LATITUDE 32 INDUSTRY ZONE
FLINDERS PRECINCT STRUCTURE PLAN

February 2008

LANDCORP

latitude32 INDUSTRY ZONE

Setting industry's course for the future.

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LATITUDE 32 INDUSTRY ZONE

STRUCTURE PLAN REPORT - FLINDERS PRECINCT

PART 1 - STATUTORY SECTION

CERTIFICATION OF AGREED STRUCTURE PLAN LATITUDE 32

INDUSTRY ZONE - FLINDERS PRECINCT

This structure plan is prepared under the provisions of the Hope Valley Wattleup Redevelopment Project Master Plan.

IT IS CERTIFIED THAT AGREED STRUCTURE PLAN FLINDERS PRECINCT LATITUDE 32 INDUSTRY ZONE WAS ADOPTED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON

14 August 2008

Record of Amendments made to the Agreed Structure Plan

Latitude 32 Industry Zone - Flinders Precinct

AMENDMENT NO.	DESCRIPTION OF AMENDMENT	WAPC ADOPTED
1	Deletion of density codes and modification of minimum lot size requirements.	04 May 2015

1.0 GENERAL PROVISIONS

1.1 Structure Plan Area

This Structure Plan shall apply to the Flinders Precinct location being the land contained within the inner edge of the broken black line shown on Map 1 - Structure Plan.

1.2 Structure Plan Content

This Structure Plan comprises the:

a) Statutory section (Part 1);
b) Explanatory section (Part 2):

1.3 Interpretation

The words and expressions used in this Structure Plan shall have the respective meanings given to them in the Master Plan.

1.4 Operation Date

In accordance with Part 6 of the Master Plan, this Structure Plan shall come into operation on the date it is adopted by the Western Australian Planning Commission.

1.5 Relationship with the Master Plan

In accordance with clause 6.2.11.2 of the Master Plan if a provision of the Structure Plan is inconsistent with a provision of the Master Plan, then the provision of the Master plan prevails to the extent of the inconsistency.

1.6 Objectives of the Structure Plan

The objectives for Structure Plan Area A are as follows:

- Incorporate the landscape and environmental process features of the site.
- Optimise access to and from regional road and rail infrastructure.
- Ensure legible, robust and permeable movement networks for all modes of transport within and between precincts.
- Facilitate and accommodate connections to regional public transport.
- Protect and enhance the presence, amenity, environmental and social values of defined conservation areas.
- Create high quality built form solutions that incorporate ESD principles and that integrate with the streetscape and natural environment.
- Provide for, encourage and celebrate industrial and aesthetic innovation through planning and design.
- Develop precincts to accommodate land uses identified in the Hope Valley Wattleup Master Plan and associated support uses as required and subject to land capability.
- Create high quality landscape architecture solutions that incorporate ESD principles and that integrate with the natural environment.
- Create a unique sense of identity and place for Hope valley Wattleup that reflects a commitment to the highest level of business and workplace amenity, state-of- the-art

place management, environmental and cultural values, recreation and social amenity; and association with leading international trade and industrial counterparts world-wide.
- The creation of long term sustainable development solutions for Hope Valley Wattleup that satisfy all other master plan and structure plan objectives and that at least meet commercial viability imperatives for land development projects.

1.7 Structure Plan Map

The Structure Plan Map (Map 1) delineates and depicts the road structure and land use precincts proposed for the Structure Plan area. The map identifies the following land use precincts:

1. Southern Industrial Precinct (Precinct 1)
2. Southern Transport Precinct (Precinct 2)

The precincts designated under this structure plan apply to the land within it as if the precincts were incorporated in the Master Plan.

1.8 Reserves

The Master Plan (as amended) delineates and depicts the following reserves within the Structure Plan area:

1. Parks and Recreation Reserve
2. Road Reserves
3. Planning Control Area as depicted in the Master Plan

1.9 Industrial Density Codes (ID Codes)

The Structure Plan delineates and depicts the Industrial Density Codes applicable to the subject land. The applicable density codings are I-1, I-2, I-4, and I-11 as depicted on Map 2 – Industrial Density Coding Plan. The purpose of the density codes is to provide an additional level of control over title creation and development intensity, providing for and retaining the larger scale operators within appropriately planned sectors.

PRECINCT/ AREA	I – CODE	Min Site Area Per Freehold Lot	Max No. Units
Southern Transport Area (Precinct 2)	I-1	1ha	4
Southern Industrial Area (Precinct 1)	I-2	5000m^2	4
McLaren Avenue Sector	I-4	2500m^2	N/A
McLaren Avenue Central Sector	I-11	900m^2	2

1.10 Other Provisions

1.10.1 Precinct 1 - Southern Industrial Precinct

Precinct 1 is intended for general industry and is well suited to bulky goods handling industries and complementary industries to the Kwinana Industrial Area and Motorplex complex. Land use will focus on industries that require and can benefit from connections to Anketell and Abercrombie Roads. Other industries will include light and service industry and industries which service rural activities.

Development within this precinct is controlled through the Master Plan Design Guidelines documentation adopted under Part 6 of the Master Plan.

1.10.1 (a) Precinct Objectives

- Focus for general industrial uses, with some bulk storage and transport related industry;
- The location will also provide for the development of Motorplex-related activities;
- Connectivity with Precinct 3 will be strong, providing for the complementary development of general and transport –focused land uses; and
- Provide for future development in association with the existing Naval Base industrial area and transport related opportunities ahead of the development of Precinct 4 and the proposed outer harbour.

1.10.1 (b) Land Use Permissibility

The permissibility of uses and development shall be in accordance with the provisions of Table 1 (Precinct Land Use) of the Master Plan.

1.10.2 Precinct 2 - Southern Transport Precinct

Precinct 2 is to be redeveloped for transport related industry. Bulk goods handling and freight industries are expected to dominate the precinct because of its proximity to existing road and rail and the proposed outer harbour and existing bulk cargo port. With the increasing industrial activity in the southern precincts of the project area, generated by the developments within the Kwinana Industrial Area, more demands will need to be met in respect to warehousing, servicing and distribution. Land use will focus on business and industry related to transport.

Development within this precinct is controlled through the Master Plan and Design Guidelines documentation, adopted under Part 6 of the Master Plan.

1.10.2 (a) Precinct Objectives

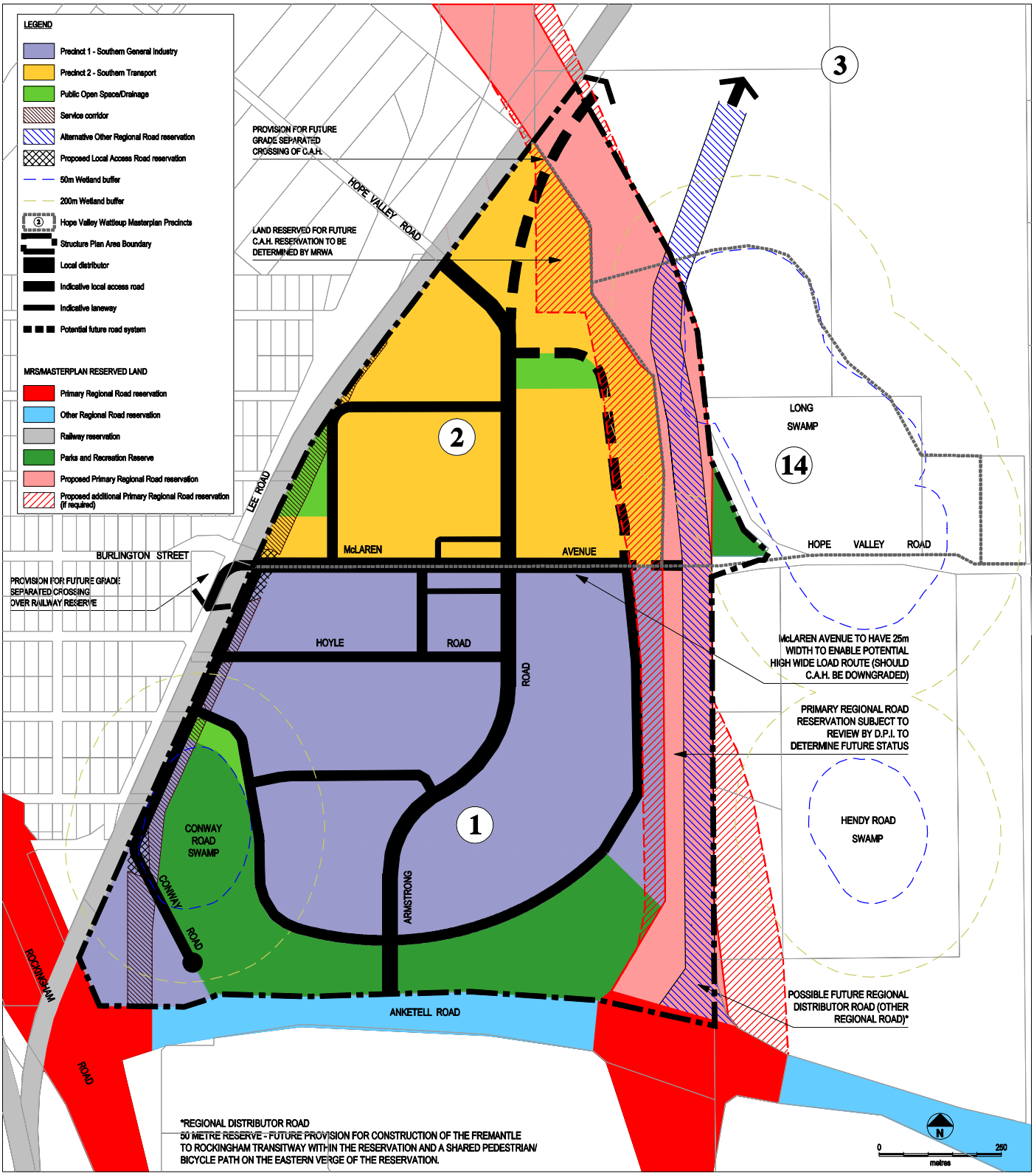
- Focus for transport related industry within the southern part of Latitude 32;
- Provide for potential industrial and commercial connectivity with Precincts 1 and 3, and the existing development of Naval Base;
- Transport related industrial opportunities ahead of the development of Precinct 4 and the outer harbour;

1.10.2 (b) Land Use Permissibility

The permissibility of uses and development shall be in accordance with the provisions of Table 1 (Precinct Land Use) of the Master Plan.

1.10.3 Vehicle Parking

Vehicle parking is to be provided in accordance with clause 5.3 of the Master Plan.



Map 1 - Structure Plan

Source: TPG

2.0 SPECIAL PROVISIONS

2.1 Environmental Conditions

Pursuant to Schedule 10 of the Master Plan, a Biodiversity Srategy and Water Management Strategy for Latitude 32 have been prepared and adopted by the WAPC. In accordance with the Strategies, the following programs and plans may be required at the subdivision and development approval stages:

SUBDIVISION STAGE
Precinct water management plans
Precinct groundwater monitoring program
Provision of public open space or reservations for key natrual areas
Bushland Management Plan
Wetland management Plan
Translocation of quenda

DEVELOPMENT STAGE
Individual water management plans
Groundwater management plans

2.2 Infrastructure Provisions

No development shall be permitted within the area designated as "Proposed Primary Regional Road" and "Proposed Additional Primary Regional Road" until such time as Main Roads Western Australia has determined the reservation requirements for the Controlled Access Highway.

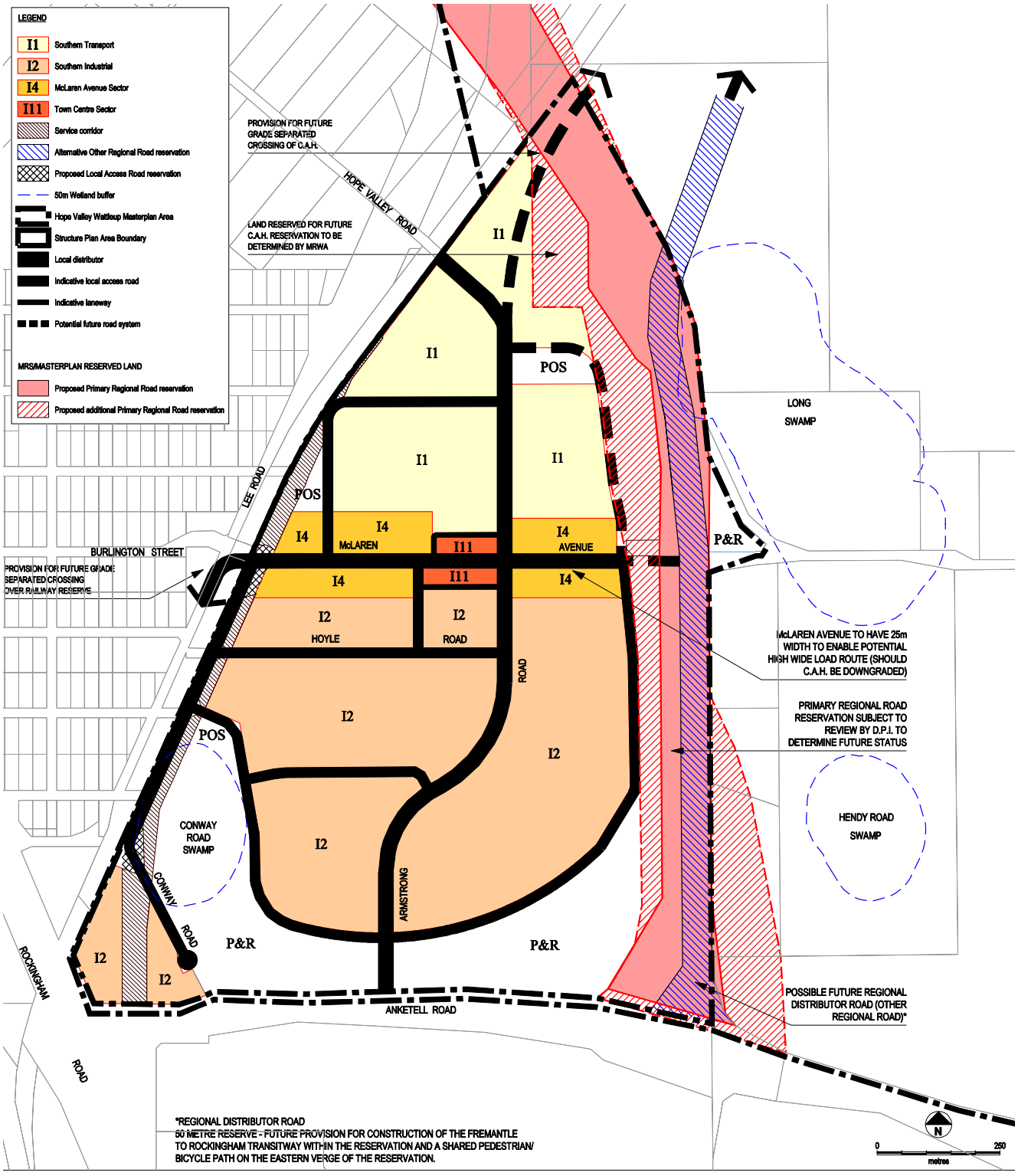
Contributions to infrastructure, the vesting of lands and the construction of roads to apply upon the subdivision of lands, shall be in accordance with the provisions as set out in Schedule 12 of the Master Plan - Developer Contribution Plan Area.

2.3 Reserves

The use and development of Reserves within the Structure Plan area is to be in accordance with Part 3 (Reserves) of the Master Plan.

2.4 Design Guidelines

Design Guidelines for the Flinders Precinct are to be adopted under Clause 6.2 of the Master Plan prior to any development approval being granted. Where there is any inconsistency between the Design Guidelines and the Master Plan, the Master Plan shall prevail.



Map 2 - Industrial Density Code

Source: TPG

LATITUDE 32 INDUSTRY ZONE

STRUCTURE PLAN REPORT - FLINDERS PRECINCT

PART 2 - STRUCTURE PLAN REPORT

OVERVIEW

Structure planning for the first area of the Latitude 32 Industry Zone project (formerly known as the Hope Valley Wattleup Redevelopment Project) has been undertaken in accordance with principles of sustainability, good urban design and industrial innovation to provide a development framework for Hope Valley Wattleup as the hub of Western Australia's industrial future.

The Hope Valley Wattleup Redevelopment Project has undergone a name change to Latitude 32 Industry Zone. Throughout this report and its attached technical reports, any reference to the Hope Valley Wattleup Redevelopment Project (HVWRP) should be read as if it was referring to the Latitude 32 Industry Zone Project (Latitude 32).

The Structure Plan responds to the topographical and coastal landscape features of the site in creating a unique sense of identity and place representing Western Australia's role as a leading trade and industrial centre world wide.

The Structure Plan has been prepared for the site known as 'Finders Precinct' within the Latitude 32 Industry Zone project (Latitude 32) and comprises a total area of approximately 156 hectares. It is located within the Town of Kwinana and is generally bounded by Anketell Road to the south, freight railway line to the west, Hope Valley Road to the north and Long and Hendy Road Swamps to the east.

The Structure Plan was prepared in accordance with the requirements of Part 6 of the Hope Valley Wattleup Redevelopment Project Master Plan. Preparing the Structure Plan involved ongoing consultation with key government stakeholders, comprehensive analysis of desktop data and site investigations by the project team, comprising urban design and town planning, engineering and traffic, environmental management and landscape architect specialists.

The Structure Plan proposes an integrated development which capitalises on the site's natural characteristics and delivers an industrial urban form that will stimulate market interest and foster high quality development at Hope Valley. Connection has been made to regional transport infrastructure to provide legible and robust permeable movement networks for all modes of transport between Hope Valley and surrounding industrial centres and within the redevelopment area.

Planning is a dynamic process as it endeavours to project the form of urban development that will be needed. It is therefore reasonable to expect structure plans to be modified during the course of their implementation. The Structure Plan prepared for the Flinders Precinct provides a robust design with flexibility to accommodate future changes as the development of the area evolves.

EXISTING PLANNING FRAMEWORK

The form of development proposed by the Structure Plan responds to the relevant key strategic and statutory planning documents. The following key statutory documents apply to the structure plan area and future development within its boundary:

- Hope Valley Wattleup Redevelopment Act (2000)
- Hope Valley Wattleup Redevelopment Project Master Plan
- Fremantle to Rockingham Industrial Area Regional Strategy (FRIARS)

- Hope Valley Wattleup Redevelopment Project Water Management Strategy
- Hope Valley Wattleup Redevelopment Project Biodiversity Strategy

The following statutory documents are repealed by the Hope Valley Wattleup Redevelopment Act (2000) and therefore do not apply to the preparation of the structure plan or subsequent development within the area:

- Metropolitan Region Scheme (MRS)
- Town of Kwinana Town Planning Scheme No. 2 (TPS No.2).

CONTEXT ANALYSIS

The suitability of the site for industrial development is supported by its linkage and relationship to the nearby regional infrastructure and the nature of surrounding development. The project area is surrounded by a mix of industrial, rural, regional open space and other minor urban land uses.

Road Network

A strong regional road system provides the Hope Valley locality with good accessibility to the broader metropolitan region. However, whilst these existing roads provide for the movement of freight traffic at present, the network will need to be upgraded to cater for additional industrial growth associated with the Latitude 32 project and the planned Fremantle outer harbour. In addition, the proposed Fremantle Rockingham Highway is subject to review through future studies to review the regional road network.

The local road network proposed within the structure plan provides for a permeable network of roads with good access to, from and through the area for all modes of transport.

Public Transport

A good bus route runs along Rockingham Road, however, there are currently no services within the Structure Plan area. The area of Hope Valley and Wattleup to the East of the freight railway is currently poorly served by public transport.

Pedestrian / Cycle Network

There are no existing or planned regional bicycle networks within close proximity to the structure plan area. Therefore there are no external routes either side of the structure plan area that need a connection through the site.

Parks and Recreation

A number of regional parks and recreation reservations (P & R Reserves) are located within close proximity to Latitude 32 in addition to regional parks and recreation reservations within the structure plan area. The most significant regional open space system is the Beeliar Regional Park located to the east, west and south. The presence of these key landscape and environmental features has been extended into the site and has been a key influencing factor in structure planning design.

ENVIRONMENTAL CONSIDERATION

The environmental considerations to be addressed by the Structure Plan have been assessed by RPS (Appendix A). Key issues include:

- The vegetation in the Structure Plan area belongs to the Cottesloe Complex - Central and South. Metropolitan area assessments made in 1998 and quoted in Bush Forever (Government of Western Australia, 2000) estimated that some 36% of the original extent of this vegetation complex within the Swan Coastal Plain portion of the Perth Metropolitan Region (PMR) remained uncleared at that time.

  Bush Forever identifies 18% of the original extent of this vegetation complex (metropolitan area) is proposed for protection (Government of Western Australia, 2000). This meets the Bush Forever target of 10% reservation for each vegetation complex within the Swan Coastal Plain portion of the PMR.

- No Declared Rare or Priority Flora were found within the Structure Plan area.

- The Structure Plan area includes Conway Road Swamp, which is categorised as a resource enhancement wetland, and is located near the Corner of Anketell Road and Conway Road. Adjacent to the north eastern boundary of the Structure Plan Area is Long Swamp, which is categorised as a Conservation Category Wetland. Long Swamp is protected under the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992, and is also proposed to be registered under the Draft Environmental Protection (Swan Coastal Plain Wetlands) Policy 1992.

- The southern Parks and Recreation (P & R) reserve will provide for the protection and enhancement of the site's most significant environmental values as well as provide for a greater viability and management costs.

- Future development outside the 50m wetland buffer, and within the 200m secondary zone of influence, for Resource Enhancement and Conservation Category wetlands should be based on the development's associated risk to the environment.

- As part of subdivision, a Wetland and Bushland Management Plan will be developed by a qualified professional for Conway Road Swamp and the proposed southern P & R Reserve area. This management plan will detail the final configuration and treatments within and adjacent to the Conway Road Swamp and the southern P & R Reserve.

Emissions from the Kwinana Industrial Area (KIA), Alcoa Residue Storage Area and Kwinana Motorplex have the potential to impact on air quality within the Structure Plan area. However, the nature of development within the Structure Plan area is primarily identified as a transport and industrial precinct, which requires low-density workforces and is therefore, not considered to be a sensitive land use.

- Noise created by the KIA, and specifically the Motorplex to the south of the Structure Plan area, may substantially influence redevelopment opportunities. However, the nature of development within the Structure Plan area is primarily identified as a transport and industrial

precinct, which requires low-density workforces and is therefore, not considered to be a sensitive land use.

- Primarily, risk in the area is generated by industry within the KIA and high transmission gas pipelines. As development proceeds it will therefore be necessary to consider risks associated with land uses as part of cumulative and individual risk assessment. As part of approval of future development applications, there may be requirement that a societal and individual risk study be undertaken as part of the risk assessment of new proposals.

- The Department of Indigenous Affairs' database indicates that no archaeological or ethnographic Aboriginal sites have been recorded within the project area.

- A search of the Heritage Council's Places Database has identified that no known sites of significant European heritage occur within the site. Three heritage sites occur outside and near the eastern boundary of the Structure Plan. These are Postans Cottage, Hope Valley School and Long Swamp. These sites are not listed under National Heritage.

STRUCTURE PLAN DESIGN CONCEPT

Industrial estates are not traditionally thought of as people friendly places. In this case, a design concept has been developed to support the needs and aspirations of a working community through the integration of built form, land uses and the qualities of the natural environment. *"A sustainable city bequeaths to future generations a better urban environment." Richard Rogers - Cities for a Small Planet.*

The Structure Plan has therefore been prepared in accordance with a vision to create a fully integrated working community providing for a specific range of industrial land uses whilst achieving the highest standards in urban design, environmental performance management and sustainability.

The Structure Plan has aspired to this vision through:

- A "town centre" activity node located on the corner of Armstrong and McLaren Avenue. Whilst the activity node will not be developed as a true "town centre" it will provide a focal point and promote the development of support service related facilities such as a lunch bar/convenience store and other complimentary uses to cater for the new employment base.
- An interconnected local road system which focuses on providing easy access for industrial traffic.
- Preservation of environmentally significant features within an integrated POS system.
- Integration of water sensitive urban design practices through the Water Management Strategy.
- Provision for the movement of industrial traffic along the Fremantle Rockingham Highway, thereby maintaining a regional road network. Development opportunities within the site, and access to the structure plan, area are therefore maximised.
- The provision for incorporating an integrated public transport network to complement the Rapid Transit service proposed within the Fremantle Rockingham Highway corridor.
- The provision of a range of lot sizes to cater for industrial uses identified by the Master Plan. Flexibility though a range if lot sizes should be provided.

- Design Guidelines are to be prepared for all lots to address development requirements including site coverage, setbacks, vehicular access, building materials and sustainability.

LANDSCAPE

The design process has integrated the landscape characteristics of the site where possible. The landscape concept plan for the Structure Plan (refer to Appendix D) includes a street tree and lighting concept, stormwater drainage basin and entry statements. A summary of these elements is provided below.

- Drainage requirements have been dealt with in both streetscape design and within the Conway Swamp reserve.
- Considerations for street trees have taken into account the uses of the space as well incorporating previous site qualities.
- Local distributors will have larger light poles to each side of the road or double luminaries to median strips whilst local trees will have smaller poles with single luminaries to each side of the road. This will also include 'human' scale lighting to the village centre.
- The entry will incorporate aspects from both the original site character and the proposed site function.
- Public open spaces and the Conway Swamp reserve have been designed as nodes of interaction between visitors to the site and the environment. A main intention of the project is habitat creation, focusing on the improvement of natural spaces to encourage populations of native fauna.

ACCESS AND MOVEMENT

Access to the existing Kwinana Industrial Area, existing and proposed port facilities and regional road and rail transport networks has been central to the structure planning for Latitude 32. This has led to a review of regional transport network provisions resulting in improved access to the Structure Plan area and better linkages between future precincts within the redevelopment area. A detailed report on Access and Movement has been prepared by Sinclair Knight Merz (Appendix B). Primary findings are:

Regional Level

The regional road network has been reviewed to ensure it provides adequate capacity and network connectivity on a regional basis and provides a good level of accessibility to the structure plan area. These objectives can best be met through provision of a regional north/south distributor road, positioned along the eastern boundary of the structure plan area, that would link Anketell Road through the HVWRP area to Russell Road. However, provision has been made for the retention of a Controlled Access Highway (CAH) in accordance with the Master Plan.

Local Level

The existing street grid has been retained where possible as it reflects a modified grid pattern. McLaren Avenue has been retained on its current location, with some realignment. Armstrong Road deviates off its original alignment. Both of these roads will perform the role of local distributor roads. Where new roads are required, they have been designed where possible to follow site contours in

order to minimise earth works and provide reference to the topographic features. The road layout has also been designed to allow maximum flexibility for lot layout.

As this will be an industrial area, dual use paths are not proposed for the internal road network. A shared path is proposed to provide for longer distance regional or sub-regional north/south bicycle movement through the area. This path would be provided in the verge of the proposed major regional distributor road, to the east of the structure plan area.

Dedicated bicycle or shared paths are not proposed on local roads. Rather, wider road pavements are proposed to cater for on-road bicycle movement.

In addition to the regional dual use paths proposed as part of this Structure Plan, an appropriate network of additional local footpaths will be provided throughout the area commensurate with current planning philosophy at the time of subdivision and construction.

The Department for Planning and Infrastructure and the Public Transport Authority have proposed that the major Rockingham to Fremantle bus services be routed through Hope Valley and Wattleup in the longer term. Provision has been made for the Rockingham to Fremantle Transitway to be accommodated in dedicated lanes within the proposed north/south regional distributor road, if approved, when fully developed. If approval were not to be given to a regional distributor road, the Fremantle to Rockingham transitway may need to be provided in existing roads or within the CAH reserve.

Currently a single track freight railway runs along the western boundary of the structure plan area. In the future this railway will link to the proposed Outer Harbour Port. To provide for future increased capacity, the railway can be upgraded to a dual track or siding system within the existing reservation.

There may be a need for sidings or an inter-modal terminal to the north of the structure plan area. The Department for Planning & Infrastructure (DPI) has commenced a study to examine the strategic need for an inter-modal terminal in the Kwinana region. However, due to geographic constraints, no linkages to the railway are proposed in the Structure Plan area.

ENVIRONMENTAL ASSESSMENT

A detailed environmental assessment report has been prepared by RPS (Appendix A). Primary findings are:

Vegetation Retention

Within the Latitude 32 project area the HVWRP Biodiversity Strategy identified the southern portion of the Structure Plan area as a Key Natural Area. The main reasons for this area being identified as a Key Natural Area were due to the following:

- Existing Parks and Recreation reserve identified in the Master Plan;
- Resource Enhancement management category wetlands and their associated buffers;
- Remnant vegetation areas to promote ecological linkages and fauna habitat areas; and
- Vegetation connecting Conway Road Swamp and Hendy Road Swamps.

Consequently, one of the recommendations from the HVWRP Biodiversity Strategy is to assess the environmental values within the Key Natural Areas in order to determine final boundary and design for proposed conservation reserve/s within the Structure Plan area using viability guidelines set out in the Perth Biodiversity Project.

Additionally, the Ministerial Condition for the HVWRP Master Plan stipulates the requirement to protect a larger area of open space within the southern portion of the HVWRP area than previously reserved as Parks and Recreation, in order to maintain a linkage along Anketell Road and the potential for a linkage with land south of the Redevelopment Area.

Subsequently, the structure plan results in the southern Parks and Recreation reserve having a total consolidated area of 22.2ha. This is approximately 6 ha more than previously proposed for the southern Parks and Recreation reserve under the HVWRP Master Plan. The perimeter to area ratio is 0.013 which equates to a high to medium viability.

In accordance with the HVWRP Biodiversity Strategy, ecological links will be provided where practicable, utilising road and railway corridors as the primary and secondary linkages. The Structure Plan proposes Hope Valley Road as a primary link which is consistent with the Town of Kwinana's Local Greenbelts Plan.

Wetland and Bushland Management

The HVWRP Biodiversity Strategy proposes that future development outside the 50m wetland buffer, and within the 200m secondary zone of influence, for Resource Enhancement wetlands should be based on the development's associated risk to the environment. The Biodiversity Strategy states that only low risk developments (e.g. commercial uses) will be acceptable within the secondary zone of influence.

As the Structure Plan area is a designated transport and industrial precinct, the allocation of uses needs to be considered. Design guidelines and lot size restrictions will be used at the subdivision stage to encourage low risk development within the 50m to 200m secondary zone of influence area

The Controlled Access Highway is located just outside the western most extent of the wetland boundary for Long Swamp, which amounts to approximately 0.83ha of the 50m buffer for Long Swamp being impacted by the Controlled Access Highway reserve.

In order to offset the Controlled Access Highway and (proposed Regional Distributor Road) intruding into the 50m buffer for Long Swamp and approximately 0.83ha of 'Parks and Recreation' reserve being amended to 'Road Reserves' in the Master Plan, the following was included in the Master Plan amendment:

- Approximately 1.36ha located on the south western side of Long Swamp was included as Parks and Recreation reserve in the Master Plan.
- Approximately 2.19ha located on the eastern side and above Hope Valley Road (currently a nursery) was included as Parks and Recreation reserve in the Master Plan.

As part of subdivision, a Wetland and Bushland Management Plan will be developed by a qualified professional for Conway Road Swamp and the proposed P & R Reserve area.

The management plan will be submitted to the Local Government and the Department of Environmental and Conservation (DEC) for comment. A copy of the final management plan will be provided to new owners within the Structure Plan area for their reference.

INTEGRATED WATER MANAGEMENT

The Water Management Strategy will guide the following with respect to the future precinct, subdivision and development planning stages, consistent with State Planning Policy 2.9 *Water Resources*:

- Consistent with the Ministerial Conditions for the redevelopment project and the HVWRP Water Management Strategy, an integrated Precinct Water Management Plan will be developed prior to subdivision. The purpose of this document will be to address, where relevant, the local water management objectives and the Design Criteria and Guidelines set out in the HVWRP Water Management Strategy. This will be assisted by the Design Guidelines, which will set a framework for what needs to be addressed in the Precinct Water Management Plan.

- The primary aim for stormwater management within the Structure Plan area is for maximised on-site retention and infiltration of both stormwater and entrained contaminants, thereby minimising collection. On-site retention and infiltration of stormwater will help to limit the impact of the development upon the surrounding catchment, and will ensure compliance with Department of Water Stormwater Management Principles and *Stormwater Management Manual for WA (2004)*. The design for the stormwater drainage system will be addressed within the integrated Water Management Plan for the site.

- In accordance with the HVWRP Water Management Strategy, and prior to subdivision a Groundwater Monitoring Program (GMP) will be developed.

- A desktop Preliminary Site Investigation (PSI) was undertaken as part of the Environmental Review for the Latitude 32 Project. The PSI was conducted with reference to the procedures advocated in the (then) Department of Environmental Protection *Guidelines for Contaminated Sites Management Series* to assess the potential for soil and groundwater contamination within the site (WALA, 2003).

INFRASTRUCTURE

A detailed report on Engineering and Infrastructure has been prepared and is available in Appendix C. Primary findings are:

- Earthworks: A significant proportion of the site is above a 3% slope gradient with some areas greater than 10%. This is particularly evident towards the south west where the site grades from RL23 to RL1.0 at the Conway Road Swamp.
- Drainage: Stormwater volumes will need to be managed to meet the requirements of local and statutory authorities. The final layout of the stormwater system will be finalised during preparation of the detailed design of the subdivision.
- Stormwater Management: The preliminary review of floodwater management for lots and road reserves, undertaken in the "Major Flooding Strategy", suggests that systems can be included within the proposed Structure Plan area to allow the appropriate containment of the 100 year ARI storm event within lots and open space within this development.
- Water, Sewer and Recycled Water: Potable water supply is currently available to most of the

existing residences in the Hope Valley area. The future development of this area for industrial uses would also use this main to provide water services for both potable and fire mains.
- Proposed Sewer System. Development of the Structure Plan area will require the construction of at least two sewer pump stations, pressure main and a gravity sewer system.
- Recycled Water. The Water Corporation have constructed a wastewater recycling plant, the Kwinana Wastewater Recycling Plant (KWRP) in the Kwinana Industrial Area. The Water Corporation suggests that the use of recycled water for a general industry land use is not viable as the cost of the recycled water is currently higher than scheme water.
- Power Supply: Power supply capacity is available from Medina 22kV Substation for the initial development of the Structure Plan area. Further development will depend on the load growth in the area.
- Western Power Transmission Easement: A 330kV transmission line easement s currently located inside the proposed development area. This easement is reserved for the reinforcement of the Western Power Transmission system.
- Communication: Currently there is little communications infrastructure in the area and all the carriers are driven by demand. This means that until the demand occurs little will be constructed to supply the Structure Plan area with world class communications.
- Gas Supply: The anticipated land use in the structure plan area is mostly for general and transport related industry. As such large users of gas are not anticipated and a normal gas supply service using common trenches is proposed.

IMPLEMENTATION

The eventual development of the Latitude 32 area will require physical infrastructure essentially at two levels:

a) basic infrastructure common to, and dependent upon, all landholdings within the precinct; and
b) internal infrastructure independent to each landholdings.

The costs of basic common infrastructure to be shared by all landowners in the Structure Plan has been identified in Schedule 12 of the Master Plan - Development Contribution Plans. The Flinders Precinct is subject to Development Control Area I of Schedule 12. Internal infrastructure remains the responsibility of each land owner/developer.

STRUCTURE PLAN ELEMENTS

The table below gives a summary of the key land use elements of the Structure Plan. Additional information regarding these matters is provided in the following sections.

Total Structure Plan Area		157.16 ha
Total estimated lot yield	100 lots	
Likely lot size range	900m2 7.8haha	
Less the following:		
- Proposed Primary Regional Road Reserve (including land potentially required for future C.A.H) within Structure Plan Area		33.8ha
- Infrastructure and Internal Roads		17ha
- Public Open Space & Drainage		24.36 ha
Regional Open Space	21.13 ha	
Local Open Space	1.93ha	
Drainage	1.3 ha	
Total Developable Area		81.92ha

Table 1: Summary of Structure Plan Statistics

1.1 Introduction

The Hope Valley Wattleup Redevelopment Project has undergone a name change to Latitude 32 Industry Zone. Throughout this report and its attached technical reports, any reference to the Hope Valley Wattleup Redevelopment Project (HVWRP) should be read as if it was referring to the Latitude 32 Industry Zone Project (Latitude 32).

The Latitude 32 project (Latitude 32) [formerly known as Hope Valley Wattleup Redevelopment Project (HVWRP)] involves the development and redevelopment of approximately 1,426 hectares of land in the local government areas of Cockburn and Kwinana. Latitude 32 is one of the most significant industrial land development projects being undertaken in Western Australia. The redevelopment will provide a stock of suitable industrial land for the needs of the region and the Perth Metropolitan Area for the next twenty to twenty five years.

This structure plan has been prepared for the first stage (Flinders Precinct) of Latitude 32 (hereafter referred to as the 'Structure Plan'). The Structure Plan and accompanying reports have been prepared by a team of town planners and urban designers, engineers, environmental scientists, and landscape architects in consultation with key stakeholders.

The Structure Plan has been prepared in accordance with Part 6 of the Hope Valley Wattleup Redevelopment Project Master Plan (hereafter referred to as the Master Plan) to support subsequent subdivision and development proposals.

1.2 Preliminary Consultation

The Structure Plan has been informed by preliminary consultation with senior representatives from key government agencies. The consultation process has been ongoing throughout the preparation of the structure plan at key project milestones. Major consultation was undertaken at the commencement of the project through a two day workshop. Below is a summary of the key issues raised during the workshop.

- Regional roads: north-west transport spine; status of Controlled Access Highway
- Regional roads: east-west routes; service to the proposed outer harbour
- Internal road network: reuse existing street grid
- Rail: potential for inter modal terminal
- Port: Final location of outer harbour could impact on land use and road networks
- Environment: review identified "high value" areas and address Biodiversity and Water Management strategies
- Land Use: providing required land uses on challenging topography. Provide land to service surrounding industrial areas
- Landscape: design to respond to site features
- Sustainability: incorporate best practice into land development and built form.

The workshop process produced two regional road options and four structure plan options for consideration. Following the review and analysis of all options, a preferred option was identified and structure planning proceeded on that basis.

Figure 1 - Location Plan

Source: Department of Land Information

1.3 Project Vision & Guiding Principles

The Structure Plan has been prepared in accordance with a vision to create a fully integrated industrial based community providing for a specific range of industrial land uses whilst achieving the highest standards in urban design, environmental performance management and sustainability.

The Team recognises the strategic location of the Latitude 32 project and has planned for a fully integrated industrial community, one that complements the surrounding industrial areas, and provides high quality industrial land to service the State's future demand. The Structure Plan proposes the creation of a quality industrial community that is expected to attract key global industries which understand the benefits of relocating to strategically positioned industrial land such as Hope Valley.

1.4 Location

The project area is located in the Town of Kwinana approximately 30km from the Perth CBD, 20km Fremantle, 7km from the East Rockingham Industrial Area and 2km from the Kwinana Heavy Industrial Area. The Flinders Precinct is located in the south-western corner of the Latitude 32 project area and is generally bound by Anketell Road to the south, the freight railway line to the west, Hope Valley Road to the north and Hendy Road to the east as depicted in **Figure 1**.

1.5 Land Ownership

The land subject to the Structure Plan comprises an area of approximately 156ha. The land is held in multiple ownership, with approximately 90% of the area held by government.

1.6 Project Team

The following consultants are acknowledged for their participation and contribution to the preparation of the Flinders Precinct Structure Plan:

Town Planning & Urban Design
HASSELL
TPG (The Planning Group)

Environmental Scientists
RPS Bowman Bishaw Gorham
Strategen

Civil and Traffic Engineers
Sinclair Knight Merz
Wood & Grieve Engineers

Landscape Architects
Ecoscape
Plan-E

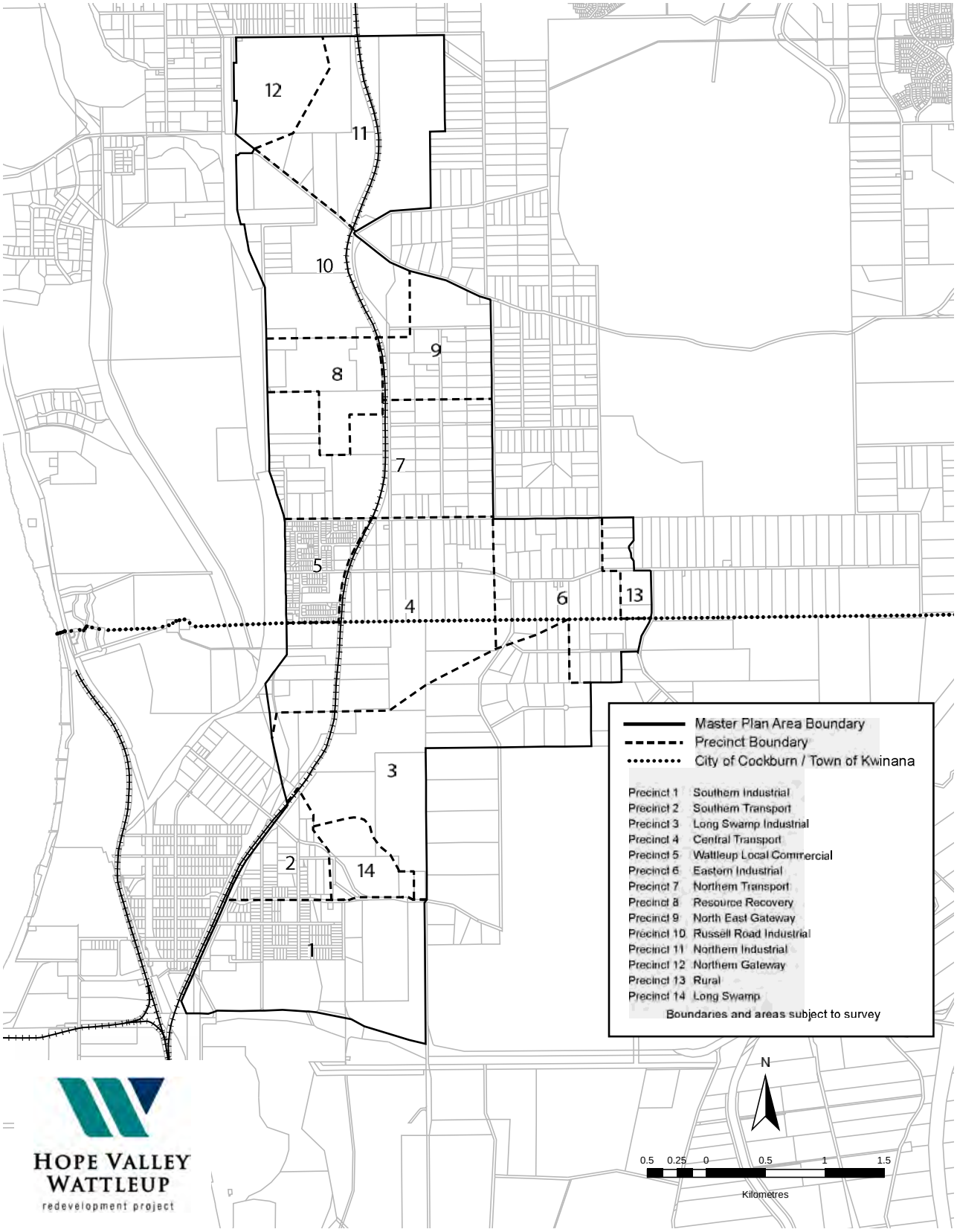


Figure 2 - Hope Valley Wattleup Redevelopment - Master Plan Map

Source: Hope Valley Wattleup Master Plan 2004 (as amended)

2.1 Applicable Key Statutory Planning Documents

The following key statutory planning documents apply to the preparation of the Structure Plan and future development of the land. Only documents of direct relevance to the Latitude 32 area have been referred to. Other major statutory planning documents such as the Planning and Development Act 2005 are assumed to apply and need no further explanation. Minor documents of statutory consideration such as planning policies and guidelines, whilst may be applicable, have similarly not been referred.

Hope Valley Wattleup Redevelopment Act 2000

The Hope Valley-Wattleup Redevelopment Act (2000) (hereafter referred to as the Act) was established to:

"…provide for the development and redevelopment of certain land in the local government districts of Cockburn and Kwinana, to confer planning, development control and other functions in respect of the land, and for related purposes."

The Act provides the Western Australian Land Authority (LandCorp) with the authority to undertake, promote and coordinate development and redevelopment of the land within the redevelopment area. Any Planning documentation (master plan, structure plan, design guidelines) or development proposals within the redevelopment area are to be approved by the Western Australian Planning Commission (WAPC).

Fremantle to Rockingham Industrial Area Regional Strategy 2000

The Fremantle to Rockingham Industrial Area Regional Strategy (FRIARS) was prepared to set a strategic direction for the growth and development of the State's key industrial land at Kwinana, which is supported by the surrounding region from Fremantle to Rockingham.

Essentially FRIARS provides for the future protection of the Kwinana Industrial Area (KIA), ensuring that it and its immediate surrounds can be developed for ongoing heavy industrial purposes. In addition, FRIARS identifies additional general industrial land within the surrounding region and aims to reduce land use conflict between non-compatible uses (residential and industrial uses).

Hope Valley Wattleup Redevelopment Project Master Plan 2004

The Hope Valley Wattleup Redevelopment Project Master Plan (hereafter referred to as the Master Plan) was prepared to implement the recommendations of the FRIARS and pursuant to the Hope Valley-Wattleup Redevelopment Act 2000 (See **Figures 2 and 3**). The Master Plan covers an area of approximately 1400 hectares and is divided into 14 precincts as amended. The purposes of the Master Plan are to:

"(a) set out the planning aims and intentions for the Redevelopment Area;
(b) set aside land reserved for public purpose;
(c) define precincts within the Redevelopment Area for the purposes defined in the Master Plan;
(d) control and guide land use and development;

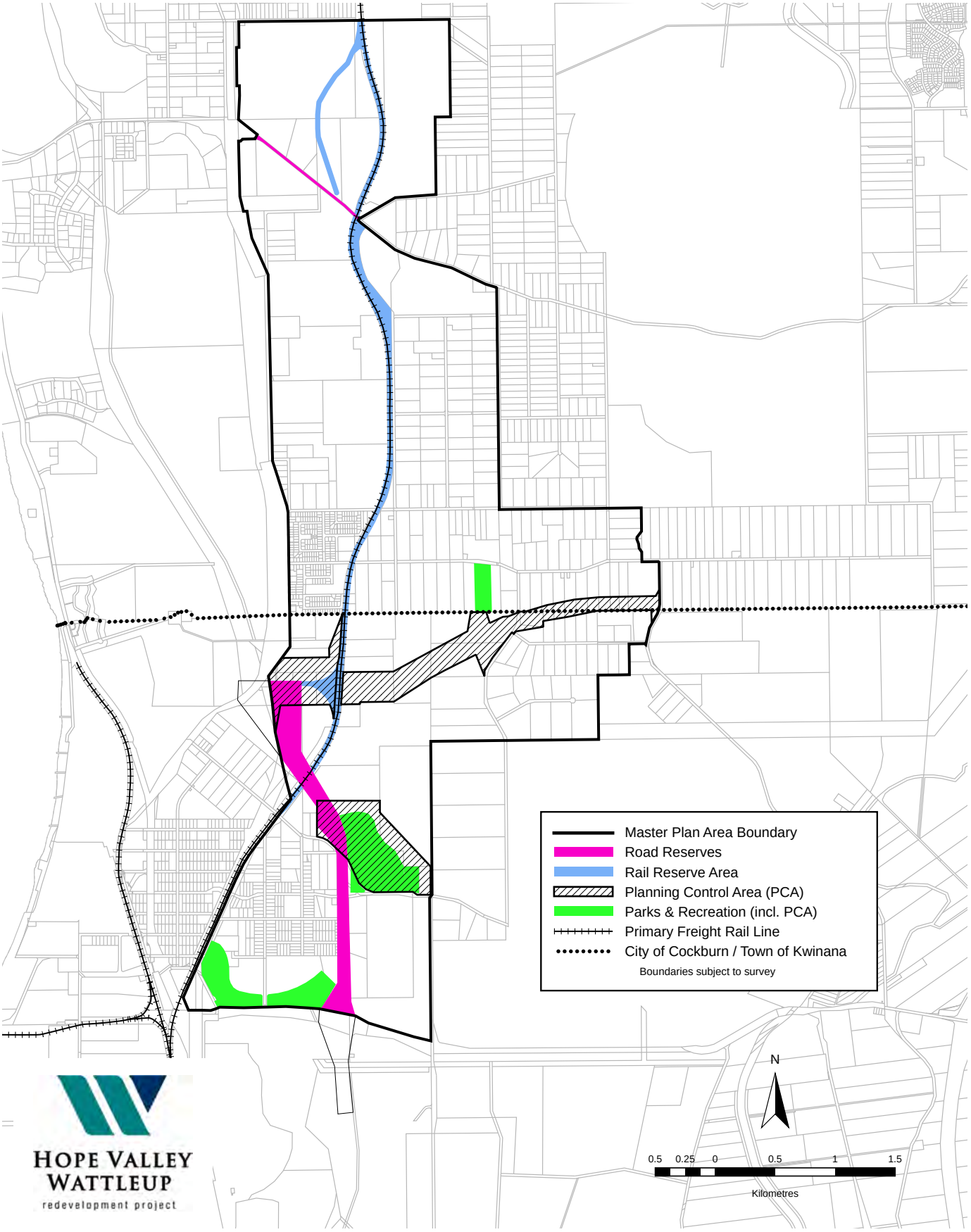


Figure 3 - Hope Valley Wattleup Redevelopment - Reserves Map

Source: Hope Valley Wattleup Master Plan 2004 (as amended)

(e) set out procedures for the assessment and determination for planning applications;
(f) make provisions *for the administration and enforcement of the Master Plan; and*
(g) address other matters set out in the First Schedule of the Town Planning and Development Act 1928.

The aims of the Master Plan are to:

(a) protect the Kwinana Industrial Area by resolving surrounding land use conflicts;
(b) protect significant heritage in the Redevelopment Area;
(c) conserve areas of local and regional environmental significance;
(d) minimise sources of pollution;
(e) distribute the cost of common infrastructure;
(f) ensure the development and use of land within the Redevelopment Area comply with accepted standards and practices;
(g) ensure that future development and use of land within the Redevelopment Area occur in a proper and orderly way;
(h) promote sustainable development;
(i) facilitate development generally in accordance with the Master Plan Report and Planning Strategy."

Hope Valley Wattleup Redevelopment Project Water Management Strategy

The purpose of the Hope Valley Wattleup Redevelopment Project Water Management Strategy (HVWRP Water Management Strategy) is to guide land use planning and development to meet water quality objectives, targets and criteria at the precinct planning and development stages. The overall objective of the HVWRP Water Management Strategy is to:

"Plan and guide land use, land use practices, water supply, stormwater and wastewater management within a total water cycle context, so as to protect and optimise the integrity, functions and environmental values of natural catchments, hydrological systems and wetlands within and adjacent to the Redevelopment Area." (HVWRP Water Management Strategy)

The HVWRP Water Management Strategy reports the findings of technical reviews and investigations which have characterised existing land use and water management factors and issues within the HVWRP and develops the water management principles and implementation methods based on a review of the most relevant policies objectives and implementation approaches at three scales of reference, being state, regional and local.

Implementation measures to meet the HVWRP Water Management Strategy objectives include:

- Design Guidelines to be prepared as part of the structure planning process under section 6.2.14 of the Master Plan.
- Precinct Water Management Plans to be prepared (by the Responsible Authority in this instance) prior to subdivision.
- Precinct Groundwater Monitoring Programs to be undertaken (by the Responsible Authority in this instance) prior to subdivision.

Hope Valley Wattleup Redevelopment Project Biodiversity Strategy

The purpose of the HVWRP Biodiversity Strategy is to provide a guiding structure to ensure that environmentally sensitive areas are protected and where possible enhanced through identified plans and management strategies. The overall objective of the HVWRP Biodiversity Strategy is to:

"To identify areas required for biodiversity conservation and enhancement and propose mechanisms for their protection and management."

The HVWRP Biodiversity Strategy provides detailed background information regarding fauna, fauna habitat, flora, vegetation and related biophysical attributes, and a clear management direction regarding the protection of natural areas from future land use development.

The Strategy also identifies Key Natural Areas for the study area. These areas include:

- Existing Parks and Recreation reserves identified in the Master Plan;
- Conservation and Resource Enhancement management category wetlands and their associated buffers;
- Vegetation in Very Good to Excellent Condition (in accordance with Bush Forever condition rating criteria);
- Remnant vegetation areas to promote linkages and fauna habitat areas; and
- Vegetation connecting Conway Road Swamp, Hendry Road Swamp (east) and Long Swamp.

In accordance with the requirements of Ministerial Statement No. 667, the HVWRP Biodiversity Strategy identifies requirements that are to be considered at the structure planning phase, which includes the following:

- Proposed reserve/s, which do not have any existing protection, to be set aside for protection and conservation as part of Structure Planning process.
- Structure planning to acknowledge the regional links, particularly between the Beeliar Regional Park.
- Structure planning process to include assessment of environmental values within Key Natural Areas in order to determine final boundary and design for proposed reserve/s within Structure Plan area.
- At structure planning determine reserve/s viability using identified criteria.
- Provide for the protection of Conway Road Swamp and its associated 50m buffer as well as the preparation of a Wetland Management Plan for Conway Road Swamp as a condition of subdivision.
- Provide for the protection of remnant bushland which will act as an east west link between Conway Road Swamp and Hendy Road Swamps (located further east of the Structure Plan area) as well as the preparation of a Bushland Management Plan for this area of remnant vegetation.
- Future development and structure planning to ensure appropriate design and interface of future land uses to proposed reserve/s.

2.2 Non-Applicable Key Statutory Planning Documents

The following key statutory planning documents do not apply to the preparation of the Structure Plan and future development of the land.

Metropolitan Region Scheme

The Metropolitan Region Scheme is repealed under Section 23 of the Hope Valley-Wattleup Redevelopment Act 2000 in relation to the Hope Valley-Wattleup Redevelopment Area. Therefore, the MRS is not applicable to the Structure Plan area.

Town of Kwinana Town Planning Scheme No. 2

The Town of Kwinana Town Planning Scheme No. 2 (District Scheme) is repealed under Section 23 of the Hope Valley-Wattleup Redevelopment Act 2000 in relation to the Hope Valley-Wattleup Redevelopment Area. Therefore the District Scheme is not applicable to the Structure Plan area.

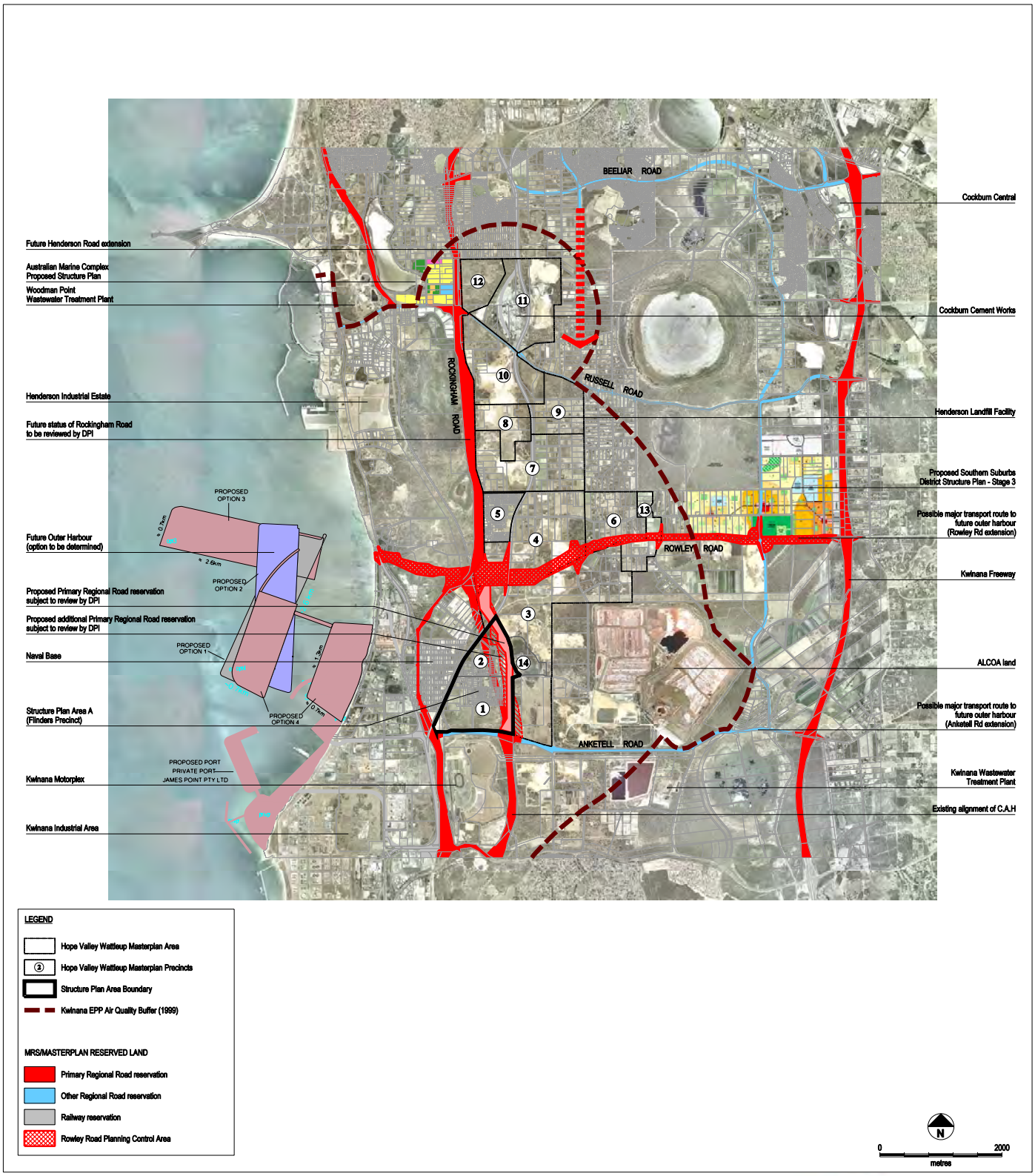


Figure 4 - District Context Plan

Source: TPG

3.1 District Context

Land Use

The Structure Plan is predominately surrounded by industrial and other non-residential landuses such as market gardens, hobby farms and also the Kwinana Motorplex. Residential land uses within the redevelopment project are gradually being acquired to avoid potential conflict between non-compatible land uses. The district context is shown in **Figure 4.**

Other than small location specific facilities, the Latitude 32 area is not well serviced by retail or service related land uses. The following local and regional retail facilities are located within a 12km radius:

- Kwinana Town Centre: approx 3km
- Cockburn Central: approx 10km
- Rockingham Town Centre approx 12km

However, given the site's location within the industrial buffer zones to the Kwinana Heavy Industrial Area, large scale facilities would not be permitted. Not withstanding this, there is the potential to provide local services and facilities within the Latitude 32 project to service the future employment base.

Regional Roads

The major road system comprises primary regional roads (red roads) and other regional roads (blue roads). In the past, three north-south primary regional roads were planned to serve the area, namely:

a) Kwinana Freeway
b) Stock Road/Rockingham Road
c) Coastal Route linking Stirling Bridge in Fremantle along the alignment of the Fremantle Eastern Bypass and a coastal reserve before crossing Rockingham Road and traversing Hope Valley, the regional open space in Medina and Calista to link into the Garden Island Expressway in Rockingham.

In the past few years there have been a number of changes proposed that will result in some downgrading of the coastal route, namely:

- The Fremantle Eastern Bypass has been removed from the Metropolitan Region Scheme.
- MRS Amendment No 1071/33 proposes that the Fremantle/Rockingham Highway through Beeliar Regional Park, between Russell Road and Rockingham Road, be deleted from the MRS (Gazetted May 2006)
- The Perth to Mandurah Railway is being constructed in the alignment of part of the Garden Island Expressway reducing its potential for construction as a major regional road.

The consequence of these changes is that planning for three continuous major regional roads no longer exists and there may be a need to supplement the north/south regional road capacity through the Hope Valley Wattleup area.

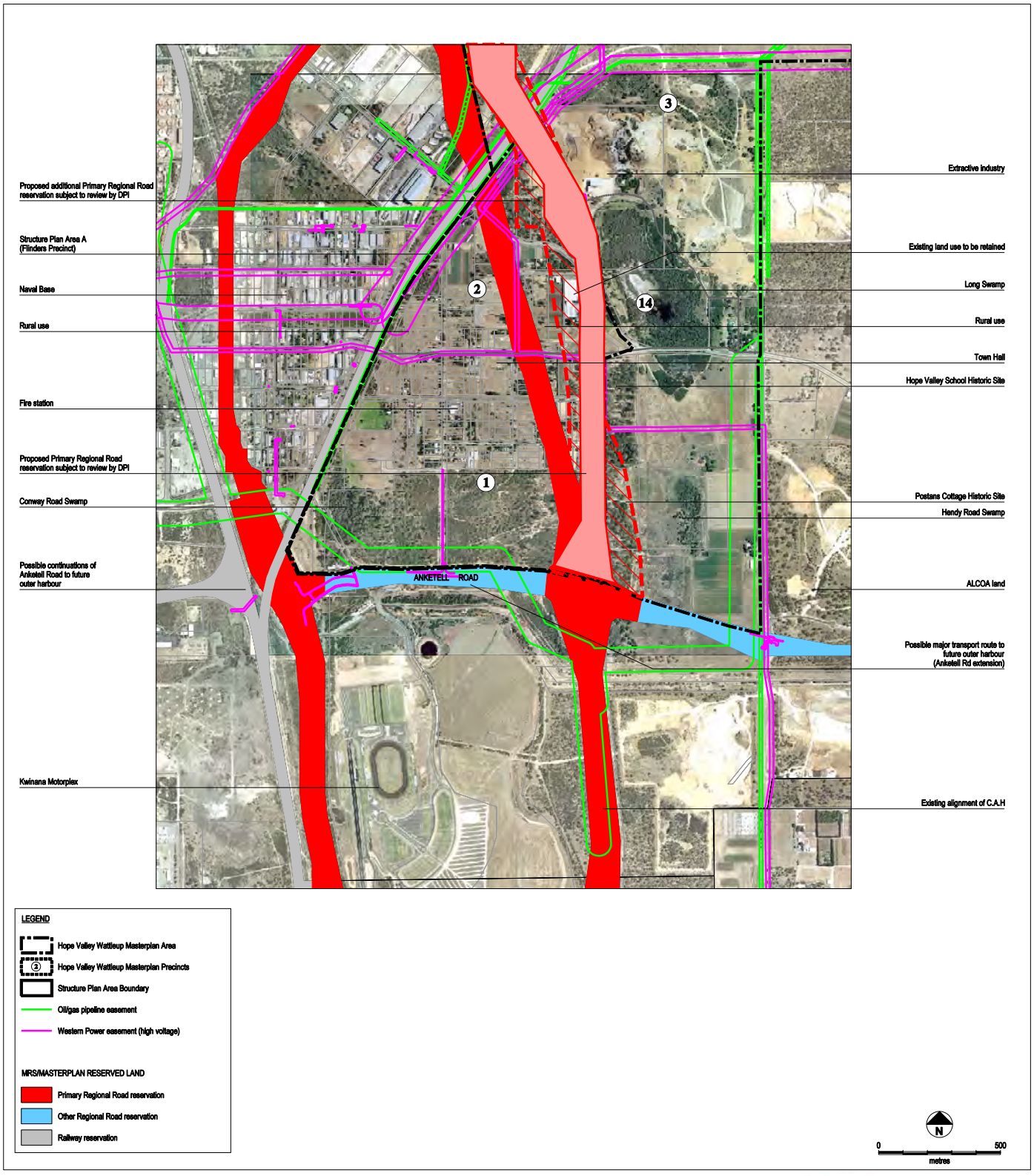


Figure 5 - Local Context Plan

Source: TPG

In addition to the changes that have occurred to the north/south system, there is a need to strengthen the east/west road system. Extensive planning has already taken place to include Rowley Road as a regional road from the Kwinana Freeway to Rockingham Road and potentially to the coast, if the northern port option is selected. There is potential for a bottleneck in the regional road system to be created as two regional roads from the south (Rockingham Road and the CAH through Hope Valley) connect into one road to the north (Rockingham Road) at the point where Rowley Road connects east/west through the area.

An alternative concept plan has been developed which is considered to have increased capacity for north/south traffic and would reinstate the three regional north/south routes through Kwinana, Hope Valley and Wattleup. It would also create a more permeable regional road network for the region providing more choice for drivers. This option is reflected in the Structure Plan and discussed in more detail in Section 6 of this report.

Public Transport

A good bus route runs along Rockingham Road, however, there are currently no services within the Structure Pan area. The area of Hope Valley and Wattleup to the East of the freight railway is currently poorly served by public transport. The Department for Planning and Infrastructure and the Public Transport Authority have proposed that the major Rockingham to Fremantle bus services be routed through Hope Valley and Wattleup. Provision has been made in the structure plan for the future Rockingham to Fremantle Transitway to be constructed within the reservation of the regional distributor road.

Regional Open Space

A number of regional parks and recreation reservations are located within close proximity to the Latitude 32 project, as well as the structure plan area providing for approximately 22ha. The most significant regional open space system is the adjacent Beeliar Regional Park located to the east, west and south. The environmental strategies, as described in Appendix A, will provide for ecological linkages through the Latitude 32 project to provide connections between the systems.

3.2 Local Context

An examination of the Local Context Plan **(Figure 5)** shows that the project area is surrounded by a mix of industrial, rural, regional open space and other minor urban land uses. Some of these land uses include:

- Residential: The Hope Valley Townsite was formerly a rural residential enclave with a number of existing residences remaining within the structure plan area. These land uses are gradually being purchased by LandCorp to remove non-compatible use conflicts.
- Industrial Activities: Cockburn Cement works, various extractive industries, Alcoa mining and tailing ponds and Australian Marine Complex.
- Rural Activities: flower and vegetable market gardens, turf farms, nurseries, horse agistment and hobby farms;
- Infrastructure Corridor: contains Flyash Slurry Pipeline and petroleum products associated with the Kwinana BP Refinery.

- Conservation Reserves: Long Swamp, Hendy Road Swamp, Beeliar Regional Park and Mt Brown Lake. Careful attention will be given to ensure that future industrial development adjacent to these conservation reserves recognise their environmental significance; and
- Community: whilst no longer used for its intended purpose, the buildings associated with the former Hope Valley Town Hall still remain on the site. New community facilities include the Hope Valley Wattleup Fire Station.

Given the close proximity of the existing industrial estates to the west, north-west and south-west; and the location of existing industrial uses within the Structure Plan boundary that are to be retained, the Structure Plan area is strategically placed to accommodate future industrial development.

The Structure plan area is flanked on its southern boundary by Anketell Road. Anketell Road will be a major freight access road, particularly if one of the Outer Harbour southern port options is chosen. To protect road access options, the Department for Planning and Infrastructure has prepared a draft Planning Control Area (PCA 85) to protect land from development until the road needs can be more accurately determined, following a decision on the preferred port option. At the time of writing this report (September 2007), the draft PCA has not yet been gazetted.

The Structure Plan area is also located within the Kwinana Environmental Protection Policy (EPP) Air Quality Buffer (1999). Emissions from the KIA, Aloca Residue Storage Area and Kwinana Motorplex have the potential to impact on air quality within the Structure Plan area. However, the nature of development within the Structure Plan area is primarily identified as a bulk storage and transport precinct, which requires low-density workforces and is therefore, not considered to be sensitive land uses.

Kwinana Industrial Area (KIA)

Primarily, risk in the area is generated by industry within the KIA (WALA, 2003). The KIA is located south-west of the Structure Plan area and is Western Australia's primary industrial area.

The manufacture and transport of a range of materials in the KIA creates a level of risk. Modelled risk contours of Individual Fatality Risk (IFR) outlines the unacceptable risk area for a fully developed KIA, in 2020, extending into the south-western quarter of the Structure Plan area. State Planning Policy 4.1 *State Industrial Buffer Policy* is sued to address off site impacts of the KIA.

It is noted that the highest contour shown for cumulative level of risk from the KIA extending into the Structure Plan area is 100 in a million per year. The Environmental Protection Authority's (EPA) criterion for cumulative risk imposed upon an industry is that the level should not exceed a target of 100 in a million per year.

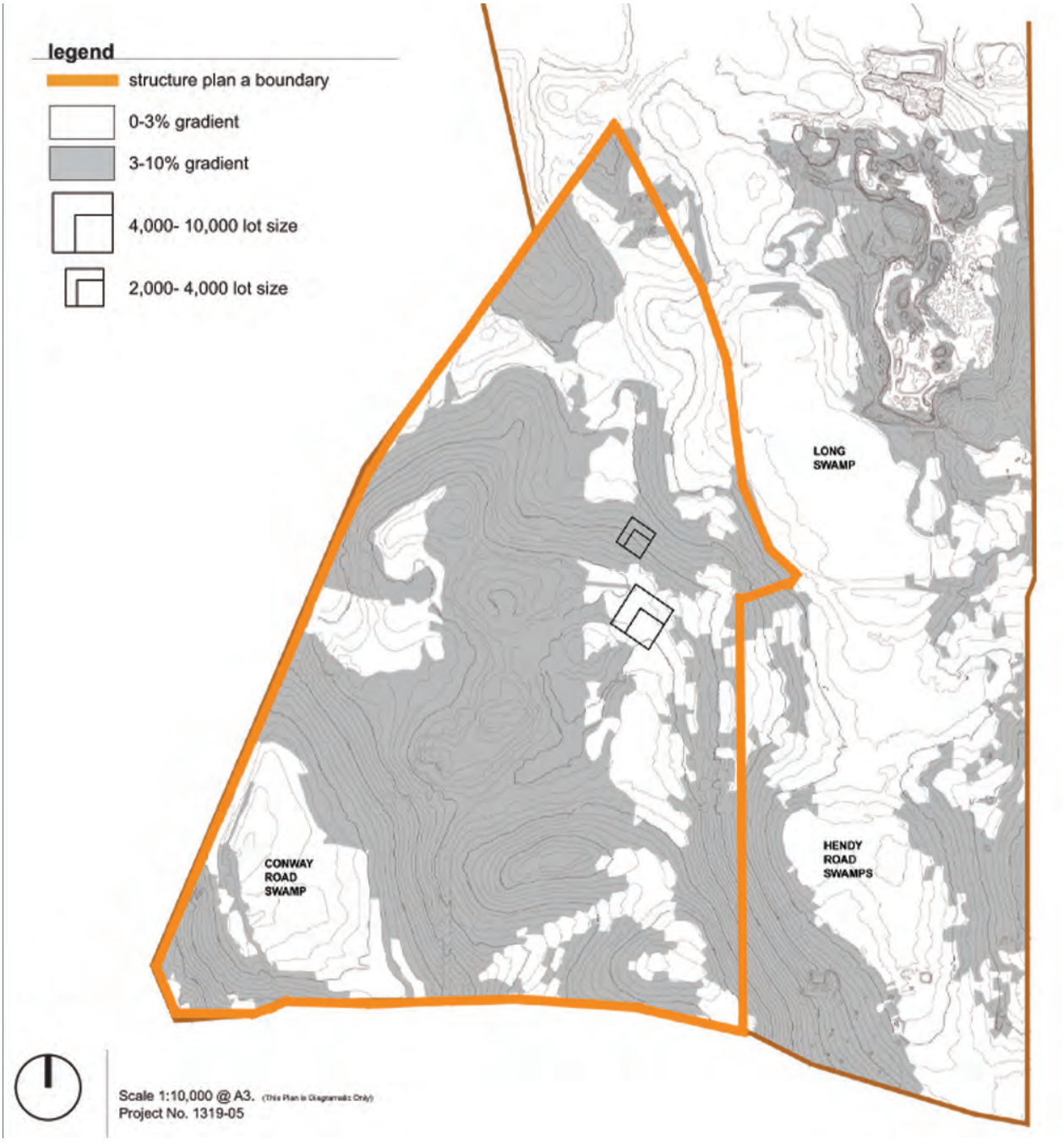
High Pressure Gas Pipelines

The gas supply network within the HVWRP area comprises Alinta and APA Group pipelines. APA Group have high-pressure pipelines that function as transportation service providers for Alinta Gas and the KIA. The APA Group line (Parmelia pipeline) carries Dongara field gas. The Alinta pipeline (Dampier to Bunbury gas pipeline) carries North-West Shelf gas.

The Dampier to Bunbury gas pipeline is located along a portion of the southern boundary and transects the south-west corner of the Structure Plan area. The Parmelia pipeline is located along the north-west boundary of the Structure Plan area, which then diverts further west towards the Naval Base. The pipelines contribute to a level of risk within the Latitude 32 project and require a buffer between land uses and restricted activities within their vicinity. The level of risk varies depending upon the characteristics of the pipe, pressure, burial depth and level of activity within the pipeline easement.

The Dampier to Bunbury Pipeline Act 1997 provides a statutory base for the administration of the pipeline. Easements registered over portions of the land under which the pipeline runs create a buffer known as the Dampier to Bunbury Natural Gas Pipeline Corridor. No development is permitted within this corridor.

As development proceeds within the Structure Plan area, it will therefore be necessary to consider risks associated with land uses as part of cumulative and individual risk assessment. The planning approval system will take cognisance of Planning Bulletin 87 *High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region* and societal and individual risk in its assessments and may require that a societal and individual risk study be undertaken as part of the risk assessment of new proposals. (WALA, 2003) Any risk assessment conducted will be assessed in accordance with the EPA's Guidance Statement No. 33 *Environmental Guidance for Planning and Development* and Guidance Statement No. 2 *Guidance for Risk Assessment and Management: Off Site Individual Risj from Hazardous Industrial Plant*.



Gradient Analysis - Site

This plan analyses the gradient of the site showing

- 0-3% slopes in white
- 3-10% slopes in grey

Large scale development should occur on 0-3% slopes and small scale development on 3-10% slopes.

Figure 6 - Slope Gradient Plan

Source: Ecoscape

4.1 Existing Land Uses

Examination of the structure plan area indicates that the site has been significantly modified and used for various urban (residential), community (former primary school and town hall) and semi-rural activities including horse agistment, market gardening, garden nursery, hobby farms, etc. The pursuit of these activities has resulted in significant clearing and the degradation of large parcels of land.

New urban land use to the area includes a fire station, which has been constructed on the corner of Armstrong and Hoyle Roads.

Existing industrial land uses will remain within the Structure Plan area.

4.2 Climate

The Latitude 32 project area experiences a Mediterranean climate with cool wet winters and hot dry summers. The average maximum and minimum temperatures during the dry period (October – March) range from 31.4ºC to 9.5ºC respectively. The average maximum and minimum temperatures during wet periods on average range from 25.8ºC to 7.0ºC respectively (Jandakot, Bureau of Meteorology, 2004).

4.3 Geomorphology, Topography and Soils

The site is part of the Spearwood Dune System and is characterised by two geology units, these being Sand (S7) and Limestone (LS1). Sand is very light grey at surface, yellow at depth, fine to medium grained sub-rounded, moderately well sorted of aeolian origin. Limestone is known to be pale yellowish brown, fine to coarse grained, sub-angular to well rounded, quartz trace of felspar, shell debris, variability lithified, surface kankar of aeolian origin (Gozzard, 1983).

The topography in the Structure Plan is the most challenging in the Latitude 32 area from a planning and construction perspective, as it ranges from RL 1.0 to RL 34, with 3º to 10º slope gradients within the south-eastern and mid south-western sections of the site. A slope gradient plan is shown in **Figure 6**.

The WAPC's Planning Bulletin No. 64 - Acid Sulfate Soils (2003) indicates that the site is considered a Low to no risk of Actual Acid Sulphate Soils (AASS) and Potential Acid Sulphate Soils (PASS) at depths of greater than 3m.

Long Swamp is mapped at regional scale as High risk of Actual Acid Sulfate Soil (AASS) and Potential Acid Sulfate Soil (PASS) occurring generally at depths of <3m. Any dewatering or soil disturbance, compaction or lateral displacement in the ASS risk areas identified above will require a preliminary site assessment and investigation to determine whether or not ASS is present.

Depending on the results of the investigation, an ASS Dewatering Management Plan (ASSDMP) may be required in accordance with DEC guidelines. The ASSDMP would identify management and/or treatment options for any disturbed ASS.

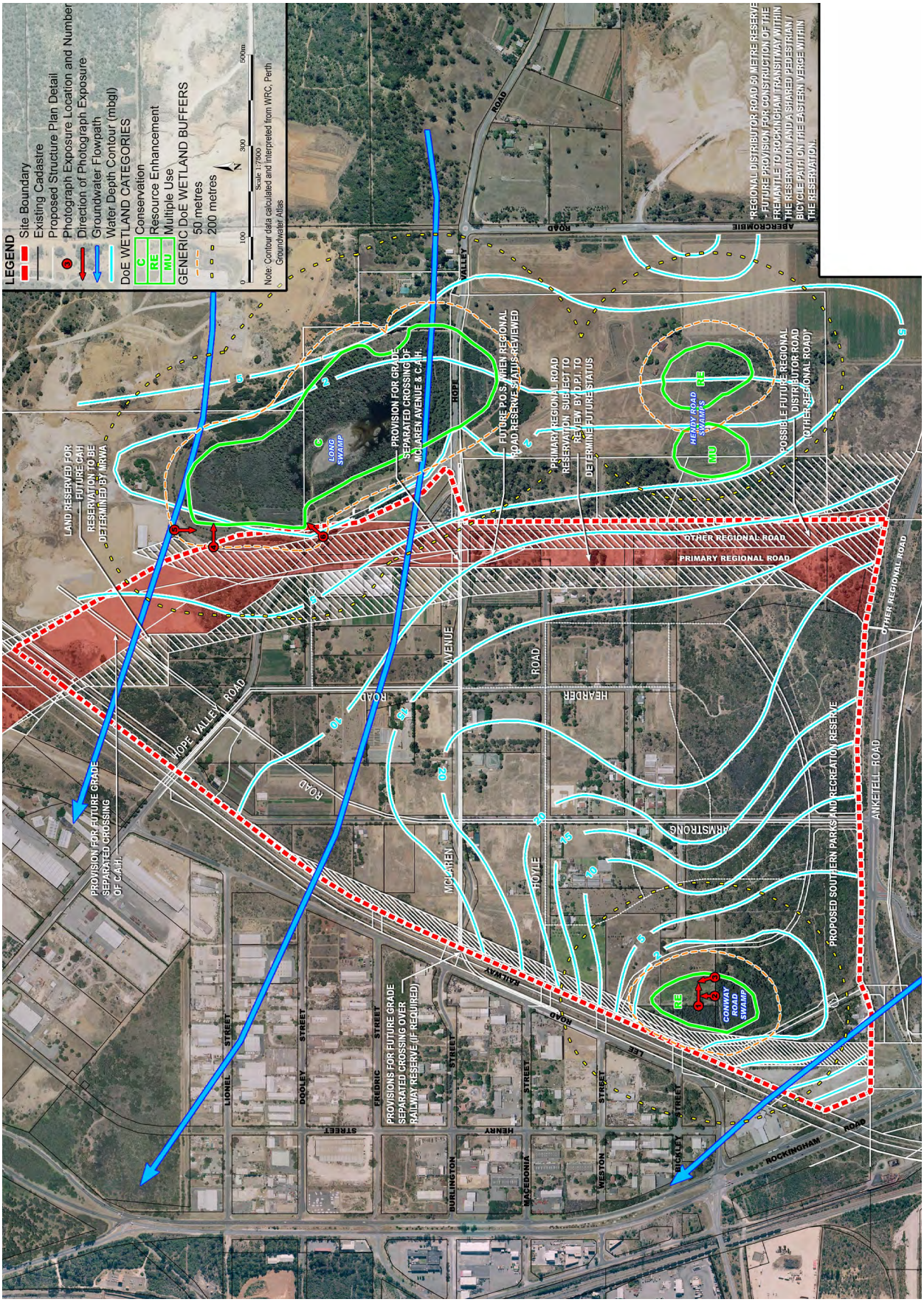


Figure 7 - Groundwater Flow Levels and Wetlands

Source: RPS

4.4 Surface Hydrology and Wetlands

The Structure Plan area includes Conway Road Swamp, which is located near the corner of Anketell Road and Conway Road (**Figure 7**). This dampland is categorised by the DEC as a Resource Enhancement Wetland, which means that the wetland is a priority wetland with the ultimate objective for management, restoration and protection to improve the wetlands conservation value (WRC, 2001).

Long Swamp is protected under the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992.

4.5 Groundwater

The Structure Plan area is contained within the Cockburn Groundwater Area which was proclaimed in 1988 under the Rights of Water and Irrigation Act 1914.

Groundwater generally flows in a westerly direction across the site toward Cockburn Sound. The water table is relatively flat but the depth to groundwater varies from $<$2m in low-lying areas near wetlands to $>$20m under the hills.

Stormwater disposal by infiltration should be achievable in most areas of the site but will need to be carefully considered in areas of shallow groundwater.

4.6 Existing Drainage

The local councils have advised that there are minimal drainage structures currently located within the existing townsite areas. The Hope Valley roads within the townsite are generally unkerbed and drainage is allowed to flow into the verge and infiltrate within the road reserves. Two drainage sumps are located along Hoyle Road. A piped drainage system was previously been installed along Garden Road but the Council has advised that this system has been removed.

4.7 Water Supply

The Water Corporation has a water supply scheme over the area, the Thompsons Lake W.S Scheme. In principle the scheme has been planned to serve general industry, therefore specific high water users would need individual consideration. Water Corporation advises that for the Latitude 32 area a Class A water supply system would be required.

The key elements of the system are:

- The area is served from the Thompsons lake Reservoir. The top water level (TWL) is 75.4m AHD.
- A scheme plan exists for 'general industry'; however this is not yet approved.
- The main water supply pipe is a DN915 pipe that runs in the Rockingham Road reserve. It also extends along the western side of the Structure Plan area parallel with the rail line and in the Lee Rd road reserve.
- No future upgrades of the water supply system are planned.

4.8 Sewerage System

The existing Water Corporation sewer scheme design makes provision for effluent to be discharged south into the future Kwinana Wastewater Treatment Plant (KWWTP). The approval of this facility and its timing will determine the interim and ultimate scheme planning.

4.9 Power Supply

The Flinders area contains major transmission (330kV and 132kV) lines, which are part of the South West Interconnected System (SWIS). There are three power stations in the vicinity of the Flinders area, including the Kwinana Power Station, a private Kwinana power station owned by the Perth Power Partnership and Cockburn Power Station. Four existing zone substations are located in close proximity to the proposed development region. These substations are Cockburn Cement substation, Medina substation, Mason Road substation and British Petroleum substation.

The existing 330 kV and 132kV transmission infrastructure needs to be maintained. The 330kV infrastructure will be protected in its current location and has a manageable impact on the proposed development. The existing 132kV infrastructure traversing the site does not suite the ultimate subdivision and will need to be relocated. The relocation will involve reconstruction of the overhead power lines to suite the proposed road reservation alignments and desig levels along the northern verge of McLaren Avenue and western verge of Armstrong Road. The power lines will need to be installed to provide the necessary headroom clearances along High Wide Load (HWL) routes of 12.1 metres, or be installed underground.

4.10 Communication

At present, there is little communications infrastructure in the area and all the carriers are driven by demand. This means that until the demand occurs, little will be constructed to supply the Structure Plan area with world class communications. Commercial industrial areas usually require higher quality, higher speed communications, generally within 1.5km from an exchange. As per SKM advice, Telstra has indicated that there are two exchanges in the area which can be upgraded to provide communications for the area.

Carrier	Existing and Capacity	Planned	Trigger
Telstra Landline	To meet existing needs plus 2%	None	Sold lots
Amcom / Amnet	Optic cable with 1 Gigabite capacity on the corner Beard St. and Rockingham Road. No capacity at available exchanges although an upgrade at Rockingham is proposed for completion in 2005. Rockingham exchange proposed at ADSL 2+ and would have 24 Mbps available although distance is limited to 1km from exchange.	None	Customers
Optus	No response		
Macquarie Corporate	No Current Infrastructure	Current plans do not include this area	40 x E1 services in the local exchange.
iinet	None	No detailed plans	Lower connection costs from 'Exchange' (Telstra) to QV1 transit charges
Westnet	None (Piggy back on Telstra ADSL)	No Plans	Nil

Table 2: Existing Services

4.11 Gas Supply

The anticipated land use in the structure plan area is mostly for general and transport related industry. As such large users of gas are not anticipated and a normal gas supply service using common trenches is proposed.

Should industries with a large gas demand look to move into the Structure Plan area then it will be possible to provide a major main gas supply.

4.12 Vegetation and Flora

The vegetation in the Structure Plan area belongs to the Cottesloe Complex - Central and South. Metropolitan region based assessments made in 1998 and quoted in Bush Forever (Government of Western Australia, 2000) estimated that some 36% of the original extent of this vegetation complex within the Swan Coastal Plain portion of the Perth Metropolitan Region (PMR) remained uncleared at that time.

Bush Forever identifies 18% of the original extent of this vegetation complex is proposed for protection (Government of Western Australia, 2000). This meets the Bush Forever target of 10% reservation for each vegetation complex within the Swan Coastal Plain portion of the PMR.

The main vegetation units mapped for the Structure Plan, comprise the following:

- Acacia rostellifera Closed Tall Scrub to Shrubland (Ar) / Melaleuca huegelii Tall Open Scrub to Shrubland (Mh).
- Tuart Woodland to Open Woodland over Jarrah-Banksia Low Open Forest to Low Woodland (TJB).
- Tuart Woodland to Open Woodland (T).
- Melaleuca raphiophylla Low Open Forest to Low Woodland / Tuart Woodland to Open Woodland (Mr/T).
- Closed Grassland of alien species.

Most of the units were mapped as having a condition of Degraded to Good using the Bush Forever condition rating system (Government of Western Australia 2000). The condition of units Mr/T and Mr was classified as Very Good to Completely Degraded and Very Good to Good respectively.

The vegetation assessment identified that no Threatened Ecological Community types occur within the Latitude 32 project area including the Structure Plan area.

The vegetation assessment found no species of Declared Rare or Priority Flora in the HVWRP, including the Structure Plan area.

4.13 Fauna

A Fauna Assessment was undertaken by Bamford (2005) for the Latitude 32 area, including the Structure Plan area. There are many amphibian, reptiles, birds and mammals that are expected to occur within the Latitude 32 project area. These species would not be confined only to the Structure Plan area. A summary of results and recommendations for the Latitude 32 project are depicted below:

- Frog species may occur around Conway Road Swamp.
- There may be a high persistence of reptiles in remnant bushland areas.
- A large proportion of avifauna is wetland dependent and sensitive to habitat fragmentation.
- In regards to mammals, there is probably a low level of persistence with very depauperate assemblage.
- Tuart trees and banksia woodland with dense understorey are significant for threatened species.
- Most woodland areas in the Structure Plan area are banskia and eucalypt banksia woodlands that are of potential importance for Carnaby's Cockatoo.
- Conway Road Swamp is an important habitat area for wetland associated species.

4.14 Aboriginal Heritage and Culture

LandCorp appointed a consultant to undertake an Aboriginal heritage survey of the subject site in June 2007. The objectives of the survey were to:

- Undertake archival research,
- Identify previously recorded Aboriginal sites on the DIA Site Register (if applicable) as defined by Sections 5 of the Aboriginal Heritage Act 1972 (the Act);
- Examine the designated Survey Area to locate any new Aboriginal ethnographic and/or

archaeological sites, as defined by Sections 5 a and b of the Aboriginal Heritage Act 1972 (the Act),
- Provide descriptions of the sites located (if applicable),
- Recommend avoidance strategies where applicable (if applicable).

A search of the Register System at the Heritage and Culture division of the Department of Indigenous Affairs revealed that there are a total of three previously identified Aboriginal sites within an area of approximately 5 km (N/S) by 5 km (E/W) centred on the Survey Area (refer to Table 3).

Site ID.	Site Name	Status	Type	Location	
4355	Wattleup Rd Swamp	0	Artefact Scatter	389072	6439443
17582	Hope Valley Trees 1-12	0	Modified Trees	388829	6435879
20865	Mount Brown	0	Mythological	285424	6438540

Table 3: Aboriginal sites located within a 5 km radius of the Survey Area

None of these previously recorded sites are located within the Survey Area. Two of the sites, are artefact scatters and the last is an ethnographic mythological site.

A survey was conducted on behalf of LandCorp by Daniel de Gand (anthropologist) of de Gand Pty Ltd and Gavin Jackson and Jim Stedman (archaeologists) of Gavin Jackson Pty Ltd. The following was revealed:

- One Aboriginal archaeological site was located in the Survey Area as a result of the Survey
- No Aboriginal ethnographic sites were located in the Survey Area as a result of the Survey
- No isolated Aboriginal artefacts were located in the Survey Area as a result of the Survey

One Aboriginal site, in the form of a modified tree, was identified and recorded within the Survey Area during the course of the Survey. This site is located near the south-west corner of the Survey Area, approximately 15 m north of Anketell Road. This area is designated as Parks and Recreation reserve under the proposed Structure Plan. No surface Aboriginal archaeological habitation sites or isolated flaked stone artefacts were recovered within the Survey Area during the course of the Survey.

The report provides a number recommendations including ensuring LandCorp's operations and contractors are advised of the above identified sites and of the legal requirement to avoid any disturbance to the site located within the south-west corner. Furthermore, should LandCorp plan to disturb any of the previously recorded sites, or the newly recorded site, then an application seeking consent to disturb these areas be made to the Minister for Indigenous Affairs under Section 18 of the Aboriginal Heritage Act 1972.

4.15 European Heritage and Culture

In 2002, Palassis Architects undertook a study, including a field survey, to identify and analyse the cultural heritage of the Latitude 32 project area and provide an inventory of sites of heritage significance.

European heritage sites were found to be relatively numerous within and surrounding the Latitude 32 project area. Those sites that do occur within the Latitude 32 project are on Municipal Heritage Inventories and have a variety of assigned conservation categories. Most historic homes/sites listed for heritage on the Municipal Inventory have low heritage ratings.

Three heritage sites occur outside and near the eastern boundary of the Structure Plan. These are Postans Cottage, Hope Valley School and Long Swamp. These sites are not listed under National Heritage. Whilst these sites do not represent a threat to future development, they do represent an opportunity to provide some continuity and links with the past.

5.1 Objectives

The Structure Plan has been developed in accordance with a series of objectives established by the consultant team in consultation with LandCorp. The objectives for Structure Plan Area A are as follows:

OBJECTIVE 1: Incorporate the landscape and environmental process features of the site.
OBJECTIVE 2: Optimise access to and from regional road and rail infrastructure.
OBJECTIVE 3: Ensure legible, robust and permeable movement networks for all modes of transport within and between precincts.
OBJECTIVE 4: Facilitate and accommodate connections to regional public transport.
OBJECTIVE 5: Protect and enhance the presence, amenity, environmental and social values of defined conservation areas.
OBJECTIVE 6: Create high quality built form solutions that incorporate ESD principles and that integrate with the streetscape and natural environment.
OBJECTIVE 7: Provide for, encourage and celebrate industrial and aesthetic innovation through planning and design.
OBJECTIVE 8: Develop precincts to accommodate land uses identified in the Hope Valley Wattleup Master Plan and associated support uses as required and subject to land capability.
OBJECTIVE 9: Create high quality landscape architecture solutions that incorporate ESD principles and that integrate with the natural environment.
OBJECTIVE 10: Create a unique sense of identity and place for Hope valley Wattleup that reflects a commitment to the highest level of business and workplace amenity, state-of- the-art place management, environmental and cultural values, recreation and social amenity; and association with leading international trade and industrial counterparts world- wide.
OBJECTIVE 11: The creation of long term sustainable development solutions for Hope Valley Wattleup that satisfy all other master plan and structure plan objectives and that at least meet commercial viability imperatives for land development projects.

The implementation and success of the Structure Plan can be measured against these objectives.

5.2 Design Elements

The Structure Plan (**Figure 8**) has been designed to provide a robust framework for the future development of an innovative, state of the art industrial precinct that capitalises on the site's relationship to existing industrial development. The Structure Plan employs the general principles of WAPC's Development Control Policy DC4.1 (Industrial Subdivision), and follows best planning practice in order to promote a greater sense of place through a legible urban environment. The essential design elements embodied in the Structure Plan include:

- A "town centre" activity node located on the corner of Armstrong and McLaren Avenue. Whilst the activity node will not be developed as a true "town centre" it will provide a focal point and promote the development of support related facilities such as a lunch bar/convenience store and community facility to cater for the new employment base. The location of these and other support services within a nominated location central to the structure plan will enable the creation of a common public space that is unlike the development of traditional estates which have typically neglected the provision of amenities for its employment base. The

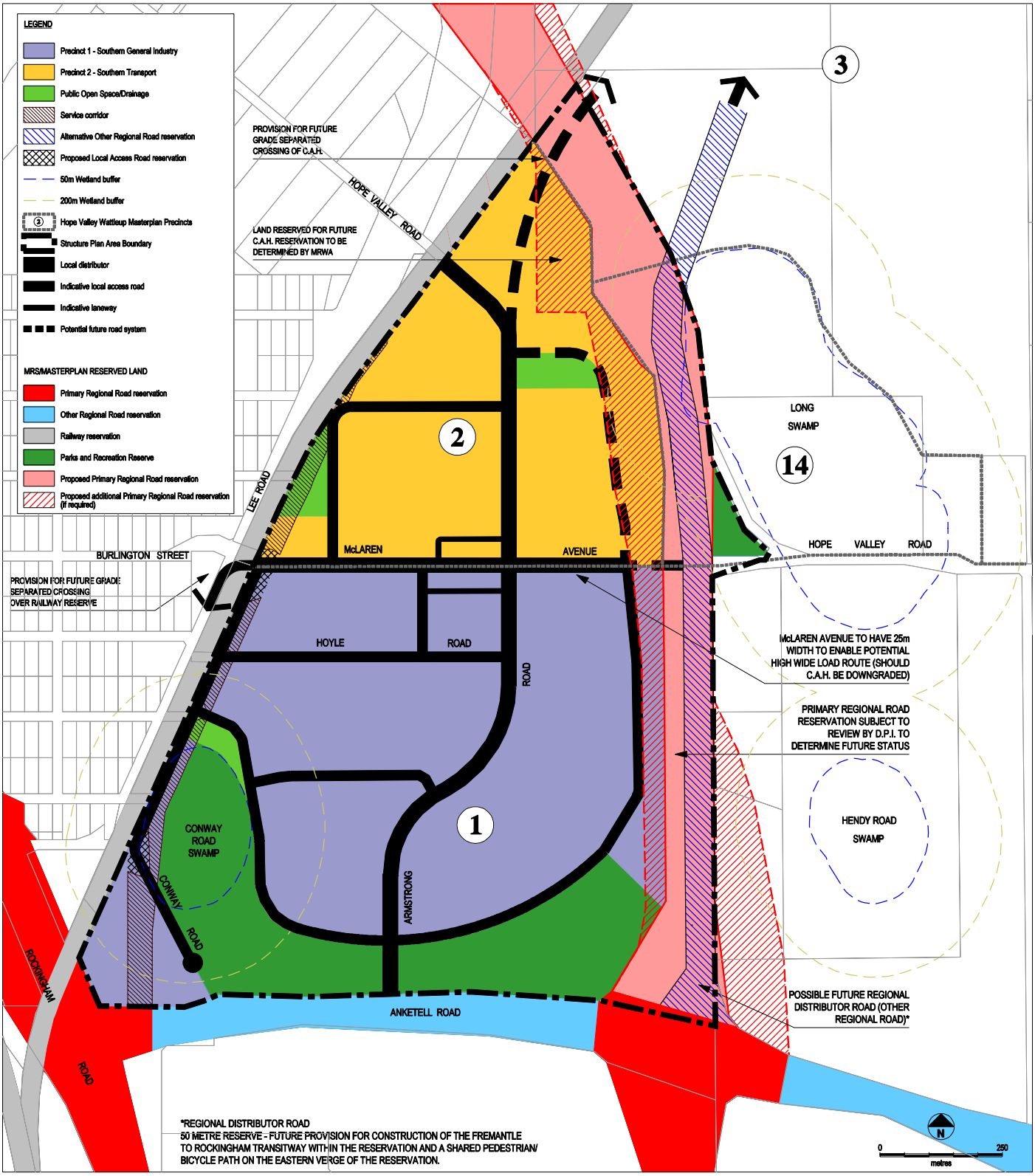


Figure 8 - Proposed Structure Plan

Source: TPG

incorporation of the town centre activity node into the Structure Plan design will facilitate the achievement of Objective 10, or part thereof.

- The area immediately surrounding the designated town centre, running east-west along McLaren Avenue, aims to encourage the clustering of small scale industrial strata developments. This will enable a higher density of strata development to occur, facilitating a greater number of businesses and associated employment densities in close proximity to the town centre, whilst consolidating the majority of the 'service sector' into one central area.
- An interconnected local road system focusing on providing easy access for industrial traffic.
- Provision has been made to accommodate "high-wide" loads on a regional distributor road along the eastern boundary of the site as well as along local distributor roads such as Armstrong Road and McClaren Avenue to ensure the structure plan area can accommodate a variety of industrial traffic.
- Regional and local roads have also been used to provide appropriate buffers to environmental wetlands. Where possible, new roads have been designed to follow existing contours of the site to minimise impact on the topography and to enhance the sense of place.
- Preservation of conservation category wetland within an integrated Parks and Recreation Reserve system.
- Integration of water sensitive urban design practices through the Water Management Strategy.
- Provision for the movement of industrial traffic along the Fremantle Rockingham Highway thereby maintaining a regional road network whilst maximising development opportunities within and access to the structure plan area.
- The provision for incorporating an integrated public transport network to complement the Rapid Transit service proposed within the Fremantle Rockingham Highway corridor.
- The flexibility to accommodate of a range of lot sizes to cater for the industrial uses identified by the Master Plan and current user needs based on recent market research.

5.3 Design Layout

Precincts (Land Use)

The landscape and environmental features of the site, and access to surrounding regional transport networks, have directly influenced the design layout and distribution of land uses into Precincts 1 and 2.

The Master Plan identifies two precincts within the Structure Plan area: Precinct 1 – Southern Industrial; and Precinct 2 – Southern Transport. Below is a summary of the precinct intent and permitted land uses.

Precinct 1 permits a range of industrial and commercial related land uses such as motor vehicle repairs, general and light industry, convenience store and lunch bar. Some of these types of land uses are more amenable to the steeper topography which is characteristic of this Precinct.

Precinct 2 permits a range of larger industrial related land uses such as transport depot, bulk goods handling, container park and warehousing. These uses typically require larger, flatter sites; which is appropriate for the northern portion of the structure plan area where the topography of the site will facilitate this form of development.

Although the precinct statements outlined under the Master Plan and associated supporting documentation provide some guidance to the development intent of the two respective precinct areas of the Flinders Precinct, the precinct statements provide a simplistic 'canvas' approach to land use allocations which does not encourage 'place making' to occur. Nor do the two precincts have a clear interface solution between the two common precinct boundaries which meet along McLaren Avenue.

The Structure Plan documentation, including the subdivision design concept and design guidelines, forms the creative components to support and achieve the Master Plan objectives in this regard.

In order to achieve a more coordinated distribution of land uses and a more planned densification of employment, it was necessary to further consider the role and workability of the central area of the Flinders Precinct. Refer to Figure 13 – Design Guidelines Plan.

Central Activity Node – Town Centre Sector

The structure plan has been designed to promote the creation of a central activity node located at the corner of Armstrong and McLaren Roads. The land uses nominated in the land use table of the Master Plan for the identified precincts, together with the design guidelines will encourage this form of development. These land uses and development outcomes are further supported by the lot layout identified in the Indicative Subdivision Plan. These development mechanisms will provide the tools for the creation of an activity node that will foster a sense of place and create activity for the structure plan area.

McLaren Avenue Sector

The area immediately surrounding the designated central activity node, running east-west along McLaren Avenue, aims to encourage the clustering of small scale industrial strata developments. This will enable a higher density of strata development to occur, facilitating a greater number of businesses and associated employment densities in close proximity to the town centre, whilst consolidating the majority of the 'service sector' into one central area.

The Town Centre and McLaren Aveune sectors will be created and controlled under the design guidelines documentation. These areas form an underlying layer to the overarching Master Plan precincts. The sectors will comply with the land uses listed under Table 1 of the Master Plan, but shall provide the necessary guidance to achieve a higher density of development and employment, whilst also detailing quality built form outcomes.

The design layout of the structure plan area directly achieves Objectives 1, 2 and 8 through the location of land uses to reflect topography, optimising access to regional road and rail infrastructure and by the accommodation of land uses in accordance with land capability.

Road Layout

Addressing regional transport network issues has been central to resolving local transport access legibility and robustness. Good access that works in the context of long term planning has been central to meeting all objectives and is the core element of sustainability for the Flinders Precinct.

The construction of the CAH to freeway standard would reduce the ability of the structure plan to adequately meet Objectives 2, 3 and 4 as outlined in Section 6.1. Connections to the regional road network, system connectivity, capacity and permeability through the site would be compromised were the CAH to be constructed as a freeway along the alignment currently shown in the Master Plan.

The structure plan therefore provides the opportunity to downgrade the CAH from a freeway to a regional distributor road consistent with an overall assessment of the regional road network. This would reduce the land requirements whilst retaining adequate capacity on the regional road network. Benefits of down grading the road include:

- It would be more compatible with the development of the Rockingham to Fremantle Transitway through Hope Valley and Wattleup, facilitating development of the transitway within the regional distributor road reserve.
- Accessibility to and from Hope Valley (structure plan area) would be much better with a distributor road than with the CAH as currently proposed in the Master Plan and a more permeable and legible local street network could be developed.

Acknowledging the need for further regional road studies, prior to potential changes to the Master Plan, the Structure Plan keeps open the option of constructing the CAH to freeway standard until the studies have been completed and a decision made.

At a local level, the existing street grid has been retained where possible as it reflects a modified grid pattern. In some areas the retention of the existing street grid system has not been practical. This is mainly due to the substantial offset of the proposed CAH land area into the project area and its impacts on creating effective lot depths. Overall, the modified grid pattern provides a very robust and legible movement network which is important for industrial development. McLaren Avenue has been retained in its current location, with some realignment, and will perform the role of a local distributor road. Armstrong Road has been realigned south-east of the existing Hoyle Road reservation, intersecting at the existing 'T' junction located on Anketell Road to the south, whilst connecting with the existing Hope Valley Road to the north. Armstrong Road will function as a local distributor road, facilitating the north-south movement of traffic, and will have the capacity to function as a High Wide Load (HWL) route, linking into the existing designated HWL route of Anketell Road.

Where new roads have been required, they have been designed to follow the site contours where possible in order to minimise earth works and provide reference to the topographic features of the site. Keeping in mind the intended industrial land uses to occur within the Structure Plan area and the operators functional needs, it became evident that earthwork solutions would play a substantial role in addressing the existing undulating landform.

The road layout has also been designed to allow maximum flexibility for lot layout. The street blocks proposed are based on a modified grid pattern, thereby allowing both small and larger lot configurations to be accommodated in response to the market needs.

The road layout responds to the Objectives 1,2, 3,4,10 and 11 and has been configured to readdress issues associated with the values of environmental conservation areas (Objective 5).

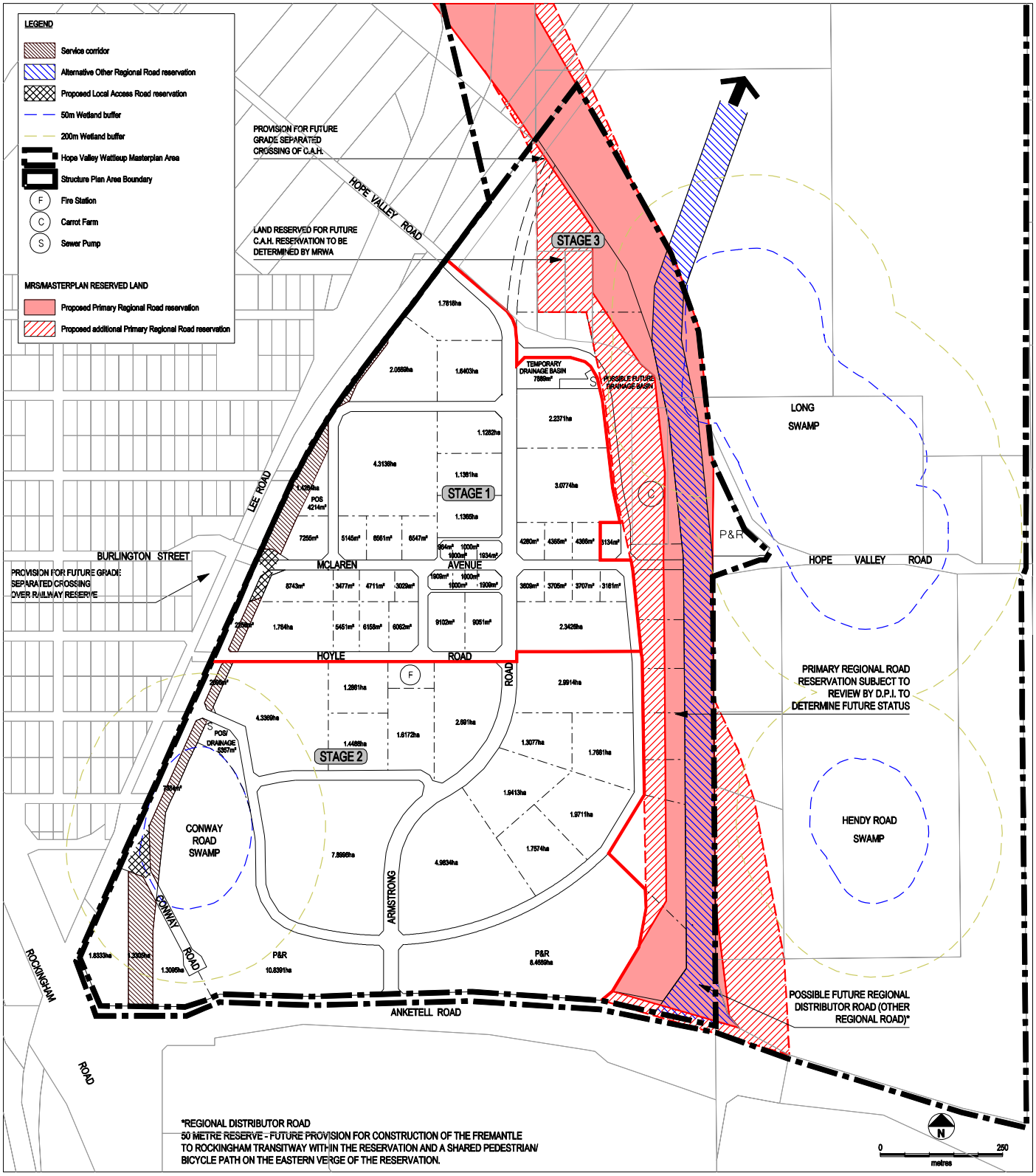


Figure 9 - Indicative Subdivision Plan

* Subdivision design subject to change

Source: TPG

Lots

The Planning Strategy suggested a range of lot sizes based on the anticipated market needs at that point in time (published 2003). Since then the market requirements have altered slightly. Despite this, the land uses and the principles regarding development patterns outlined under the Master Plan report and Planning Strategy have still been applied within the Indicative Subdivision Plan **(Figure 9)**. In this regard, the Structure Plan recommends lot sizes ranging from 900 square metres to 8 hectares as shown in Figure 9.

Any subsequent subdivision plan should be consistent with the intent and objectives of the Structure Plan.

Lots are encouraged to be rectangular in shape and orientated in a north-south configuration wherever possible, thereby facilitating solar access and energy efficiency opportunities and providing workable lot dimensions for building footprints and the movement of commercial vehicles.

Market research also indicated that double frontage lots were desirable to provide greater flexibility for manoeuvring large industrial vehicles. Vehicles can essentially enter the site from one street frontage, and exit via the other street frontage, all in a forward gear with no, to minimal turning on site required.

The road layout also provides greater flexibility to respond to market changes in lot size requirements.. Should the market needs change, the road layout is robust to ensure it can accommodate a range of lot configurations. However, future subdivision of the structure plan area will need to be assessed in accordance with the Structure Plan objectives, precinct objectives and Design Guidelines to maintain the overall objectives of the Master Plan.

The range of lot sizes which can accommodate a variety of permitted land uses meets Objectives 8, 10 and 11.

Public Open Space

Inherent in the approach to the design of the Structure Plan has been the objective to complement, enhance and take advantage of the existing environment. The landscape and site analysis and environmental assessment have strongly influenced the open space location and thereby the form of the Structure Plan **(Figure 10)**.

The Master Plan establishes the requirement for a regional parks and recreation reservation within the southern portion of the structure plan adjoining Anketell Road to facilitate an ecological corridor between wetlands, and to retain significant vegetation. This not only creates a more robust ecological corridor between wetlands, but provides an appropriate mechanism for dealing with the change in topography north of Anketell Road.

Due to the area of land designated for regional parks and recreation, there was little need and benefit in providing additional areas of public open space (POS). However, one small area has been provided in the northern portion of the site adjoining the new Anketell Road and existing Hope Valley Wattleup Road. This area of POS will not only be developed to create the western entry statement into

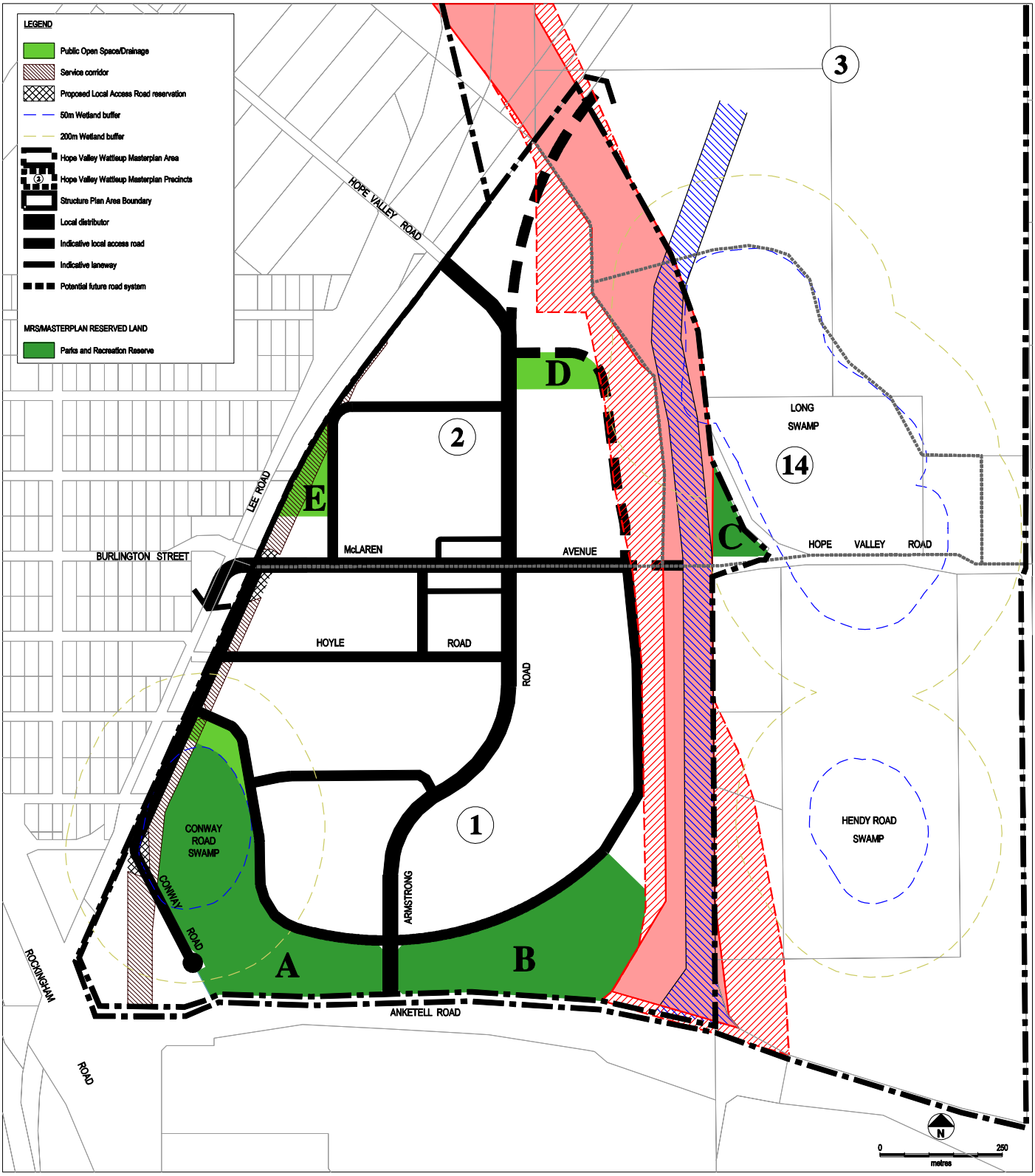


Figure 10 - Proposed Open Space

Source: TPG

the structure plan area, but will also perform a drainage function. A summary of public open space within the Structure Plan is provided in Table 4.

Public Open Space Area	Land Area
Regional Parks and Recreation	
Area A	11.46ha
Area B	8.62ha
Area C	1.05ha
Local Public Open Space	
Area D (includes 0.9 ha of drainage)	1.33ha
Area E	1.2ha
Area F (includes 0.4ha of drainage)	0.7ha
Total Area	**24.36ha**

Table 4: Public Open Space Schedule

Based on the above, the Structure Plan design successfully incorporates the landscape and environmental process features of the site. Quality landscape solutions have been formulated to maximise the presence, amenity, environmental and social values of these Park and Recreation reserve and Public Open Space areas, as detailed in the Landscape Design section of this report. The Park and Recreation areas will form an important part in creating a unique sense of identity and place within the Flinders Precinct in accordance with Objectives 1, 5, 9 and 10.

Built Form

The urban design approach to the Flinders Precinct has been to focus on the role, value and amenity of streetscapes as they are defined by the landscape and built form outcomes. To help increase the level of activity and 'service sector' uses within the identified 'town centre', smaller scale industrial uses may be considered in the form of strata title developments. This area is primarily confined to McLaren Avenue and its immediate surrounds with built form being controlled through the use of design guidelines.

The Flinders Precinct design guidelines will be the key reference material for developers in the preparation of development applications and subsequent building licences in accordance with the Master Plan **(Figure 11)**. It will address a number of design elements within each of the Precincts including:

- Logical building footprints, outlining building setbacks and lot development alignments;
- Building orientation to maximise solar access and provide positive relationships to street frontages;
- Implementation of quality landscaping;
- The integration of water sensitive design principles and on-site drainage retention;
- Energy management;
- Building design and preferred material components; and
- Building interfaces to Parks and Recreation and Public Open Space areas.

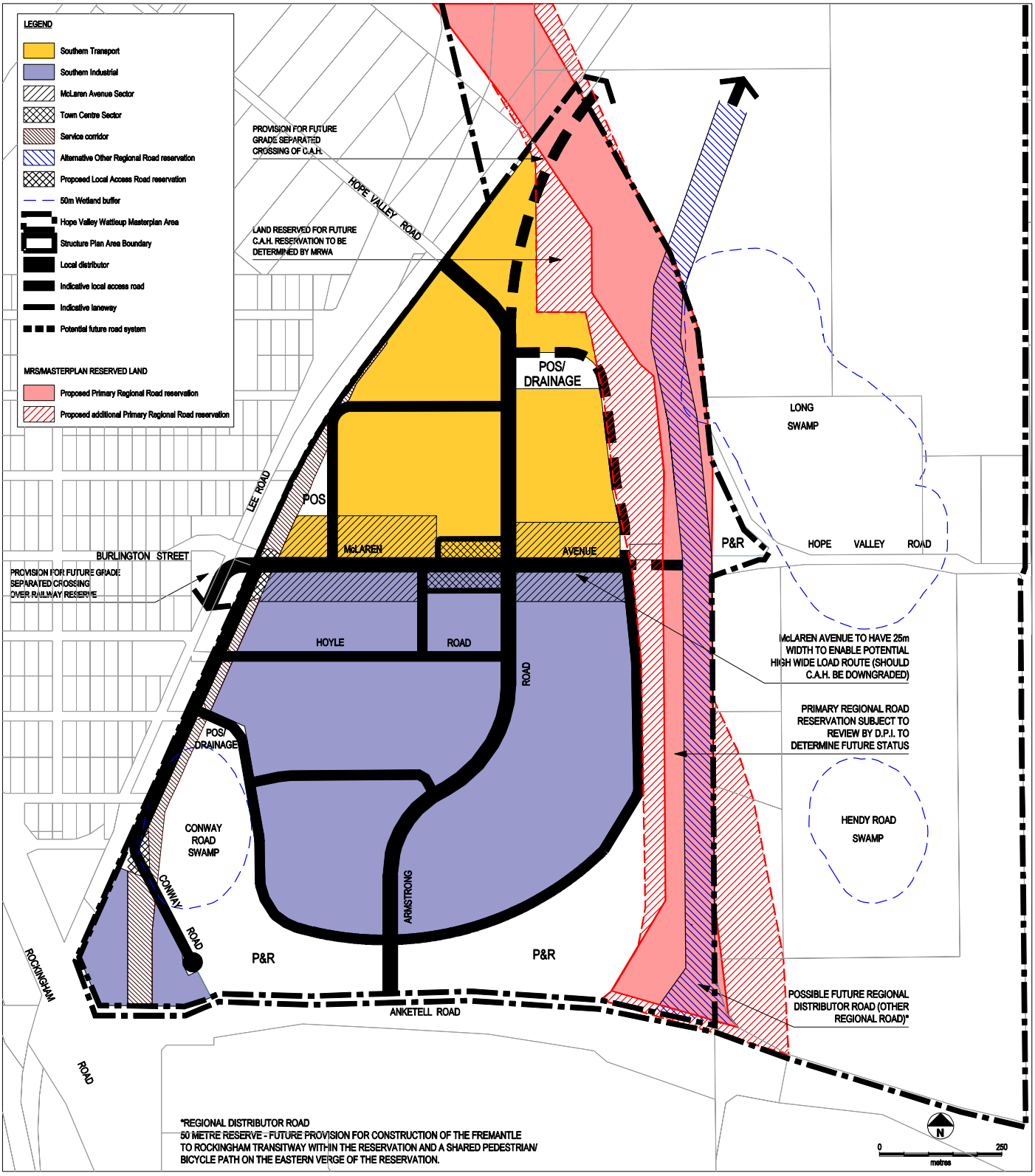


Figure 11 - Design Guidelines Plan

Source: TPG

The key objectives of the document are:

- To create a high quality industrial park development, where the built form contributes to a unique sense of place;
- To form a cohesive transport land use related industrial precinct, where there is a context in the range of scales and forms of business that may co-locate and benefit from complementary industries;
- To implement and achieve sustainable building and management practices, including maximising resource efficiency, minimising waste to landfill, minimising energy use and potable water consumption; and
- To achieve a quality social dimension to the estate by designing for areas which facilitate social interaction and provide amenity, whilst also addressing crime prevention through design to promote security and safety.

The guidelines aim to achieve a sustainable outcome that builds on the principles embodied in the Structure Plan. The use of Design Guidelines to shape the built form will assist in achieving Objectives 6 - 11.

Landscape Design

The goal of the landscape concept plan was to create a functional site which retains original site characteristics. To achieve this the following design principles were employed;

- Respect for existing site processes and functions;
- The retention of existing features where possible;
- The successful blend of natural site and built environment, with special consideration to scale;
- The inclusion at every possible point of a re-use strategy and education programs;
- The intention to improve the retained natural environment.

A detailed landscape assessment of the Structure Plan has been prepared by Plan E and is contained in **Appendix D**.

The function of the site, as primarily industrial use, creates major landscape design constraints and issues. Dealing with these issues in a positive and creative manner will ensure the site retains it's natural characteristics whilst functioning as a large scale development. Issues that were significant in the creation of the landscape were;

- The retention of site characteristics when placing a large scale development onto a predominantly hilly landscape;
- Addressing issues of scale within the streetscape;
- Minimising overall impact on the site;
- Preserving the existing functions of the site and incorporating them into the new site;
- Establishing an aesthetic that is both familiar to the original site as well as suitable to the function of the space;
- The management of stormwater drainage throughout the site , especially at catchment points where water will be returning to the water table;
- Creation of habitat corridors throughout the site linking green areas;
- Encouragement of pedestrian activities in a large scale site;

Figure 12 - Landscape Concept Plan

Source: Plan E

- Preservation of swamp environment, including weed control and major rehabilitation to ensure improvement of the site;
- Selection of appropriate plant palette and hardscape materials; and
- Creating entry points that represent the uses and aspects of the site,.

The landscape concept plan for the Structure Plan includes a street tree and lighting concept, stormwater drainage basin and entry statements **(Figure 12)**. A summary of these elements is provided below.

Design Resolution

When assessing design issues with developed site principles a structured and reasonable design resolution can be arrived. The plan for Hope Valley incorporates solutions to the issues of the site, particularly those of scale and preservation of site values.

Drainage

Drainage requirements have been dealt with in both streetscape design and within the Conway Swamp reserve. The implementation of swales along the lower sides of each road have allowed for water infiltration to occur at regular intervals reducing contamination risks of water entering the table. The swales also act to drain water towards Conway Road reserve where water will be treated with a series of infiltration basins to further improve water quality through nutrient stripping before returning to the water table.

Street Trees

Considerations for street trees have taken into account the uses of the space as well incorporating previous site qualities. The design creates a structured and defined hierarchy of streetscapes to reflect the proposed haulage route requirements, incorporating tall trunks such as the Tuart and assisting in defining scale within the streetscape.

In areas of a more urban quality, such as the village centre, street trees will reflect a more functional use within the space, incorporating trees recovered from the site.

Lighting

A reflection of the hierarchy of the roads will be created when considering street lighting. Local distributors will have larger poles to each side of the road or double luminaries to median strips whilst local trees will have smaller poles with single luminaries to each side of the road. This will also include 'human' scale lighting to the village centre.

Entry Environments

The entry will incorporate aspects from both the original site character and the proposed site function. Stands of Tuarts will create a backdrop at entry points, reflecting scale and providing a 'soft' backdrop. Low endemic swathes of planting will create an understorey with opportunities for artworks that reflect the sites qualities to be incorporated.

Public Open Space and Conservation Zones

Public open spaces and the Conway Swamp reserve have been designed as nodes of interaction between visitors to the site and the environment. Opportunities include bushwalking, seating nodes, shaded recreation spaces, open turfed areas, signage, bird watching and education programs. A main intention of the project is habitat creation, focusing on the improvement of natural spaces to encourage populations of native fauna.

Reuse Strategy

A key component of the Landscape design has been the incorporation of re-use strategy, incorporating;

- Community involvement of the project at all parts of the process;
- Salvage of trees and shrubs from the site, including grass trees, native endemic shrubs and groundcovers and exotic trees;
- Salvage of fallen trees for habitat creation;
- Collection of seed and growing on of tubestock by Murdoch TAFE;
- A program to donate salvaged plant stock to the new Kwinana High School;
- Salvage and site use of mulches and top soil; and
- Organisation of weed control and revegetation works, with the possibility of co-operation with community groups.

The proposed landscape design and integration of regional open space meets Objectives 1,5,6, 9 and 10 of the Master Plan.

The traffic and transportation report has been prepared by Sinclair Knight Merz (SKM). It assesses the regional road network, future traffic generation of the proposed development and provides advice on appropriate width of road reserves. The report also addresses freight rail and pedestrian, cyclist and public transport routes within the structure plan area. A complete copy of the report forms **Appendix B.**

Road Network

The regional road network has been reviewed to ensure it provides adequate capacity and network connectivity on a regional basis and provides a good level of accessibility to the structure plan area. These objectives can best be met through provision of a regional north/south distributor road, positioned along the eastern boundary of the structure plan area, that would link Anketell Road through the Latitude 32 project area to Russell Road.

The construction of the CAH to freeway standard on the current Master Plan alignment would severely restrict access to the structure plan area It would also result in a lower level of connectivity for regional traffic and a 'bottleneck' in the north/south regional road system where Rockingham Road and the CAH meet at Rowley Road.

The proposed road hieirachy reflects that outlined in the HVWRP Master Plan and has been designed to accommodate the needs of both an industrial development and the needs of the regional road network. The four types of road include: Primary Regional Road, Other Regional Road (Regional Distributor); Local Distributor; and Access Road **(Figure 13)**.

However, an alternative regional road network has been proposed and it is intended to replace the Primary Regional Road Reservation identified in the Master Plan with a regional distributor road. It is recognised that this will require a change to the Master Plan. Therefore, until appropriate formal studies and statutory processes can be undertaken the structure plan has retained flexibility to construct the CAH to freeway standard.

It is considered that the alternative road network would have increased capacity for north/south traffic and would reinstate the three regional north/south routes through Kwinana, Hope Valley and Wattleup. It would also create a more permeable regional road network for the region providing more choice for drivers.

It is considered that the regional distributor road would have significant benefits for the development of the Latitude 32 area. Firstly, a north/south regional road through the heart of the area linking Rockingham with Cockburn would provide excellent access to and from the area and would provide commercial viability to the industrial region by the injection of much needed through traffic. Other advantages of this option include:

- It would be more compatible with the development of the Rockingham to Fremantle Transitway through Hope Valley and Wattleup, facilitating development of the transitway within the regional distributor road reserve.
- Accessibility to and from Hope Valley (structure plan area) would be much better with a distributor road than with the CAH as currently proposed in the Master Plan and a more permeable and legible local street network could be developed.

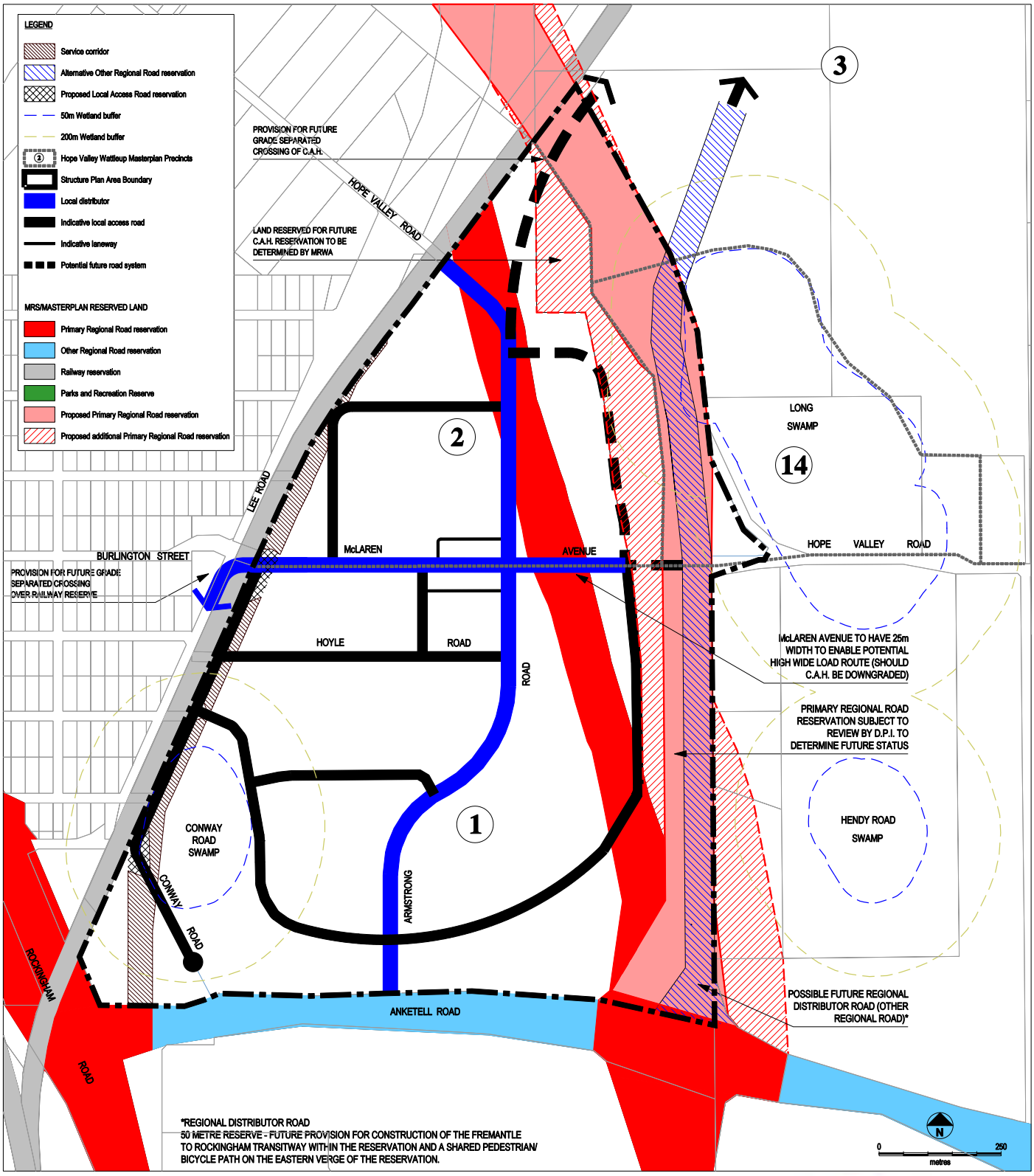


Figure 13 - Proposed Access and Movement Plan

Source: TPG 2007

Further details of the rationale for the downgrading of the primary regional road reservation have been addressed in SKM's technical report.

A large percentage of the existing road layout has been retained in the Structure Plan, with the introduction of new roads where required. The existing road network was based on a modified grid and provides a robust framework to accommodate industrial land and future subdivision requirements. The local network provides good connections with adjoining industrial areas and will accommodate the future bus route that is proposed to operate throughout the Structure Plan area. The internal street layout will effectively disperse traffic throughout the network, and provide for a permeable urban structure conducive to industrial vehicular movement.

Pedestrian/Cyclist Movement

Due to the industrial nature of the development, the provision of dual use paths will be limited within the internal road network. A shared path is proposed to provide for longer distance regional or sub-regional north/south bicycle movement through the area. This path would be provided in the verge of the CAH, to the east of the structure plan area. Should the studies referred to above demonstrate that the CAH is not required, it is proposed that the shared path would be located within the verge of the proposed regional distributor road.

Dedicated bicycle or shared paths are not proposed on local roads. Rather, wider road pavements are proposed to cater for on road bicycle movement.

In addition to the regional dual use paths proposed as part of this Structure Plan, an appropriate network of additional local footpaths will be provided throughout the area commensurate to current planning philosophy at the time of subdivision and construction. Generally a footpath will be provided on both sides of local distributors and one side of access roads.

A feature of the Structure Plan design is the integration of the regional open space network (P & R Reserve) into the development. As previously mentioned, the Structure Plan is required to acknowledge the regional open space links, particularly between the Beeliar Regional Park. This has been addressed in a number of ways, one of which is to provide defined and controlled pedestrian access into the proposed regional open space and wetland buffer areas. These paths can provide an educational and interpretive function as well as a recreational function for employees within the region. The details of the paths will be addressed through the preparation of management plans at subdivision stage.

Public Transport

Currently public transport in the Hope Valley / Wattleup area runs north/south along Rockingham Road. There are also north/south buses along the Kwinana Freeway, which will soon be replaced by the Perth to Mandurah Railway. There are no bus services which directly serve Hope Valley.

The development of the Latitude 32 will increase the need for improved public transport to and within the region. Current public transport initiates such as the Perth to Mandurah railway and the proposed Rapid Area Transit (Rockingham to Fremantle bus service) will provide opportunities for Latitude 32 to have access to alternative transport modes.

The Department for Planning and Infrastructure and the Public Transport Authority have proposed that the major Rockingham to Fremantle bus services be routed through Hope Valley and Wattleup in the longer term. Provision has been made for the Rockingham to Fremantle Transitway to be accommodated in dedicated lanes within the proposed north/south regional distributor road, if approved, when fully developed. If approval were not to be given to a regional distributor road, the Fremantle to Rockingham transitway may need to be provided in existing roads or within the CAH reserve.

Freight Rail

Currently a single track freight railway runs along the western boundary of the structure plan area. This railway is a strategic link to the north and to Inner Harbour, Kewdale/Forrestfield and the eastern states. To the south, it links to the Kwinana industrial area, the Fremantle Outer Harbour and the south west of the state.

In the future this railway will link to the proposed Outer Harbour Port. To provide for future increased capacity, the railway can be upgraded to a dual track within the existing reservation.

There may be a need for sidings or an inter-modal terminal to the north of the structure plan area. The DPI has commenced a study to examine the strategic need for an inter-modal terminal in the Kwinana region. Due to geographic constraints, no planned linkages to the railway are proposed in the structure plan area.

An Environmental assessment of the Structure Plan area has been undertaken by RPS. A summary of their technical report (see **Appendix A**) is provided below.

7.1 Vegetation Retention

Within the Latitude 32 project area the HVWRP Biodiversity Strategy identified the southern portion of the Structure Plan area as a Key Natural Area. The main reasons for this area being identified as a Key Natural Area were due to the following:

- Existing Parks and Recreation reserve identified in the Master Plan;
- Resource Enhancement management category wetlands and their associated buffers;
- Remnant vegetation areas to promote linkages and fauna habitat areas; and
- Vegetation connecting Conway Road Swamp and Hendy Road Swamps.

Consequently, one of the recommendations from the HVWRP Biodiversity Strategy is to assess the environmental values within the Key Natural Areas in order to determine final boundary and design for proposed conservation reserve/s within the Structure Plan area using viability guidelines set out in the Perth Biodiversity Project.

Additionally, the Ministerial Condition for the HVWRP Master Plan stipulates the requirement to protect a larger area of open space within the southern portion of the HVWRP area than what was previously reserved as Parks and Recreation, in order to maintain a linkage along Anketell Road and the potential for a linkage with land south of the Redevelopment Area.

Southern Parks and Recreation Reserve

In accordance with the above requirements of the HVWRP Biodiversity Strategy and the Ministerial Condition 2-4 (3) for the strategy, an amendment for the HVWRP Master Plan was undertaken to include an additional ~6ha of vegetation into the area reserved as Parks and Recreation within the southern portion of the Structure Plan area.

As part of the structure planning design for the site, a review of the location and dimension of the proposed Controlled Access Highway was undertaken. As an outcome of this review, the Structure Plan now reflects the Controlled Access Highway to the eastern boundary of the Structure Plan area as shown in the Master Plan (as amended).

Subsequently, these changes result in the southern Parks and Recreation reserve having a total consolidated area of 22.2ha. The perimeter to area ratio is 0.013 which is a high to medium viability.

Ecological Linkages

Due to vegetation being highly fragmented within Latitude 32 a continuous ecological link (north-south, east-west) through the whole project area was identified in the HVWRP Biodiversity Strategy as not being possible. Instead, the strategy proposes an emphasis on utilising road and railway corridors as primary and secondary linkages. The fauna most likely to utilise these linkages will be birds and mammals.

With regard to the Structure Plan area, the HVWRP Biodiversity Strategy identifies Hope Valley Road as a primary link, which is consistent with the Town of Kwinana's Local Greenbelts plan. The purpose of this link will be to provide a linkage between Long Swamp with the western sector of the regional park, and to the south-east to woodland around Alcoa's tailings ponds and The Spectacles.

The opportunity to create this primary link through the Structure Plan area will be determined through the final realignment of the Controlled Access Highway and/or the internal road network for the Structure Plan area.

7.2 Wetland and Remnant Bushland Management

Future Development near Wetland Area

The HVWRP Biodiversity Strategy proposes that future development outside the 50m wetland buffer, and within the 200m secondary zone of influence, for Resource Enhancement wetlands should be based on the on the development's associated risk to the environment, for example:

- Low risk developments such as commercial industry and office buildings can occur adjacent to and beyond the 50m wetland buffer.
- Medium risk developments such as light industry can occur at and beyond the 200m zone of secondary influence.
- No high risk development such as medium to heavy industry can occur within 200m upstream and downstream from wetland boundary.

As the Structure Plan area is a designated transport and industrial precinct, the above criteria will be used to assist in the allocation of industry/storage types within the Structure Plan area. Design guidelines and lot size restrictions will be used at the subdivision stage to encourage low risk development within the 50m to 200m secondary zone of influence area.

Transport Networks near Wetland Areas

Regional Distributor Road

As stated previously, a review of the location and status of the proposed Controlled Access Highway was undertaken. As an outcome of this review, the Structure Plan proposes to downgrade the Controlled Access Highway to a major Regional Distributor Road, whilst still reflecting its alignment as shown in the Master Plan.

However, in order to avoid existing land uses, the alignment and downgrading of this regional road reservation will intrude into the western side of the 50m buffer for Long Swamp by approximately 23.5m. The area impacted within the western portion of this 50m buffer amounts to approximately 0.20ha.

Controlled Access Highway

The Controlled Access Highway is located just outside the western most extent of the wetland boundary for Long Swamp, which amounts to approximately 0.83ha of the 50m buffer for Long Swamp being impacted by the Controlled Access Highway reserve.

The Master Plan was amended to reflect the realignment of the Controlled Access Highway and was referred to Environmental Protection Authority (EPA) in August 2006 and a Level of Assessment was set at 'Not Assessed – Advice Given'. Appendix A of the Environmental Assessment Report presents the EPA's level of assessment and advice.

In order to offset the Controlled Access Highway and (proposed Regional Distributor Road) intruding into the 50m buffer for Long Swamp and approximately 0.83ha of 'Parks and Recreation' reserve being amended to 'Road Reserves' in the Master Plan, the following was included in the Master Plan amendment:

- Approximately 1.36ha located on the south western side of Long Swamp was included as Parks and Recreation reserve in the Master Plan.
- Approximately 2.19ha located on the eastern side and above Hope Valley Road (currently a nursery) was included as Parks and Recreation reserve in the Master Plan.

The acquisition of the nursery for the purpose of conservation will provide a net environmental benefit by:

- Increasing the Parks and Recreation reservation for Long Swamp by approximately 2.19ha and thereby, contribute towards the long-term protection and conservation of Long Swamp.
- Removing the current land use and the site eventually being rehabilitated and revegetated to provide for the long-term protection and conservation of Long Swamp.
- Further protection of Long Swamp's water quality by removing a potentially contaminating landuse due to groundwater flowing in a westerly direction towards Long Swamp.
- Provide a buffer distance ranging from 120m at the shortest point and 185m at the longest point.
- With respect to Conway Road Swamp, a 50m buffer will be maintained from future development.

In addition to this, Main Roads WA has provided some preliminary design requirements for the Controlled Access Highway which will require a slightly different alignment to the north as well as a wider Primary Road reservation under the Master Plan. The Structure Plan has accommodated this potential requirement.

Furthermore, should Main Roads design preference for the Controlled Access Highway be confirmed, then the Structure Plan and Master Plan will be revised and the potential environmental impacts on wetlands and vegetation will be re-assessed with new environmental management and offset measures proposed.

Wetland and Remnant Bushland Management Plan

As part of subdivision, a Wetland and Bushland Management Plan will be developed by a qualified professional for Conway Road Swamp and the proposed P & R Reserve area. The management plan may cover the following aspects:

- Adjacent Development.
- Existing Wetland Features (including significance, vegetation, fauna and Hydrological Regime).

- Address the feasibility of working with relevant owners and authorities to rehabilitate areas within the railway reserve to provide for a continuous north south linkage.
- Wetland and Buffer Zone Management (including rehabilitation, nutrient and weed management revegetation, drainage, fire management, water quality, habitat protection, environmental education, access and signage).
- Management of Remnant Bushland (Linkage) area (including revegetation, edge effects, weed control, fire management, access, signage, fauna movement).
- Funding opportunities.
- Implementation, timing, reporting and responsibility.

The management plan will be submitted to the Local Government and DEC for comment. A copy of the final management plan will be provided to new owners within the Structure Plan area for their reference.

Expanding on the state regional scale policy and objectives which apply to the Latitude 32 project, with reference to local factors and issues in water, appropriate water management objectives and methods to ensure local scale implementation within a total water cycle context has been developed by the HVWRP Water Management Strategy for the following areas:

- Land Use Planning and Industrial Ecology
- Pollution Source Controls
- Stormwater Management
- Water Conservation and Re-Use
- Groundwater Abstraction
- Scheme Water
- Irrigation and Fertiliser Use
- Management of Non-Conforming Land Use

The local water management objectives, actions, and design criteria and guidelines, detailed in HVWRP Water Management Strategy, have been developed to provide guidance to the future precinct, subdivision and development planning stages.

8.1 Precinct Water Management Plan and Design Guidelines

In accordance with the requirements of Ministerial Statement No. 667 (Condition 1) and the HVWRP Water Management Strategy, an integrated Precinct Water Management Plan will be developed (by the Responsible Authority in this instance) prior to subdivision.

The purpose of this document is to cover, where relevant, the local water management objectives and the Design Criteria and Guidelines set out in the HVWRP Water Management Strategy (RPS, 2007). This will be assisted by the Design Guidelines, which will set a framework for matters to be addressed in the Precinct Water Management Plan (WMP).

Furthermore, individual applications for development approval will need to demonstrate how the proposed development complies with the WMP.

8.2 Stormwater Management

The primary aim for stormwater management within the Structure Plan is for minimised collection, and on-site retention and infiltration of both stormwater and entrained contaminants. On-site retention and infiltration of stormwater will help limit the impact of the development upon the surrounding catchment, and ensure compliance with DoW Stormwater Management Principles.

The specific principles for stormwater management applying to the drainage design for the structure plan area are:

- Rainfall from a 1:1 year ARI event should be retained and infiltrated on-site, unless it can be clearly demonstrated that achievement of this objective is impractical due to the hydrologic conditions of the site.
- Runoff from all impervious areas, i.e. roads and buildings, should be directed to soakwells or other infiltration structures which are able to accommodate a 1:10 year ARI event prior to overflow, except when the basin is near a wetland where it will be sized for the critical 1-year ARI storm event.
- Controls which incorporate vegetation are generally considered an effective water quality management measure. These should be used both as single management measures (eg. Swales and filter strips) and as links between infiltration measures.
- Runoff towards waterways and wetlands to be along overland flow paths that are across vegetated surfaces.

As stated previously, an integrated Precinct Water Management Plan will be prepared as structure planning for the area proceeds. The Precinct Water Management Plan will address stormwater management as part of its integrated water management approach for the Structure Plan area

8.3 Groundwater Monitoring Program

In accordance with the HVWRP Water Management Strategy, and prior to subdivision as the planning process proceeds, a Groundwater Monitoring Program (GMP) will be developed for the Structure Plan area. Components of this monitoring program may include:

- Identification of existing bores and any requirement for additional monitor bores.
- Groundwater sampling regime and protocol (as identified in the HVWRP Water Management Strategy).
- Identification of groundwater analysis parameters.
- Contingency Measures.
- Timing (eg. for pre to post construction), responsibility and reporting.

8.4 Soil and Groundwater Contamination

Potential Sources

A desktop Preliminary Site Investigation (PSI) was undertaken as part of the Environmental Review for the Latitude 32 project. The PSI was conducted with reference to the procedures advocated in the Department of Environmental Protection Guidelines for Contaminated Sites Management Series to assess the potential for soil and groundwater contamination within the site (WALA, 2003).

The PSI involved a review of the following information sources to identify potential areas and sources of potential contamination within the Latitude 32 area:

- Department of Environment (DoE) Site Legaci Database
- City of Cockburn Environmental Constraints Maps
- HVWRP Master Plan

Areas and sources of potential soil and groundwater contamination within the Structure Plan area are:

- a historical landfill site that may potentially occur within the north eastern boundary of the site and within Long Swamp; and
- unsewered residential areas

Further investigation of potential contamination is being undertaken by LandCorp as part of subdivision planning.

Remediation

As part of LandCorp's continual acquisition of houses within the Hope Valley town site, removal of existing septic tanks along with the houses has already been undertaken. Thereby, substantially reducing the level of nutrients, trace metals and pesticides entering soils and groundwater.

With respect to the historical landfill site that may potentially occur within the north eastern portion of the Structure Plan area and along part of the proposed Regional Distributor road, a Preliminary Site Investigation will be required to determine the potential for contamination. This will be undertaken prior to any ground disturbing activities being undertaken.

Under the provisions of the HVWRP Master Plan, future developments identified as having the potential to generate contamination are required to demonstrate full on-site containment and appropriate management procedures, including emergency spill management and disposal.

An Engineering assessment of the Structure Plan area has been undertaken by Wood and Grieve. A summary of their technical report (see **Appendix C**) is provided below.

9.1 Earthworks

As noted in Section 4 of this report a significant proportion of the site is above a 3% slope gradient with some areas greater than 10%. This is particularly evident towards the south west where the site grades from RL23 to RL1.0 at the Conway Road Swamp.

To consider a preliminary bulk earthworks design the following parameters were used to establish the design contours.

- Where possible roads are to follow the contours.
- The design concept is based on the realignment of the Fremantle Rockingham CAH which is subject to review by the Department of Planning and Infrastructure.
- Where possible grades on the lots to be kept to a 3% maximum slope gradient.
- Retaining walls to be no greater than 3.0 m in height to minimise the cost.
- Use embankments where possible to minimise the heights of the retaining walls. All embankments are to be outside the wetland buffers.

Proposed Earthworks

The proposed bulk earthworks plan is shown in **Figure 14**. This plan shows the proposed contours over the site. The broad slope gradients are shown in Figure 2.3 in Appendix C.

Whilst most of the lots are within the 0% to 3.0% slope gradient there are some areas above these slopes. These will have to be dealt with on an individual basis during detailed design.

The proposed bulk earthworks provides for significant reworking of the site with cuts of up to 12.0m on the southern end of the site. Preliminary modeling indicates that a surplus of approximately 1 million cubic metres of material will be generated. The surplus material could be used for future filling of the CAH or for surrounding development requiring fill.

9.2 Drainage

Proposed Design Approach

Stormwater volumes will need to be managed to meet the requirements of local and statutory authorities. As part of a "Major Flooding Strategy" report undertaken for the preparation of the Water Management Strategy some preliminary hydrologic modelling of the proposed total development area has been undertaken. This work has provided preliminary indicative storage volumes for stormwater detention.

The layout of the stormwater system will be finalised during preparation of the detailed design of the subdivision, a however the principles in Table 5 should be considered as a suitable approach for stormwater management at this structure plan level.

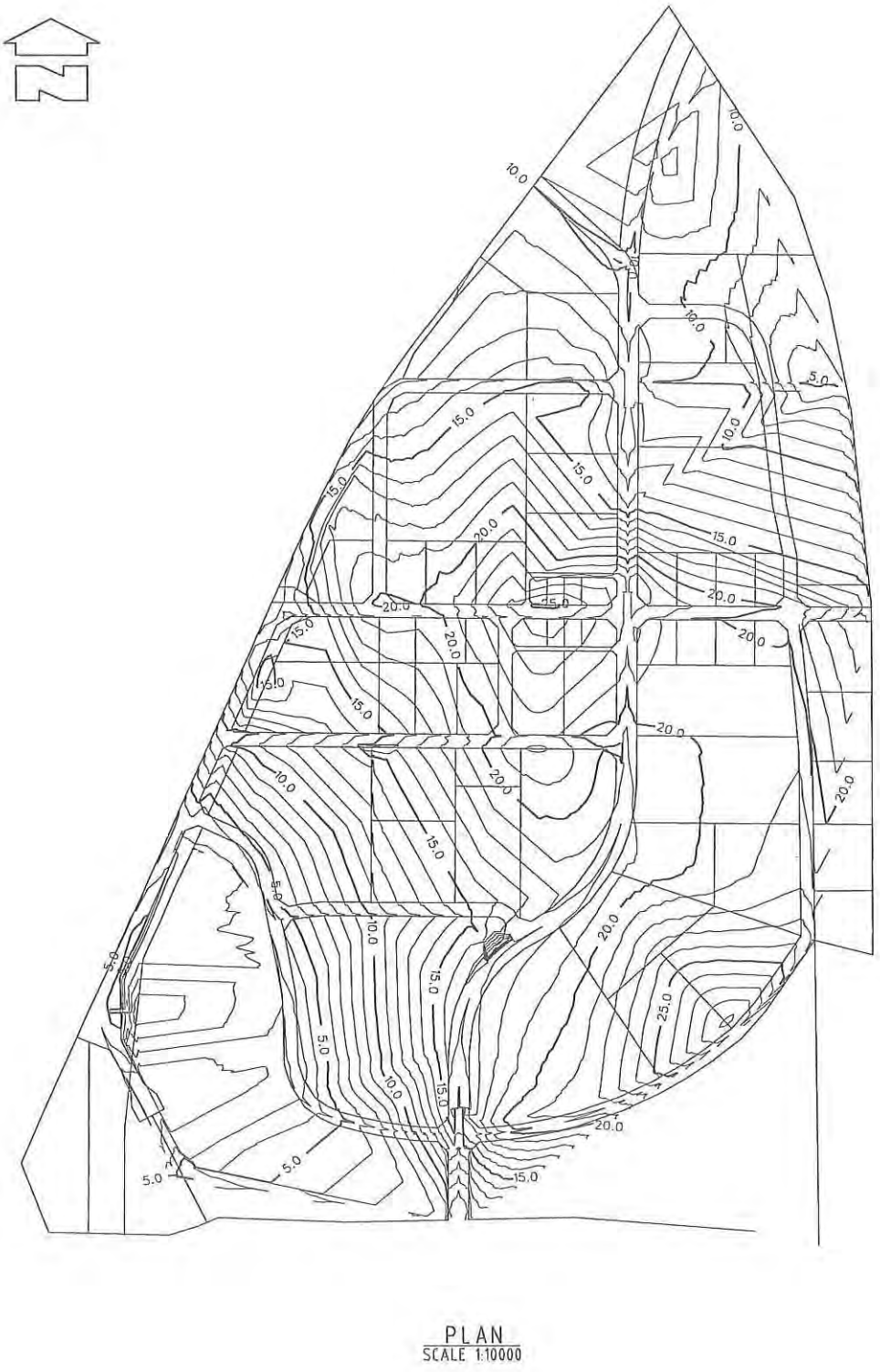


Figure 14 - Proposed Bulk Earthworks

Source: Wood and Grieve

Catchments

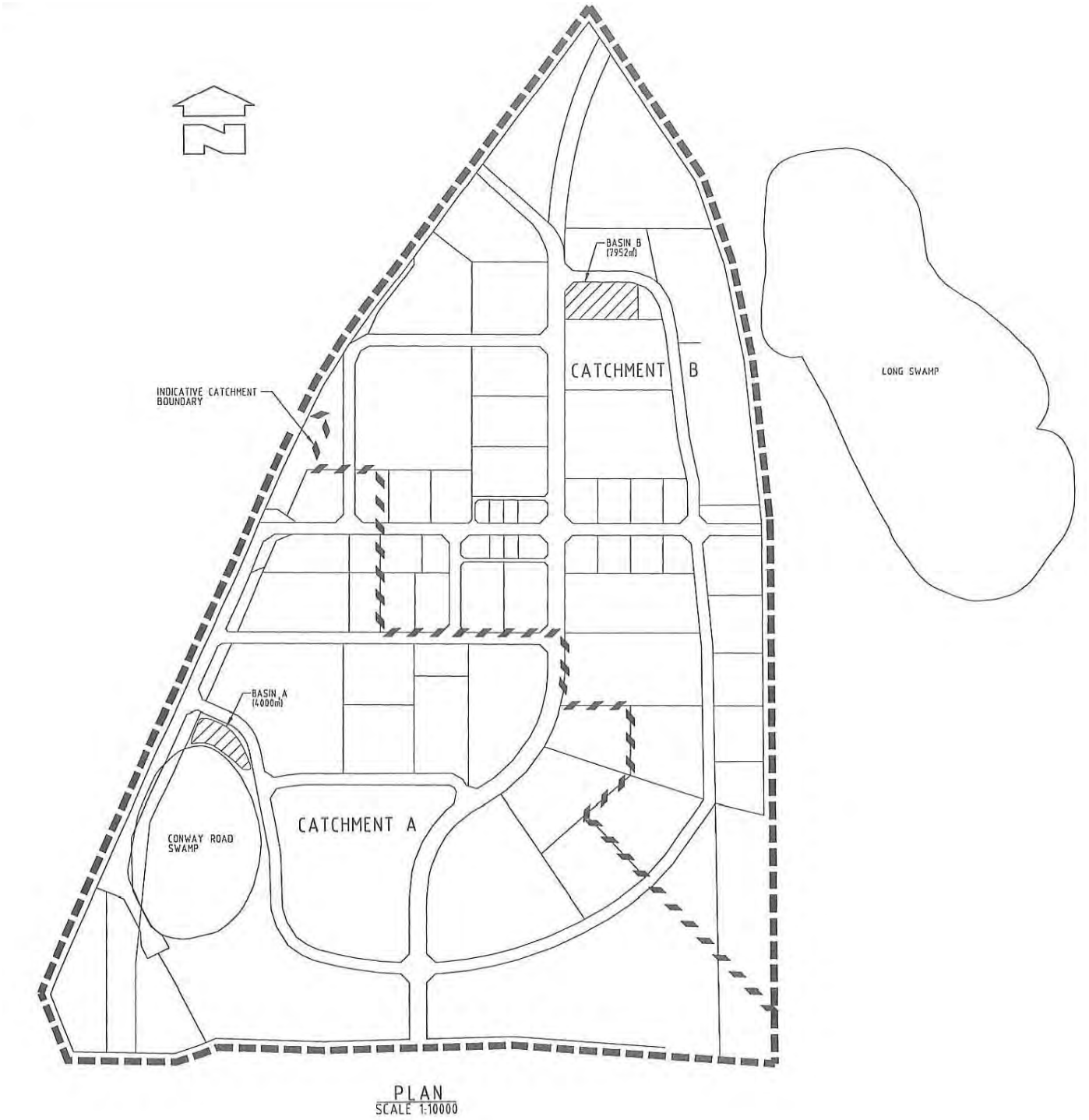
A preliminary review of surface water catchments for the existing landforms within the site area has identified 2 catchments within the Structure Plan area. The catchments areas and indicative proposed drainage basins are shown in **Figure 15**.

9.3 Stormwater Management.

Drainage management methods recommended by City of Cockburn, Town of Kwinana and Department of Environment have been reviewed. The preliminary review of floodwater management for lots and road reserves, undertaken in the "Major Flooding Strategy", suggests that systems can be included within the proposed Structure Plan area to allow the appropriate containment of the 100 year ARI storm event within lots and open space within this development.

Drainage and flood management design principles for public road reserves and private lots that are recommended for this development are outlined in Table 5.

Item	Description
Stormwater Disposal	*Disposal method* - On-site infiltration *Up to 1 year ARI events* - Short duration events to be infiltrated in the vicinity of the stormwater runoff collection point (eg through open bottoms in side entry pits or locally within swales). *Greater than 1 year and up to 100 year ARI events* - Storm event flow to be transferred to an infiltration basin. - Infiltration basin to be sized for the critical 10-year ARI storm event except when the basin is near a wetland where it is to be sized for the critical 1-year ARI storm event. - Infiltration basins to be allowed to overtop during storm events that are larger than the basin design capacity.
Stormwater Conveyance System and Treatment	*Conveyance system* - Pipe system or swales sized for the critical 10-year ARI storm event. *Gross pollutants* - Pipe system Suitably sized gross pollutant traps to be included on the outlet of all pipe systems discharging into public area infiltration basins. - Swales Suitably sized gross pollutant traps to be included prior to discharging into infiltration basins that overflow into wetlands during a storm event that is larger than the basin capacity.



Source: Wood and Grieve

Figure 15 - Proposed Drainage Basins

Item	Description
Stormwater Collection	Public roads to be kerbed with side-entry pits or with gaps in the kerbing to allow stormwater to flow to the piped or swale drainage system. This arrangement will allow for easier management of large spills on the road pavement.
Flood Management	*Road Reserves* - Storage volume is required within the road reserves and at the site of the infiltration basin to accept flows from the critical 100-year ARI storm event. Flood storage volume may be achieved by temporary storage in areas such as parkland or by overland flow into wetlands. - Minimum freeboards to building floor levels above the critical 100-year ARI storm event to comply with local authority requirements. *Lots* - Storage volume is required on the site to store runoff from the critical 100-year ARI storm event. Flood storage volume may be achieved by temporary flood storage in areas such as carparks and hard standing areas. - Minimum freeboards to building floor levels above the critical 100-year ARI storm event to comply with local authority requirements.
Wetlands	Runoff towards waterways and wetlands to be along overland flow paths that are across vegetated surfaces. Drainage works are not permitted within the 50m buffer around the wetland boundary.
Catchments near Site Boundaries	Drainage systems shall be designed to ensure that the infiltration of the 100 year ARI storm event is within the site boundary unless permission has been granted from all affected landowners and the relevant statutory authorities to allow drainage off site.
Local Permeability	In-situ soil permeability is to be tested across the site to ensure the appropriate sizing of the drainage infrastructure.
Depth to Groundwater	Depth to groundwater shall be confirmed on site and is to be considered during design of the drainage system in accordance with local and state government authority requirements.
Other Requirements	All other requirements are as prescribed by local and state government authorities.

Table 5: Recommended Design Principles for Storm Water Management

9.4 Water, Sewer and Recycled Water

Proposed Water Supply

The existing DN915 pipe currently provides a water supply to the existing residences in the Hope Valley area. The future development of this area for industrial uses would also use this main to provide water services for both potable and fire mains.

Development of the water supply system for this development will require boring under the rail line to make a connection to the DN 915 main.

Proposed Sewer System

The existing Water Corporation sewer scheme design makes provision for effluent to be discharged south into the future Kwinana Wastewater Treatment Plant. As servicing of the Flinders Precinct is currently dependent on the future of the treatment plant, it is proposed to amend the existing sewer scheme design to discharge effluent to the existing Woodman Point Waste Water Treatment Plant.

Sewer catchment layouts are dependent on earthwork configuration and as such it is not possible to complete this until the earthworks configuration is finalised. It is expected that the catchments will be distributed as demonstrated in figure 15.

Recycled Water

The Water Corporation have constructed a wastewater recycling plant, the Kwinana Wastewater Recycling Plant (KWRP) in the Kwinana Industrial Area. The capacity of the KWRP is 17 Ml/day which is fully allocated to industry within the Kwinana Industrial Area (KIA).

To provide a dual water supply system to the Latitude 32 project area and the Flinders Precinct in particular, would be an expensive exercise and at this stage, given the proposed land use for the Structure Plan would not be an economic proposition.

9.5 Power Supply

Power Supply for Structure Plan Area A

The total Structure Plan development area is approximately 82 hectares. On the basis of a load demand of 200kVA per hectare, the load consumption will be 16.4MVA. The existing power infrastructure will not be able to supply the required power from surrounding sub stations. As an initial connection option, Medina substation would be the nearest source to connect to the load. Load may be transferred away from Medina to adjacent sites to ensure sufficient capacity is available.

It is likely that the vapacity at Medina will become an issue, depending on the size of the load and date of connection. It is proposed that additional power to the development will be provided by installing an additional transformer at the Medina Substation.

Stage 1 Power Infrastructure.

Stage 1 power infrastructure requirements would need to be outlined by the proponent as part of an application to Western Power for a quotation for connection.

From an indicative study of infrastructure requirements, Western Power has provided the following summary of the potential options based on the anticipated load size and current forecasted network capacity.

Medina substation would be the nearest source for an initial load connection. Load may need to be transferred away from Medina to adjacent sites to ensure sufficient capacity is available. At least one new feeder circuit will need to establish, as there are no spare circuits available.

A 22kV feeder can then be built between the Medina substation and the first stage of development. This will enable the establishment of a number of 22kV/415V transformers throughout the development.

Western Power advises that transformer capacity at Medina could be an issue, depending on the size of the load and date of connection. A third transformer is forecasted to be installed at Medina to meet load growth; however the date of this project is yet to be confirmed. Western Power expects fewer issues if the new load is connected after the installation of the third transformer at Medina. When firm proposals for development are received load forecasts will be amended and timing of the third transformer adjusted if not already approved for installation.

Western Power advises that the above initial connection requirements are only indicative and may change due to other developments in the area proceeding before this. Any capital works required to enable connection would be subject to connection and capital contribution policies applicable at the time.

Western Power Transmission Easement

A 330kV transmission line easement is currently located inside the proposed development area. This easement is reserved for the reinforcement of the Western Power transmission system.

As noted earlier, there will be a need in the future to construct a new Terminal Substation in order to meet the future load growth in the South West Interconnected System. The new terminal substation should be established close to the 330kV transmission line easement to minimise establishment costs. The location of this terminal will need to be considered in the future development of the HVWR land.

As the blocks in the development area are categorised as being industrial, it is likely that the buffer zone will be relaxed as compared to areas designated for residential development.

Although Western Power currently does not have easements for the 132kV transmission lines, they will need to be considered as part of the future development of the area.

In addition to the land requirement for zone substations and the Terminal Substation, provision will need to be made for transmission line easements to interconnect the four new zone substations and

the terminal substation with the network. Ultimately, at least two lines of supply will be required to each new zone substation.

9.6 Communication

At present there is little communications infrastructure in the area and all the carriers are driven by demand. This means that until the demand occurs little will be constructed to supply the Structure Plan area with world class communications, with infrastructure being provided on an 'as needs' basis.

Commercial industrial areas usually require higher quality; higher speed communications generally within 1.5Km from an exchange.

Telstra has recently advised that there are two exchanges in the area which can be upgraded to provide communications for area. In addition another site and building for Telstra would be required in the Structure Plan area with the site and building supplied and constructed by the developer at their cost.

Telstra has also advised they may be able to offer 'Optic Fibre to the Premise' technology in the near future which would provide additional bandwidth over ADSL. This would allow video conferencing and moving large volumes of data over the internet.

9.7 Gas Supply

The anticipated land use in the structure plan area is mostly for general and transport related industry. As such large users of gas are not anticipated and a normal gas supply service using common trenches is proposed.

Should industries with a large gas demand look to move into the Structure Plan area then it will be possible to provide a major main gas supply.

10.1 Infrastructure Cost Sharing

The Master Plan identifies common infrastructure items that are subject to development contributions - Schedule 12: Development Contribution Plans. The Structure Plan is located within Development Contribution Area (DCA) I of Schedule 12.

The eventual development of the Structure Plan area will require physical infrastructure essentially at two levels, namely:-

a) Basic infrastructure common to, and dependent upon, all landholdings within the precinct; and
b) Internal infrastructure, independent to each landholding.

It is proposed that the costs of basic common infrastructure be shared by all land owners in the Structure Plan whereas internal infrastructure remains the responsibility of each land owner/ developer.

10.2 Development Contribution Plan Implementation

As outlined in the Master Plan (section 6.3.3), there is a requirement for Development Contribution Plan (DCP) to be prepared for all Development Contribution Areas. As such, a DCP has been prepared for DCA I which identifies the common infrastructure items relevant to the Structure Plan area. A copy of the DCP is contained in Schedule 12 of the Master Plan. The details of the cost contribution of each land owner is set out in the Cost Apportionment Schedule.

The Authority (LandCorp) will be responsible for administering the DCP. Should arbitration be necessary, section 6.3.12.4 of the Master Plan requires that it be undertaken in accordance with the Commercial Arbitration Act 1985.

10.3 Additional Works Prior to Development

Prior to the commencement of subdivision works within the Structure Plan area, there are a number of additional statutory planning and environmental documents that need to be approved.

Document	Status	Expected Approval Date
Precinct Water Management Plan	To be prepared	To be advised
Wetland & Bushland Management Plan	To be prepared	To be advised
Ground Water Monitoring Program	Currently being undertaken	To be advised
Preliminary site investigation (contamination)	To be prepared	To be advised

10.4 Staging

The staging of development within the Structure Plan area will be guided by four primary elements:

- location of existing services;
- location of exiting roads;
- ownership of land; and
- topography of the site (cut to fill)

An assessment of these three factors, indicates that the first stage is likely to be focused on land adjoining Hearder Avenue, McLaren Avenue and Hoyle Road. Staging may then progress southwards towards Anketell Road and Conway Road Swamp.

Staging and development will need to ensure that access is maintained to all existing land uses and that the necessary service requirements such as drainage can be met. Temporary compensating storage facilities may need to be constructed and maintained to ensure appropriate stormwater outlets. The rate of development will be dependant upon market demand for industrial lots, however it is envisaged that the Structure Plan will be fully developed over a 5 to 10 year period.

The adoption of the FRIAS reflects the need to preserve the ability of industry in WA to continue growing into the 21st Century. The Latitude 31 project area has been set aside for the long term availability of land in a planning framework that protects the interests of industry and that captures the advantage of connection to regional transport infrastructure by road, rail and sea. Fundamental to successful long term structure planning has been the focus on sustainability and the need to:

"...take account of the social, economic and environmental outcomes of the performance of its functions and to ensure that those outcomes are balanced so far as is practicable." (The Western Australian Land Authority Act 1992)

This has been achieved through integration of the natural landscape with planning for industrial development, the recognition of the value of 'place' in attracting high level industrial decision makers and meeting the needs and impacts of associated economic development. The structure planning process has investigated world trends and the changing needs of industrial development, the location related decision making trends of new industry and the day to day needs of an industrial work force. The future industrial development of Latitude 32 forms a natural extension of the south west corridor of the Perth Metropolitan Region. The redevelopment area was created by legislation through the Hope Valley Wattleup Redevelopment Act 2000.

A comprehensive planning framework is provided for the future subdivision and development of the Flinders Precinct. The design approach has been multi-dimensional, incorporating diversity of lot sizes, variety of industrial uses, the qualities of the natural coastal landscape, a legible and interconnected street pattern, a priority on the needs of industrial transport and the impact of implementation over time. Planning provides for and welcomes industrial synergies to be developed and the challenges of creating a sense of 'place' built around the needs of the workforce population.

The Structure Plan responds to topography, water quality management (drainage requirements), preservation and enhancement of the existing wetland areas and integration with surrounding areas. The Structure Plan has encapsulated key sustainability principles including:

- Economic: the proposed development brings with it the provision of industrial land to allow for the development of complimentary uses to the KIA and future outer harbour;
- Environment: the Structure Plan process has reviewed the environmental features of the site as stated in the Master Plan, and proposed modifications to improve the environmental outcomes for the site;
- Social: the Structure Plan provides the ability for existing non-compatible uses to be removed from Hope Valley to allow for the provision of a future industrial estate; and
- Political: the Structure Plan will facilitate the development of land for industrial purposes in accordance with the FRIARS and broader State Government commitments.

Challenges of topography, the need for targeted infrastructure and inherent access issues have been turned to advantage in the structure planning process. Latitude 32 provides a robust planning framework for the provision of land to service industry in a landscape environment with minimal interruption to the established road network and layout. The objectives for the structure plan and master plan have been met to accommodate the demands of a changing industrial environment to be served over time.

References

Australian Trade Coast. *Linking Australia to the World*. Sea and Air Capital, Brisbane.

Ecoscape (2006) *Hope Valley Wattelup Redevelopment Project: Structure Plan Area A - Landscape Concept Plan Report*. Prepared for LandCorp, January 2006.

HASSELL (2007) *Flinders Precinct Latitude 32 Industry Zone Project Structure Plan*, Prepared for LandCorp, September 2007.

Hope Valley-Wattleup Redevelopment Act 2000 (Western Australia)

Ministry for Planning (1999) *Industrial Land Use Survey 1997 - Perth Metropolitan Region*. Ministry for Planning, May 1999.

National Association of Industrial and Office Properties (2003) *Exceptional Industrial Projects: Beyond the Box*. 2003.

Parker, S., Parker, R., Ladzinski, U., Sauman, I. (2001 - 2002) *Hope Valley Wattelup Redevelopment Project: Under the Aboriginal Heritage Act (1972) & the Heritage Act (1990)* Prepared for Ove Arup (Pty Ltd). December 2001 - July 2002.

Plan E (2007) *Landscape Concept Report*, Prepared for Landcorp, November 2007.

RPS (2007) *Hope Valley Wattelup Redevelopment Project: Structure Plan Area A - Environmental Assessment Report*. Prepared for LandCorp, November 2007.

Sinclair Knight Merz (2006) *Hope Valley Wattelup Redevelopment Project: Structure Plan Area A - Engineering Report*. Prepared for LandCorp, August 2007.

Sinclair Knight Merz (2006) *Hope Valley Wattelup Redevelopment Project: Structure Plan Area A - Traffic and Transport Report*. Prepared for LandCorp, November 2007.

Town of Kwinana (2003) *Draft Local Planning Strategy*. September 2003.

TPG (2007) *Flinders Precinct Structure Plan Figures,* Prepared for Landcorp, October 2007.

Urban Land Institute (Development Handbook Series) (2001) *Business Park and Industrial Development Handbook*, Second Edition, 2001.

Western Australian Land Authority (2003) *Hope Valley Wattleup Redevelopment Project – Environmental Review – EPA Assessment No 1470.* Dated December 2003.

Western Australian Land Authority (2003) *Hope Valley Wattleup Redevelopment Project – The Proposed Master Plan Report.* December 2003.

Western Australian Land Authority (2004) *Hope Valley Wattleup Redevelopment Project Master Plan.* December 2004.

References

Western Australian Land Authority (2004) *Hope Valley Wattleup Redevelopment Project – Social Transition Strategy.* June 2004.

Western Australian Planning Commission (1998) *Development Control Policy 4.1 - Industrial Subdivision*. Western Australian Planning Commission, July 1998.

Western Australian Planning Commission (1991) *Development Control Policy 4.2 - Planning for Hazards and Safety*. Western Australian Planning Commission, June 1991.

Western Australian Planning Commission (2000) *Fremantle - Rockingham Industrial Area regional Strategy*. Western Australian Planning Commission, April 2000.

Western Australian Planning Commission (2004) *Network City: Community planning strategy for Perth and Peel*. Western Australian Planning Commission, September 2004.

Wood and Grieve (2007) *Latitude 32 Flinders Precinct Structure Plan, Engineering and Infrastructure Report,* Prepared for LandCorp, October 2007.

Structure Plan Appendices - Technical Reports, are contained in Volume 2 of the Latitude 32 Industry Zone Project: Structure Plan Area, Flinders Precinct Report.

LATITUDE 32 INDUSTRY ZONE

FLINDERS PRECINCT STRUCTURE PLAN

APPENDICES: TECHNICAL REPORTS

November 2007

Appendices

Appendix A: Environmental Report
Appendix B: Access and Movement Report
Appendix C: Engineering and Infrastructure Report
Appendix D: Landscape Report

Appendix A - Environmental Assessment Report

RPS

Appendix B - Access and Movement Report

Sinclair Knight Merz

Appendix C - Engineering & Infrastructure Report

Wood and Grieve

Appendix D - Landscape Report

Plan E