





**LOTS 312 – 313 FIFTY ROAD AND LOTS 2, 4, 7 AND 8 EIGHTY ROAD, BALDIVIS**  
**ENGINEERING SERVICES REPORT - REF BDVCAN10**

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## 1 General

This report has been prepared to outline the servicing proposals and constraints to support the Local Structure Plan on the above land as outlined in the DPS plan.

The investigations in this report has involved consultation with the various service authorities and Council and a desk top study of the available information over the site to establish the opportunities and constraints to development of the area.

## 2 Executive Summary

The land the subject of this report is located immediately south of Fifty Road between Baldvis road and McDonald Road. The land is sparsely vegetated, mainly hosting residual trees, after being used as market gardens, residential and grazing land for many years. The basic land form is undulating sand hills of free draining sand.

The Environmental Geology map of the Geological Survey of Western Australia classifies this site as being suitable for urbanization.

The land can be connected to all services, either by extension from new neighbouring subdivision developments, or by extension along Baldvis Road. Some upgrading and construction of major water infrastructure will be required to service the development. Sewer services are available either from the neighbouring developments, now that access to the East Rockingham Waste Water treatment Plant (ERWWTP) has been approved for the Water Corporation.

Experience with this land form in developments north of the site shows the soils to be free draining, meaning that all storm water will be retained on site by soakage in swales in line with current best practice as outlined in the “Liveable Neighbourhoods” policy. Ground water levels are a minimum of 3.0 m below the lowest proposed fill levels.

The site is traversed by the Australian Pipeline Trust (APT) high pressure gas pipeline located within a large easement on the west side of the land. The easement land is available for use as POS, drainage and road crossings under strict guidelines as set out in the report below. Road crossings will need special attention to clearances and protection.

## 3 Site

The land covered by the structure plan is located as shown in Drawing LW-01 in Attachments, being south of Fifty Road in Baldvis and east of Baldvis Road to the APA and Water Corporation Pipeline easement. The land occupies an area of approximately 63.6ha.

The land is undulating, with elevation varying from Baldvis Road at around RL7.0mAHD to a ridge line midway between Eighty Road and Baldvis Road at around RL12.0mAHD down to around RL9.0mAHD at Eighty Road. The land falls further in westerly direction to an isolated low point at around RL3.0m AHD some 250m west of Eighty Road, then rises a to another ridge at around RL14.0mAHD prior to falling to around RL4.0mAHD on the western boundary of the site.

As shown in the Environmental Geology Map (Rockingham part of Sheets 2033II and 2033III, Gozzard J. R) as comprising two soil types:

- Eastern Portion of the site east of Eighty Road and eastern portion abutting Eighty Road: Bassendean Sand, light grey at the surface, yellow at depth of eolian origin.
- Western Portion of Site: Sand derived from Tamala Limestone of residual origin.

Both soil types are described as suitable for urbanization.

The site to the west of Eighty Road comprises of active market gardens and the area east of Eighty Road consists of rural residential land and a hatchery.

Across the eastern half of the land, within an easement, there is the high pressure natural gas pipeline of APT.

Fifty Road, Baldivis Road and Eighty Road and which are located at the northern, eastern and bisect the area respectively are constructed as a good standard rural road with bitumen seal without any formal drainage. Part of Fifty Road has been upgraded as part of the “Baldivis North” development.

## 4 Development Proposal

It is proposed to develop the land as a residential subdivision of around 750 lots, with all normal services being; wastewater, water, power, roads, gas and telecommunications service. All drainage is proposed to be retained on site using best management practices. One road crossing of the pipeline easement is proposed.

The development will entail substantial earthworks to provide level building blocks from the undulating land form, with all lots having retaining walls to allow this, plus the lower areas west of Eighty Road will need to be filled to facilitate sewerage grades. Ridge lines and locations of substantial trees have been identified and have been incorporated in POS where possible to preserve the existing trees.

## 5 Earthworks & Retaining Walls

The site requires filling in the southern and western areas to facilitate sewerage into the existing infrastructure. The fill levels vary, depending on the proximity of the site to the pumping station, but in general the western portion of the site will be filled some 2.5 to 3.0m and retained on the boundary where necessary.

Each lot will be finished level, with installation of retaining walls to suit. The retaining wall height is proposed to be restricted to 1.5m (4 blocks) in height on side boundaries, with a maximum of 3m heights to rear boundaries in order to provide the maximum amenity to lots without shading. Retaining walls will be constructed using reconstituted limestone blocks.

Included in Attachments is the proposed sewerage strategy plan which shows the proposed fill levels required to facilitate the sewerage of the land and the approximate levels.

The earthworks are proposed to be designed to be on a “cut to fill” balance, meaning that cut areas will need to be resolved to make up the shortfall of filling required for the filing shown. The future Nairn Drive reserve also passes through the development area. Council has prepared a preliminary design for Nairn Drive which essentially sets the levels. Although this may have to be varied when the detailed design is done, at very least the preliminary design will need to be set at Fifty Road and Eighty Road to coincide with existing road levels.

Where roads join between land holdings with separate ownership, it is likely that the levels on the boundaries will need to be either matched to existing level or co-ordinated to ensure that a staged development approach can be accommodated.

## 6 Roads

All roads will be constructed to City of Rockingham standards.



Nairn Drive will be constructed where possible although in the interim period it is proposed to be constructed to link into Eighty Road subject to land issues being resolved with adjoining owners.

Baldivis Road and Fifty Road are proposed to be upgraded to a “Boulevard” standard where the road abuts the site. It is envisaged that Baldivis, Fifty and Eighty Roads will be upgraded to urban standard during the development, including reconstruction (or supplementing), kerbing, sheeting and drainage, plus underground services as required for the development.

Where roadways cross the pipeline easement, the profile of the road will be lifted to ensure that the required minimum cover over the pipeline is maintained at 1.2m as required. Previous experience in constructing roads across this easement has given us the background to forecast required levels.

## 7 Drainage

As outlined in Section 3, the sandy soil characteristics of the site are conducive to soakage. Therefore all stormwater drainage will be retained on the site via soakage swales, including the 1 in 100 year event.

The land falls into a number of drainage catchments that is shown in Attachments in Drawing LW-04.

Catchments have been established based on topography, minimum grades and land ownership to ensure optimization of basin areas and minimization of impact on POS.

Generally the low points in each catchment have been designated as infiltration swales for the 1 in 5 year design storm, with additional capacity either in the swale itself or in the abutting POS to contain the 1 in 100 year ARI storm.

A separate **Local Water Management Strategy (LWMS)** will be provided to Council for the area.

The proposed drainage system for the subdivision will also include accommodating drainage flows from Baldivis Road, Eighty Road and Fifty Road.

All basins will have the maximum depth of water of 1.5m for the 1 in 100 year ARI storm.

## 8 Groundwater

Extrapolation from the Perth Ground Water Atlas 2004 indicates that the AAMGL for the area is at around RL1.50m AHD at the western side of the site, grading up to around RL2.50m AHD on the eastern boundary of the development. The Groundwater contours are shown in Attachments on Drawing LW04. In the centre of the area there is a soak that has been used for water supply for irrigation, in August of 2011; the water level in the soak was surveyed at around RL1.2m AHD being around 800mm below the AAML levels according to the DoW atlas.

The lowest ground level on the site is approximately RL6.0m AHD at the P.O.S. / drainage swale basin site located in the southern corner of the site. Base of the basin level the same location is at around RL4.0m AHD being which at least 2.0m above AAMGL.

## 9 Power

It appears that sufficient power supply exists in the area to supply the development. A 22Kv aerial line is located in Baldivis Road, Fifty Road and Eighty Road which serves the area.

All aerial lines along the existing roads will be relocated underground in line with current WAPC approval policy at the cost of the developer. The existing aerial service lines inside the lots will be removed as part of the development.

All internal power reticulation lines and transformer installations will be constructed at the cost of the developer. Transformer sites will be determined at the detailed subdivision design stage.

## 10 Water Supply

At present there is reticulated water supply past the site in Fifty Rd.

There is an existing 250mm water main along the north verge of Eighty Rd for the whole frontage of the site and beyond to the west, which serves the existing “Baldivis North” and “Chase” developments from the Water Corporation’s Tamworth reservoir (which is immediately south of the development area). There is also a 300mm distribution main which is proposed to be extended along Baldivis Road from Ingram Rd to Eighty Rd by other developers in the near future. The 250mm main also links along Fifty Road to Baldivis Road.

Water Corporation Planning requires a future 600mm main to be extended along Baldivis Rd and also along Eighty Road between Tamworth Reservoir and Fifty Road which will boost the capacity and pressures in the area.

It is likely that portions of these mains may need to be constructed as part of this development, although the timing of the various upgrades will depend on the timing of this development relative to others and the proposed staging of this development. For example, if a cross connection was made between Baldivis Road and Eighty Road, the boost from that cross connection may increase the number of lots that can be serviced.

## 11 Sewer

The site falls within the catchments of three existing wastewater pumping stations (WWPS’s) being McDonald Road WWPS to the north, Baldivis Road WWPS to the north east and Tamworth Boulevard WWPS to the south.

The catchment plan, together with the required fill levels is shown in Drawing S100 in Attachments.

At present, the only portion of the catchment that is relatively unconstrained by capacity is the southern catchment into the Tamworth Boulevard WWPS which discharges south to the Rivergums, then west to the Point Peron Waste Water Treatment Plant (WWTP). The existing system has sufficient capacity for the designated catchment.

The Water Corporation has now achieved approval for the linking mains to the ERWWTP, and as a result they are agreeing to new developments in this area.

Connections can be made directly into existing sewers for the north east and southern catchments, and partially for the northern catchment as set out below.

The areas to the north within the McDonald Road and north east within the Baldivis Rd WWPS’s are currently limited by capacity as they pump to the Kwinana WWTP via the Baldivis Rd WWPS. Currently McDonald Road Station has been sized for an interim capacity of 15l/s (Equivalent to around 1500lots) and Baldivis Road Pumping Station with an upgrade can cater for a capacity of around 24l/s (Around 2400lots) with significant pressure from developers to connect.

Ultimately the McDonald Road WWPS will accept discharge from the Baldivis Rd WWPS, and will then pump directly to the new East Rockingham WWTP which is anticipated to be operational after 2015.

The western area of the development, being the northern catchment, west of Eighty Rd is separated into two subcatchments, although they both connect ultimately to the McDonald Rd WWPS. The eastern subcatchment area connects to the existing 375mm sewer at the junction of Fifty Rd and Ingerfield Gardens, and as part of the development a 225mm diameter sewer is proposed to be extended from Fifty Rd at Ingerfield Gardens through the subdivision to Eighty Rd to serve the proposed large commercial site. There is a need for fill to be placed on the southern portion of lot 312 adjacent to Eighty Rd he land to allow cover to the sewer.



The western subcatchment area will need a 225mm extension from the McDonald Rd WWPS along McDonald Rd to Fifty Rd. There is a need to fill the southern portion of this subcatchment to allow for the sewer to be constructed over the top of the gas pipeline and the low area along the southern boundary.

## **12 APT Pipeline Easement**

This is a 67 metre wide affected area skewed across the western half of the site, which contains the 375mm Australian Pipeline Trust (APT, originally WANG) natural gas pipeline in its centre, plus the Water Corporation's 1400mm Stirling Trunk Water main located on the eastern side of the gas pipeline.

The development setbacks from the pipeline must be in accord with the requirements of Planning Bulletin 87 – High pressure Gas Transmission Pipelines in the Perth Metropolitan Region (PB 87).

Prior to commencement of subdivision works, the subdivider will prepare and implement a Pipeline Management Plan detailing measures to ensure public safety and the protection of the high pressure natural gas pipeline, including completion of a risk assessment in accordance with AS2885 and implementation of measures required to ensure that the level of risk of future inhabitants of the subdivision is as low as is reasonable practicable.

This risk management assessment has been carried out for other developments in the area and it has been agreed with APT that higher risk land uses such as aged housing, schooling and neighbourhood centres will be removed from the higher risk locations. The planning for this development is cognisant of those requirements.

Although there are no concerns in this development from a planning perspective, at the time of construction the developers and their consultants will need to approach APT to resolve a further pipeline management plan to ensure that the construction of the works in close proximity to the pipeline are properly managed to ensure the safety of the construction personnel. It is at that time that the matter of the road crossing, the levels thereof and the required management measures for the job will be required to be resolved.

## **13 Telephone**

The new area will be served by the NBN or another provider for broadband and telephony. Capacity exists off fifty Road and Baldivis road as part of adjoining developments and will require minor extensions to facilitate connection.

## **14 Gas**

Gas services are located in Fifty Road and Baldivis road and have sufficient capacity to serve the area with minimal augmentation.

## **15 Attachments**

Drawings referred to above are attached as follows;

- Structure Plan – DPS Drawing CarBd060B
- Locality Plan - LW-01.
- Aerial Photograph with Plan – LW-02
- Drainage Strategy Plan – LW-04
- Sewerage Strategy Plan – S100

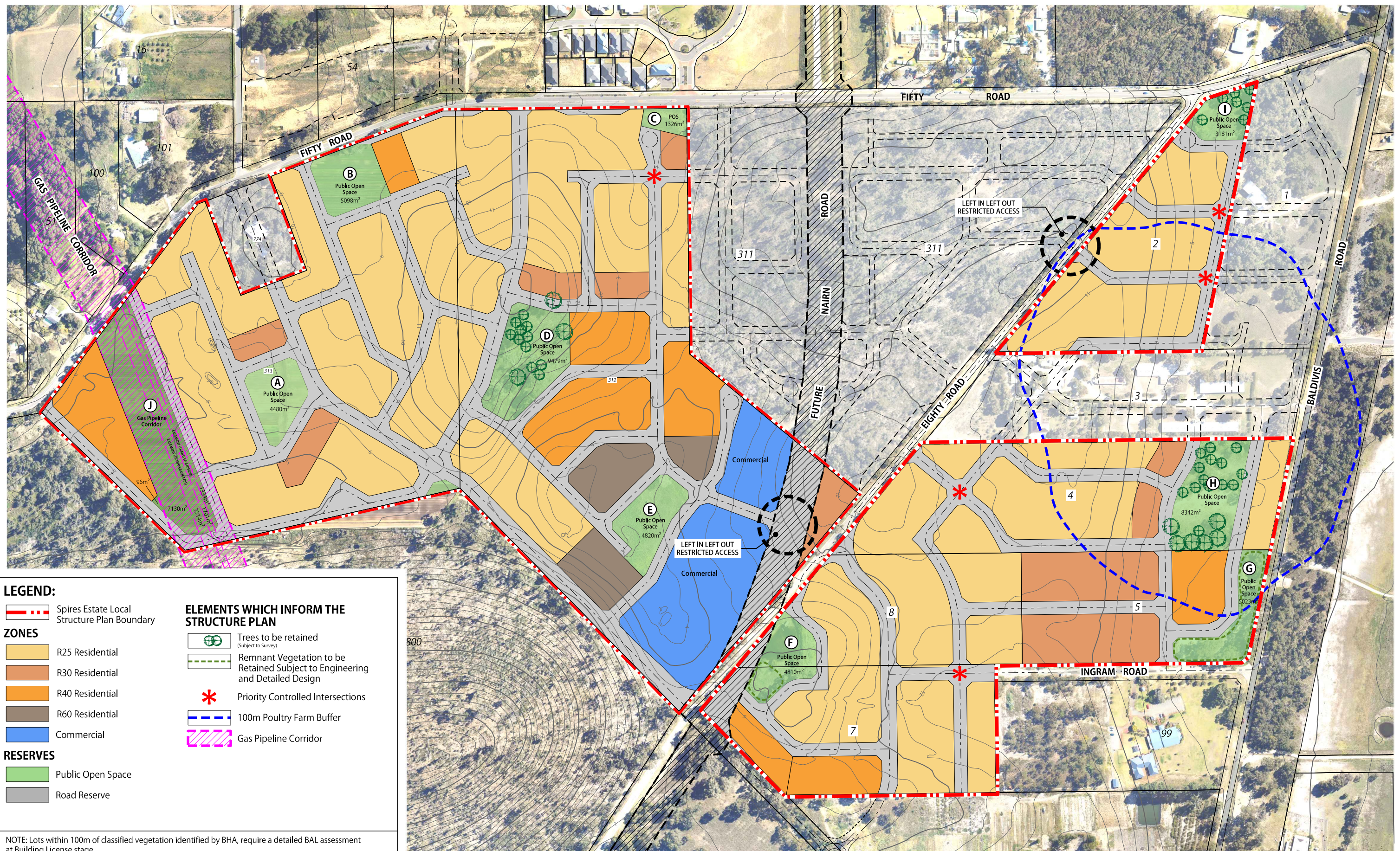


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**THIS REPORT IS DATED 1<sup>ST</sup> MAY 2014.**





**LEGEND:**

Spires Estate Local Structure Plan Boundary

**ZONES**

- R25 Residential
- R30 Residential
- R40 Residential
- R60 Residential
- Commercial

**RESERVES**

- Public Open Space
- Road Reserve

**ELEMENTS WHICH INFORM THE STRUCTURE PLAN**

- Trees to be retained (Subject to Survey)
- Remnant Vegetation to be Retained Subject to Engineering and Detailed Design
- Priority Controlled Intersections
- 100m Poultry Farm Buffer
- Gas Pipeline Corridor

NOTE: Lots within 100m of classified vegetation identified by BHA, require a detailed BAL assessment at Building License stage.

# PLAN 1 - Spires Estate Local Structure Plan

Various Lots Fifty and Eighty Road, BALDIVIS

for: Spatial Property Group



**NOTES:**

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Scale 1: 4000 @ A3 | 1:2000 @ A1  
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COMPILED: DPS	DRAWN BY: RF
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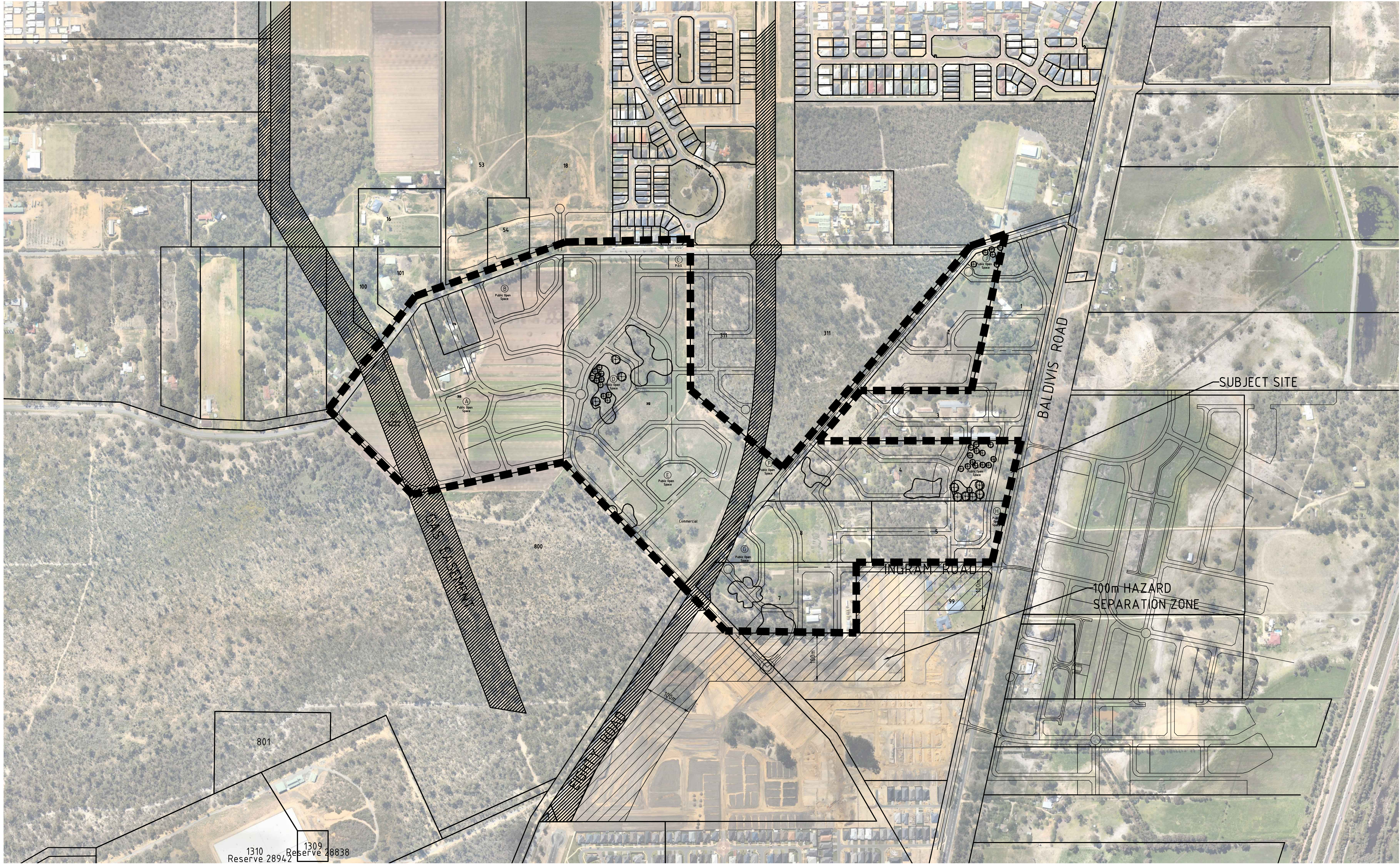


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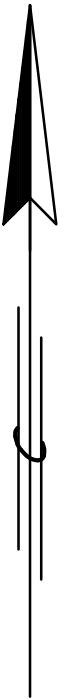






LEGEND

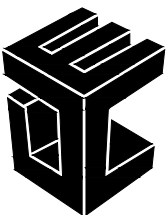
--- SITE BOUNDARY



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D	13/5/14	DPH LOTS 1 & 3 REMOVED FROM CATCHMENT BOUNDARY	SRA
C	1/5/12	JEG BUFFER ZONE ADDED	SRA
B	24/2/12	JEG UPDATED STRUCTURE PLAN	SRA
A	7/12/19	JEG ISSUED FOR APPROVAL	SRA
No.	DATE	BY	REVISION

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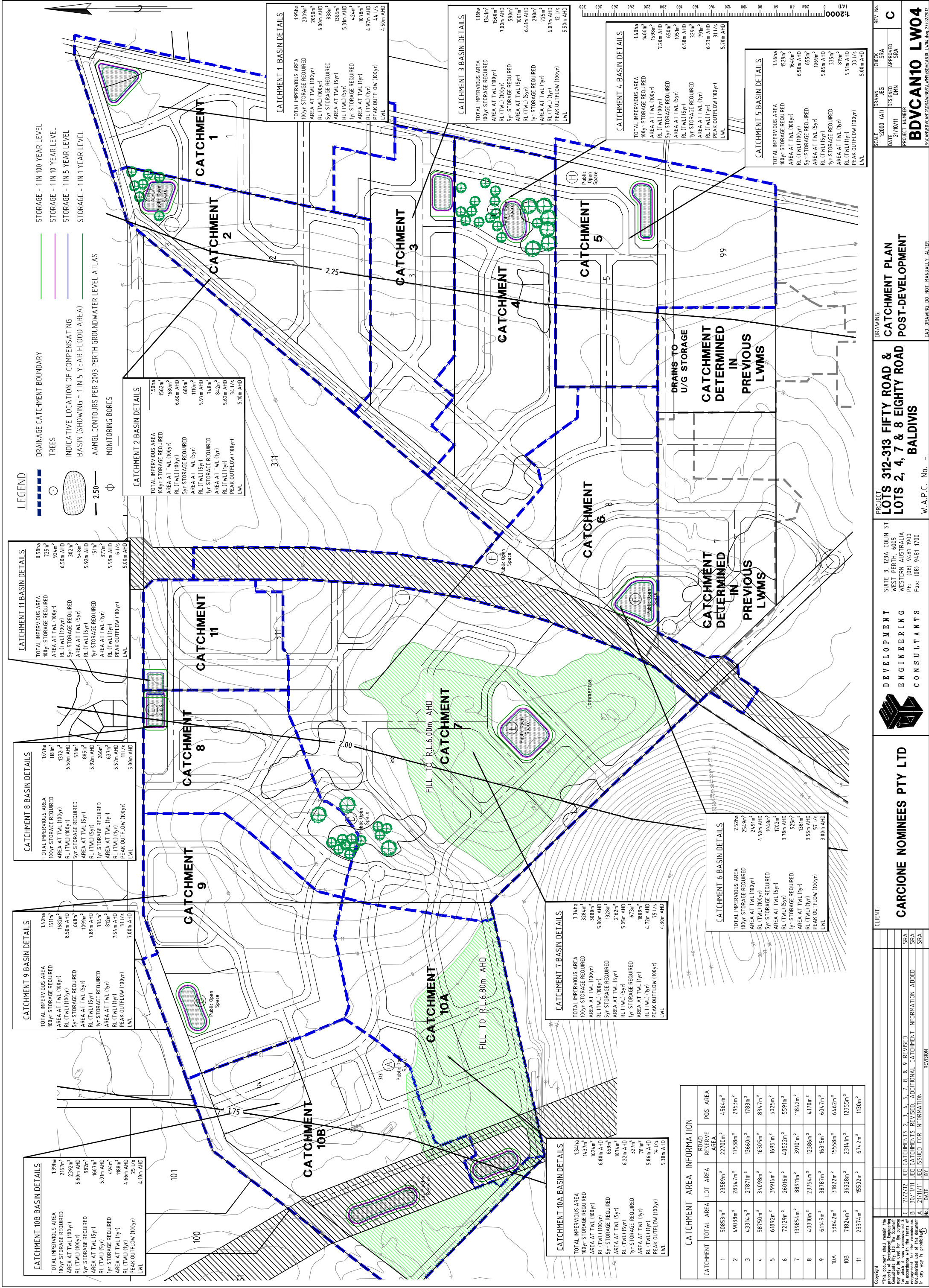
SUITE 3, 123A COLIN ST,  
WEST PERTH, 6005  
WESTERN AUSTRALIA  
Ph: (08) 9481 1900  
Fax: (08) 9481 1700

PROJECT:  
**LOT 400  
BALDIVIS ROAD  
BALDIVIS**  
W.A.P.C. No. -

DRAWING:  
**AERIAL PHOTO**  
CAD DRAWING DO NOT MANUALLY ALTER

SCALE 1:2500	DRAWN JEG	CHECK SRA	REV No. <b>D</b>
DATE 7/12/09	DESIGNED SRA	APPROVED SRA	
PROJECT NUMBER <b>BDVCAN01 LW02</b>			
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CATCHMENT AREA INFORMATION				
CATCHMENT	TOTAL AREA	LOT AREA	ROAD RESERVE AREA	POS AREA
1	50853m <sup>2</sup>	23589m <sup>2</sup>	22700m <sup>2</sup>	4564m <sup>2</sup>
2	49038m <sup>2</sup>	28547m <sup>2</sup>	17538m <sup>2</sup>	2953m <sup>2</sup>
3	43314m <sup>2</sup>	27817m <sup>2</sup>	13660m <sup>2</sup>	1783m <sup>2</sup>
4	58750m <sup>2</sup>	34098m <sup>2</sup>	16305m <sup>2</sup>	8347m <sup>2</sup>
5	68922m <sup>2</sup>	39916m <sup>2</sup>	16951m <sup>2</sup>	4953m <sup>2</sup>
6	72129m <sup>2</sup>	26016m <sup>2</sup>	45022m <sup>2</sup>	5591m <sup>2</sup>
7	139854m <sup>2</sup>	88911m <sup>2</sup>	3940m <sup>2</sup>	11842m <sup>2</sup>
8	40310m <sup>2</sup>	23754m <sup>2</sup>	12386m <sup>2</sup>	4170m <sup>2</sup>
9	61149m <sup>2</sup>	38187m <sup>2</sup>	16315m <sup>2</sup>	6047m <sup>2</sup>
10A	53842m <sup>2</sup>	31827m <sup>2</sup>	15558m <sup>2</sup>	6462m <sup>2</sup>
10B	71824m <sup>2</sup>	36338m <sup>2</sup>	23141m <sup>2</sup>	12355m <sup>2</sup>
11	223374m <sup>2</sup>	15502m <sup>2</sup>	6742m <sup>2</sup>	1130m <sup>2</sup>



