danger Index

A blanket rating of FDI 80 is adopted for Western Australian environments, as outlined in AS 3959 and endorsed by Australasian Fire and Emergency Service Authorities Council.

2.5.2 Vegetation class as per AS 3959

Vegetation class is described in Section 2.2.1 (Figure 3). In consideration of the proposed clearing extent required to facilitate development in accordance with the existing/proposed subdivision lot layout for Stages 1–5, the post-development vegetation extent will consist of:

- Class D scrub located adjacent south of the site within the northern Flynn Drive road verge
- Class A forest located adjacent southwest and south of the site within the northern and southern Flynn Drive road verges
- · Class A forest located adjacent south of the site opposite Flynn Drive within private lots
- low threat vegetation excluded from classification under Clause 2.2.3.2 (e) located adjacent west and east of the site following creation of a 100 m wide low threat buffer throughout on-site temporary vegetation.

2.5.3 Effective slope

Effective slope is described in Section 2.2.2 (Figure 4). For the classified vegetation affecting proposed development within Stages 1–5, Class D scrub and Class A forest areas are located on flat land (0 degrees) or up-slope except for the far eastern portion of Class A forest, which has an effective slope of 0–5 degrees and is down-slope.

2.5.4 Distance between proposed development areas and the classified vegetation

Minimum separation distances for a BAL–29 rating or lower can be achieved for all proposed development within Stages 1–5. This equates to a minimum separation distance of 21 m adjacent to Class A forest and 13 m adjacent to Class D scrub. The required separation distances will be achieved in the form of minimum 20 m wide Asset Protection Zones (APZs) comprising road reserves at the vegetation interface and building setbacks where required.

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2.5.5 Method 1 BAL calculation

A Method 1 BAL calculation has been completed for existing/proposed development within Stages 1–5 that are located within the 100 m wide HSZ in accordance with AS 3959 methodology (Table 1). The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed buildings and subsequently informs the standard of building construction required to increase building tolerance to potentially withstand such impacts in line with the assessed BAL.

The assessed BAL ratings are depicted as BAL contours in Figure 6. A detailed depiction of the BAL contours is provided in Appendix 2. All proposed lots situated outside of the 100 m wide HSZ are BAL–Low, where there is insufficient risk to warrant specific building construction requirements. However, the extent of BAL–Low application relies on successful implementation of the management measures documented in this BMP.

Table 1: Method 1 BAL calculation

Classified vegetation	Effective slope	Hazard separation distance	BAL rating	Comment
		<16 m	BAL-FZ	No development is proposed in this area
	All up-slopes	16-<21	BAL-40	No development is proposed in this area
Class A forest	and flat land	21-<31	BAL-29	Development may occur in this area
101031	(0 degrees)	31-<42	BAL-19	Development may occur in this area
		42-<100	BAL-12.5	Development is likely to occur in this area
Class A	Down-slope >0-5 degrees	<20 m	BAL-FZ	No development is proposed in this area
forest		20-<27	BAL-40	No development is proposed in this area
		27-<37	BAL-29	Development may occur in this area
		37-<50	BAL-19	Development may occur in this area
		50-<100	BAL-12.5	Development is likely to occur in this area
Class D		<10 m	BAL-FZ	No development is proposed in this area
scrub	All up-slopes and flat land (0 degrees)	10-<13	BAL-40	No development is proposed in this area
		13-<19	BAL-29	No development is proposed in this area
		19–<27	BAL-19	Development may occur in this area
		27-<100	BAL-12.5	Development is likely to occur in this area

The above BAL contours are based on the vegetation class and effective slope assessed at the time of inspection and take into consideration the proposed clearing extent and separation distances achieved in line with proposed subdivision and development. Should there be any changes in development/subdivision design or vegetation/hazard extent that requires a modified bushfire management response, then the above BAL contours will need to be reassessed for the affected areas and documented in a brief addendum to this BMP prepared to accompany a future planning/building application.



Bushfire management measures

Strategen has identified a range of bushfire management measures that on implementation will enable proposed development to be implemented with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959. The bushfire management measures are discussed in the following subsections and depicted in Figure 6 where applicable.

3.1 Separation distances and fuel management

3.1.1 APZs

APZs will be implemented at the interface between all proposed development areas and the classified vegetation extent. The width of the APZs will be a minimum of 20 m and can be accommodated within existing/proposed road reserves and building setbacks where required.

APZs are required to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition all year round. This may include regular slashing of road verges and grassland fuels where applicable. Individual trees can be retained within the APZ provided the understorey is managed through regular slashing to achieve a low threat vegetation minimal fuel condition. No buildings are permitted in the APZ.

Alignment and width of the APZs may be reassessed through a BMP addendum in response to any modifications to lot layout, changes to the vegetation extent currently affecting the site or as an accompaniment to subdivision applications for new development stages.

3.1.2 HSZs

Formal HSZs in accordance with Acceptable Solution A 2.2 of the Guidelines are not required around the proposed APZs in this instance since building construction within each proposed lot will meet the standard appropriate to the BAL for that location (WAPC 2015b).

3.1.3 On-site staging buffers

Clearing will occur throughout the project area on a staged basis and in advance where necessary to ensure building construction is not inhibited by a temporary vegetation extent located on an adjacent development stage that is yet to be cleared. This can be achieved by ensuring each approved stage subject to construction is surrounded by a 100 m wide, on-site cleared or low threat vegetation buffer prior to development (not including vegetation proposed to be retained).

A proportion of the required 100 m wide staging buffers will be achieved through battering, whereby, due to differences between proposed development levels and the natural surface levels of retained Bush Forever and conservation sites, the resultant cut batters will be cleared of vegetation.

Once the buffers are created, they will need to be maintained on a regular and ongoing basis at a fuel load less than 2 t/ha to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of the next development stage. This will manage the bushfire risk from on-site temporary vegetation during development staging.



3.1.4 POS management

Development within 100 m of on-site vegetation retained within POS, proposed conservation areas or Bush Forever sites will require BAL contour assessment in accordance with AS 3959. Results will need to be provided in the form of a brief BMP addendum to accompany the relevant subdivision application.

The location and size of Drainage POS (if required) is yet to be confirmed. Some planting may occur throughout Drainage POS; however, LandCorp has confirmed that these areas will be subject to an ongoing management commitment by the responsible authority. The required works will include slashing of understorey grasses and weeds on a regular and ongoing basis to maintain fuel loads at less than 2 t/ha and achieve a low threat minimal fuel condition all year round.

Should the final Drainage POS concept result in introduction of vegetation that triggers application of AS 3959, then BAL assessment will be required to determine the necessary separation requirements and building construction standards for affected development areas.

3.2 Increased building construction standards

Strategen acknowledges that the bushfire construction provisions under AS 3959 and the National Construction Code do not apply to Class 4–9 buildings, which are likely to be the dominant types of buildings constructed throughout the proposed industrial development. Therefore, the applicant has the discretion to utilise any or all of the elements of AS 3959 in the construction of the building that they deem appropriate if the building is a Class 4–9 building (WAPC 2015b).

Whilst acknowledging the above, Strategen considers however that to achieve a best practice outcome for protection of future life and property assets from potential bushfire, building design measures be applied for all proposed buildings situated within the 100 m wide HSZ to ensure the building construction standard aligns with the assessed BAL under AS 3959 as far as reasonably practicable, regardless of building class. This measure intends to address the deemed provisions relating construction of habitable buildings in bushfire prone areas as outlined in Section 78B of the *Planning and Development (Local Planning Schemes) Amendment Regulations 2015.*

Strategen has assigned BAL contours throughout the 100 m wide HSZ for Stages 1–5 only, as depicted in Figure 6 and Appendix 2, as these are the only stages where subdivision lot layout is known. BAL contours have been assigned in accordance with AS 3959 on the basis of the existing/proposed subdivision layout and parameters assessed at time of inspection (refer to the Method 1 BAL calculation outlined in Section 2.5). The BAL contour assessment indicates that all proposed development within these stages can achieve a BAL–29 rating or lower and no development is proposed within BAL–FZ or BAL–40 areas. If a lot is affected by more than one BAL, then the worst case BAL shall apply unless it can be demonstrated that the worst case BAL can be avoided through strategic building location at the building permit stage.

All proposed lots within these stages that are situated outside of the 100 m wide HSZ are BAL-Low, where there is insufficient risk to warrant specific building construction requirements. The extent of BAL-Low throughout these stages relies on the separation distances and fuel management measures being implemented as per Section 3.1. BALs may be reassessed through a BMP addendum or individual lot BAL assessment in response to any modifications to lot layout or changes to the vegetation extent currently affecting the site.

Strategen reiterates that BAL assessment will need to be undertaken at the relevant subdivision stage for areas of the site where subdivision lot layout is yet to be confirmed.

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^{&#}x27;Habitable building' is defined as any permanent or temporary structure that is fully or partially enclosed and has at least one wall and a roof of solid material and is used for a purpose that involves the use of the interior of the structure by people for living, working, studying or being entertained.

3.3 Vehicular access

3.3.1 Public roads

The proposed road network will provide at least two different points of vehicular access for all development stages at all times. This will be achieved initially through multiple connections with Flynn Drive to the south and links with the existing road network to the east, such as Warman Street. All public roads constructed as part of the development will comply with technical requirements of the Guidelines, as outlined in Table 2

Where applicable, each stage of subdivision will include a requirement for provision of fire service access routes in accordance with acceptable solution A3.7, or an appropriate performance-based solution in accordance with P3 of the bushfire protection criteria set out in the Guidelines. Any proposed fire service access routes will be required to meet the technical requirements of the Guidelines, as outlined in Table 2.

Table 2: Vehicular access technical requirements

Technical requirement	Public road	Fire service access route			
Minimum trafficable surface (m)	6*	6*			
Horizontal distance (m)	6	6			
Vertical clearance (m)	4.5	4.5			
Maximum grade <50 m	1 in 10	1 in 10			
Minimum weight capacity (t)	15	15			
Maximum crossfall	1 in 33	1 in 33			
Curves minimum inner radius	8.5	8.5			
* Refer to E3.2 Public roads: Trafficable surface					

Source: WAPC 2015b

3.3.2 Individual lot firebreaks

Following creation of lots, internal lot boundary firebreaks will need to be created and maintained to meet compliance with the current City of Wanneroo annual firebreak notice (refer to Appendix 3). The relevant firebreak provisions currently state that:

- for any lot greater than 2000 m², a minimum 3 m wide firebreak with 3 m high vertical clearance is required immediately inside and around all external boundaries of the lot
- for any lot less than 2000 m², a minimum 2 m wide firebreak with 2 m high vertical clearance is required immediately inside and around all external boundaries of the lot.

These provisions are required unless a firebreak variation stating otherwise is approved by the City.

3.4 Reticulated water supply

All proposed development areas will be provided a reticulated water supply. The reticulated system will ensure an all year round supply of water is provided for each lot to meet minimum industrial and emergency water supply requirements.

A network of hydrants will also be provided along the internal road network at locations which meet relevant water supply authority and DFES requirements, in particular the Water Corporation Design Standard DS 63 'Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250'. This standard will guide construction of the internal reticulated water supply system and fire hydrant network, including spacing and positioning of fire hydrants so that the maximum distance between a hydrant and the rear of a building envelope (or in the absence of a building envelope, the rear of the lot) shall be 120 m and the hydrants shall be no more than 200 m apart.



3.5 Additional measures

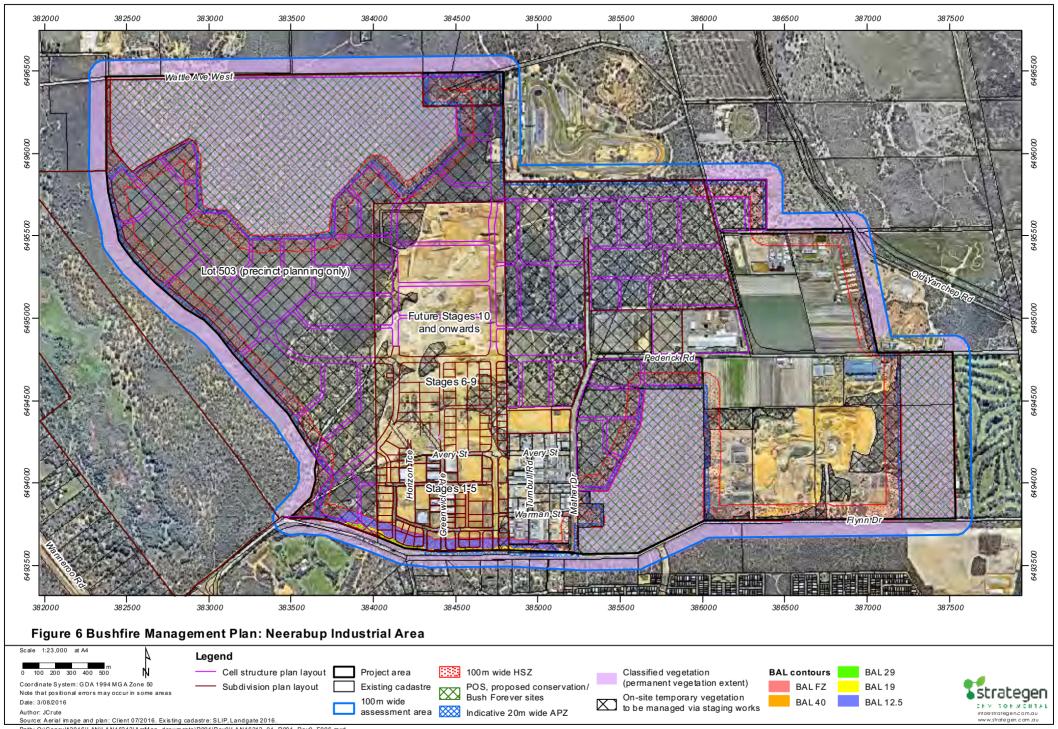
Strategen makes the following additional recommendations to inform ongoing stages of development:

- 1. <u>High risk land uses</u>: proposed industrial development has the potential to establish high risk land uses² throughout the project area. Where possible, high risk land uses should be avoided throughout the 100 m wide HSZ. Where they can't be avoided, high risk land uses located in areas of BAL–12.5 to BAL–29 will require the following documentation in addition to this BMP to accompany submission of the Development Application (DA) or building permit application (whichever is deemed more appropriate) in order to address Policy Measure 6.6.1 of SPP 3.7:
 - (a) Emergency Evacuation Plan
 - (b) Risk Management Plan that addresses bushfire risk management measures for any flammable on-site hazards.
- 2. Notification on Title: notification is to be placed on the Title of all proposed lots with a designated BAL rating (either through condition of subdivision or other head of power) to ensure all landowners/proponents and prospective purchasers are aware that their lot is currently in a designated bushfire prone area and that increased building construction standards may apply to future buildings as determined by this BMP. The notification on title is also to include that the site is subject to a Bushfire Management Plan.
- 3. <u>Updated BMP or individual lot BAL assessment</u>: the BAL assessment contained within this BMP is considered sufficient to inform future development and building construction within Stages 1–5. However, an updated BMP will be required to accompany each future subdivision application within the project area. Further BMP addendums or individual lot BAL assessment may be prepared at a later date to demonstrate reassessment of the management measures documented in this BMP (such as the APZ and/or BALs) in response to any modifications to development design or changes to the vegetation extent currently affecting the site.
- Compliance with current City of Wanneroo annual firebreak notice: the developer/land manager and
 prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice,
 as documented in Appendix 3.

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² High risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.



Proposal compliance and justification

Proposed development within the project area is required to comply with SPP 3.7 under the following policy measures:

- 6.2 Strategic planning proposals, subdivision and development applications
- a) Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level (BHL) above low and/or where a Bushfire Attack Level (BAL) rating above BAL-LOW apply, are to comply with these policy measures.
- **b)** Any strategic planning proposal, subdivision or development application in an area to which policy measure 6.2 a) applies, that has or will, on completion, have a moderate BHL and/or where BAL-12.5 to BAL-29 applies, may be considered for approval where it can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.
- **c)** This policy also applies where an area is not yet designated as a bushfire prone area but is proposed to be developed in a way that introduces a bushfire hazard, as outlined in the Guidelines. 6.3 Information to accompany strategic planning proposals

Any strategic planning proposal to which policy measure 6.2 applies is to be accompanied by the following information prepared in accordance with the Guidelines:

- **a) (i)** the results of a BHL assessment determining the applicable hazard level(s) across the subject land, in accordance with the methodology set out in the Guidelines. BHL assessments should be prepared by an accredited Bushfire Planning Practitioner; or
- **a) (ii)** where the lot layout of the proposal is known, a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. The BAL Contour Map should be prepared by an accredited Bushfire Planning Practitioner; and
- b) the identification of any bushfire hazard issues arising from the relevant assessment; and
- c) clear demonstration that compliance with the bushfire protection criteria in the Guidelines can be achieved in subsequent planning stages.

This information can be provided in the form of a Bushfire Management Plan or an amended Bushfire Management Plan where one has been previously endorsed.

- <u>6.4/6.5 Information to accompany subdivision applications/development applications</u>
 Any subdivision application/development application to which policy measure 6.2 applies is to be accompanied by the following information in accordance with the Guidelines:
- a) a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. BAL Contour Maps should be prepared by an accredited Bushfire Planning Practitioner
- b) the identification of any bushfire hazard issues arising from the BAL Contour Map
- **c)** an assessment against the bushfire protection criteria requirements contained within the Guidelines demonstrating compliance within the boundary of the subdivision/development site.

Implementation of this BMP is expected to meet the following objectives of SPP 3.7:

- **5.1** Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount.
- **5.2** Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stages of the planning and development process.
- **5.3** Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications take into account bushfire protection requirements and include specified bushfire protection measures.
- **5.4** Achieve an appropriate balance between bushfire risk management measures and, biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.



In response to the above requirements of SPP 3.7, the bushfire management measures, as outlined in Section 3, have been devised for the proposed development in accordance with acceptable solutions of the Guidelines to meet compliance with bushfire protection criteria. An 'acceptable solutions' assessment is provided in Table 3 to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrate that the measures proposed meet the intent of each element of the bushfire protection criteria.



Table 3: Acceptable solutions assessment against bushfire protection criteria

Bushfire protection criteria	Intent	Acceptable solutions	Proposed bushfire management measures	Compliance statement
Element 1: Location	To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure	A1.1 Development location The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL–29 or below.	Refer to Section 3.2, which demonstrates that development will only occur in areas of BAL–29 or lower. No development will occur in BAL–FZ or BAL–40 areas.	The measures proposed are considered to comply and meet the intent of Element 1 Location.
Element 2: Siting and design of development	To ensure that the siting and design of development minimises the level of bushfire impact	A2.1 Asset Protection Zone Every building is surrounded by an APZ, depicted on submitted plans, which meets detailed requirements (refer to the Guidelines for detailed APZ requirements).	Refer to Section 3.1, which demonstrates that a minimum 20 m wide APZ will be provided at all development-vegetation interfaces.	The measures proposed are considered to comply and meet the intent of Element 2 Siting and design of development
		A2.2 Hazard Separation Zone Every building and its contiguous APZ is surrounded by an HSZ, depicted on submitted plans, that meets detailed requirements (refer to the Guidelines for detailed HSZ requirements). An HSZ may not be required if the proposed construction meets the standard appropriate to the BAL for that location, and does not exceed BAL-29.	HSZs are not proposed since individual building construction meets the standard appropriate to the BAL for that location.	
Element 3: Vehicular access	To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event	A3.1 Two access routes Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.	Refer to Section 3.3, which demonstrates that a minimum of two different vehicular access routes will be provided for the proposed development at all times via the existing/proposed road network.	The measures proposed are considered to comply and meet the intent of Element 3 Vehicular access
		A3.2 Public road A public road is to meet the requirements in Table 4 Column 1 of the Guidelines.	Refer to Section 3.3, which demonstrates that all proposed public roads will meet requirements of the Guidelines (refer to Table 2).	
		A3.3 Cul-de-sac (including a dead-end-road) A cul-de-sac and/or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/or will need to be demonstrated by the proponent), detailed requirements will need to be achieved as per Table 4 Column 2 of the Guidelines.	N/A No cul-de-sacs are proposed as part of the development.	
		A3.4 Battle-axe Battle-axe access legs should be avoided in bushfire prone areas. Where no alternative exists, (this will need to be demonstrated by the proponent) detailed requirements will need to be achieved as per Table 4 Column 3 of the Guidelines.	N/A No battle-axe lots are proposed as part of the development.	

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		A3.5 Private driveway longer than 50 m A private driveway is to meet detailed requirements as per Table 4 Column 3 of the Guidelines.	N/A No private driveways longer than 50 m are proposed as part of the development.	
		A3.6 Emergency access way An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet detailed requirements as per Table 4 Column 4 of the Guidelines.	N/A No emergency access ways are required as part of the development.	
		A3.7 Fire service access routes (perimeter roads) Fire service access routes are to be established to provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for fire fighting purposes. Fire service access routes are to meet detailed requirements as per Table 4 Column 5 of the Guidelines.	Where applicable, fire service access routes will be required at the subdivision stage in accordance with A3.7 or an appropriate performance based solution in accordance with P3 of the Guidelines.	
		A3.8 Firebreak width Lots greater than 0.5 hectares must have an internal perimeter firebreak of a minimum width of three metres or to the level as prescribed in the local firebreak notice issued by the local government	Refer to Section 3.3, which demonstrates that all proposed lots will be required to comply with the firebreak requirements prescribed in the annual firebreak notice issued by the local government.	
Element 4: Water	To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.	A4.1 Reticulated areas The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.	Refer to Section 3.4, which demonstrates that all proposed lots will be provided a reticulated water supply and network of hydrants in accordance with local water authority, City and DFES requirements.	The measures proposed are considered to comply and meet the intent of Element 4 Water
		A4.2 Non-reticulated areas Water tanks for fire fighting purposes with a hydrant or standpipe are provided and meet detailed requirements (refer to the Guidelines for detailed requirements for non-reticulated areas)	N/A The proposed development will not occur within a non-reticulated area.	
		A4.3 Individual lots within non-reticulated areas (only for use if creating 1 additional lot and cannot be applied cumulatively) Single lots above 500 square metres need a dedicated static water supply on the lot that has the effective capacity of 10 000 litres.	N/A The proposed development will not occur within a non-reticulated area.	

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2-Jun-17

5. Implementation and enforcement

Implementation of the BMP applies to LandCorp, prospective landowners and the relevant land authority/manager (such as the City or future land purchasers) to ensure bushfire management measures are adopted and implemented on an ongoing basis. A summary of the bushfire management measures described in Section 3, as well as a works program, is provided in Table 4. These measures will be implemented to ensure the ongoing protection of proposed life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 4: Proposed works program

Bushfire management measure	Timing for application	Responsibility
Creation and ongoing maintenance of APZs as per Section 3.1.1	APZs are to be created for each development stage where required, prior to development within that stage, and maintained as required to ensure they are kept in a low threat minimal fuel condition on a regular and ongoing basis	LandCorp during development of each relevant stage, relevant land authority/manager where required following completion of each relevant stage
Creation and maintenance of on- site staging buffers as per Section 3.1.3 Staging buffers are to be created in advance around each development stage where required, prior to development within that stage, and maintained as required to ensure they are kept in a low threat minimal fuel condition on a regular and ongoing basis until developed		LandCorp
Ongoing maintenance of Drainage POS as per Section 3.1.4	If created, Drainage POS is to be maintained, in advance where required, prior to development within that stage to ensure the POS is kept in a low threat minimal fuel condition on a regular and ongoing basis	LandCorp during development of each relevant stage, relevant land authority/manager where required following completion of each relevant stage
Building construction to the recommended BAL ratings as far as reasonably practicable as per Section 3.2	At the building construction stage	Prospective landowner, builder
Construction of public roads and fire service access routes (if required) as per Section 3.3.1	Prior to building construction for each relevant stage	LandCorp
Creation and ongoing maintenance of firebreaks as per Section 3.3.2	Firebreaks are to be created for each relevant lot following creation of lots and maintained as required in accordance with the current City of Wanneroo annual firebreak notice	LandCorp prior to lot sale, prospective landowner following lot sale
Provision of reticulated water supply and network of hydrants as per Section 3.4	Prior to building construction for each relevant stage	LandCorp
Preparation of Emergency Evacuation Plan and Risk Management Plan as per Section 3.5	At the Development Application stage or building permit application stage (whichever is deemed more appropriate) for any high risk land uses proposed in areas of BAL–12.5 to BAL–29	Prospective landowner
Notification on Title as per Section 3.5	Following subdivision approval	LandCorp
Updated BMP or individual lot BAL assessment as per Section 3.5	An updated BMP is required to support each future subdivision application within the project area. Further BMP addendums and/or individual lot BAL assessments may be required at future planning/building stages to demonstrate reassessment of the management measures documented in this BMP (such as the APZ and/or BALs) in response to any modifications to development design or changes to the vegetation extent currently affecting the site.	LandCorp or prospective landowner depending on the applicant



Bushfire management measure	Timing for application	Responsibility	
Compliance with current City of Wanneroo annual firebreak notice as per Section 3.5	All year round as specified in the current firebreak notice	LandCorp, prospective landowner, relevant land authority/manager	

5.1 Document review

This BMP will be updated as necessary following the date of approval to ensure:

- 1. Implementation is assessed and corrective actions are applied in cases of non-compliance.
- 2. The effectiveness and impact of fire prevention work is evaluated and any significant changes in development design or the surrounding environment are reassessed in a BMP addendum.

LandCorp will be responsible for updating and revising the BMP as required until such time that the development is complete, after which time the City will be the authority responsible for updating and revising the BMP as required.

5.2 Stakeholder consultation

Strategen has undertaken consultation with LandCorp, the City and DFES to ensure aims and objectives of the BMP are in accordance with stakeholder expectations and the BMP maintains compliance with the Guidelines.



6. References

- City of Wanneroo 2016, Fire Management Plan: LandCorp Land at Neerabup, plan prepared for the City and DFES, February 2015.
- Department of Fire and Emergency Services (DFES) 2016, Map of Bush Fire Prone Areas, [Online], Government of Western Australia, available from: http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx, [11/07/2016].
- Standards Australia (SA) 2009, *Australian Standard AS* 3959–2009 Construction of Buildings in Bushfire-prone Areas, Standards Australia, Sydney.
- Taylor Burrell Barnett and Sinclair Knight Merz (SKM) 2011, *Neerabup Industrial Area Agreed Structure Plan (As Amended)*, report prepared for LandCorp, November 2011.
- Western Australian Planning Commission (WAPC) 2015a, State Planning Policy 3.7 Planning in Bushfire-Prone Areas, Western Australian Planning Commission, Perth.
- Western Australian Planning Commission (WAPC) 2015b, *Guidelines for Planning in Bushfire-Prone Areas*, Western Australian Planning Commission, Perth.



Appendix 1
Photo points (refer to Figure 3 for spatial location of photo points)

Photo No.	Vegetation class	Comment	Photo
1	Class B woodland	Banksia overstorey, scrub understorey, adjacent west of Lot 9005	
2	Class D scrub	Temporary vegetation within Lot 9005	
3	Class D scrub	Adjacent west of Lot 9005, eucalyptus overstorey in background signifies narrow band of Class A forest	

Photo No.	Vegetation class	Comment	Photo
4	Class D scrub	Adjacent west of Lot 9005	
5	Class A forest	Adjacent northwest of Lot 9005, subject to recent prescribed burn by DFES/City of Wanneroo brigades (Cell 2)	
6	Class D scrub	Adjacent west of Lot 9005, south of prescribed burn (Cell 2) boundary	

Photo No.	Vegetation class	Comment	Photo
7	Class A forest	Central north within Lot 503, south of prescribed burn (Cell 2) boundary	
8	Class A forest	Adjacent north of Lot 9005, subject to recent prescribed burn by DFES/City of Wanneroo brigades (Cell 2)	
9	Class D scrub	Adjacent west of Barbagallo Raceway	

Photo No.	Vegetation class	Comment	Photo
10	Low threat vegetation Clause 2.2.3.2 (e) and (f)	Within western boundary of Barbagallo Raceway	
11	Class D scrub	View to southwest from DPaW station, north of site	
12	Class D scrub	View to southeast from DPaW station, north of site	

Photo No.	Vegetation class	Comment	Photo
13	Class B woodland	Sparse banksia and casuarina canopy over grassland, within northeast portion of site	
14	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, within northeast portion of site	
15	Class B woodland	Sparse melaleuca canopy over grassland, within northeast portion of site	

Photo No.	Vegetation class	Comment	Photo
16	Class A forest	Eucalyptus regrowth, will become forest in mature state, northeast of site	
17	Class A forest	Roadside vegetation east of site, eucalyptus overstorey	
18	Class B woodland	Predominant banksia woodland within Pinjar Park, east of site	

Photo No.	Vegetation class	Comment	Photo
19	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	
20	Low threat vegetation Clause 2.2.3.2 (f)	Managed horticulture within central eastern portion of site	
21	Class A forest	Very recently burnt, eucalyptus overstorey with regeneration of understorey within northeast portion of site	

Photo No.	Vegetation class	Comment	Photo
22	Class G grassland	Unmanaged grassland plot, central to site	
23	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, central to site	
24	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	

Photo No.	Vegetation class	Comment	Photo
25	Class B woodland	Roadside vegetation, southeast of site	
26	Class B woodland	Roadside vegetation, southeast of site	
27	Class B woodland	Predominant banksia and casuarina woodland, proposed for on-site retention within central southern portion of site	

Photo No.	Vegetation class	Comment	Photo
28	Class A forest	Greater proportion of eucalyptus overstorey over banksia and casuarina midstorey over shrubs/scrub, south of site opposite Flynn Drive	
29	Class A forest	South of site within adjacent larger rural residential lots	
30	Low threat vegetation Clause 2.2.3.2 (e)	Within Stages 1–5 subdivision area	

Photo No.	Vegetation class	Comment	Photo
31	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, southwest of Stages 1–5 subdivision area	
32	Low threat vegetation Clause 2.2.3.2 (e)	Within Stages 1–5 subdivision area	
33	Class D scrub	West of Stages 1–5 subdivision area	

Photo No.	Vegetation class	Comment	Photo
34	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, southwest of site opposite Flynn Drive	
35	Class A forest	Three tiered vegetation with eucalyptus overstorey, banksia/casuarina midstorey and shrub/scrub understorey, west of site opposite quarry access road	
36	Class B woodland	Predominant banksia overstorey with scrub understorey, west of Stages 1–5 subdivision area	

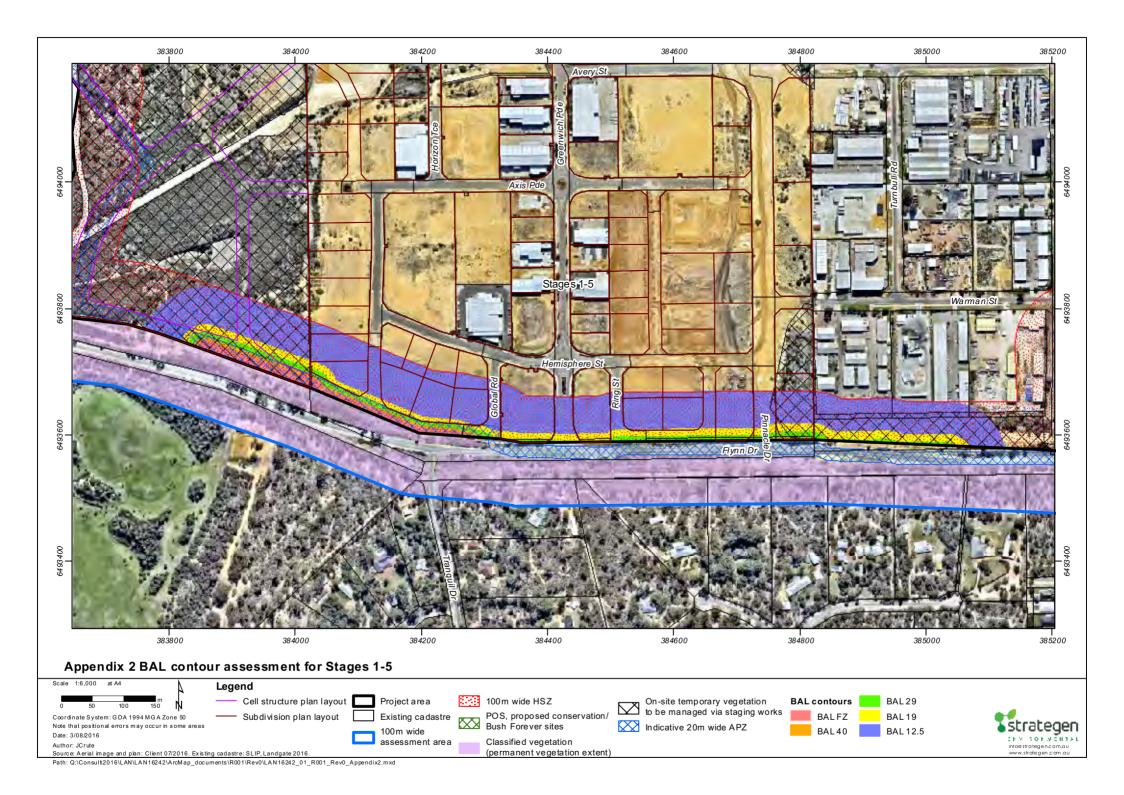
Photo No.	Vegetation class	Comment	Photo
37	Class B woodland	Sparse banksia/eucalyptus overstorey over grassland, west of quarry access road	
38	Class G grassland	Unmanaged grassland plot west of quarry access road	
39	Class B woodland	Banksia and casuarina woodland proposed for on-site retention within eastern portion of site	

Photo No.	Vegetation class	Comment	Photo
40	Class B woodland	Banksia and casuarina woodland proposed for on-site retention within eastern portion of site	
41	Class B woodland	Banksia woodland in background beyond predominant grassland plot within central northern portion of site	
42	Class B woodland	Predominant banksia and casuarina woodland with some minor eucalyptus incursion within southern portion of site	

Photo No.	Vegetation class	Comment	Photo
43	Class D scrub	West of quarry access road	
44	Class D scrub	East of quarry access road	
45	Class D scrub	Low lying contiguous scrub within Lot 503	

Photo No.	Vegetation class	Comment	Photo
46	Class D scrub	Low lying contiguous scrub within Lot 502	
47	Class D scrub	Adjacent south of Stages 1–5 subdivision area, north of Flynn Drive	

Appendix 2
BAL contour assessment for Stages 1–5



Appendix 3
City of Wanneroo annual firebreak notice

Protect your home and property from bushfires

NOTICE TO ALL OWNERS OR OCCUPIERS OF LAND IN THE DISTRICT OF THE CITY OF WANNEROO REGARDING FIREBREAKS.

The City of Wanneroo hereby gives notice pursuant to Section 33 of the **Bush Fires Act 1954** to all owners or occupiers of land in its district that they are required on or before 15 November, or within 14 days of becoming the owner or occupier of the land if that occurs after the 15 November, to annually plough, cultivate, scarify, or otherwise clear firebreaks as specified in this Notice and thereafter up to, and including the 30 April, annually, to maintain the firebreaks clear of flammable matter.

1. Land having an area of 2000m2 or more

A firebreak not less than 3 metres wide and 3 metres high immediately inside and around all external boundaries of the land must be cleared.

2. Land having an area of less than 2000m²

A firebreak not less than 2 metres wide and 2 metres high immediately inside and around all external boundaries of the land must be cleared.

3. Buildings

A firebreak not less than 3 metres wide immediately around all external walls of every building must be cleared. Whenever a firebreak is cleared by burning the provisions of the Act and Regulations made thereunder must be observed. If pursuant to Item (2) of this Notice, mowing or slashing is carried out the height of vegetation thereafter must not exceed, as far as is reasonably practicable, 20mm over the entire area of the firebreak. The use of chemicals is subject to all restrictions imposed by the Department of Agriculture. Attention is drawn to the Flammable Liquids Regulations made under the Explosives and Dangerous Goods Act 1961, which requires a site on which flammable liquid is stored to be totally cleared of all flammable material for a minimum distance of 5 metres surrounding the site.

If it is considered to be impracticable for any reason to comply with the provisions of this Notice, application may be made not later than the 1st day of November annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

Penalty

An owner or occupier of land who fails or neglects in any respect to comply with the requirements of this Notice is liable to a maximum fine of \$5,000.

DATES TO REMEMBER

- Firebreaks must be cleared by

 15 November (AND KEPT CLEAR UNTIL APRIL 30)
- Burning permits required all year round
 - Burning prohibited between
 1 December to 31 March

When and how to obtain a fire permit

Permits are available from the City of Wanneroo at the following locations:

WANNEROO ANIMAL CARE CENTRE

Located at the rear of the Ashby Operations Centre, 1204 Wanneroo Road, Ashby The City's Rangers / Fire Control Officers are available to issue permits 7 days a week* from 4pm - 6pm *Except Good Friday

CITY OF WANNEROO CIVIC CENTRE

23 Dundebar Road, Wanneroo The City's Fire Control Officers / Permit Issuing Officers are available to issue permits Monday to Friday 9am - 4pm

NEED ADVICE?

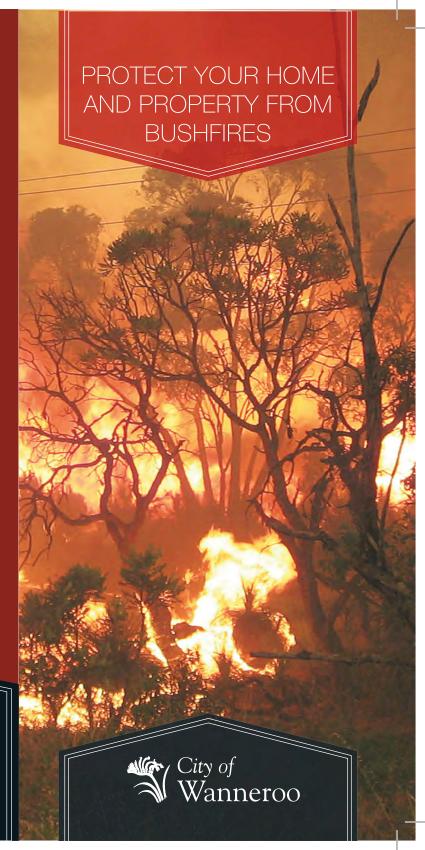
Further advice about how to protect your home, constructing firebreaks, and when and how to burn off, is available from the City of Wanneroo during office hours on 9405 5000.



23 Dundebar Road, Wanneroo, WA 6065 Locked Bag 1, Wanneroo, WA 6946

T: (08) 9405 5000 F: (08) 9405 5499 After Hours: 1300 13 83 93 E: enquiries@wanneroo.wa.gov.au

wanneroo.wa.gov.au 🚹 🛩



Keeping your home safe from fire

There are a number of ways you can help keep your home safe from fire:

- Install smoke detectors in your home
- Clear vegetation away from the walls of your home
- Clear all rubbish and flammable material from around your home to create a 20 metre circle of safety
- Store firewood, timber, petrol, and kerosene well away from your home
- Prior to summer, clean all leaves and debris from your gutters
- Don't have flammable trees such as conifers near buildings
- Have branches trimmed that overhang the house or powerlines
- Fit wire insect screens or shutters to windows and glass doors

If a firebreak is impractical along your boundary for environmental or other reasons notify the City of Wanneroo by 1 October to obtain permission to install firebreaks in alternative positions, or of a different nature.

ALTERNATIVE METHODS OF REDUCING FIRE HAZARDS ON VACANT LAND

- For urban land less than 2000m², if mowing or slashing is carried out, the height of the vegetation must not exceed, as far as is reasonably practical, 20mm over the entire area of the firebreak
- The use of chemicals is subject to all restrictions imposed by the Department of Agriculture
- Mulching Disposal at an authorised rubbish tip site

When and how to burn

NO BURNING FROM 1 DECEMBER - 31 MARCH

Burning off - that is, bush/running fire including grass, on any land is totally prohibited between 1 December and 31 March. Fire permits for burning material other than garden rubbish are required all year round.

A person in control of the fire must stay with the fire until it is completely extinguished.

GARDEN RUBBISH AND REFUSE

The burning of garden refuse is permitted between the hours of 6pm and 11pm, provided the fire danger rating is not VERY HIGH, SEVERE, EXTREME or CATASTROPHIC or a TOTAL FIRE BAN has been declared.

Fire danger rating signs are located at the following locations:

- Corner of Joondalup Drive and Wanneroo Road
- Wanneroo Road, south of the Yanchep Beach Road turn off
- Wanneroo Road, Carabooda Marmion Avenue, Jindalee
- Neaves Road, Mariginiup Old Yanchep Road, Pinjar
- Gnangara Road, Landsdale Country Side Drive, Two Rocks

Other points to remember when burning garden refuse and rubbish are:

- All bush and flammable material must be thoroughly cleared within two metres of all points of the site of the fire
- The material must be on the ground, and be no more than one metre wide and one metre high

Only one heap may be burnt at any one time Incinerators may be used providing:

- The incinerator is properly constructed and designed to prevent the escape of sparks of burning material
- The incinerator is situated not less than two metres away from a building or fence
- An area of two metres surrounding the incinerator is clear of all flammable material

BARBECUES

Only gas or electric barbecues may be lit during VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger rating or declared TOTAL FIRE BAN. The lighting of solid fuel barbecues is not permitted on these days.

SMOKE NUISANCES

City of Wanneroo residents are advised to be mindful of smoke issues associated with any burning that they conduct. Steps should be taken to avoid undue smoke impact to neighbours and adjacent roads. Smoke across roadways can severely impact motorists' visibility and therefore road safety. Issues of smoke nuisance are regulated by the Waste Avoidance and Resource Recovery Act 2007.

CAMPFIRES

Campfires must not be lit on VERY HIGH, SEVERE, EXTREME or CATASTROPHIC fire danger days or declared TOTAL FIRE BAN. A person must remain in attendance at the site during the whole time the fire is burning. The user must extinguish the fire using water or earth before leaving the area.

Hints for safer burning

- Don't light a fire on a hot or windy day
- Don't burn more than you can control
- Let your neighbours know you'll be burning material
- Make sure smoke and sparks will not affect your neighbour's washing or enter open windows
- Cut or rake long grass around trees, building and fences before burning
- Burn against the wind
- On a sloping block, burn from the top down
- Keep a hose or spray pack at hand to dampen down fierce fires
- If in doubt, don't burn material yourself call the Volunteer Fire Brigade
- Stay with the fire until it is completely extinguished
- Where possible, don't burn any closer than 20 metres from your home or other buildings

Penalties

Under the Bush Fires Act 1954, failing to comply with regulations can result in a fine ranging from \$250 to \$250,000 or imprisonment.

as per firebreak order	\$230
Offence relating to lighting fire in the open air	\$250
Setting fire to bush during prohibited	\$250
burning times	
Failure of occupier to extinguish bush fire	\$250
Major offences result in Court action with fines ra	
from \$250 to \$250,000 or imprisonment for 14 y	ears.

THE BIGGEST PENALTY OF ALL

The biggest penalty of all would be losing your loved ones or home to fire. Please ensure you, your family and your home are kept safe by taking the necessary precautions.

Special rural and residential land

Owners and occupiers of special rural and special residential land should be aware of their responsibilities to take bush fire prevention measures, while ensuring they do not contravene Town Planning Scheme provisions which control the removal of vegetation in Special Residential and Special Rural Zones.

These special rural zones were created in areas of natural flora, and the Scheme recognises the importance of preserving the natural environment in these areas. Anyone found cutting down, lopping or damaging trees in these areas without City approval may be guilty of an offence.

However, bush fire prevention, including the installation of firebreaks, is essential regardless of the zoning of the land. Below are some guidelines for installing firebreaks in special rural zones to prevent bush fires, while minimising damage to the natural environment.

- A 3 metre wide and 3 metre high firebreak should be cleared around the perimeter of special rural or special residential lots
- These firebreaks need not be strictly around the perimeter, but may deviate according to the flora
- The firebreak does not have to be ploughed but can instead be created by clearing and removing all flammable material
- Care should be taken to avoid damaging or removing significant trees and shrubs
- Avoid the build up of undergrowth and leaf litter