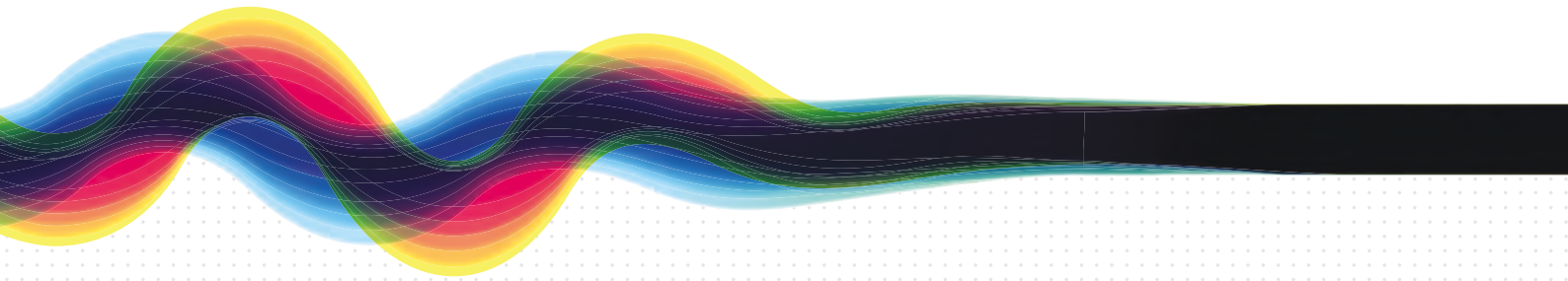


Lots 14, 15 and 299 Kerosene Lane Structure Plan

Amendment No. 4

June 2022 | 20-372



We would like to acknowledge the Kariyarra, Ngarla, and Nyamal people as the Traditional Custodians of the Town of Port Hedland lands. We recognise their strength and resilience and pay our respect to their Elders past and present.

Document ID: Graphics/2020/20-372 Baldivis, Kerosene Lane - Paradiso Estate/Report/Final/Structure Plan No.4/20-372 - Baldivis Kerosene Lane F1 210623.indd

Issue	Date	Status	Prepared by	Approved by
1	20.12.21	Final	Ella Compton	Justin Page
2	23.06.22	Final	Ella Compton	Justin Page

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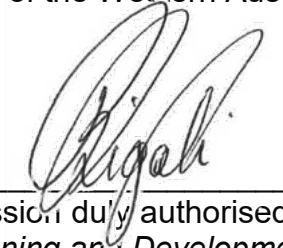
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IT IS CERTIFIED THAT AMENDMENT NO. 4 TO LOT 14, 15 AND 299
KEROSENE LAND STRUCTURE PLAN WAS APPROVED BY
RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING
COMMISSION ON: **6 JULY 2022**

Signed for and on behalf of the Western Australian Planning Commission

A handwritten signature in black ink, appearing to read 'Rigali', is written over a horizontal line. The signature is fluid and cursive.

an officer of the Commission duly authorised by the Commission pursuant
to Section 16 of *the Planning and Development Act 2005* for that purpose.

Table of Amendments to Structure Plan

Amendment No.	Description of Amendment	Amendment Type	Date Endorsed by WAPC
1	Modifications to Commercial zone, road reserve widths, road alignments and Residential – R60 density abutting Commercial zone.	Minor	N/A
2	Modifications to residential density codes, roads, public open space, gas pipeline setback and easement and inclusion of Residential Medium Density provisions as per WAPC Planning Bulletin 112/2015.	Minor	N/A
3	Modification to residential density down-coding R60 to R40.	Minor	Amendment No.3 was withdrawn.
4	Modification to residential density up-coding R20 to R25.	Minor	

Executive Summary

The Lots 14, 15 and 299 Kerosene Lane Structure Plan was originally endorsed by the Western Australian Planning Commission (WAPC) on 11 February 2011 for the Paradiso Estate residential subdivision and development. Since its inception the structure plan has undergone minor amendments in 2014 (Amendment No. 1) and 2015 (Amendment No. 2) that have been approved by the City of Rockingham, but not formally determined by WAPC. Notwithstanding, the structure plan (as amended) has been recognised by WAPC as the official structure plan to guide planning decision making and the various WAPC approved subdivisions for Paradiso Estate.

Amendment No. 4 of the structure plan proposes a change in residential density from the existing R20 code to an R25 code for the existing R20 southern area. The amendment also modifies the structure plan format to align with the current WAPC Structure Plan Framework.

The planning rationale for the residential density up-coding is provided in this report, essentially demonstrating the amendment will bring the structure plan density into conformity with contemporary planning expectations.

The following is a summary of the proposed structure plan.

Item	Data	Section number referenced within the Structure Plan Report
Total area covered by the Structure Plan	38.75 hectares	2.1
Area of each land use proposed		2.1
• Residential	18.91 hectares	
• Public Open Space and Drainage	3.539 hectares	
• Commercial	3.007 hectares	
• Public Purpose (Primary School)	3.554 hectares	
• Roads	9.740 hectares	
Total estimated lot yield	497	2.1
Estimated number of dwellings	497	2.1
Estimated residential density		2.1
• Per site hectare	26 dwellings per site hectare	
• Per gross urban hectare	13 dwellings per site hectare	
Estimated Population (average 2.8 people/household)	1391	2.1
Number of Primary Schools	1	2.1
Estimated area and percentage of public open space given over to:		2.3
• Local Parks	3.539 hectares (POS 11.2%)	

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Part One - Implementation

1. Structure Plan Area

This structure plan shall apply to the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map.

2. Operation

The date of the structure plan comes into effect is the date the structure plan is approved by the Western Australian Planning Commission as set out in the Structure Plan – Certification Page.

3. Staging

Approximately 65% of the structure plan area has now been developed, with the area on the eastern side of McDonald Road almost fully developed. Future staging will generally be from the south-west northward towards the north-west portion of the structure plan. The pace of future subdivision will be subject to market forces.

4. Subdivision and Development Requirements

4.1 Land Use and Permissibility

The structure plan outlines the Zones and Reserves applicable within the structure plan area and these will guide future subdivision and development of the land. Land use permissibility within the structure plan area shall generally be in accordance with the corresponding Zone and/or Reserve under the City of Rockingham Town Planning Scheme No. 2 (TPS 2).

4.2 Residential Density

Residential densities applicable to the Structure Plan area shall be those residential densities shown on the Structure Plan map.

4.3 Built Form (Residential R25 – R40)

The R-Codes variations specified in *Planning Bulletin 112: Medium-density single house development standards – Development Zones* and duplicated in the *City of Rockingham Local Planning Policy 3.3.22 Medium Density Single House Development Standards* are applicable to all land coded R25, R30 and R40.

4.4 Public Open Space

A minimum of 10% public open space in accordance with WAPC Liveable Neighbourhoods is required at the time of subdivision and/or development. The location for public open space is generally shown in the structure plan map. The final design of the public open space is subject to detailed subdivision design.

4.5 Notifications on Title

In respect of applications for the subdivision of land the local authority shall recommend to the WAPC that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) to advise of the following:

- i. Land or lots deemed to be affected by a Bush Fire Hazard.
- ii. Land or lots in proximity to gas pipeline.
- iii. Land or lots in proximity to extractive industry.

5. Local Development Plans

A Local Development Plan(s) is required to be prepared and implemented pursuant to the provisions of TPS 2 and the Planning & Development (Local Planning Schemes) Regulations 2015, for lots with the following site attributes:

- i. Lots with vehicular access from a rear laneway.
- ii. Lots with density code of R60.

6. Other Requirements

6.1 Developer Contributions

The land in the Structure Plan is within City of Rockingham Town Planning Scheme No. 2 Development Contribution Area No. 2. Developer contributions are applicable at the subdivision and/or development approval stage.

6.2 Conditions of Subdivision Approval

The following technical reports/strategies are to be prepared and submitted as a condition of subdivision approval (where applicable):

- Urban Water Management Plan
- Bushfire Management Plan
- Pipeline Risk Management Plan

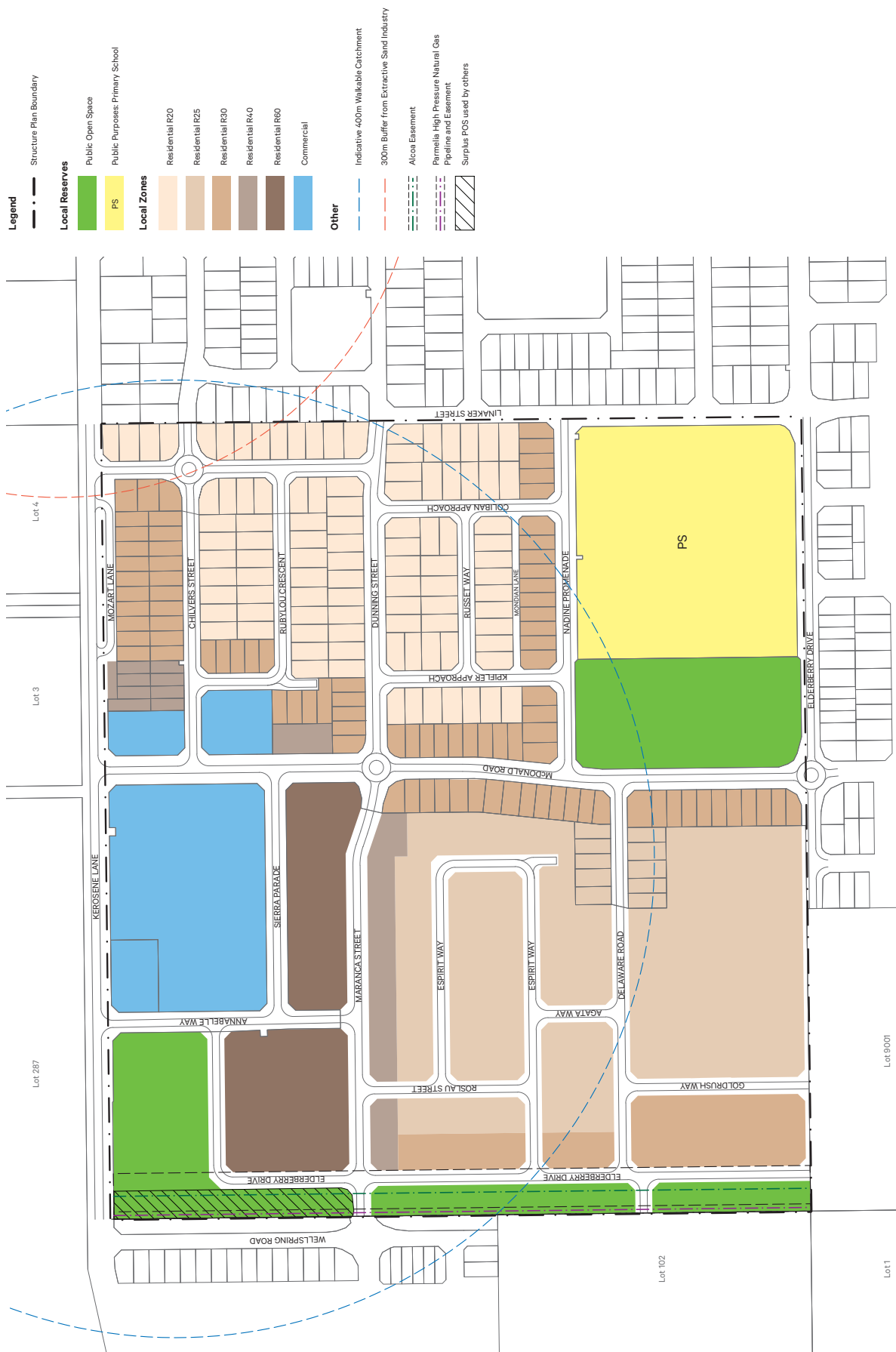


Figure 1 - Structure Plan

Part Two – Explanatory

1. Introduction

The *Lots 14, 15 and 299 Kerosene Lane Structure Plan* was originally endorsed by the Western Australian Planning Commission (WAPC) on 11 February 2011 for the Paradiso Estate residential subdivision and development. Since its inception the structure plan has undergone minor amendments in 2014 (Amendment No. 1) and 2015 (Amendment No. 2) that have been approved by the City of Rockingham, but not formally considered by WAPC. Amendment No. 3 proposed a down-coding of the R60 density to R40 density however has not progressed to endorsement.

Subdivision and development have occurred since 2011, with approximately 65% of the structure plan area now fully developed and/or under construction. This includes the Baldivis Spudshed Neighbourhood Centre adjacent to Kerosene Lane, which includes a local supermarket and pharmacy. This is in the context of the steadily increasing urbanisation of the northern portion of Baldivis.

The structure plan (as amended) has been recognised by WAPC as the official structure plan to guide planning decision making for the various WAPC approved subdivisions for Paradiso Estate.

Amendment No. 4 of the structure plan proposes a change in residential density from the existing R20 code to an R25 for the area west of the primary school site, in the south-east portion of the structure plan area (refer to plan in Appendix 1). The amendment also brings the now dated 2015 structure plan formatting into consistency with the current WAPC Structure Plan Framework.

Refer to Appendix 1 – Amendment Area (in context of current approved structure plan)

The structure plan (as amended) will continue to provide the primary statutory framework for determining future land uses, design and implementation of the desirable planning outcomes. These will inform the planning decision making for future subdivision and development approvals for Paradiso Estate.

1.1 Structure Plan Amendment No. 4

Amendment No. 4 proposes a minor structure plan modification to up-code the existing Residential – R20 density code to an R25 density code.

The low R20 density code is not desirable given a base density code of R25 now more accurately reflects target density and built form expectations under contemporary greenfield planning.

The amendment should be read in conjunction with the previously endorsed Lots 14, 15 and 299 Kerosene Lane Local Structure Plan and subsequent amendments approved by the City of Rockingham, being Amendment No. 1 (July 2014) and Amendment No. 2 (October 2015). The previously approved structure plan is contained in Appendix 2.

Refer to Appendix 2 – Lots 14, 15 & 299 Kerosene Lane Local Structure Plan (2015)

2. Amendment No. 4

2.1 Structure Plan Residential Densities and Yield

The current approved structure plan provides for approximately 543 dwellings under the existing density code range of R20 – R60. The R20 density in the southern area was provided for in the original structure plan approval in 2011. The R20 coding is no longer preferred, and this will be discussed further in this report under the planning justification for the proposed up-coding to R25.

The proposed residential density change from R20 to R25 is a subtle change that will not result in any material changes to the structure plan dwelling yield. The original approved structure plan identified an estimated dwelling yield of 543 dwellings for the 38.75 hectare structure plan area. This equates to a density of 17 dwellings per gross urban hectare. The structure plan dwelling yield will therefore remain unchanged with the upcoding to R25.

2.2 Proposed R25 density in lieu of R20 density

WAPC 156058 subdivision approval was granted by WAPC on 14 March 2018 for the southern portion of Paradiso Estate. WAPC 156058 creates 97 residential lots, roads and public open space. The proposed residential lots range in size from 333m² – 514m².

The current approved structure plan allocates an R20 density code to the WAPC 156058 subdivision lots. An R25 (and R30 coding) is typically the base coding now being applied to greenfield structure plans in urban development zones.

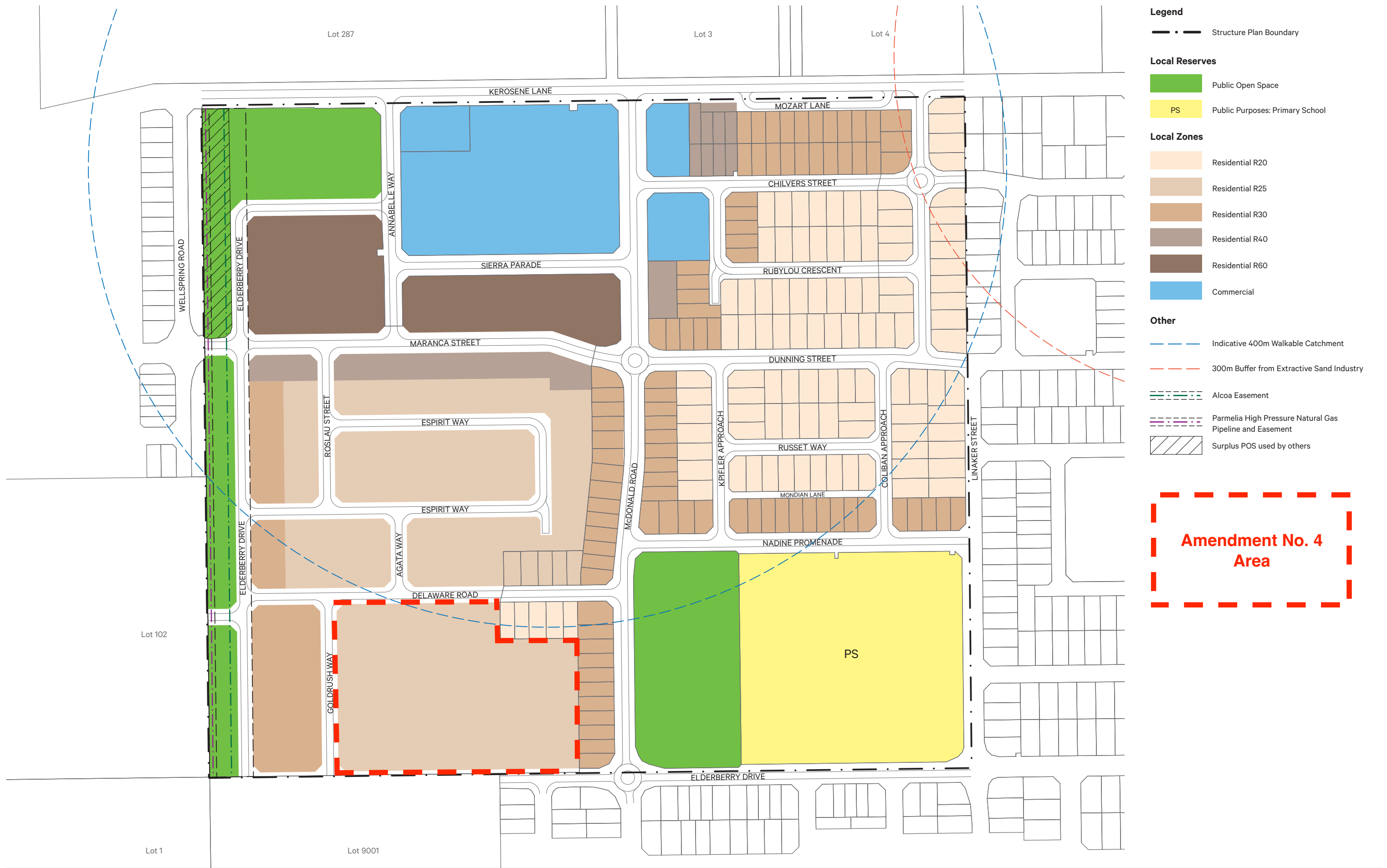
The RMD-R25 provisions (as provided for under Part One Clause 4.3) provides for an acceptable standard of residential development compatible with market expectations. The structure plan R20 coding (and default R20 provisions in the R-Codes) does not reflect current contemporary planning and market expectations. The R-Code R20 acceptable development provisions are often at odds with project home designs which are suited for the subdivision lots.

R25 is a preferred base density code and will provide prospective residents with greater flexibility for development. The upcoding will not result in any significant or material change to the original approved structure plan intent. There are no significant modifications required to transport planning as a result of the minor up-coding.

The amendment is standard and will not result in any adverse impact on the amenity of the area. The proposal is in keeping with proper and orderly planning so as to align the WAPC 156058 subdivision approval with the more appropriate R25 density code.

APPENDIX 1

Amendment Area



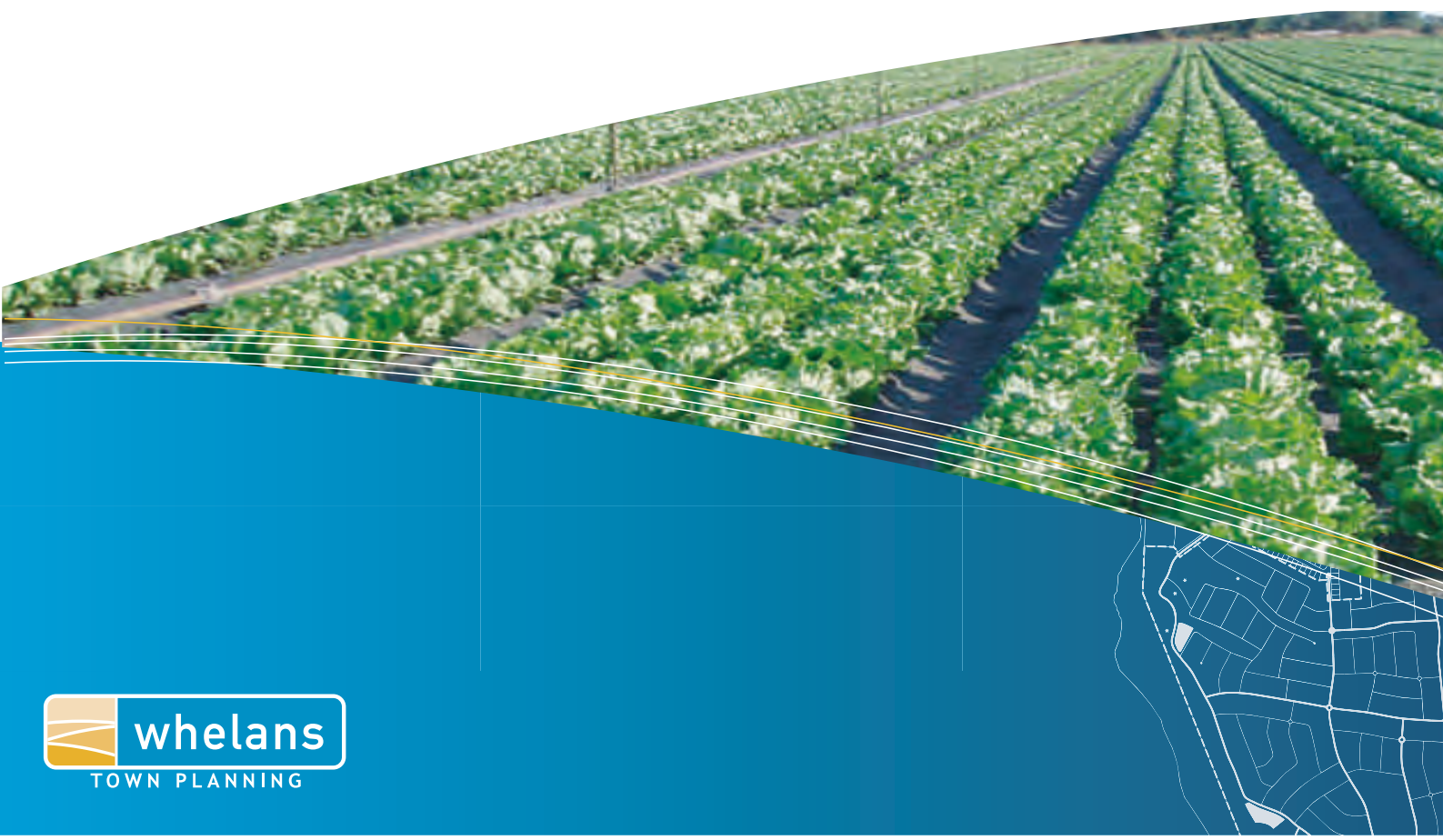
Area the subject of Amendment No. 4

Lots 14, 15 and 299 Kerosene Lane, Baldivis

APPENDIX 2

Lots 14, 15 and 299 Kerosene Lane Local Structure Plan (2015)

LOTS 14, 15 & 299 KEROSENE LANE, BALDIVIS LOCAL STRUCTURE PLAN



LOCAL STRUCTURE PLAN

LOTS 14, 15 & 299 KEROSENE LANE, BALDIVIS
CITY OF ROCKINGHAM

PREPARED FOR
GALATI NOMINEES PTY LTD

CERTIFICATION OF APPROVED STRUCTURE PLAN

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

.....Date

Signed for and on behalf of the Western Australian Planning Commission

.....

An officer of the Commission duly authorised by the Commission pursuant to section 24 of the *Planning and Development Act 2005* for that purpose, in the presence of:

.....Witness

.....Date

AND ADOPTED BY
RESOLUTION OF THE COUNCIL OF THE CITY OF ROCKINGHAM ON:

.....Date

.....

Director, Planning & Development Services
Signed under Delegated Authority for and on behalf of the Council of the City of Rockingham

This Structure Plan is prepared under the provisions of the City of Rockingham Town Planning Scheme No. 2.

TABLE OF CHANGES OR DEPARTURES FROM STRUCTURE PLAN

Change or Departure No.	Description of Change or Departure	Date Adopted by Council	Date Endorsed by the WAPC (if required)	Date Structure Plan commences operation
1	Modifications to 'Commercial' zone, road reserve widths, road alignments and 'Residential' (R60) abutting 'Commercial' zone.	01/07/2014	N/A	01/07/2014
2	Modifications including: - Increase the R60 site area adjacent to POS west of the Neighbourhood Centre; - Increase R-Code density of central area of original Lot 299 from 'R30' to 'R40'; - Minor change to the road, indicative lot layout and R-Code boundary between 'R25' & 'R40' areas; - Increase in R-Code density of central area of original Lot 299 from 'R20' to 'R25' and modification to indicative lot layout and local access road layout; - Reduction in road reserve width from 15.0m to 12.9m for sections of road reserve abutting the linear Public Open Space; - Amendments to Public Open Space table as a result of proposed amendments; - Modify 'Gas pipeline setback' from 65.0m to 32.0m; - Inclusion of Alcoa Gas pipeline easement; and - Inclusion of Residential Medium Density provisions as per WAPC Planning Bulletin 112/2015.	16/10/2015	N/A	19/10/2015

EXECUTIVE SUMMARY

This document provides for a variation to *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014*. The land the subject of this LSP is located within the Baldivis (North) District Structure Plan area. This Local Structure Plan (LSP) will provide the planning framework to guide and facilitate the development of approximately 38.75 hectares of land for urban purposes and has been prepared in accordance with the provisions of the City of Rockingham Town Planning Scheme No. 2.

The *Lots 14, 15 & 299 Kerosene Lane, Baldivis Local Structure Plan* was previously endorsed by the WA Planning Commission on 11 February 2011. Since 2011 a variation has been approved by the City of Rockingham to modify certain elements of the LSP, which were considered to be minor in nature. The variation resulted in the City's approval of *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014*.

The LSP forms part of a wider area that has undergone structure planning and is being developed as greenfield residential subdivision. The approved 2014 Local Structure Plan has enabled subdivision applications to be lodged for the subject land, with construction of lots completed and progressing to date.

This LSP document seeks a variation to the *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014* and should be read in conjunction with the previously WA Planning Commission endorsed *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2011* and subsequent *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014* approved by the City of Rockingham in July 2014.

Item	Data	Section number referenced within the Structure Plan Report
Gross Structure Plan Area	38.75 hectares	3.2
<u>Zones</u> Residential Commercial <u>Reserves</u> Public Purpose – Primary School Public Open Space	18.91 hectares (48.8% of site) 3.007 hectares (7.76 % of site) 3.554 hectares (9.17 % of site) 3.539 hectares (11.2 % of gross subdivisible area)	3.2
Estimated Lot Yield	543 lots	3.1
Estimated Number of Dwellings	543 dwellings	3.1

Estimated Residential Density - dwellings per gross hectare <i>As per Directions 2031</i> - dwellings per site hectare <i>As per Liveable Neighbourhoods</i>	17 dwellings per gross hectare 29 dwellings per site hectare	3.1
Estimated Population	1,520 people @ 2.8 people/household	3.1
Number of Secondary Schools	Nil	
Number of Primary Schools	1	3.2
Total amount of Public Open Space Amount of restricted Public Open Space as per Liveable Neighbourhoods - 1:5yr multiple use POS - Pipeline Easement (100% credit)	3.539 hectares (11.2%) 0.094 hectares (0.25% of total POS) 0.538 hectares (17% of total POS)	3.2
Composition of Public Open Space - District Parks - Neighbourhood Parks - Local Park	Nil Nil 3.539 hectares (11.2 % of site)	3.2

PART ONE (STATUTORY SECTION)

1.0 STRUCTURE PLAN AREA

This Structure Plan shall apply to Lots 14, 15 & 299 Kerosene Lane being the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map.

The Structure Plan (**Plan 1**) is identified as the *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan*.

2.0 STRUCTURE PLAN CONTENT

The Structure Plan comprises the following sections:

- (i) **Part One** – Statutory Section. This section includes the Structure Plan Map and any textual provisions, standards or requirements that require statutory effect.
- (ii) **Part Two** – Explanatory Section (Non-Statutory). This section provides the planning context and justification for the Structure Plan Map and the textual provisions contained in Part One of the Structure Plan. Part Two is to be used as a reference to guide interpretation and implementation of Part One.
- (iii) **Appendices** - Includes all specialist consultant reports and documentation used in the preparation of and to support the land use outcomes of the Structure Plan.

3.0 INTERPRETATION AND RELATIONSHIP WITH CITY OF ROCKINGHAM TOWN PLANNING SCHEME NO.2

3.1	Terms and Interpretations	Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the City of Rockingham Town Planning Scheme No. 2 ('Scheme') including any amendments gazetted thereto.
3.2	Relationship of the Structure Plan with City of Rockingham Town Planning Scheme No. 2	This Structure Plan has been prepared under Clause 4.2 of the Scheme as the subject land is zoned 'Development' and contained within Development Area No. 22 which is shown on the Scheme Map and contained within Schedule No. 9. The Structure Plan Map outlines the Zones and Reserves applicable within the Structure Plan Area. The Zones and Reserves designated under this Structure Plan apply to the land within it as if the Zones and Reserves were incorporated into the Scheme.

3.3	Provisions	Pursuant to Clause 4.2.9.4 of the Scheme, the provisions, standards or requirements specified under Part One of this Structure Plan shall have the same force and effect as if it were a provision, standard or requirement of the Scheme. In the case of any inconsistency between the Scheme and any provisions, standards or requirements specified under Part One of this Structure Plan, the Scheme prevails to the extent of any inconsistency.
3.4	Land Use Permissibility	Land use permissibility within the Structure Plan Area shall be in accordance with the corresponding Zone under the Scheme.

4.0 OPERATION

4.1	Operation Date	This Structure Plan commences operation on the date it is adopted by Council pursuant to Clause 4.2.6.15 of the Scheme.
4.2	Variation to Structure Plan	Clause 4.2.7 of the Scheme outlines the manner in which a change to or departure from a Structure Plan is determined.

5.0 LAND USE

5.1	Structure Plan Map	The subdivision and development of land is to generally be in accordance with the Structure Plan and any associated provisions contained in Schedule No.9.
5.2	Residential Density	Residential densities applicable to the Structure Plan Area shall be those residential densities shown on the Structure Plan Map.

6.0 SUBDIVISION / DEVELOPMENT

6.1	Notifications on Title	In respect of applications for the subdivision of land the City of Rockingham shall recommend to the Western Australian Planning Commission that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) to advise of the following: - 1. Land or lots in proximity to market garden operation. 2. Land or lots in proximity to gas pipeline. 3. Land or lots in proximity to extractive industry.
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6.2	(Local Development Plans	- Local Development Plans (LDP's) are required to be prepared and implemented pursuant to Clause 47(b) of the Deemed Provisions for lots with the following site attributes: - Lots with vehicular access from a rear laneway. - Lots zoned R60. - With respect to item (ii) above, the Local Development Plan is to stipulate that all garage access must be from a laneway or internal accessway, and not directly from a Primary or Secondary Street.
6.3	Variations to Residential Design Codes (R-Codes)	- Table 1 (Residential Medium Density Codes) sets out variations to the Residential Design Codes that are deemed to constitute 'deemed-to-comply' Development within the Structure Plan area and which do not therefore, require neighbour consultation and planning approval. - The provisions set out in Table 1 (Residential Medium Density Codes) act as a replacement to existing R-Codes standards for building and garage setbacks (Clauses 5.1.2, 5.1.3 and 5.2.1), open space (Clause 5.1.4), parking (Clause 5.3.3), visual privacy (Clause 5.4.1) and solar access (Clause 5.4.2). - All other R-Codes standards apply, where relevant to the proposal, including site area (Clause 5.1.1); building height (Clause 5.1.6); street surveillance, walls, fences and sightlines (Clauses 5.2.3 to 5.2.5); parking space design and vehicular access (Clauses 5.3.4 and 5.3.5); site works, retaining walls and stormwater management (Clauses 5.3.7 to 5.3.9); and outbuildings, external fixtures and utilities and facilities (Clauses 5.4.3 to 5.4.5). - Residential Medium Density Code numbers shown on Plan 1 shall correspond with the associated RMD Code number within Part One - Table 1.

7.0 OTHER REQUIREMENTS

7.1	Other land use, development and subdivision requirements	Pipeline Management Plan Requirements as per <i>Lots 14, 15 and 299 Kerosene Lane Baldivis AS2885 Pipeline Protection Plan (A10526-PSO-RX-001 Rev 0)</i>.
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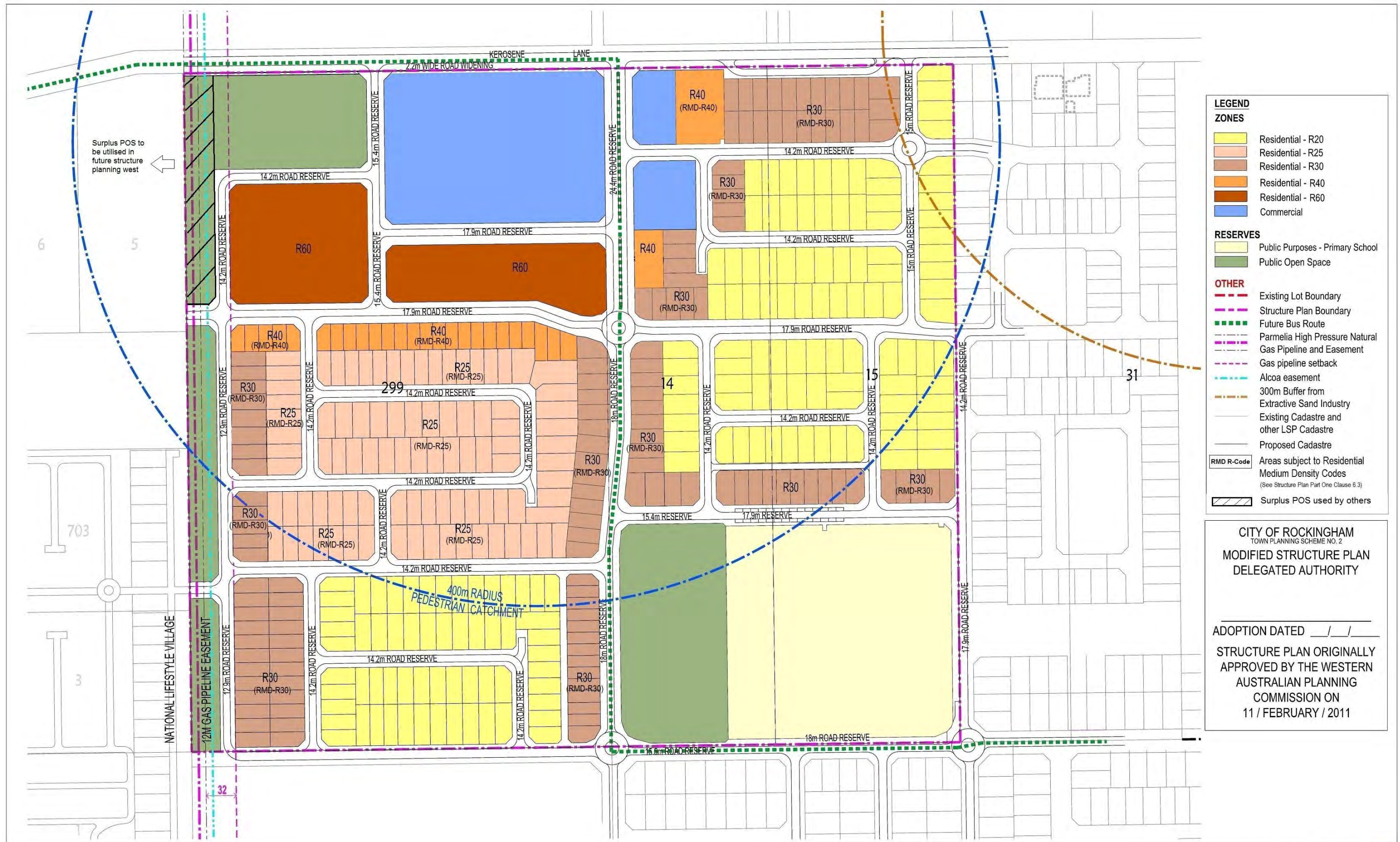


TABLE 1. Single House (R-MD) standards for medium-density housing in structure plan areas

RMD	Street Setback & Front Fences	Lot Boundary Setback	Open Space	Garage setback and width and vehicular access	Parking	Overshadowing	Visual Privacy
RMD –R40	- Primary street setback shall be a minimum 2.0m with no averaging and minimum 1.5m to porch/veranda with no maximum length. - Secondary street setback shall be a minimum 1.0m. - Front fences within the primary street setback area shall be a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence.	<u>Boundary Setbacks</u> - Boundary setback minimum 1.2m for wall height 3.5m or less with major openings. - Boundary setback minimum 1.0m for wall height 3.5m or less without major openings. <u>Boundary Walls</u> - Boundary walls are permitted to both side boundaries subject to (i) no maximum length to one side boundary and (ii) two thirds maximum length to second side boundary for wall height 3.5m or less.	- An outdoor living area (OLA) with an area of 10% of the lot size or 20m², whichever is greater, directly accessible from a habitable room of the dwelling and located behind the street setback area. - At least 70% of the OLA must be uncovered and includes areas under eaves which adjoin uncovered areas. - The OLA has a minimum 3.0m length or width dimension. - Apart from the above, no other R-Code site cover standards apply.	- For rear loaded (laneway) lots the minimum setback shall be 0.5m garage setback to laneway. - Primary street setback minimum 4.5m, which may be reduced to 4.0m where an existing or planned footpath or shared path is located more than 0.5m from the street boundary. - For lots with frontage 10.5m or greater, a double garage is permitted to a maximum width of 6.0m as viewed from the street subject to: - garage setback a minimum of 0.5m behind the building alignment; - a major opening to a habitable room directly facing the primary street; - an entry feature consisting of a porch or veranda with a minimum depth of 1.2m; and - no vehicular crossover wider than 4.5m where it meets the street. - Secondary street setback minimum 1.5m. - Lots with a frontage less than 10.5m or not compliant with the above require single or tandem garaging.	As per R-Codes.	- No maximum overshadowing for wall height 3.5m or less. - No maximum overshadowing for wall height greater than 3.5m where overshadowing is confined to the front half of the lot. If overshadowing intrudes into rear half of the lot, shadow cast shall not exceed 35%.	R-Code Clause 5.4.1 (C1.1) applies; however the setback distance is reduced to 3.0m to bedrooms and studies, 4.5m to major openings to habitable rooms other than bedrooms and studies and 6.0m to unenclosed outdoor active habitable spaces.

TABLE 1. Single House (R-MD) standards for medium-density housing in structure plan areas

RMD	Street Setback & Front Fences	Lot Boundary Setback	Open Space	Garage setback and width and vehicular access	Parking	Overshadowing	Visual Privacy
RMD-R30	- Primary street setback shall be a minimum 2.0m with no averaging and minimum 1.5m to porch/veranda with 800 maximum length. - Secondary street setback shall be a minimum 1.0m. - Front fences within the primary street setback area shall be a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence.	<u>Boundary Setbacks</u> - Boundary setback minimum 1.2m for wall height 3.5m or less with major openings. - Boundary setback minimum 1.0m for wall height 3.5m or less without major openings. <u>Boundary Walls</u> - Boundary walls are permitted to both side boundaries subject to (i) two thirds maximum length to one side boundary and (ii) one third maximum length to second side boundary for wall height 3.5m or less.	- An outdoor living area (OLA) with an area of 10% of the lot size or 20m², whichever is greater, directly accessible from a habitable room of the dwelling and located behind the street setback area. - At least 70% of the OLA must be uncovered and includes areas under eaves which adjoin uncovered areas. - The OLA has a minimum 3.0m length or width dimension. - Apart from the above, no other R-Code site cover standards apply.	- For rear loaded (laneway) lots the minimum setback shall be 0.5m garage setback to laneway. - Primary street setback minimum 4.5m, which may be reduced to 4.0m where an existing or planned footpath or shared path is located more than 0.5m from the street boundary. - For lots with frontage 10.5m or greater, a double garage is permitted to a maximum width of 6.0m as viewed from the street subject to: - garage setback a minimum of 0.5m behind the building alignment; - a major opening to a habitable room directly facing the primary street; - an entry feature consisting of a porch or veranda with a minimum depth of 1.2m; and 800 vehicular crossover wider than 4.5m where it meets the street. - Secondary street setback minimum 1.5m. - Lots with a frontage less than 10.5m or not compliant with the above require single or tandem garaging.	As per R-Codes.	- No maximum overshadowing for wall height 3.5m or less. - No maximum overshadowing for wall height greater than 3.5m where overshadowing is confined to the front half of the lot. If overshadowing intrudes into rear half of the lot, shadow cast shall not exceed 35%.	R-Code Clause 5.4.1 (C1.1) applies, however the setback distance is reduced to 3.0m to bedrooms and studies, 4.5m to major openings to habitable rooms other than bedrooms and studies and 6.0m to unenclosed outdoor active habitable spaces.

TABLE 1. Single House (R-MD) standards for medium-density housing in structure plan areas

RMD	Street Setback & Front Fences	Lot Boundary Setback	Open Space	Garage setback and width and vehicular access	Parking	Overshadowing	Visual Privacy
RMD –R25	- Primary street setback shall be a minimum 3.0m and minimum 1.5m to porch/veranda with no maximum length. - Secondary street setback shall be a minimum 1.5m. - Front fences within the primary street setback area shall be a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence.	<u>Boundary Setbacks</u> - Boundary setback minimum 1.2m for wall height 3.5m or less with major openings. - Boundary setback minimum 1.0m for wall height 3.5m or less without major openings. <u>Boundary Walls</u> - Boundary walls are permitted to both side boundaries subject to (i) two thirds maximum length to one side boundary and (ii) one third maximum length to second side boundary for wall height 3.5m or less.	- An outdoor living area (OLA) with an area of 10% of the lot size or 20m², whichever is greater, directly accessible from a habitable room of the dwelling and located behind the street setback area. - At least 70% of the OLA must be uncovered and includes areas under eaves which adjoin uncovered areas. - The OLA has a minimum 3.0m length or width dimension. - Apart from the above, no other R-Code site cover standards apply.	- For rear loaded (laneway) lots the minimum setback shall be 0.5m garage setback to laneway. - Primary street setback minimum 4.5m, which may be reduced to 4.0m where an existing or planned footpath or shared path is located more than 0.5m from the street boundary. - For lots with frontage 10.5m or greater, a double garage is permitted to a maximum width of 6.0m as viewed from the street subject to: - garage setback a minimum of 0.5m behind the building alignment; - a major opening to a habitable room directly facing the primary street; - an entry feature consisting of a porch or veranda with a minimum depth of 1.2m; and - any vehicular crossover wider than 4.5m where it meets the street. - Secondary street setback minimum 1.5m. - Lots with a frontage less than 10.5m or not compliant with the above require single or tandem garaging.	As per R-Codes.	- No maximum overshadowing for wall height 3.5m or less. - No maximum overshadowing for wall height greater than 3.5m where overshadowing is confined to the front half of the lot. If overshadowing intrudes into rear half of the lot, shadow cast shall not exceed 25%.	R-Code Clause 5.4.1 (C1.1) applies, however the setback distance is reduced to 3.0m to bedrooms and studies, 4.5m to major openings to habitable rooms other than bedrooms and studies and 6.0m to unenclosed outdoor active habitable spaces.

PART TWO (EXPLANATORY SECTION)

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TECHNICAL APPENDICES INDEX

Appendix No.	Document Title	Approval Required or Supporting Document only	Approval Status	Approval Agency
1	Lots 14, 15 & 299 Kerosene Lane Local Structure Plan (Planning Solutions, 2014)	Supporting Document	N/A	N/A

PART TWO (EXPLANATORY SECTION)

1.0 INTRODUCTION

1.1 *Lots 14, 15 & 299 Kerosene Lane LSP 2011 & 2014*

The *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2011* report and subsequent *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014* variation documentation (contained in **Appendix 1**) should be read in conjunction with this Part Two (Explanatory Section).

The following sections provide supplementary updates, details and justification for the proposed variations to the *Lots 14, 15 & 299 Kerosene Lane Local Structure Plan 2014 (2014 LSP)*.

2.0 LOCAL STRUCTURE PLAN VARIATIONS

2.1 Proposed Variations to 2014 LSP

Table 2. outlines the proposed variations to the WAPC endorsed 2014 Lots 14, 15 & 299 Kerosene Lane Local Structure Plan.

Table 2. Proposed Variations to LSP

Proposed LSP minor amendment item	Justification/Rationale
Increase in R60 site abutting POS west of Commercial and modified road layout.	An updated POS schedule (see Section 3.2 of this report) has been provided for the LSP based on City's approved Urban Water Management Plan for approved subdivision within the LSP. The updated POS schedule indicates that a substantial surplus of POS was being provided for in the approved 2014 LSP (approximately 14.65%). As such, it is considered that adjustments can be made to reduce the original area of POS in the 2014 LSP, without compromising the required minimum 10% POS contribution. The most logical reduction of POS and extension of the residential footprint is in the NW portion of the LSP. However, the POS can only be reduced insofar as the necessary land requirements to accommodate future drainage infrastructure and to satisfy the 10% POS requirement. The proposed amended LSP provides for an increase in the R60 development site in the NW portion of the LSP. The proposed R60 site is strategically located opposite the proposed commercial <i>Spudshed Neighbourhood Centre</i>¹. This is a major activity node and the R60 density will provide opportunity for higher density residential development to capitalise on the proximity to the centre and POS amenities. This could include multiple dwelling development or other forms of higher density residential accommodation. It is therefore a more efficient use of land to increase, wherever possible, R60 development area at this location. This is consistent with the principles of <i>Liveable Neighbourhoods</i>, which encourages higher density residential development abutting or within 400m of an activity centre. The reduction in road reserve width from 15.0m to 14.2m is justifiable given that there would only be development on one side of the road (i.e. POS on the western side). Accordingly, the width of verge can be reduced on the POS side of the proposed road reserve.

	The road reserve is also located within the gas pipeline setback area (not the easement area) in order to maximise the area available for residential development. The 14.2m wide road reserve would be sufficient to provide for on-street parking embayments on both sides of the road pavement, with parallel on-street parking bays to be a minimum 2.3m wide with 2.0m pathway on the residential development side of the road. These modifications are considered to be minor for the LSP amendment as (i) the proposal does not reduce the LSP overall public open space contribution area below the required 10% POS and (ii) the modification to the road layout does not significantly alter the intent of the original approved LSP road network & hierarchy. ¹ Refer to City's DA Ref: 20.2014.546.1/AD14/182078
Increase in R-Code density of central area of Lot 299 from R30 to R40, modification to indicative road and lot layout and R-Code boundary between R25 & R40 areas.	Liveable Neighbourhoods (LN) promotes a variety of lot sizes and types to facilitate housing diversity and choice to meet the projected requirements of people with different housing needs. Consistent with LN, smaller lots and lots capable of supporting higher density are proposed to be located close to the <i>Spudshed Neighbourhood Centre</i> and adjacent to high amenity areas, such as POS. The R40 density also provides a transition between the R60 and proposed R25 and R30 residential areas. It should also be noted that the proposed R40 density boundary has been modified [by reducing depths of lots facing opposite R60 site] to increase the central area of the proposed R25 density. The modification to the residential density within the LSP is considered to constitute a minor variation to the approved 2014 LSP as the up-coding from R30 to R40 is within the [medium density band] of the R-Codes and the proposed dwelling yield is comparable. That is, the proposed amendment to is not an up-coding from a low density band to a medium density band. To provide for a high quality streetscape, a Local Development Plan is intended to be provided for the R60 sites, which will address builtform aspects including setbacks, development orientation, vehicular access, visitor parking and landscaping for streetscape.
Increase in R-Code density of central area of Lot 299 from R20 to R25 and modification to indicative lot layout and local access road layout.	Similar to the reasoning above, the proposed up-coding from R20 to R25 is considered to be still within the low residential density band of the R-Codes and is not an up-coding from a low density band to a medium density band.

	The indicative lot layout under the approved 2014 LSP shows an estimated (85) lots at R20 density. The proposed amended LSP shows indicatively (91) lots at R25 density. The later design is based on preliminary engineering design, whereas the current [R20] indicative design is conceptual only. The potential up-coding would allow opportunity for smaller lot sizes in 400m proximity to the commercial centre. The proposed modification to the road layout is a result of preliminary engineering design for future staging of subdivision. The modified layout allows for more efficient subdivision design. Ordinarily approved LSPs are not required to 'lock in' the local access road network, which can be determined at the subdivision approval.
Reduction in road reserve width from 15.0m to 12.9m for sections of road abutting POS linear parkway.	The reduction in road reserve width from 15.0m to 12.9m is justifiable given that there would only be development on one side of the road, with POS proposed on the western side. Accordingly, the width of verge can be reduced on the POS side of the proposed road reserve. The road reserve is also located within the gas pipeline setback area (not the easement area) in order to maximise the area available for residential development. The 2.1m strip of road reserve has been incorporated into the north-south POS linear parkway area. This has provided for a minor increase in overall POS area as set out in Attachment 1 POS Schedule. The proposed reduction in road reserve width will retain the 'local access road' function and therefore will not materially depart from the intent of the approved 2014 LSP. It is considered a minor variation to the approved LSP. In addition, the provision of parking bays abutting the roads can be provided for within the proposed POS area as a surplus of POS is being provided. The location of parking bays within the POS area, to service the POS, will not result in the nett provision of POS being less than the minimum 10% POS requirement.
Deletion of roundabout notation for four-way intersection abutting R60 site.	It is considered that a roundabout is not required at this location. A low volume of [local only] traffic is expected from the proposed (one-development-sided) road abutting the POS and R60 site. The intersection should be constructed as an adjunct 3-way with three directions being clear and the northern leg road being treated more as a minor access road with a raised entry. This type of 4-way road intersection treatment has been successfully used in the nearby Baldivis North development, with both sides being raised, however in this instance, only the northern leg is considered for raising. The details of the intersection treatment would be worked through in consultation with the City of Rockingham at subdivision stage.

Adjustments to Public Open Space as a result of proposed amendments.	As stated above, an updated POS Schedule is provided which demonstrates that the proposed amended LSP does not materially depart from the approved 2014 LSP. Approximately 11.2% POS (surplus approximately 3,820m ²) is provided under the proposed amended LSP, which satisfies the minimum 10% POS requirement.
Modify 'Gas pipeline setback' from 65.0m to 32.0m.	It is unclear as to where the 65.0m gas pipeline setback is derived. Consultation with APA Group (Parmelia Gas Pipeline Operator) indicates that a minimum 32.0m setback to sensitive development is required. This is shown in the proposed amended LSP, with the 65.0m setback requirement removed to avoid any confusion.
Inclusion of Alcoa Gas pipeline easement	There is a 6m wide Alcoa gas pipeline easement which is registered on the Lot 299 title which should be notated on the LSP map.
Inclusion of Residential Medium Density provisions as per WAPC Planning Bulletin 112/2015	Consultation with Department of Planning indicates that the inclusion of the RMD standards can be done as an amendment to an approved LSP. Accordingly as part of the LSP amendments, the Proponent requests the inclusion of RMD codes as shown in the LSP Plan 1. Areas which already have an approved DAP (i.e. R30 laneway lots opposite the primary school) are not proposed to be included in the RMD amendment.

3.0 LOCAL STRUCTURE PLAN UPDATES

3.1 Residential Densities and Yield

As a result of the above proposed variations to the 2014 LSP, the proposed LSP ultimately provides for approximately 543 dwellings with a density coding ranging from R20, R25, R30, R40 & R60. Proposed development as provided by the LSP could accommodate up to approximately 1,520 people based on an average household of 2.8 persons.

The proposed R20 to R60 densities provide opportunity for low and medium density lot sizes and housing types, responsive to the site's location. In particular, medium density housing has been located to take advantage of and overlook public open space and proximity to commercial land use. The R60 density for the two large lots opposite the 'Commercial' zone provides for opportunity to develop Grouped Dwelling or Multiple Dwelling developments on these lots.

Table 2 provides development statistics which can be used to measure the performance of the LSP and conceptual subdivision design against the key target outcomes of *Directions 2031* and *Liveable Neighbourhoods*.

Table 2 Estimated Development Outcomes for LSP

	Site Outcomes	Target Density
Total LSP Landholdings Area	38.75 hectares	-
Area set aside for roads, drainage & POS	13.29 hectares	-
Area set aside for Non-Residential Land Uses		
- Commercial	3.00 hectares	
- Primary School	3.55 hectares	
Balance area for residential development	18.91 hectares	-
Estimate ultimate number of dwellings	543 dwellings ³	-

Estimated number dwellings per <i>site hectare</i> ¹	29 dwellings/ha	Liveable Neighbourhoods 12 – 20 dwellings per site hectare for standard lot layouts 20 – 30 dwellings per site hectare for lots within proximity to activity centres
LSP target density per <i>gross urban hectare</i> ²	17 dwellings/gross ha	Directions 2031 15 dwellings per gross urban hectare

Notes for Table 2

- ¹ Liveable Neighbourhoods definition of *site hectare* is the area available for residential development excluding roads, non-residential uses, public open space and drainage areas.
- ² Directions 2031 definition of *gross urban hectare* is the gross area available for urban development
- ³ This includes the R60 grouped housing sites.

The LSP delivers approximately 543 dwellings per *site hectare*, which exceeds the Liveable Neighbourhoods density expectations for the site's locational context with regard to activity centres and major transport networks. Similarly, the LSP delivers approximately 17 dwellings per gross urban hectare, which exceeds the target density of 15 dwellings per gross urban hectare under Directions 2031.

3.2 Public Open Space Schedule

The following updated POS schedule is based on *DEC Urban Water Management Strategy, 2015*.

LSP Site Area			
Lot 14	8.24 ha		
Lot 15 (currently Lot 9010)	9.32 ha		
Lot 299	21.19 ha		38.75 ha
Deductions (LN Element 4 – R43)			
Primary School	3.554 ha		
Neighbourhood Centre (Retail/Commercial)	3.007 ha		
Dedicated drainage reserve			
DS No. 1 (1:1yr site area basin)	0.081ha		
DS No. 2 (1:1yr site area basin)	0.096 ha		
DS No. 3 (1:1yr site area basin)	0.321 ha		
Pipeline easement (surplus >20% max. restricted use POS)	0.119 ha		7.178 ha
Gross Subdivisible area (GSA)			31.572 ha
Public open space @ 10 per cent required			3.157 ha
Public open space contribution			
May comprise:			
- minimum 80 per cent unrestricted POS	2.525 ha		
- Maximum 20 per cent restricted use POS	0.632 ha		3.157 ha
Unrestricted POS area (Non-Drainage Areas > 5yr ARI) (Parmelia Pipeline Buffer)²			
Local Parks			
Shared Local Park & Primary School Oval (LP No. 1)	1.491 ha		
Balance Lot 299 north-west park outside gas pipeline buffer (LP No. 2)	0.542 ha		
Increase to balance Lot 299 (NW POS)			
Pipeline easement buffer parkway - PW No. 1	0.050ha		
Pipeline easement buffer parkway - PW No. 2	0.170 ha		
Pipeline easement buffer parkway – PW No. 3	0.290 ha		
	0.364 ha	2.907ha	2.907ha
Restricted use POS area (Parmelia Pipeline Easement)²			
Pipeline Easement Parkway²			
Pipeline easement parkway - PW No. 1	0.158 ha		
Pipeline easement parkway - PW No. 2	0.260 ha		
Pipeline easement parkway – PW No. 3	0.239 ha	0.657 ha	
1:5 yr ARI drainage swales			
Turf/Landscaped Drainage Swale (DS No. 1)	0.024 ha		
Turf/Landscaped Drainage Swale (DS No. 2)	0.027 ha		
Turf/Landscaped Drainage Swale (DS No. 3)	0.043 ha	0.094 ha	

Sub-Total Restricted Use POS			0.751 ha
Surplus Restricted Use POS (0.751 ha - 0.632 ha)			- 0.119 ha
Total Restricted Use POS (max. 20% allowance)			0.632 ha
Public open space provision provided	(11.2%) 3.539 ha¹		

Notes

- 1) **Surplus of approximately 3,820m² of POS.** Final POS calculations will be subject to detailed survey and approved Urban Water Management Plan. A minimum of 10% POS land contribution to be provided at Survey Deposited Plan final approval stage.
- 2) WAPC requires that the POS Schedule show the pipeline easement as restricted POS (100% credit) and the pipeline buffer as unrestricted POS (100% credit)

3.3 Public Open Space Surplus

A surplus of approximately 3,820m² of POS has been identified. The final POS calculations will be subject to detailed survey and approved Urban Water Management Plan for future stages of subdivision within the western part of the LSP. A minimum of 10% POS land contribution to be provided at final approval stage.

Discussions have been held between the Proponent and the neighbouring landowners (Lots 5 – 8 Kerosene Lane) to the west of the Parmelia Gas Pipeline. It is considered that the landowners to the west can utilise surplus POS within future structure planning of the neighbouring land to the west of the LSP subject land. This would be subject to separate structure planning by the landowner/s to the west and approval of the City of Rockingham and WA Planning Commission.

APPENDIX 1

LOTS 14, 15 & 299 KEROSENE LANE LOCAL STRUCTURE PLAN

PROPOSED LOCAL STRUCTURE PLAN

LOTS 14, 15 & 299 KEROSENE LANE, BALDIVIS

Job No: 1391

Date: JULY 2010

Job No: 1391

Date: July 2010

**PROPOSED LOCAL STRUCTURE PLAN
LOTS 14, 15 & 299 KEROSENE LANE, BALDIVIS**

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Direct all inquiries to:

PLANNING SOLUTIONS (AUST) PTY LTD
Suite 1, 255 Beaufort Street
PERTH WA 6849

ALL CORRESPONDENCE TO:
PO Box 8701
PERTH BC WA 6849

Phone: 08 9227 7970
Fax: 08 9227 7971
E-mail: admin@planningsolutions.com.au
Web: www.planningsolutions.com.au

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 Appendix 5: Environmental Assessment Report
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 Appendix 8: Local Water Management Strategy (revised)
 Appendix 9: Environmental Preliminary Site Investigation
 Appendix 10: Parmelia Gas Pipeline Risk Assessment and Protection Plan

1.0 INTRODUCTION

The following report has been prepared by Planning Solutions, on behalf of Galati Nominees and A and VP Galati, the registered proprietors of Lots 14, 15 and 299 Kerosene Lane, Baldvis (herein referred to as the 'subject site'), in support of the proposed Local Structure Plan (LSP) for the subject site.

The subject site is contained within the Baldvis (North) District Structure Plan area (herein referred to as the BNDSP), which encompasses a total of approximately 422.14 hectares of land, bounded to the north and east by Kerosene Lane and Baldvis Road respectively.

The BNDSP was approved by the City of Rockingham in 2000 and sets the principal framework for the development of the area in a coordinated and integrated manner.

The BNDSP comprises of three precincts. Precincts one and two are either side of the 'Other Regional Road' reservation (extension of Eighty Road), with precinct three south of Ingram Road. The subject site falls within precinct two which has an area of approximately 184.75 hectares.

The BNDSP identifies a Neighbourhood Centre of maximum 5,500m² net leasable area and a Community Purposes site which is predominately within precinct two and partially within precinct one.

It is intended that portion of the site which currently accommodates the existing 'Spud Shed' commercial premises be redeveloped as a 2500m² retail NLA 'main street' local centre accommodating commercial (including retail) and complimentary community services. The proposed local centre is also to be supported by three (3) proposed, and surrounding 'Mixed Use – R60' sites.

The City of Rockingham has advised that the proposed 'Commercial' local centre and 'Mixed Use' sites proposed under the LSP will be progressed through separate Amendment to the City's Town Planning Scheme No.2 (TPS2), via Amendment No. 105.

It is considered Lots 14, 15 and 299, specifically the existing commercial premises, represent the ideal location for the future provision of a 'local centre' servicing all lots within the Structure Plan and future Light Industrial uses immediately to the north of Kerosene Lane.

The proposed LSP is entirely consistent with relevant statutory and strategic planning documents and represents an opportunity to 'fast track' the establishment of a local centre in this locality.

Accordingly, the following report shall provide detail regarding background investigation and justification for the LSP for the subject site, including the provision of a local centre.

This report and supporting technical reports have been revised to address the various matters contained within Council's resolution to adopt the proposed LSP, for the purposes of public advertising, at its meeting on 25 May 2010.

The City of Rockingham is therefore requested to initiate and subsequently grant final approval to the LSP for the subject site, Amendment to TPS2 to facilitate the implementation of proposed local centre and mixed use sites and also minor amendment to its Local Commercial Strategy to allocate 2500m² retail NLA floor space to the proposed local centre under the LSP.

2.0 SITE DETAILS

2.1 Legal Description

Table 1 below describes the landholdings comprising the subject site.

Table 1 - Landholding

Registered Proprietor	Lot	Plan	Volume	Folio	Lot Area
A and VP Galati	299	202704	1276	821	21.194 ha
Galati Nominees Pty Ltd	14	32035	12	110A	8.2422 ha
Galati Nominees Pty Ltd	15	32035	16	370A	9.3485 ha
TOTAL					38.7847 ha

The Certificates of Title relevant to the subject site are contained in Appendix 1.

2.2 Regional Context

The subject site is located within the municipal boundary of the City of Rockingham and within the locality of Baldivis. The subject site is located approximately 38 kilometres south of the Perth Central Business District and approximately 27.5 kilometres south of Fremantle. The Rockingham City Centre approximately 6.5 kilometres west of the subject site.

Figure 1 depicts the subject site in its regional context.

2.3 Local Context

The subject site has frontage to the southern side of Kerosene Lane, Baldivis. The general locality is bounded to the east by Baldivis Road and to the west by Mandurah Road.

The locality of Baldivis is experiencing rapid and development, incrementally replacing rural uses traditionally associated with the area with residential and associated community, public and commercial land uses.

Figure 2 depicts the subject site in its local context.

2.4 Land Use and Topography

The subject site is generally flat with a gentle undulation downwards towards Kerosene Lane. AHD levels of the subject site range from 6 metres to 18 metres.

Given the current use of the site is for market garden land use purposes, the site is predominantly cleared and contains little remnant vegetation. The site does not possess any local or regional areas of conservation significance worthy of retention, such as waterways and seasonal drainage lines.

A commercial premises, known as the 'Spud Shed', currently exists upon the subject site which gains frontage to Kerosene Lane. The premises has been established in the locality for several years and is primarily used for the retail sale of fruit and vegetables.

3.0 BACKGROUND

The subject site is contained within precinct two of the Baldivis (North) District Structure Plan (BNDSP), endorsed by the City of Rockingham in 2000.

A Local Structure Plan covering Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldivis was adopted by Council in 2007. The Local Structure Plan (LSP) articulates, at a district level, broad land uses, major roads and resultant lot layouts. The LSP details the configuration for the future subdivision of the lots and a neighbourhood centre, which is currently focused on the intersection of the 'Other Regional Road' reservation (extension of Eighty Road) and Fifty Road.

The Structure Plans were produced and approved under clause 4.2 of TPS2, and provides the framework for the future planning of the area whilst managing key environmental, urban design and infrastructure servicing issues.

In accordance with the requirements of TPS2, Clause 4.2.5 – Preparation of Structure Plans, a structure plan may include the following, inter alia:

- (i) *the area to which the Structure Plan applies;*
- (ii) *key opportunities and constraints of the Development Area including landform, topography, hydrology, landscape, vegetation, soils, conservation and heritage values, ownership, land use, roads and public transport, and services;*
- (iii) *the planning context for the Development Area including the regional and neighbourhood structure, relevant strategies, Scheme provisions and policies and where appropriate, indicating how the Proposed Structure Plan is to be integrated into the surrounding area;*
- (iv) *proposed major land uses, in particular, residential areas, public open space, school sites, civic and community uses, commercial uses (including the location and hierarchy of commercial centres), mixed use, industrial and mixed business uses;*
- (v) *the proposed indicative lot pattern and general location of any major buildings;*
- (vi) *estimates of future lots, dwellings, population, employment and retail floor space;*
- (vii) *provision for major infrastructure, including main drainage, sewerage, water supply and other key infrastructure services;*
- (viii) *the proposed road network and hierarchy, public transport services, and bicycle and pedestrian networks;*
- (ix) *the timeframe and staging of subdivision and development, and the method of implementation, including any proposals for funding by development contributions;*
- (x) *details as appropriate relating to vehicular access and parking, the location, orientation and design of buildings and the space between buildings, conservation areas, heritage places, special development control provisions; and,*
- (xi) *such other information as may be required by the Council.*

Commensurate with the above, the subject site has been identified within the BNDSP for low to medium density residential development, with public open space, a future primary school site and a small corner store in the south western corner of Lot 299.

4.0 STATUTORY AND STRATEGIC CONSIDERATIONS

4.1 Metropolitan Region Scheme

Under the provisions of the Metropolitan Region Scheme (MRS), the subject site is zoned 'Urban'. Land located immediately to the north of the subject site is currently zoned 'Rural'.

An 'Other Regional Road' reservation (extension of Eighty Road) is located to the east of the subject site.

The subject proposal is consistent with the provisions of the MRS, and therefore may be supported.

4.2 City of Rockingham Town Planning Scheme No. 2

The City of Rockingham Town Planning Scheme No. 2 (TPS2) was gazetted on 19 November 2004.

Under the provisions of TPS2, the subject site currently zoned 'Development' with an applicable residential density of 'R20/40'. Lot 299 also has an additional use (designated A22 on the Scheme Map via Amendment No. 46) which allows for the retail sale of fruit and vegetables and associated incidental items from the site.

Amendment No. 46 sought to rationalise existing commercial land use being undertaken at the subject site and, upon its gazettal on 17/12/2007, clearly established a resultant commercial land use pattern in the locality.

The purpose of the 'Development' zone, as defined by clause 4.2 of TPS2, states as follows:

- (a) *To identify areas requiring comprehensive planning prior to subdivision and development.*
- (b) *To coordinate subdivision, land use and development in areas requiring comprehensive planning.*

Clause 4.2.5 generally requires that a Structure Plan be prepared and adopted by Council and the Western Australian Planning Commission (WAPC) prior to subdivision and/or development of land within the 'Development' zone. The proposed Local Structure Plan (LSP) has therefore been prepared in conformity with this requirement.

Pursuant to Clause 4.2.1 of TPS2, the Council may adopt a minor change or departure from a Structure Plan where the Council is of the view that the change or departure will not materially alter the general intent of the Structure Plan.

Given the above, it is considered appropriate to consider the proposed Local Structure Plan over the subject site, Amendment No. 105 to TPS2 to facilitate the proposed local centre and mixed use sites and also future amendment to the City's Local Commercial Strategy to allocate 2500m² of retail NLA to the proposed 'Local Centre' within the LSP area upon Kerosene Lane.

4.3 City of Rockingham – Local Commercial Strategy (2004)

The City of Rockingham endorsed its Local Commercial Strategy at the Council meeting on 24 February 2004. The principal objective of the City's Local Commercial Strategy is as follows;

The principal objective for Rockingham, in this context, is to promote commercial development in its widest sense for the benefit of the community and to maximise local employment opportunities. The strategy divides the City into five (5) precincts for the purposes of establishing a retail hierarchy. These precincts are Precinct 1 - Rockingham, Precinct 2 - Warnbro/Port Kennedy, Precinct 3 - South Coastal, Precinct 4 - Baldivis and Precinct 5 - Karnup.

The subject site is located within Precinct 4 - Baldivis. The local commercial strategy allocates one district centre, eight neighbourhood centres and one general store. The subject site is within an area referred to as "North Baldivis", with an allocation of 7,000m² of retail floor space. The allocation comprises of 4,500m² for a neighbourhood centre on the corner of the 'Other Regional Road' reservation (extension of Eighty Road) and Fifty Road, and a 2,500m² sized local centre in a location yet to be determined, on Baldivis Road, half way between fifty Road and Safety Bay Road.

The Structure Plan over lots 30, 31 and 308 includes a local centre of 2,500m², generally in accordance with the City's Local Commercial Strategy.

4.4 State Sustainability Strategy

In September 2003, the Government of Western Australia published The *Western Australian State Sustainability Strategy*. The State Sustainability Strategy is intended to illustrate and guide responses to the sustainability agenda by adopting a framework and highlighting actions that support the framework. Part 4 of the State Sustainability Framework deals with 'Sustainability and Settlements', with the stated goal to "*plan and provide settlements that reduce the ecological footprint and enhance quality of life at the same time*".

In pursuit of the above goal, the State Sustainability Strategy highlights the importance of sustainable urban design, and integrating land use with balanced transport.

Relevant objectives proposed under the State Sustainability Strategy include:

- *Create a sustainable balance of employment, transport, housing choice and community development by managing urban and regional growth, including population change, through better urban structure; [and]*
- *Plan and manage urban environments to facilitate human and economic dimensions of sustainability.*

Whilst the Strategy addresses an enormous range of issues and topics, in pursuit of the above objectives, the State Sustainability Strategy designates the Liveable Neighbourhoods Community Design Code (herein referred to as 'Liveable Neighbourhoods') as the key policy framework giving substance to the principles of sustainable urban design, by enabling development to be more walkable and transit oriented. Section 5.4 of this report details the proposal's compliance with the various relevant provisions of Liveable Neighbourhoods.

In acknowledging the economic factors which shall impact on the viability of commercial development and by employing established principles of urban design (as established within Liveable Neighbourhoods) to optimise access and integrate land use and transport modes, the subject proposal seeks to implement the objectives of the State Sustainability Strategy.

4.5 State Planning Policy No. 4.2 – Metropolitan Centres Policy Statement for the Perth Metropolitan Region

The principal purpose of ‘State Planning Policy No. 4.2 – Metropolitan Centres Policy Statement for the Perth Metropolitan Region’ (herein referred to as ‘SPP No. 4.2’) is to provide a broad regional planning framework to coordinate the location and development of retail and commercial activities throughout the Perth metropolitan region, and is mainly concerned with the hierarchy, location, size and design criteria of commercial (retailing) centres.

The relevant objectives of SPP No. 4.2 include:

Establish a hierarchy of well-located centres in the metropolitan region that will:

Promote Neighbourhood Centres, Local Centres and corner shops as performing a vital role in providing the day-to-day convenience shopping for the neighbourhood as well as an important focus for neighbourhood services and community facilities; and

Ensure that centres are highly accessible, of a high standard of urban design and developed with due regard to the residential amenity of the locality.

The proposed LSP is therefore compliant with SPP No. 4.2 requirements.

4.6 State Planning Policy No. 3 – Urban Growth and Settlement

The stated objectives of ‘State Planning Policy No. 3 – Urban Growth and Settlement’ (herein referred to as ‘SPP No. 3’), include, inter alia:

- *To promote a sustainable and well planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space;*
- *To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints; and,*
- *To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand whilst ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community.*

SPP No. 3 is intended as a “broad sector policy ... [which] will be implemented by more detailed policies on particular matters”, and therefore draws upon concepts and strategies covered in greater detail in other related strategies and policies, including Network City, Liveable Neighbourhoods and the various State Planning Policies.

The subject proposal’s consistency with the provisions of the various elements of the State Planning Framework, and the statutory and strategic planning provisions of the City of Rockingham, is examined in other sections of this report pertaining to those elements. Briefly, the subject proposal shall foster achievement of key requirements identified in SPP No. 3 for sustainable communities, including:

- A strong, diversified and sustainable economic base, coordinated with the efficient and economic provision of transport;
- Variety and choice in the size, type and affordability of housing;

- Supporting higher residential densities in the most highly accessible locations, and adjacent to high amenity areas such as parks; and,
- Clustering retail, employment, recreational and other activities in activity centres so as to reduce the need to travel, encourage non-vehicular transport modes and create attractive, high amenity, mixed use urban activity centres.

In light of the above achievement of key requirements identified in SPP No. 3 for sustainable communities, the proposed Local Structure Plan is consistent with the intent of SPP No. 3. Accordingly, the proposed Local Structure Plan for the subject site, Amendment No. 105 to TPS2 and future amendment to the City's Local Commercial Strategy to provide for a 2500m² NLA retail local centre and three supporting Mixed Use sites within the proposed Structure Plan warrants the support and endorsement of the determining authorities.

4.7 Network City

'Network City: community planning strategy for Perth and Peel' (herein referred to as 'Network City') sets out strategies and actions for achievement of planning objectives for Perth and Peel to 2030. Key objectives of Network City are as follows:

- *Accommodate urban growth primarily within a Network city pattern, incorporating communities;*
- *Align transport systems and land use to optimise accessibility and amenity; and,*
- *Ensure employment is created in centres.*

Fundamental to the Network City strategy is the spatial plan, based on the integration of transport and land use through a network of 'activity centres' connected by 'activity corridors'. Strategies to implement this plan include;

- *Developing an integrated land use and transport network with activity and transport corridors as major elements in the movement of goods and people;*
- *Developing (non-industrial) activity centres at selected locations along activity corridors to support the development of the public transport network with strong centres at the ends of each corridor; and,*
- *Encouraging mixed-use development in activity centres, including higher density residential developments and employment generators, especially where centres are well serviced by public transport and have high amenity, walkable environments.*

In support of these objectives and strategies, Network City also recommends the integration of Liveable Neighbourhoods to "*deliver a planning policy framework that will deliver a sustainable urban structure*". A detailed assessment of Liveable Neighbourhood elements is discussed below.

In addition, the subject site is located at the intersection of relatively busy roads, being Kerosene Lane and a proposed local neighbourhood connector road.

Clearly, the proposed LSP integrates land use and transport more effectively than the current endorsed LSP for the land to the south which also contains the neighbourhood centre, which feature small neighbourhood centres "*hidden away within 'residential cells'*". The provision of a 2500m² NLA retail local centre upon the subject site, with its resultant frontage to Kerosene Lane is therefore considered superior in terms of achieving the aims and objectives of Network City.

4.8 Liveable Neighbourhoods

Liveable Neighbourhoods has been adopted by the West Australian Planning Commission (WAPC) and aims to achieve sustainable development, with particular emphasis on the planning of residential neighbourhoods.

Liveable Neighbourhoods is recognised as the preferred design and assessment tool for the preparation of structure plans for new and infill urban areas throughout the metropolitan area and country centres. The principal aims of Liveable Neighbourhoods are summarised as follows:

1. *To provide for an urban structure of walkable neighbourhoods clustering to form towns of compatible mixed uses in order to reduce car dependence for access to employment, retail and community facilities.*
2. *To ensure that walkable neighbourhoods and access to services and facilities are designed for all users, including those with disabilities.*
3. *To foster a sense of community and strong local identity and sense of place in neighbourhoods and towns.*
4. *To provide for access generally by way of an interconnected network of streets which facilitate safe, efficient and pleasant walking, cycling and driving.*
5. *To ensure active street-land use interfaces, with building frontages to streets to improve personal safety through increased surveillance and activity.*
6. *To facilitate new development which supports the efficiency of public transport systems where available, and provides safe, direct access to the system for residents.*
7. *To facilitate mixed-use urban development which provides for a wide range of living, employment and leisure opportunities, capable of adapting over time as the community changes and which reflects appropriate community standards of health, safety and amenity.*
8. *To provide a variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services.*
9. *To ensure the avoidance of key environmental areas and the incorporation of significant cultural and environmental features of a site into the design of an area.*
10. *To provide for a more integrated approach to the design of open space and urban water management.*
11. *To ensure cost-effective and resource-efficient development to promote affordable housing.*
12. *To maximise land efficiency wherever possible.*

In order for the principal aims of Liveable Neighbourhoods to be addressed eight specific elements which are to be considered and implemented through the structure plan and subdivision design. Each element has objectives, which describe the principal aims of each element, and requirements which present a range of qualitative and quantitative responses to meeting the objectives. The eight elements of Liveable Neighbourhoods comprise:

- Element 1: Community Design;
- Element 2: Movement Network;
- Element 3: Lot Layout;
- Element 4: Public Parkland;
- Element 5: Urban Water Management;
- Element 6: Utilities;
- Element 7: Activity Centres and Employment; and,
- Element 8: Schools.

This report has been prepared in accordance with the structural elements contained within Liveable Neighbourhoods and follows elements 1 to 8 as outlined in section 5 of this report.

5.0 LOCAL STRUCTURE PLAN

The proposed Local Structure Plan (LSP) has been designed in accordance with the aims and design elements of Liveable Neighbourhoods. Particular attention has been given to Element 1 – community design, given Liveable Neighbourhoods states:

For structure plans and larger subdivisions, the primary measure of compliance is achieving the objectives and requirements of Element 1 - community design. Compliance with the balance of the element objectives and requirements should follow.

Element 1 will be considered under the particular requirements as described in Liveable Neighbourhoods. The applicable requirement (e.g. R1 to R3) is referred to adjacent to each heading for ease of reference.

The remainder of Elements 2 to 8 will be discussed under headings referred to in Table 1 of Liveable Neighbourhoods. These headings encompass various requirements applicable to each Element. Where an aspect of the proposed structure plan departs from a requirement, consideration will be given under the relevant objective(s).

Supporting plans have also been prepared (and are provided at the end of this section) and form the following figures;

- Figure 3: Local Structure Plan Map
- Figure 4: Context Analysis Plan
- Figure 5: Site Analysis Plan
- Figure 6: Indicative School Site Layout Plan
- Figure 7: Road Hierarchy Plan
- Figure 8: Path Network Plan
- Figure 9: Staging Plan
- Figure 10: Ped Shed Analysis Plan

5.1 Community Design

5.1.1 Objectives

The principal objective of Element 1 - Community Design, is to facilitate the development of neighbourhoods in a sustainable manner whilst creating a unique sense of place and identity through urban design and variety of uses and densities.

More specific objectives address matters such as, integrated movement networks for all modes of transport (public, private and walkability), public parkland and the integration of environmental constraints.

The proposed LSP meets with the community design objectives of Liveable Neighbourhoods, by satisfying the requirements detailed below.

5.1.2 Requirements

The requirements of Element 1 cover a wide range of matters which are explored in specific detail through Elements 2 to 8. Notwithstanding, comment upon each of the requirements for this element are discussed, as follows;

Neighbourhood and Town Structure (R2 - R4)

The neighbourhood structure has been broadly established by the Baldivis (North) District Structure Plan (BNDSP), which establishes major movement networks, neighbourhood cells and activity centres (refer Appendix 2).

The road network is based on a modified grid pattern which provides interconnected access and focus to a proposed local centre and complimentary mixed use allocated land situated to the north of the subject site. The centre is located on the 'T' intersection of Kerosene Lane and a new north-south neighbourhood connector road. Approximately 281 (74.7%) of lots within the proposed structure plan are within a 400m walkable catchment or 'ped shed' of the proposed local centre.

A range of residential densities are proposed from R20 to R30, with higher densities of R40 and R60 located in close proximity to the proposed local centre, along Kerosene Lane and the proposed north-south neighbourhood connector road, adjoining public open space areas and also the school site (Refer Figure 3 - Proposed Local Structure Plan Map).

Integrating with Adjoining Development (R5 - R7)

The proposed structure plan has been designed in general conformity to the overarching BNDSP and integrates with the adjoining approved local structure plan over Lots 30, 31 and 308. The proposed north-south neighbourhood connector road will also service and connect Lot 306 to the south of the proposed structure plan area, which is presently undeveloped and, at the time of writing, no local structure plan has been prepared nor approved for this land.

A proposed local centre on the northern boundary of the proposed structure plan area fronting Kerosene Lane will also integrate with future 'Light Industrial' land uses proposed for land immediately opposite this proposed structure plan, along the northern side of Kerosene Lane. In addition, the provision of a local centre provides an appropriate and useful buffer between the proposed industrial land use activities to the north and proposed residential land uses to the south.

The land use pattern proposed by the LSP is responsive to the site's physical characteristics. The combined public open space and primary school site is positioned on higher ground within the proposed structure plan area and located well away from proposed light industrial uses to the north. The local centre fronts Kerosene Lane and, in part, occupies both high and low points of the site. The proposed design will allow for an 'entry statement/urban edge' of commercial development to define the neighbourhood to the south of the proposed structure plan area. The proposed layout will contribute to, and build upon, the sense of local identity.

Street Network and Lot Layout (R8 - R12)

The proposed street network is based upon a modified grid pattern which provides for a high level of inter-connectivity within the proposed structure plan area and also to adjoining areas. The use of offset street blocks ensures traffic speed is restricted to create a low speed residential environment and ensures efficient movement through the structure plan area for all modes of transport. The use of round-a-bouts at four way intersections and speed reduction devices along straight stretches of road also assist in lowering the speed environment within residential areas and ensures the safe management of traffic.

All roads provide frontage to lots and public parkland to ensure a hard edge defines the public and private realm. No culs-de-sac are proposed as part of the Local Structure Plan.

The Road Hierarchy Plan is provided in Figure 7 and Traffic Assessment Report provided within Appendix 7.

Street and Lot Layout for Energy Efficiency (R13)

Lots have been designed with an east-west orientation in order to accommodate appropriate solar design (i.e. north facing courtyards) and capture southwest prevailing winds. Where an east west orientation is not able to be accommodated, lots have been designed, where possible to provide for a north facing rear yard.

No battle axe leg configured lots are proposed under this LSP.

Mix of Uses and Employment (R14 - R15)

The Baldivis (North) District Structure Plan and City of Rockingham's Local Commercial Strategy provides for 7,000m² of retail floor space. The proposed Local Structure Plan incorporates a proposed 2500m² NLA retail local centre and three (3) surrounding mixed use sites which will provide for local employment and home business opportunities, whilst contributing to the mixture of land uses and resultant local employment opportunities within the Local Structure Plan area.

The local centre's location will provide a transitional buffer to future light industrial uses to the north of the Local Structure Plan area whilst appropriately interfacing with residential uses to the south. In this context, it is submitted that the proposed local centre is considered highly appropriate and desirable, particularly from a land use segregation and resultant amenity protection perspective.

A Retail Assessment and Strategic Justification Report in support of the proposed 2500m² NLA retail local centre forms Appendix 4.

Density and Mix of Housing Types (R16 - R20)

Land within the proposed Local Structure Plan area is within 400m of the proposed local centre and has a mixture of residential densities ranging from R20 to R60.

The average residential density achieved under this proposed Local Structure Plan is approximately 20 dwellings per site hectare. The minimum residential density requirement under Liveable Neighbourhoods is 20 dwellings per site hectare and as such, the proposed LSP is compliant in terms of achieving the required dwelling density.

Schools (R21 - R22)

A primary school site is proposed in accordance with the Baldivis (North) Structure Plan to the south east corner of the proposed Local Structure Plan area.

This location adjoins an approved structure plan for lots 30, 31 and 308 and is intended to be shared by this adjoining neighbourhood.

An Indicative School Site Layout Plan is provided in Figure 6.

Community Safety, Social Capital and Health (R23 - R24)

Lots have been designed to orientate and overlook the public realm, including roads, public parkland and the primary school. Lots have been carefully designed to ensure street frontages are not overly dominated by car parking and garages and to provide maximum opportunity for passive surveillance from habitable rooms from proposed residential dwellings. Offset street blocks ensure that streetscapes are clearly visible to residential development opposite, thus also facilitating passive surveillance of streets.

The inclusion of a local centre with a diverse range of land uses and community focused services and facilities will ensure community wellbeing is enhanced by providing a strong focus and create a local sense of place to facilitate community interaction.

Bushfire Hazard (R25)

The modified grid pattern provides for safe and efficient movement of emergency vehicles whilst providing buffers, in the form of road reserves which act as strategic fire breaks for undeveloped areas adjoining the proposed Local Structure Plan area.

Public Parkland (R26 - 27)

The proposed Local Structure Plan identifies a total of three (3) Public Open Space (POS) areas.

Firstly, a linear POS area of approximately 1.2522 hectares is provided along the western side of the Local Structure Plan area which hosts the Parmelia high pressure gas pipe line and related infrastructure. This POS area will therefore facilitate pedestrian east-west pedestrian access from the Local Structure Plan area to the planned Local Structure Plan area to the west.

Secondly, a combined POS and drainage swale of 1.3916 hectares in area is proposed in the north west corner of the Local Structure Plan area, and is located at the lowest level of the entire site, for drainage purposes and local resident use for primarily passive recreational purposes.

Thirdly, a combined POS and drainage swale of approximately 1.9525 hectares in area is provided adjacent to the proposed primary school site, in accordance with contemporary planning practice for the co-location of school and POS sites. This POS area is expected to be utilised primarily for active recreational pursuits and thus will contain an oval for sporting purposes.

It should also be noted that all proposed drainage swales have been specifically designed in accordance with the provisions of the City's Planning Policy 3.4.1 – Public Open Space for a 1 in 10 year storm event.

Flooding and Urban Water Management (R28 - R29)

The proposed Local Structure Plan area is not subject to, nor prone to flooding. POS has been designed to support urban water management via drainage swales to store and infiltrate stormwater on the subject site, thus integrating stormwater into the landscape within POS areas.

A Local Water Management Plan (LWMS) supporting the LSP is contained within Appendix 8.

Utilities and Easements (R30 - R31)

The proposed Local Structure Plan area is able to be adequately serviced by all utilities and will provide for flexibility to respond to changing technology. An appropriate easement(s) and associated buffer have been provided to accommodate development in proximity to the existing Parmelia gas pipeline, as provided and shown in the BNDSP.

An Engineering Servicing Assessment Report supporting the LSP is contained within Appendix 6.

Balancing Urban and Environmental Sustainability (R32)

Given the current market garden use of the entire site, there are no environmental features on the site identified for retention. The subject land is not identified as being important agricultural land and its agricultural productivity is considered to be economically marginal.

The residential component of the proposed Local Structure Plan is within 450 metres walking distance of the proposed local centre and therefore will reduce the reliance on short vehicle trips, in favour of alternative modes of transportation such as walking and cycling.

The north-south neighbourhood connector is centrally located to the proposed LSP, and in combination with Kerosene Lane, is expected to form future public transport routes.

5.2 Movement Network

5.2.1 Objectives

The principal objective of Element 2 - Movement Network, is to determine movement networks, street design and construction and public transport, with an emphasis upon connectivity, amenity and integration to achieve safe, efficient and attractive street networks.

The proposed LSP meets with the community design objectives of Liveable Neighbourhoods, by satisfying the requirements detailed below.

5.2.2 Application Requirements

Further technical details relating to vehicular access and traffic issues are contained within the Traffic Assessment Report forming Appendix 7 to this report and a Road Hierarchy Plan provided in Figure 7.

Arterial Routes (R2 - R4)

Kerosene Lane is classified as a District Distributor (B type) road. A total of three (3) local streets are proposed to directly intersect with Kerosene Lane thus facilitating an even spread of local traffic which ensures queuing lengths are minimised during peak travel times. The spacing of these junctions satisfies Liveable Neighbourhood requirements.

Local Streets (R5 - R9)

All local streets proposed within this LSP are contained within 15 metre wide road reserves, with the exception of the proposed neighbourhood connector A (central boulevard) road, with a proposed road reserve width of 24.4 metres, and roads running alongside the proposed school site, which are 20 and 17.9 metres respectively (Liveable Neighbourhoods Access Street B – Figure 20).

The cross section of the proposed access streets is based upon Figures 20, 21 and 22. Access Street 'C' and "D" of Liveable Neighbourhoods, however for consistency, a 15 metre wide road reserve is proposed for all access streets "B", "C" and "D".

The cross section of the proposed neighbourhood connector (central boulevard) road is based upon Figure 17 – Neighbourhood Connector 'B' of Liveable Neighbourhoods, however a 20 metre wide road reserve is proposed in lieu of 19.4 metres, along the length of this road with the proposed school POS site as shown in Figure 18 of Liveable Neighbourhoods.

The proposed local streets with a road reserve of 15 metres are a standard access street, or yield (give way), type of street, with a target operating speed of 30 to 40km/h. The proposed neighbourhood connector (Central Boulevard) road, with a road reserve width of 20 to 24.4 metres, is a lower volume neighbourhood connector type road with a target operating speed of 50km/h. All of the proposed local streets under the proposed LSP are expected to carry less than 3000 vehicles per day, with the majority carrying less than 100 vehicles per day.

The local streets with road reserve widths of 15 metres are designed for infrequent on street parking which is desirable and needed as part of speed control. These streets are not used by buses for public transport provision, nor do they contain a dedicated bike lane. As outlined within Liveable Neighbourhoods, this type of street is one of the most common residential streets in densities up to and including R30 to R35.

The neighbourhood connector (central boulevard) road with a road reserve width of 20 to 24.4 metres is designed to accommodate a bus route, has no dedicated cycle lane (although a shared path is being provided in lieu of this) and allows for on-street parking, with low parking turnover, particularly opposite proposed commercial and mixed use sites.

Laneways (R10 - R11)

One rear laneway of approximately 6 metres wide and 130 metres in length is proposed within the proposed LSP. The proposed laneway provides rear access for ten (10) R30 density lots which front the school and POS site, in order to maximise passive surveillance. The proposed laneway entirely satisfies Element 2, R1 of Liveable neighbourhoods and is based upon Figure 24 of Liveable Neighbourhoods.

Street Network (R12 - R14)

As mentioned in 5.1.2 above for Element 1, the proposed street network is based upon a modified grid pattern which provides for a high level of inter-connectivity within the proposed Local Structure Plan area and also to adjoining areas. The use of offset street blocks ensures traffic speed is restricted to create a low speed residential environment and ensures efficient movement through the LSP area for all modes of transport.

The use of round-a-bouts at four way intersections and speed limiting devices along straight stretches of road also assist in traffic management and lowering the speed environment within residential areas and ensures the safe management of traffic.

Schools (R15 - R16)

Four (4) proposed roads surround the proposed school site and POS, with road reserve widths of 20 metres (south and west), 17.9 metres (north) and 15 metres (east, and upon adjoining land subject to an existing approved LSP. Given the site is surrounded by all four roads, there are multiple access opportunities and thus, traffic generation and flow created by the school, particularly during morning and afternoon peak times, are able to be equally shared. Also the provision of roundabout intersection at the two corners of the school and POS site, facilitate excellent circulation of traffic, particularly 'u-turns'.

Furthermore, given the proposed neighbourhood connector (central boulevard) road is expected to host a public transport service, the other streets can alleviate traffic congestion by sharing the demand between them thus minimising traffic and pedestrian conflicts which is usually experienced with school sites which have limited road access (i.e. frontage to only one or two roads).

An indicative School Site Layout Plan is provided in Figure 6.

Connections to Existing and New Urban Areas (R17 - R18)

The proposed LSP provides for vehicular and other non vehicular transport modes to the approved LSP to the south east and east of the LSP area, and also to the south of the LSP area, along the northern boundary of Lot 306, which currently has no LSP approved.

Given the existing Parmelia high pressure gas pipeline along the western boundary of the LSP area, two vehicular linkages to access lots immediately to the west are proposed, as required by the City. The proposed lineal POS area proposed within this LSP facilitates pedestrian and cycle access from this LSP area to the proposed residential area to the west.

Intersection Spacing (R19 - R20)

Intersection spacing has been carefully considered in accordance with Table 5 of Liveable Neighbourhoods in order to reduce overloading on major intersections and to contribute to shortened vehicular trips. Junctions between local streets have also been carefully located to achieve a safe and permeable local road network.

Given no traffic signals are proposed within the proposed LSP, table 5A of Liveable Neighbourhoods relating to signalised junction spacing is not relevant to this LSP proposal.

Culs-de-sac (R21 - R23)

No culs de sac roads are proposed under this LSP and therefore, the provisions of R21 - R23 of Liveable Neighbourhoods are not relevant to this LSP proposal.

Traffic Speed (R24 - R25)

The local street network proposed under this LSP has been carefully designed to produce the target operating speeds set out in Table 4 of Liveable Neighbourhoods, and in accordance with the design speed for those parameters outlined in Table 5B of Liveable Neighbourhoods.

Furthermore, the intended use of street cross sections detailed in figures 17, 18, 21 and 22 of Liveable Neighbourhoods contribute to achieving target operating speeds. Additional measures to constrain speeds may be introduced, where warranted, generally in accordance with Table 6 of Liveable Neighbourhoods.

Public Transport (R26 – R29)

The proposed LSP provides for two public transport routes. The first public transport route is expected to be provided along Kerosene Lane, and this service is expected to link to other bus and train services accessing nearby Wellard/Warnbro/Rockingham Train Station's and the Rockingham Town Centre.

The second public transport route proposed within the LSP is along the proposed neighbourhood connector (Central Boulevard) road. This public transport route is expected to facilitate access to the local centre, primary school site and residential dwellings within the proposed LSP area and those residential areas to the south of the LSP area.

Footpaths and Shared Paths in Streets (R30 - R36)

All access streets must be provided with a footpath or shared path on one side of the road in accordance with the requirements of Liveable Neighbourhood figures 17 to 22.

All proposed footpaths are to be 1.5 metres wide and offset 0.3 metres from the property boundary. Where paths are proposed immediately adjacent to the property (lot) boundary, the width is increased to 1.8 metres. Footpaths have also been widened to 2 metres where it abuts the school site and also where it abuts the proposed local centre and mixed use sites.

Given figures 21 and 22 of Liveable Neighbourhoods is to be utilised for all proposed access streets under this LSP, a path location plan has been prepared which sets out the location of these paths (refer Figure 7 – Path Network Plan).

In addition, given the proposed neighbourhood connector (central boulevard) road is based upon figures 17 and 18 of Liveable Neighbourhoods, a shared path is intended to be provided along both sides of this road.

Walkable Catchments (R37)

Liveable Neighbourhoods requires at least 60% of dwellings should be in a safe 400 metre walk of the local centre, or an existing or potential bus stop. Ped shed analysis of the proposed LSP reveals that approximately 74.7% of dwellings are within a 400m walk of the proposed local centre and potential bus stop, with the remaining 25.3% being within a 400 metre walk of a potential bus stop. Full 100% compliance is able to be achieved, as a planned public transport service is intended along the proposed neighbourhood connector (Central Boulevard) road which runs through the middle of the LSP area, thus maximising resident access to this proposed public transport service.

A Ped Shed Analysis Plan has been prepared for the proposed LSP and is shown in Figure 10.

Cycling on Streets (R38 - R40)

Given all proposed LSP local roads are expected to carry less than 3000 vehicles per day, dedicated cycle lanes are not required under Liveable Neighbourhoods. Shared (dual use) paths and footpaths are to be provided throughout the LSP area, which will facilitate use by less experienced cyclists, predominantly primary school aged children. Experienced cyclists are expected to utilise the road itself. Cyclist safety will be assured as local streets and the neighbourhood connector (Central Boulevard) road have a maximum design speed of 50km/h.

Shared Paths (R41 - R44)

As outlined above, a shared path is proposed along the neighbourhood connector (Central Boulevard) road, adjacent to the proposed school site and adjacent to the commercial centre and mixed use lots.

A footpath/shared path location plan has been prepared which sets out the location of these paths (refer Figure 7).

The proposed shared paths are to be a minimum width of 2 metres, as shown in figure 28 of Liveable Neighbourhoods.

Footpath and/or Shared Path Construction (R45)

In terms of footpath/shared path construction, it is expected that all footpaths and shared paths will be constructed using concrete and shall be built to the specification and satisfaction of the City of Rockingham.

Streetscape (R46 - R47)

The subject site does not contain any existing mature trees which can be retained and used to help establish streetscape, however street trees are expected to be provided throughout the LSP area in accordance with the City of Rockingham's requirements at the time of subdivision in order to ensure pedestrian shade and shelter is provided, whilst also improving streetscape amenity and traffic management.

Street Reserves, Road and Crossovers (R48 - R52)

Given street cross sections shown in Figures 17, 18, 21 and 22 of Liveable Neighbourhoods are being used for proposed roads within this LSP, this particular requirement is considered to be satisfied.

Verges and Medians (R53)

Once again, given street cross sections shown in Figures 17, 18, 21 and 22 of Liveable Neighbourhoods are being used for proposed roads within this LSP, this requirement is considered to be satisfied.

Stopping Sight Distances (R54 - R55)

Approach sight distance and intersection sight distances are based on the design speeds for each street type. A design speed for all internal local roads of 40km/h is provided, thus requiring an approach sight distance of 35 metres and a safe intersection sight distance of 60 metres. All proposed internal local roads achieve this requirement.

The LSP road network and intersection satisfies the stopping sight distance requirements. Appropriate truncations for corner lots have been provided.

General Geometric Criteria (R56)

All longitudinal street gradients proposed under the LSP are under 15 percent and are therefore compliant.

Intersections (R57 - R61)

All intersections and truncations proposed under the LSP are compliant with Liveable Neighbourhoods and relevant Australian Standards.

Priority Controlled Four-Way Intersections (R62 - R65)

No priority controlled four way intersections are proposed under the LSP, except at intersections of laneways and access streets. Four (4), four way intersections are proposed, however, roundabouts at these intersections is proposed.

Roundabouts (R66)

Roundabouts are proposed at all four way intersections. Liveable Neighbourhoods suggests roundabouts should have up to a 5 metre central island radius. Proposed roundabouts under the LSP comply with this requirement.

Service Roads (R67)

No service roads are proposed under the LSP.

Bushfire Requirements (R68)

This requirement is not applicable to this LSP as the subject land is surrounded by land which is either already developed for residential land use purposes or is earmarked for future residential land use purposes. No conservation areas are located adjacent to this LSP area which would require strategic firebreaks and other bushfire management techniques to be provided.

Road Construction (R69 - R70)

Road design and construction is to be undertaken in accordance with all applicable standards and requirements of the City of Rockingham. It is likely that a combination of normal bitumen and red-oxidised bitumen will be utilised for all roads throughout the LSP area.

5.3 Lot Layout

5.3.1 Objectives

The principal objective of Element 3 - Lot Layout, is to outline requirements for residential lots in a planning context where a mixture of compatible uses is encouraged.

The proposed Local Structure Plan meets with the lot layout objectives of Liveable Neighbourhoods, by satisfying the requirements detailed below.

5.3.2 Application Requirements

Density and Diversity (R2 - R6)

Land within the proposed Local Structure Plan area is within 400m of the proposed local centre and has a mixture of residential densities between R20 and R60.

The average residential density achieved under this proposed Local Structure Plan is approximately 20 dwellings per site hectare. The minimum residential density requirement under Liveable Neighbourhoods is 20 dwellings per site hectare and as such, the proposed LSP is compliant in terms of achieving the required dwelling density.

The dimensions of residential blocks within the proposed LSP provide for a pedestrian friendly environment and are of maximum depth of approximately 70 metres and maximum length of approximately 240 metres. These are within the requirements of Liveable Neighbourhoods, which prescribes a depth ranging from 70-120 metres and a length ranging from 120-240 metres.

Lot Size and Shape (R7 - R14)

A variety of lot sizes are proposed to facilitate housing choice and diversity to meet the needs future needs of residents. Residential lot sizes for proposed 'single residential dwellings' within the LSP range between 300m² (R30) to 450m² (R20). All lots have direct street frontage, and as such, no battleaxe lots are proposed.

Smaller R30 density lots are proposed along the main north-south neighbourhood connector road which will provide for future public transport and traverses through the proposed neighbourhood centre. In addition, smaller lots are also proposed opposite POS which provides for a higher level of residential amenity.

All lots proposed are of a regular rectangular shape/dimension and of suitable size to accommodate modern dwelling development forms. The City has advised of the need for Detailed Area Plans (DAP's) for proposed grouped housing and rear laneway frontage lots.

A pocket of larger grouped housing and mixed use lots surrounding the proposed local centre are proposed and it is anticipated that these lots are able to accommodate higher density residential and non retail based, predominantly 'home business' type land uses which will support and compliment the proposed local centre.

Mixed-use Development (R15)

The proposed LSP contains three (3) mixed use development sites which are intended to be developed for non retail based businesses to support the proposed local centre.

Neighbourhood Centres (R16)

One commercial lot of 1.4505 hectare in area is provided within the proposed LSP which forms the proposed 'main street' local centre.

The commercial lot associated with the proposed local centre has been designed to have significant frontage to Kerosene Lane and is of regular shape to facilitate flexible development forms, including buildings, service areas, landscaping and car parking.

Road access is also provided to the commercial lot to ensure traffic circulation and service access can occur without affecting the functionality of the centre or residential amenity.

Site Responsive Design (R17)

Proposed lot sizes and dimensions under this LSP enable dwellings to be sited to protect natural and cultural features, acknowledge site constraints, minimise earthworks and retaining walls, capitalise on views available, minimise overlooking and overshadowing and provide sufficient space for appropriate planting to assist microclimate management and energy conservation.

Climate Responsive Design (R18 - R19)

A large percentage of lots proposed under this LSP are orientated to facilitate appropriate siting of dwellings and private open space to optimise solar access, particularly given all residential street blocks are aligned on a north/south and east/west axis.

Battle-axe Lots (R20 - R25)

The proposed LSP does not contain any battle-axe lots and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Access to Residential Lots (R26)

All lots are provided with frontage to a gazetted road and no dual frontage lots are proposed under this LSP, except for two R30 rear laneway residential cells as shown on the LSP.

Frontage to Parks and Natural Areas (R27 - R28)

The proposed LSP has been carefully designed to ensure lot frontage to all three POS areas proposed. All lots are orientated to directly front POS areas to enhance and capitalise upon amenity, while contributing to personal and property security through passive surveillance opportunities and the resultant deterrence of crime, vandalism and anti-social behaviour.

Frontage to Streets and Arterial Routes (R29 - R30)

The proposed LSP does not contain any lots with frontage to arterial roads and therefore, this component of Liveable Neighbourhoods is not considered to be relevant. All lots fronting Kerosene Lane are either to be provided with a slip lane for vehicular access, or access being restricted to secondary roads (refer notation 9 on the LSP).

Lots along Arterial Roads (R31 - R32)

The proposed LSP does not contain any lots with frontage to arterial roads and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Noise Buffering (R33)

The proposed LSP does not contain any lots which directly abut external noise sources and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Detailed Area Plans for Small Lots and Special Site Conditions (R34 - R35)

The City has advised of the need for Detailed Area Plans (DAP's) for all proposed grouped housing and R30 rear laneway frontage lots. The required DAP's will be prepared and approved as part of the future subdivision stage.

Lots with Rear Lane Access (R36)

The layout of the two proposed rear laneway's under the LSP have been designed in order to maximise personal and property safety for laneway users, as outlined within Figure 49 of Liveable Neighbourhoods.

5.4 Public Parkland

5.4.1 Objectives

The principal objective of Element 4 - Public Parkland, is to provide a range of site responsive urban parkland which have clear sightlines from nearby buildings and are safe and conveniently located for the majority of residents they are intended to serve.

The proposed Local Structure Plan meets with the public parkland objectives of Liveable Neighbourhoods by satisfying the requirements detailed below.

5.4.2 Application Requirements

Application Requirements (R1- R2)

An open space schedule is provided on the proposed LSP map as shown in Figure 3.

A significant amount of public open space (POS), being a total of 3.5243 hectares, representing approximately 10.75% of the total gross subdivisible area, is provided under the LSP.

Parkland Function and Distribution (R3)

The proposed Local Structure Plan (LSP) identifies a total of three (3) POS areas.

Firstly, a lineal POS area of approximately 1.2522 hectares is provided along the western side of the Local Structure Plan area which hosts the Permelia high pressure gas pipeline and related infrastructure. This POS area is expected to be utilised for passive recreational pursuits and will facilitate pedestrian east-west pedestrian access from the Local Structure Plan area to the planned Local Structure Plan area to the west.

Secondly, a combined POS and drainage swale of 1.3916 hectares in area is proposed in the north west corner of the Local Structure Plan area, and is located at the lowest level of the entire site, for drainage purposes and local resident use for primarily passive recreational purposes.

Thirdly, a combined POS and drainage swale approximately 1.9525 hectares in area is provided adjacent to the proposed primary school site, in accordance with contemporary planning practice for the co-location of school and POS sites. This POS area is expected to be utilised primarily for active recreational pursuits and thus will contain an oval for sporting purposes.

The BNSP designates areas of POS along the gas pipeline and adjoining a primary school site. The proposed Local Structure Plan has followed the district pattern set out for POS provision. An additional local park is centrally provided within the residential cells for improved local community access and to improve visual amenity.

Additional POS has been provided as a consequence of providing a buffer to the gas pipeline. Whilst this adversely impacts upon the amount of land able to be provided for residential development, it equally provides for an increased level of amenity, particularly for smaller R30 Lots. As such these smaller lots are proposed with direct frontage to this POS.

POS is being provided in optimal locations to maximise local resident accessibility and has also been designed to optimise achievability without recourse to complex cost sharing provision initiatives.

Amount of Public Open Space (R4 - R6)

Public open space within the proposed overall subdivision has been designed to accord with the normal 10% gross land area requirement, with 10.75% POS being provided.

Regional Open Space (R7 - R8)

The proposed LSP does not contain any land required for regional open space purposes and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Foreshore Reserves (R9 - R10)

The proposed LSP does not contain any land required for foreshore reserve purposes and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Wetlands and Buffers (R11)

The proposed LSP does not contain any land required for wetland and resultant buffer purposes and therefore, this component of Liveable Neighbourhoods is not considered relevant.

Parkland and Surveillance (R12 - R13)

The proposed LSP has been carefully designed to ensure lot frontage to all three POS areas proposed. All lots are orientated to directly front POS areas to enhance and capitalise upon amenity, while contributing to personal and property security through passive surveillance opportunities and the resultant deterrence of crime, vandalism and anti-social behaviour.

Local Parks (R14)

Refer comments in Parkland Function and Distribution (R3) section above.

Neighbourhood Parks (R15 - R16)

Refer comments in Parkland Function and Distribution (R3) section above.

District Parks and/or Open Space (R17 - R19)

The proposed LSP does not contain any land required for district parks and/or open space purposes and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Combining Parks with Different Functions (R20)

A lineal POS area of approximately 1.2522 hectares in area is proposed along the western side of the LSP area which reflects the location of an existing high pressure gas pipeline. It is therefore considered appropriate for the City of Rockingham and the WAPC to support its provision as POS, in the location and manner proposed under this LSP, as it is permissible under this component of Liveable Neighbourhoods.

Integrating Stormwater and Public Parkland (R21 - R26)

POS has been designed to support urban water management via drainage swales to store and infiltrate stormwater on the subject site, thus integrating stormwater into the landscape, whilst maximising resident useability. All proposed drainage swales have been specifically designed in accordance with the provisions of the City's Planning Policy 3.4.1 – Public Open Space for a 1 in 10 year storm event.

A Local Water Management Plan (LWMS) and Engineering Servicing Report supporting the LSP are contained within Appendices 8 and 6 respectively.

Community Purpose Sites (R27 - R29)

The proposed LSP does not contain any land required for community purpose site purposes and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Public Open Space Allowances (R30)

The proposed LSP does not seek, nor does it require any variations to POS allowances and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Public Open Space Provision and Restricted Use Public Open Space (R31 – R33)

An open space schedule is provided on the proposed LSP map as shown in Figure 3.

The proposed LSP provides for 2.8686 hectares as unrestricted POS, with 0.6557 hectares being provided as restricted POS.

Regional Variations (R34)

The proposed LSP does not seek, nor does it require any variations to POS provision and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Cash in Lieu and Transfers (R35 – R36)

The proposed LSP does not seek, nor does it require any cash in lieu or reliance upon land transfers and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Development of Public Open Space (R37 - R38)

All POS areas proposed under this LSP are to be developed to a standard required by both the City of Rockingham and the WAPC. All POS areas are to be developed in accordance with an approved landscaping plan which is to be prepared by the proponent and approved by the City of Rockingham at the future land subdivision stage.

Public Open Space for Five Lots or Less (R39)

Given the proposed LSP seeks to create more than five (5) lots, this component of Liveable Neighbourhoods is not considered to be relevant.

Implementation Procedures (R40 - R41)

All three POS areas proposed under this LSP are intended to be ceded free of cost to the Crown under Section 152 of the Planning and Development Act. This requirement is likely to be imposed as a condition of subdivision approval of the land by the WAPC and must be satisfied prior to new lot titles being issued.

Public Open Space in Stages (R42)

POS is intended to be provided through the future subdivision application and approval process.

POS staging is therefore not considered relevant in this instance, as all POS is to be provided as shown on the LSP map.

Deductions (R43 - R44)

An open space schedule is provided on the proposed LSP map as shown in Figure 3, which clearly sets out all the permissible deductions which have been applied to this LSP proposal.

5.5 Urban Water Management

5.5.1 Objectives

The principal objective of Element 5 - Urban Water Management, is to promote opportunities for linking water management infrastructure with the urban built form and landscape design to achieve a more sustainable development.

The proposed Local Structure Plan meets with the urban water management objectives of Liveable Neighbourhoods by satisfying the requirements detailed below.

5.5.2 Requirements

Application Requirements (R1)

Consulting civil and environmental engineers have undertaken a detailed and comprehensive drainage analysis and have prepared a Drainage Management Plan and Local Water Management Plan (LWMS) for the LSP area (refer Appendix 6 and 8 respectively).

This urban water management strategy provides that storm water both within the subject area and beyond is to be managed in accordance with the Department of Water's 'Water Sensitive Design Guidelines', being wherever possible, the disposal of storm water by 'soakage at source' and management of nutrients and any other potential pollutants which are discharged from the site into the groundwater through use of appropriately designed infiltration devices.

The strategy is to dispose of storm water by soakage and use of water sensitive design methods. In general, storm water runoff from road pavements will be piped to various infiltration areas within the overall subdivision. It is intended that storm water manholes will be laid with open bases to permit soakage for small rainfall events thereby encouraging further soakage 'at source', subject to Council approval of this system.

Run-off from dwelling roofs and hard surfaces within lots will be infiltrated into soak wells directly at source and may also be directed into rainwater tanks by individual landowners.

It is envisaged that the developer provided drainage system will be taken over by the City of Rockingham in accordance with its policy and accepted practice.

Urban Structuring (R2 - R4)

Refer comments contained within the Engineering Servicing Report and LWMS reports contained within Appendices 6 and 8 respectively.

Water Quality (R5 - R7)

Post-development management of water quality will occur in line with the *Stormwater Management Manual for Western Australia* (DoW 2004-2007) and *Better Urban Water Management* (BUWM) (WAPC 2008). Strategies will include structural and non-structural Best Management Practices (BMPs). These include drainage swales incorporated into Public Open Space (POS) to reduce nutrients and sediments in stormwater entering groundwater.

Further details regarding management of stormwater and groundwater quality are included in the accompanying Local Water Management Strategy (LWMS) shown in Appendix 8.

Water Quantity (R8 - R10)

Pre-development flows will be maintained for 1 in 100 year events in accordance with the design objectives stated in *Better Urban Water Management* (WAPC 2008). This will be achieved through the use of bottomless manholes and side entry pits and infiltration swales. Two drainage swales will be used to allow stormwater to be infiltrated onsite.

Further details regarding the management of stormwater runoff are included in the accompanying LWMS (Refer Appendix 8).

Water Conservation (R11)

The development aims to meet the State Water Plan (Government of Western Australia, 2007) potable water consumption target of 100 kL/person/year. Landscaping within the POS will be designed to minimise water consumption. Further details regarding the water conservation strategy for the subject site are included in the accompanying LWMS.

Protecting and Enhancing Valued Native Vegetation and Habitats (R12)

There is no native vegetation on the site and the development of the site will not directly impact any native vegetation. The site is, however, in proximity to a number of natural areas that have identified significance. The potential for the development of the site to impact these identified natural areas is considered to be minimal. The natural areas are identified and discussed as follows;

An area of bushland to the north east of the site is identified as Bush Forever site No 356 which is part of Lake Cooloongup, Lake Walyungup and adjacent Bushland, Hillman to Port Kennedy. No buffers to development apply to Bush Forever sites and a road interface between the site and the Bush Forever site already exists. The presence of the Bush Forever site does not restrict the development of the site.

The site is approximately 750 metres to the east of Lake Cooloongup and less than 100 m south of Kerosene Lane Swamp which is a small wetland to the north of Kerosene Lane. Both Lake Cooloongup and Kerosene Lane swamp are Conservation Category wetlands which are also identified by the Environmental Protection (Swan Coastal Lakes) Policy 1992 giving them protection under the Environmental Protection Act (1986).

The Environmental Protection Authority (EPA) management objectives for Conservation Category wetlands are to preserve and enhance the existing conservation values of the wetlands (Environmental Protection Authority 2008). Buffer separation distances of 50–100m from development apply to conservation category wetlands. The separation distances, including the presence of Kerosene Lane are such that buffer requirements do not affect the site.

Integrating Stormwater into the Landscape (R13 - R16)

POS has been designed to support urban water management via drainage swales to store and infiltrate stormwater on the subject site, thus integrating stormwater into the landscape.

Street Network and Design (R17 - R21)

Street design has made provision for the retention, detention, low velocity flows and treatment of stormwater through the use of landscaping, drainage swales and other appropriate source controls.

Maintenance and Management (R22)

The LWMS and Drainage Concept Plan, forming Appendices 8 and 6 respectively, sets out the proposed design, monitoring and implementation framework.

5.6 Utilities

5.6.1 Objectives

The principal objective of Element 6 - Utilities, is to cover contemporary subdivision servicing requirements and emphasise the need to predetermine, through design, the most appropriate way in which to provide utility services in a sustainable and land-efficient manner.

The proposed LSP meets with the utilities objectives of Liveable Neighbourhoods, by satisfying the requirements detailed below.

5.6.2 Application Requirements

A detailed Engineering Servicing Report is provided within Appendix 6. A summary of this report is provided in section 6.

It is apparent the subject area can readily be provided with all required utility services in a timely and economic manner.

5.7 Activity Centres and Employment

5.7.1 Objectives

The principal objective of Element 7 - Activity Centres and Employment, is to provide requirements at a greater level of detail than Element 1 - Community Design, relating to both activity centres and employment, including siting and design of mixed use activity centres.

The proposed Local Structure Plan meets with the utilities objectives of Liveable Neighbourhoods, by satisfying the requirements detailed below.

5.7.2 Application Requirements

A detailed retail assessment and strategic justification relating to the proposed LSP and the intended provision of a local centre and mixed use sites within the proposed LSP area is provided within Appendix 4.

Provision and Location of Activity Centres (R4 - R7)

The City of Rockingham Local centres Strategy (2004) allocated a total of 7,750m² of retail floor space, comprising of five (5) local centres, one neighbourhood centre of 4500m² on at the intersection of the 'Other Regional Road' (extension of Eighty Road) and Fifty Road and a further local centre of 2500m² on Baldavis Road, halfway between Fifty road and Safety Bay Road.

The BNDSP establishes the location of the larger neighbourhood centre focused around the intersection of the 'Other Regional Road' (extension of Eighty Road) and Fifty Road. An area of 5500m² was initially set out in the BNDSP, however a centre of 4500m² was ultimately included in the LSP for Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldavis, in conformity with the City's approved local commercial strategy.

Clearly, the provision of a 2500m² NLA retail local centre on the subject site satisfies Liveable Neighbourhood's to a much greater extent than the current location of the neighbourhood centre within the LSP over Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldavis. In particular, the subject site is:

- Centrally located;
- Supported by medium density residential development within walkable range;
- Located at an intersection of relatively busy streets;
- At the 'downstream' end of the anticipated daily movement pattern; and
- On the 'going home' side of the road, for the majority of vehicle traffic.

Conversely, the endorsed neighbourhood centre within the LSP over Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldivis are not considered to be on the 'downstream' end of daily movements, and are not on the 'going home' side of the road for most residents. From an urban design point of view, the locations of the endorsed centres are considered to be inferior to the subject site.

As demonstrated in the retail study forming Appendix 4 to this report, the provision of a local centre will be of greater economic viability than the existing, less appropriately-located endorsed neighbourhood centre contained within the LSP over Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldivis. It is also submitted the community uses which seek to co-locate synergistically with the commercial uses shall also be more viable if consolidated on the subject site.

The retail study also confirms the provision of the proposed local centre shall not result in over-provision of retail floor space in the locality, and shall not undermine the planned retail hierarchy.

As demonstrated in the retail study, the proposed local centre is anticipated to have a negligible effect on the planned hierarchy of centres in the region, and shall not adversely impact on the economic viability of existing centres. In fact, the proposed site is a significantly superior location, in the context of maximisation of catchment areas for both proposed and existing centres in the region.

As suggested in the above, non-viable centres can have a detrimental impact on the amenity of the locality in which they are situated, and it is therefore appropriate to ensure centres are sited and designed to optimise the opportunities to ensure their ongoing viability and success. As is demonstrated in the Retail Study, the subject site enjoys improved access (in terms of public, private and non-motorised transport), and exposure, in comparison with the alternative location, and is therefore anticipated to enhance the amenity of the locality, through the provision of a vital and viable local centre delivering a higher level of service to the community.

The proposed centrally-located local centre, sited on a major through road, will perform at viable higher sales levels and provide a better level of service to the community than would the neighbourhood centre to the south which is considered to be in an inferior location. Accordingly, the proposed local centre shall encourage development of a range of uses, thereby improving local access to employment.

Whilst detailed design of the proposed local centre has not been undertaken at this stage, the subject site is considered to lend itself more favourably to 'main street' principles than other comparable sites, and these design principles shall be given due regard in the local centre's design.

The subject site accords with the relevant principles, objectives and requirements of Liveable Neighbourhoods, which is the accepted manual for quality urban design in Western Australia. Preceding Sections detail the improved economic viability, employment opportunities and community services likely to result from the establishment of a local centre upon the subject site, which shall thereby foster a community that is sustainable, vibrant and efficient.

Regional Centres (R 8 - R9)

No regional scale centres are located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Town (District) Centres (R10 - R11)

No town or district scaled centres are located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Large Neighbourhood Centres (R12 – R13)

No large neighbourhood scale centres are located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Neighbourhood and Local Centres (R14 - R20)

The Baldavis (North) District Structure Plan and City of Rockingham's Local Commercial Strategy provides for 7,000m² of retail floor space. The proposed Local Structure Plan incorporates a 2500m² NLA retail local 'main street' centre which will provide for local employment opportunities, whilst contributing to the mixture of land uses and resultant local employment opportunities within the Local Structure Plan area.

The local centre's location will provide a transitional buffer to future light industrial uses to the north of the Local Structure Plan area whilst appropriately interfacing with residential uses to the south. In this context, it is submitted that the proposed local centre is considered highly appropriate and desirable, particularly from land use segregation and resultant amenity protection perspective.

Provision of Land for Employment and Business (R21 - R24)

One commercial lot of 1.4505 hectares in area is provided within the proposed LSP, forms the proposed local centre and is expected to provide the majority of business and resultant local employment opportunities.

The provision of a future light industrial area immediately to the north of the proposed local centre will also attract local business and resultant employment opportunities. The co-location of light industrial and neighbourhood centre land uses will have the effect of ensuring the long term economic viability and resultant local employment within both areas.

Industrial and Warehousing Precincts (R25 - R27)

Except for the above proposed light industrial area, no other industrial and warehousing precincts is located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Strategic Business Sites (R28 - R30)

No strategic business sites are located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Home Based Businesses (R31 - R33)

Provision has been made within the LSP to allow for home based businesses upon the three (3) proposed mixed use lots immediately adjacent to the proposed local centre, with potential for 'home occupation' upon all remaining residential land, subject to City of Rockingham policy and approval.

Mixed Use Compatibility (R34 - R35)

Provision has been made within the LSP to ensure compatibility of mixed land uses in close proximity to the proposed local centre and in support of that local centre.

Street Layout and Parking in Activity Centres (R36 - R45)

Commercial and mixed use lots have been designed to have significant frontage to Kerosene Lane and the internal road network and are of regular shape to facilitate flexible development forms, including buildings, service areas, landscaping and car parking.

Urban Locations and Formats for Universities, TAFE's, Hospitals and Other Institutional Uses (R46 - R48)

No Universities, TAFE's, Hospitals or other Institutional uses are located either within or in close proximity to the proposed LSP area and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.

Integration of Activity Centres and other Employment Areas with Public Transport (R49 - R50)

The proposed LSP provides for two public transport routes. The first public transport route is expected to be provided along Kerosene Lane, and this service is expected to link to other bus and train services accessing nearby Wellard/Warnbro/Rockingham Train Station's and the Rockingham Town Centre.

The second public transport route proposed within the LSP is along the proposed neighbourhood connector (Central Boulevard) road. This public transport route is expected to facilitate access to the local centre, primary school site and residential dwellings within the proposed LSP area and those residential areas to the south of the LSP area.

Design for Community Safety in Centres (R51 - R52)

It is expected that development within the proposed local centre will be to a very high standard and will ensure a safe, well defined public realm will be created.

It is also expected that in order to achieve safer communities and related facilities, careful consideration needs to be given to the WAPC's '*Designing Out Crime Planning Guidelines*'. It is intended that all development within the proposed local centre will be designed to incorporate these guidelines.

Creating Attractive, High Amenity Urban Centres (R53 - R56)

The local centre is intended to also contain fine grain detail in order to assist to create a truly unique, attractive, high amenity 'main street' based urban centre. The use of such treatments as shade and shelter trees, landscaping treatments, pavement treatments, street furniture and public lighting and art is expected to create not only a strong and unique sense of place and identity for local residents, but also seeks to instil community pride in its own local centre thus minimising potential antisocial issues such as graffiti and other vandalism of elements comprising the public realm.

5.8 Schools

5.8.1 Objectives

The principal objective of Element 8 - Schools, is to facilitate site responsive design to allow flexibility for a number of design scenarios and locations for school sites, and to protect surrounding residential amenity.

The proposed Local Structure Plan meets with the 'schools' objectives of Liveable Neighbourhoods by satisfying the requirements detailed below.

5.8.2 Application Requirements

Provision of School Sites (R2 - R4)

A primary school site is required to be provided within the LSP area as shown in the approved BNDSP and as such, the LSP map has identified a shared School and POS site. An indicative School Site Layout Plan is provided in Figure 6.

Location of School Sites (R5 - R6)

A combined school and POS site is provided under the approved BNDSP and has therefore been provided in the same location as shown in this LSP.

Size of School Sites (R7 - R14)

The size of the proposed school site under this LSP is 3.4983 hectares. Generally, a primary school site is required to be a minimum of 4 hectares, however can be reduced in size to 3.5 hectares where there is co-location with adjoining POS (as is the case with this proposed LSP, given approximately 1.9525 hectares of co-located POS is to be provided under the proposed LSP).

Ceding and Acquisition of Land (R15 - R16)

The school site proposed under this LSP is intended to be ceded free of cost to the Department of Education.

This requirement is likely to be imposed as a condition of subdivision approval of the land by the WAPC and must be satisfied prior to lot titles being issued.

Infrastructure Costs and Recovery (R17 - R18)

In terms of infrastructure cost contributions, until detailed design of the school site is completed, the locations of on-street car parking areas and raised pedestrian crossings are unable to be determined at this point in time.

However, the proposed LSP has been designed to facilitate provision of on-street car parking areas and raised pedestrian crossings in the future once detailed plans are prepared to develop the school site.

Topography and Special Features (R19)

No special features, such as remnant vegetation, exist upon the proposed school site under the LSP.

Land topography of the proposed school site ranges from 11 metres (south west corner) to 15 metres (north east corner). The sites slope is no greater than 1 in 20 as required under Liveable Neighbourhoods.

The City of Rockingham and the Department of Education require the school and POS to be flat. The LSP map has been annotated accordingly (refer notation No. 7) and an indicative earthwork design for the school site prepared by Cossill and Webley Engineers (refer Appendix 6) will be undertaken as part of the future land subdivision approval process.

Street Network and Design (R20 - R28)

School sites should be surrounded by a minimum of three streets, including a neighbourhood connector and a wider local street. The school site and associated POS under the LSP is provided with frontage to four streets, with its western and southern lot frontage to a neighbourhood connector roads and the remainder having frontage to local access streets.

Roads within the proposed LSP have been designed with the objective of encouraging walking and cycling and have a high level of inter-connectivity and will provide direct and safe access from within the subject area to school site.

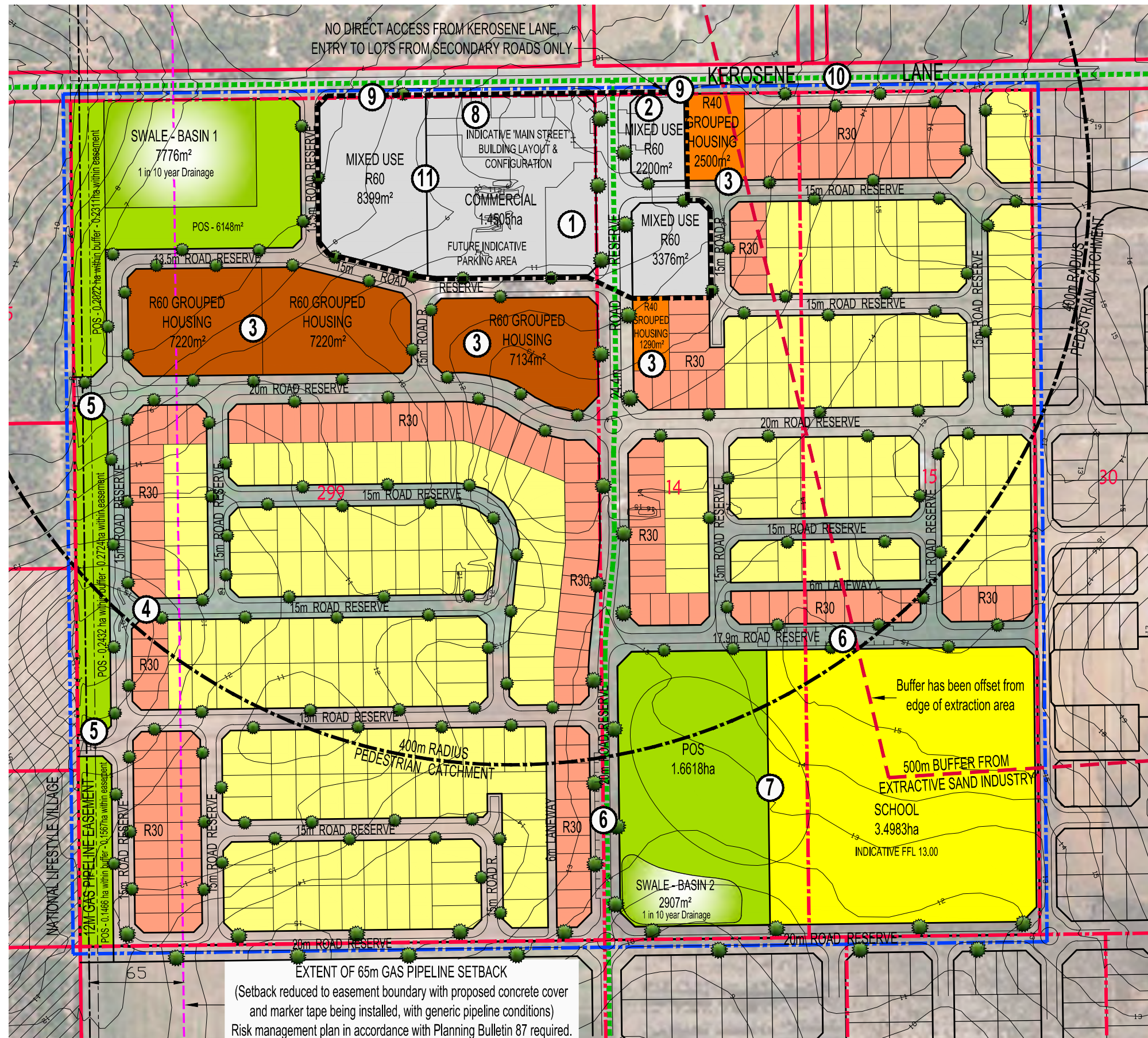
This requirement of Liveable Neighbourhoods is therefore considered to be satisfied.

Surrounding Land Uses (R29 - R31)

The LSP shows surrounding residential development at a R30 density which is designed to overlook both the school site and its adjoining POS area. No side or rear fences immediately abutting the school site is proposed. Furthermore, the school site is located outside of the local centre's catchment as recommended under Liveable Neighbourhoods.

Interim School Buildings (R32 - R34)

It is unlikely that the school site under this LSP will be developed for interim purposes and therefore, this component of Liveable Neighbourhoods is not considered to be relevant.



STRUCTURE PLAN NOTES

- 1 Spud Shed Commercial Premises - (2500m² retail NLA max)
- 2 Existing House (to be demolished).
- 3 Grouped housing, Mixed use and Commercial sites subject to DAP to ensure high quality main street built form and streetscape is achieved.
- 4 Traffic calming treatment at intersection.
- 5 Potential future east-west road linkages across gas pipeline.
- 6 On-street carparking surrounding school site.
- 7 POS (active playing field) and school site. Site to be flat as per City of Rockingham and Department of Education and Training requirements.
- 8 Single access for Commercial premises shown on plan.
- 9 No direct access from Kerosene Lane, entry to lots from secondary roads only.
- 10 Future upgrading of Kerosene Lane as per Baldivis Road, needs Study.
- 11 Slip lane servicing Residential Lots fronting Kerosene Lane as shown. Acoustic and visual buffer between mixed use development and commercial premises.

Total Structure Plan Area		38.7847 ha
Deductions for Calculating Net Site Area		
Primary School	3.4983 ha	
Commercial Site 1	1.4505 ha	
Restricted POS (1.7285 ha provided restricted open space - 0.6767 ha maximum permitted)	1.0518 ha	
Total	6.0006 ha	
Net Area		32.7841 ha
10 % POS	3.2784 ha	
8% unrestricted	2.6227 ha	
Joint School POS	1.6618 ha	
Pipeline Buffer	0.5920 ha	
NW Pocket Park	0.6148 ha	
Total	2.8686 ha	
2% restricted	0.6767 ha	
Pipeline Easement	0.6602 ha	
Basin 1	0.7776 ha	
Basin 2	0.2907 ha	
Total	1.7285 ha	
8% unrestricted	2.8686 ha	
2% restricted	0.6557 ha	
Total	3.5243 ha (10.75%)	

LEGEND

- Residential - R20
 - Residential - R30
 - Residential - R40
 - Residential - R60
 - School
 - Public Open Space
 - Drainage Swale incorporated into POS
 - Existing Lot Boundary
 - Structure Plan Boundary
 - Future Bus Routes
 - Gas pipeline setback
 - 500m Buffer from Extractive Sand Industry
- All Commercial and mixed use sites are excluded and are to be progressed through separate Amendment to Town Planning Scheme No. 2.



TOWN PLANNING SCHEME NO. 2

COUNCIL APPROVED
DATE ____/____/____

APPROVED ENDORSED BY
WAPC ON ____/____/____

FIGURE 3:
LOCAL STRUCTURE PLAN

LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WESTERN AUSTRALIA

SCALE 1:3,000 @ A3
DATE 8 June 2010
FILE 100608 1391 Structure Plan.dwg
REVISION H



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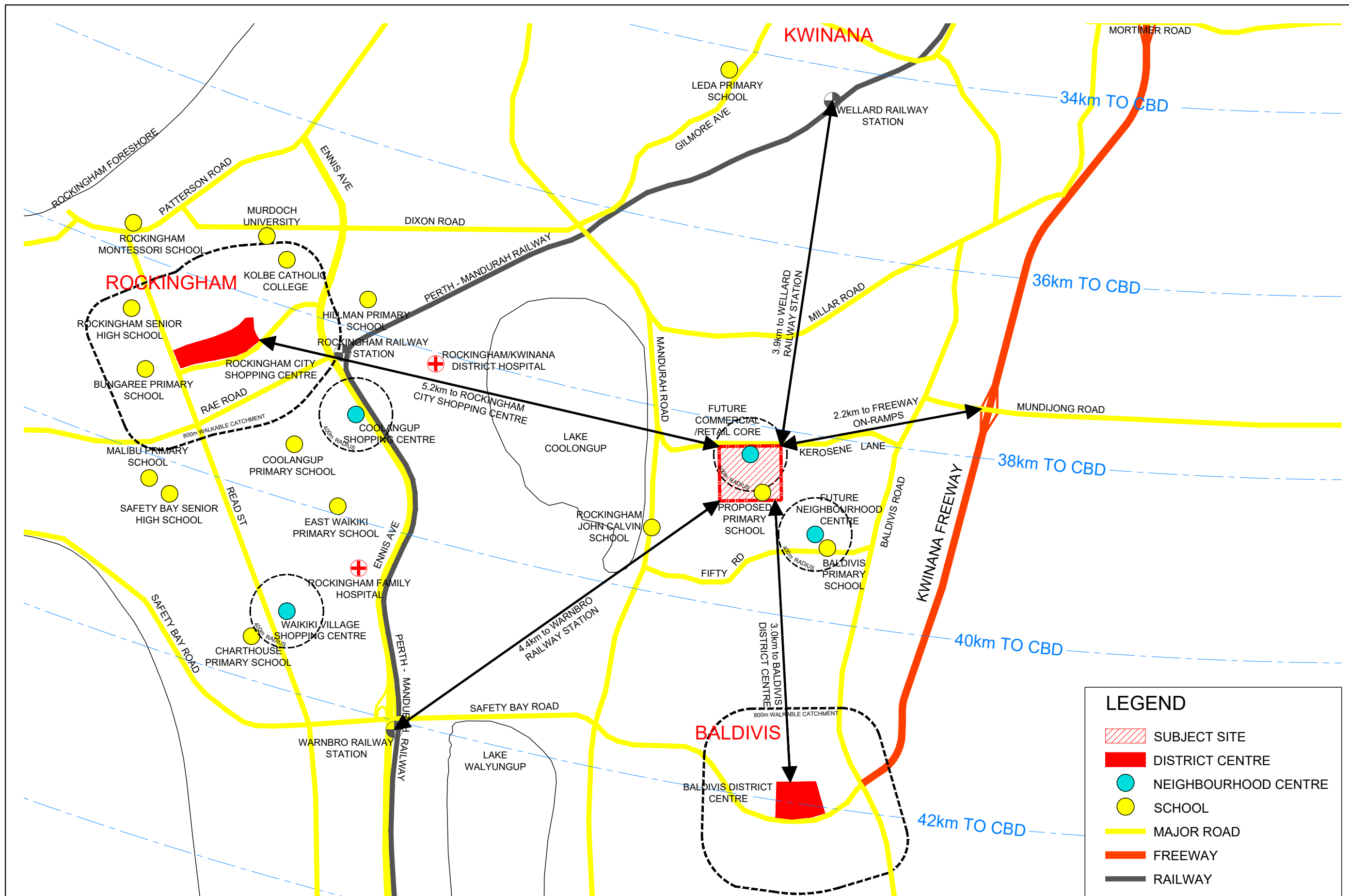


FIGURE 4:
CONTEXT ANALYSIS PLAN

LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WA

SCALE 1:40,000 @ A3
DATE 12 August 2009
FILE 090812 1391 Fig04 Context Analysis.dwg
REVISION -



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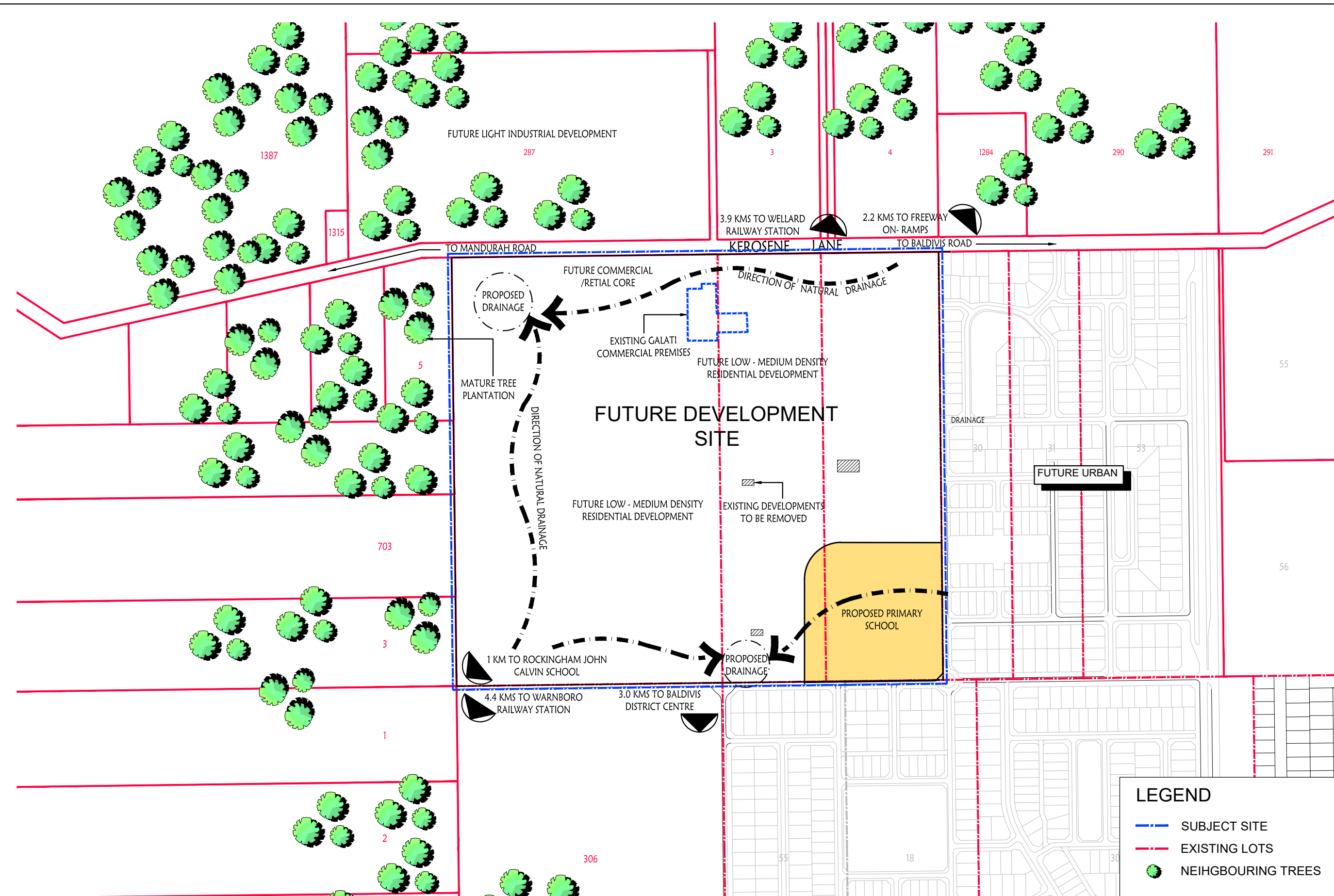


FIGURE 5:
SITE ANALYSIS PLAN

LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WA

SCALE 1:5,000 @ A3
DATE 12 August 2009
FILE 090812 1391 Fig05 Site Analysis.dwg
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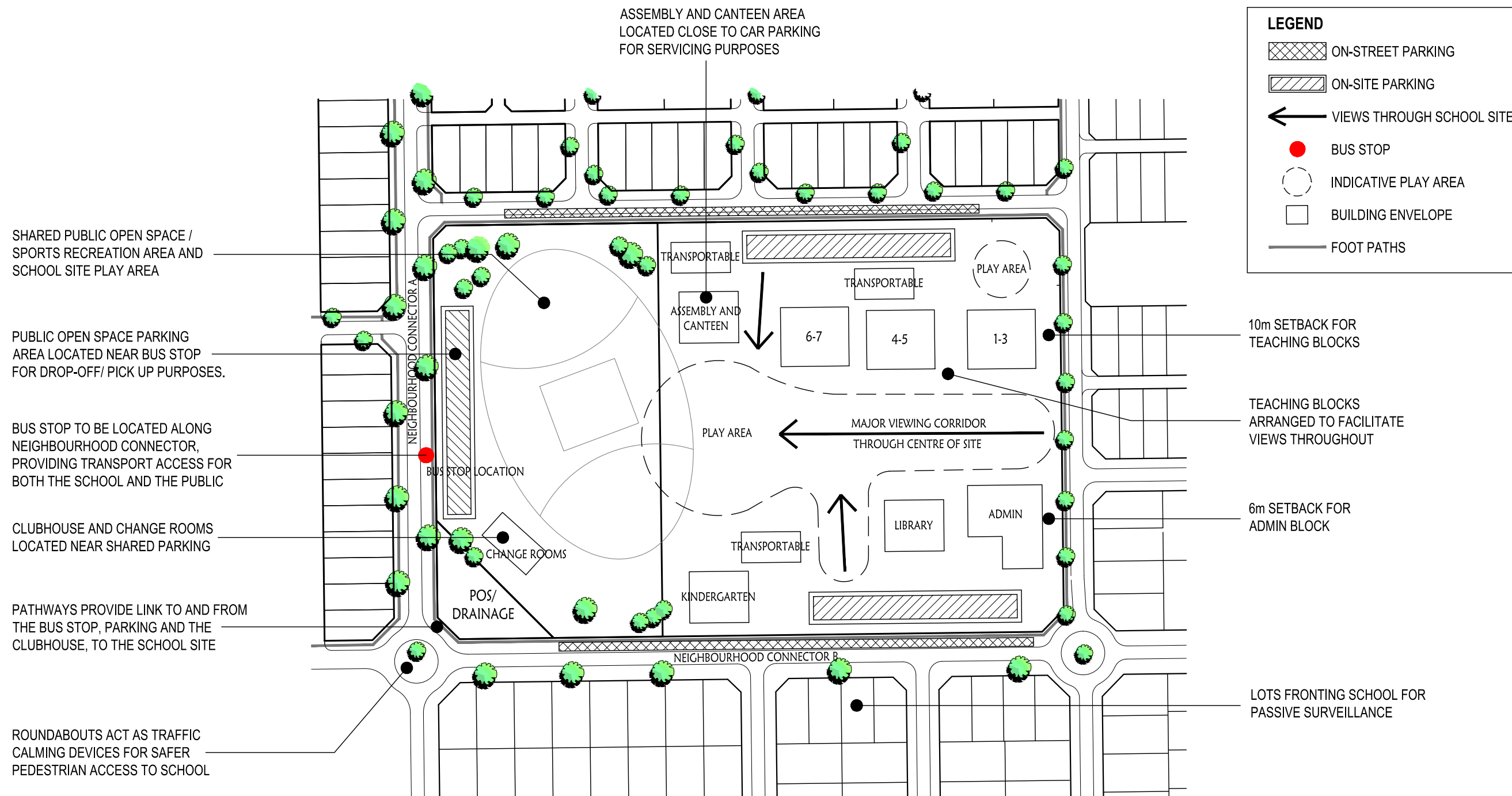


FIGURE 6:
INDICATIVE SCHOOL SITE LAYOUT

LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WA

SCALE 1:2,000 @ A3
DATE 12 August 2009
FILE 090812 1391 Fig06 School Site.dwg
REVISION -



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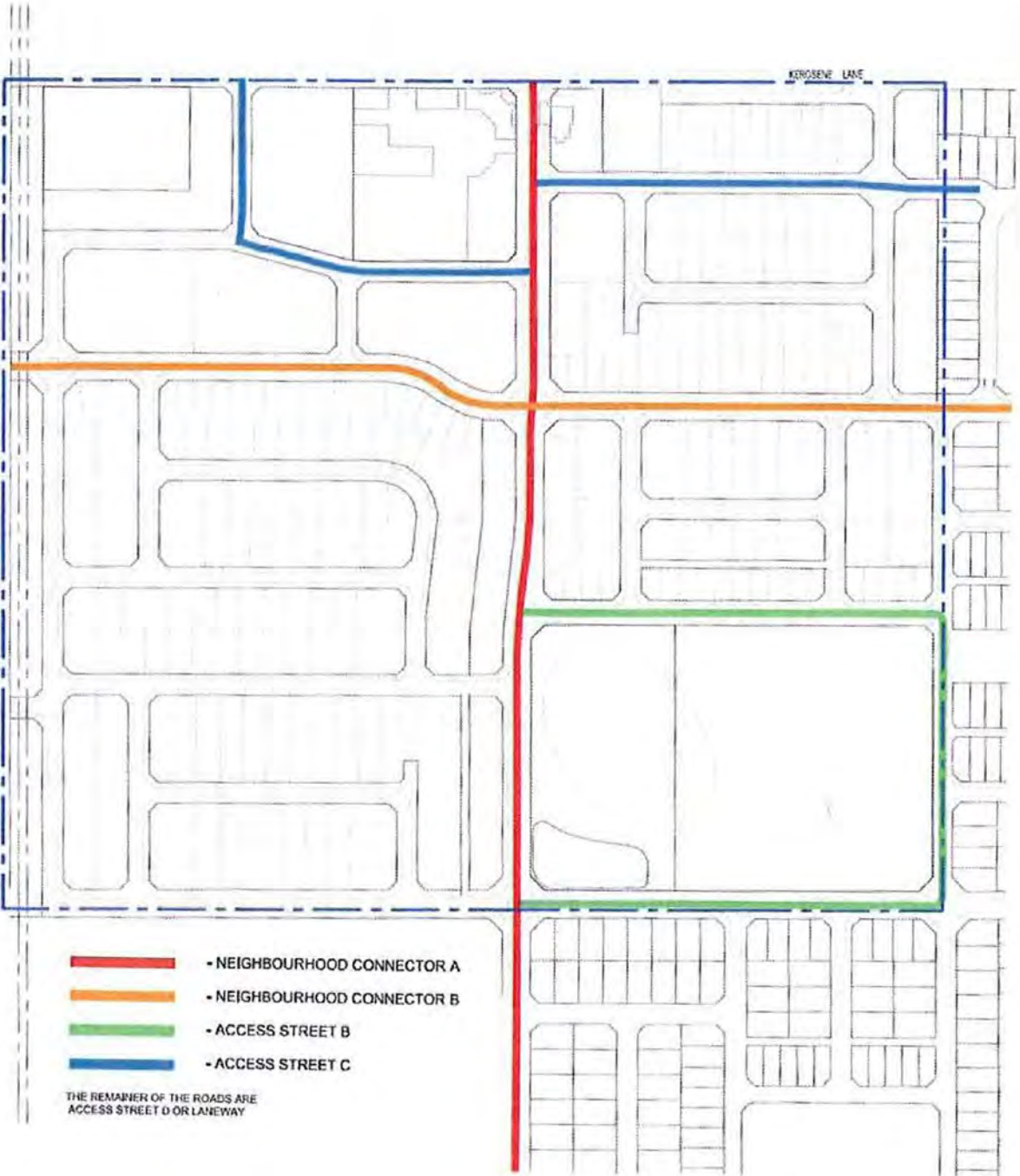


FIGURE 7: ROAD HIERARCHY PLAN
LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WESTERN AUSTRALIA

SCALE NTS @ A4
DATE 07 July 2010
FILE 100707 1391 Report Map.dwg
REVISION A



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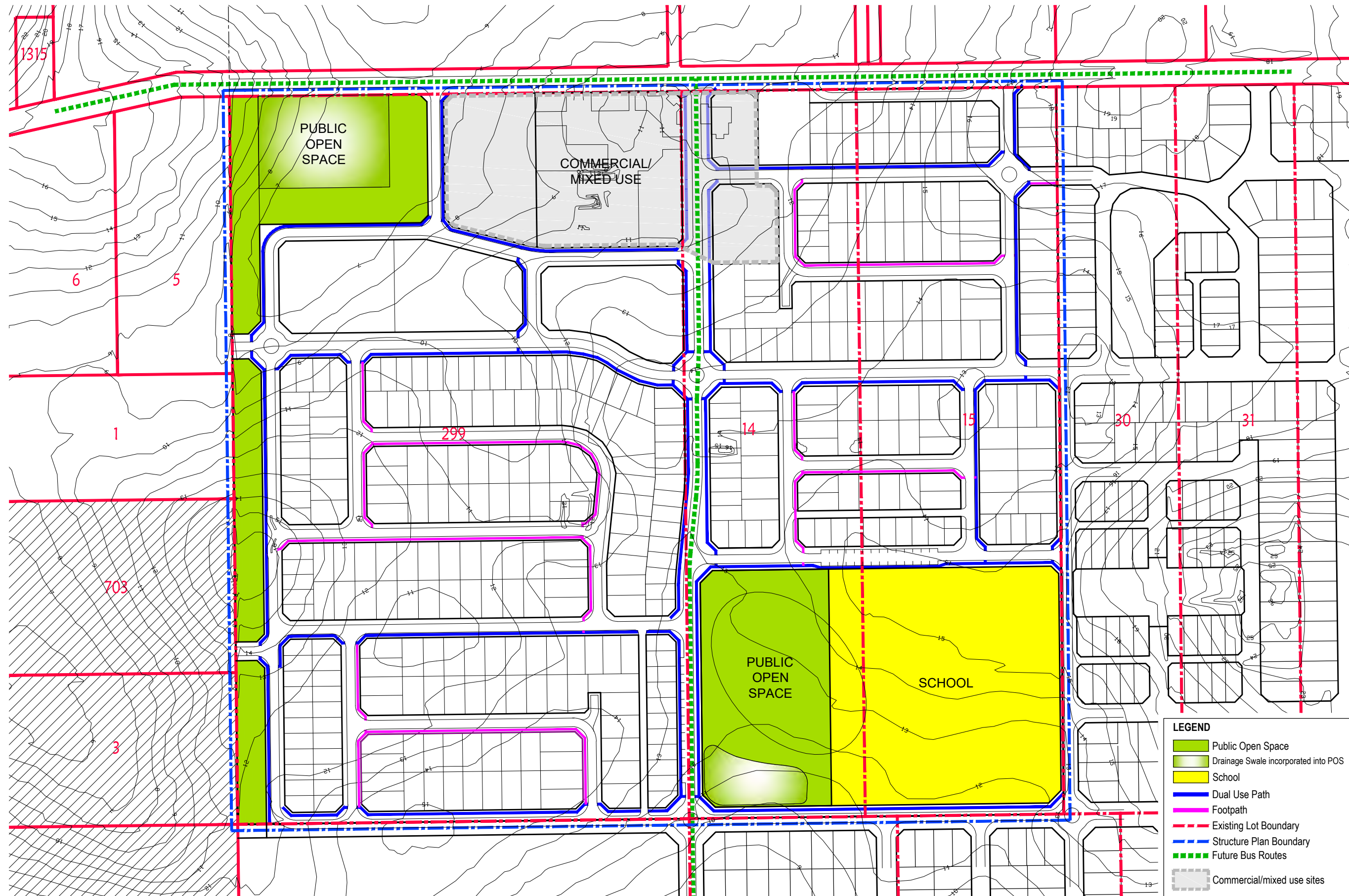


FIGURE 8:
PATH NETWORK PLAN

LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WESTERN AUSTRALIA

SCALE 1:3,000 @ A3
DATE 3 June 2010
FILE 100603 1391 DUP Plan.dwg
REVISION H



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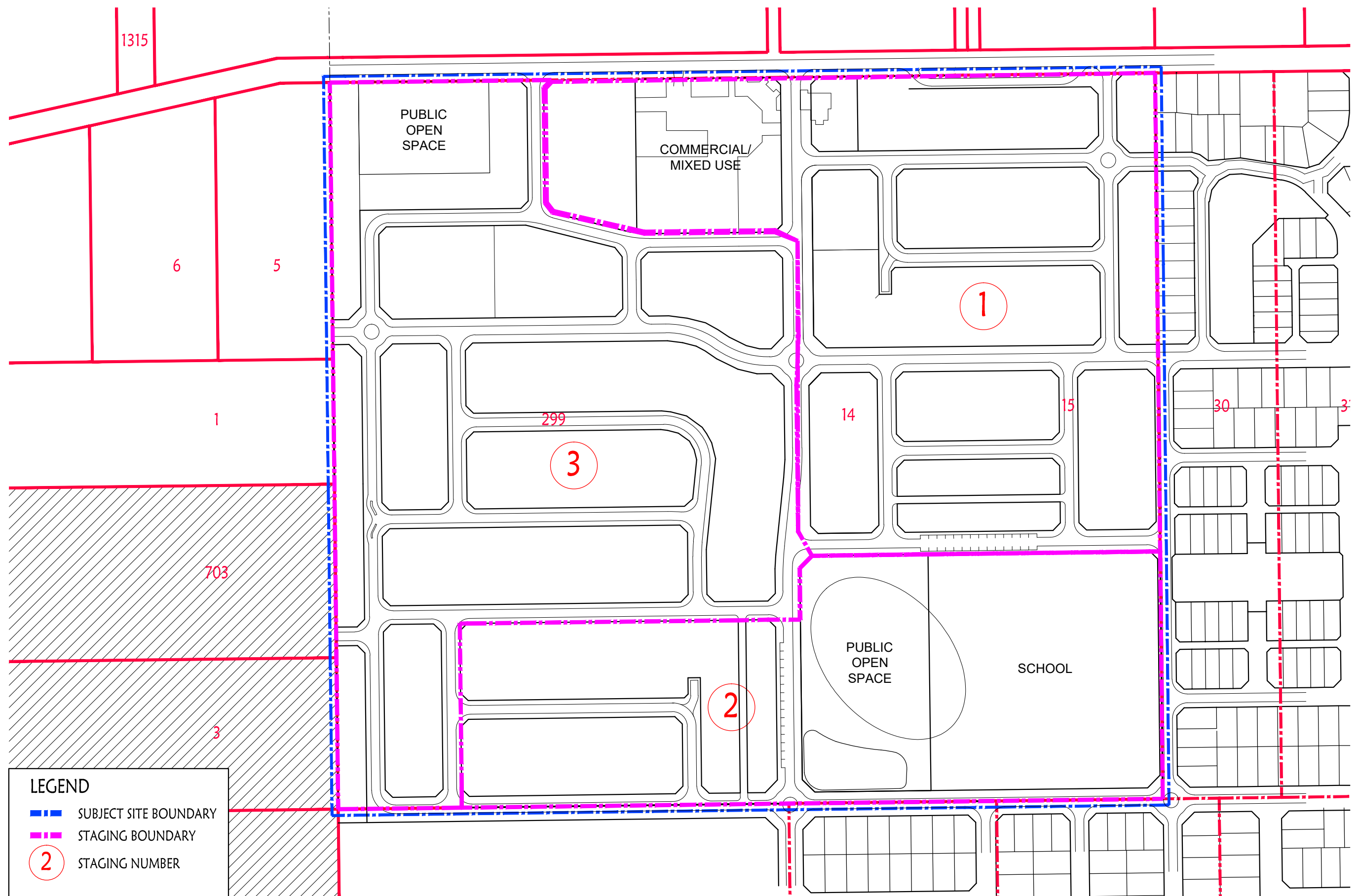


FIGURE 9:
STAGING PLAN

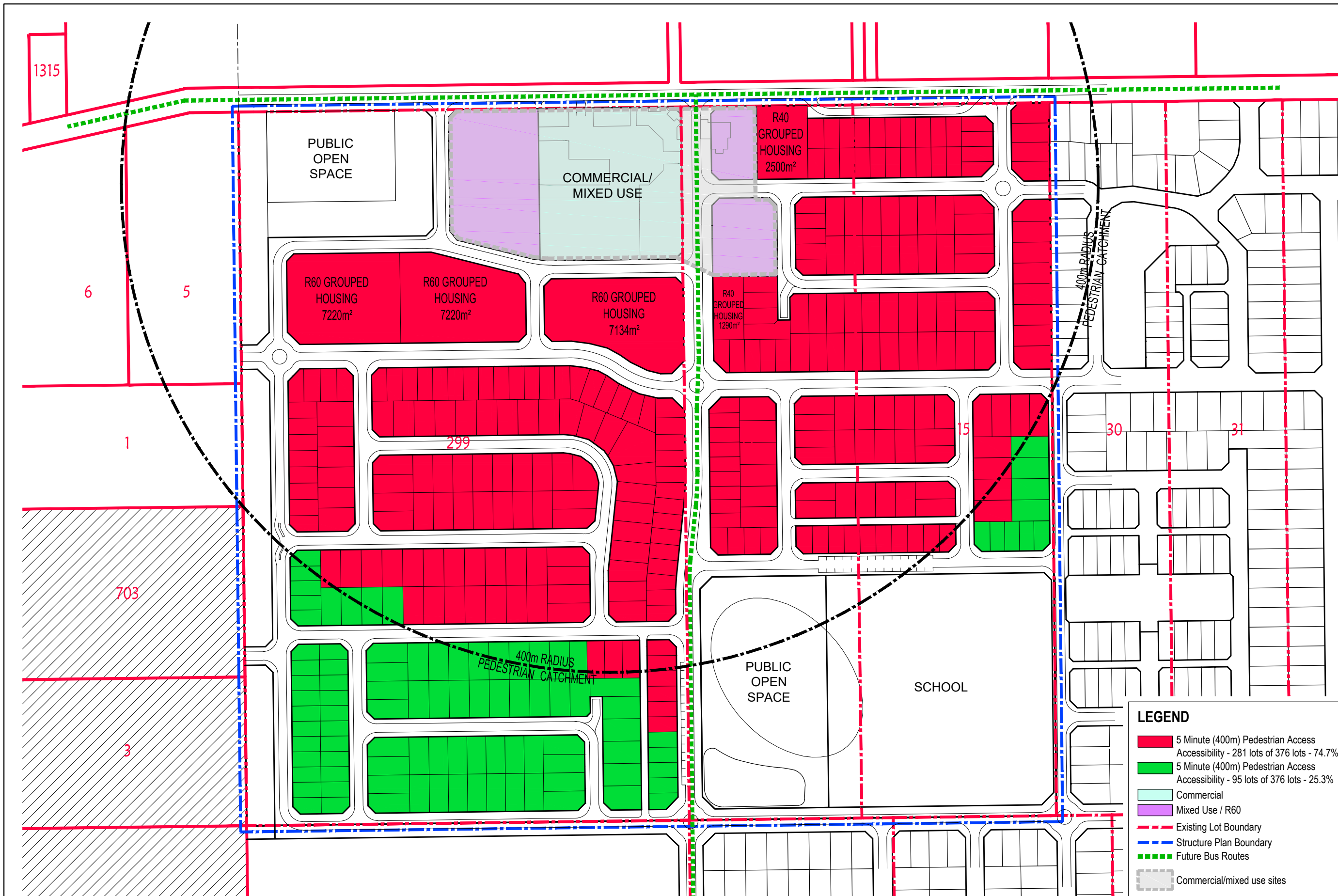
**LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WA**

SCALE	1:3,000 @ A3
DATE	12 August 2009
FILE	090812 1391 Fig09 Staging Plan.dwg
REVISION	-



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6.0 STATUTORY PLANNING SECTION

This section represents the statutory planning component of the Local Structure Plan and includes the corresponding structure plan map (refer Figure 3).

This section is to be read in conjunction with Clause 4.2 (including all subclauses) of the City of Rockingham Town Planning Scheme No. 2 (TPS2).

Unless provided for by specific requirements contained within this Local Structure Plan, all development standards and requirements shall be in accordance with the City's TPS2, applicable Local Planning Policies and the Residential Design Codes of Western Australia 2002.

6.1 GUIDING PRINCIPLES AND OBJECTIVES

The following guiding principles and objectives apply to the Commercial and Mixed Use zoned land within the Local Structure Plan area;

- To create an active focus for the community with a diversity of land uses which generate both day and evening activity and promote and contribute to the achievement of a vibrant and diverse Local Centre which achieves economic, social and environmental sustainability.
- To allow appropriate businesses to locate and develop in close proximity to the Local Centre for the convenience of its residents.
- Encourage high standards of 'Main Street' streetscape, urban design and built form.
- Provide efficient vehicle access and circulation with pedestrian focus and priority.
- Encourage development with a high level of passive surveillance of public and private spaces in accordance with the WAPC's 'Designing Out Crime' guidelines.
- A legible and interconnected network of publicly accessible internal streets being provided to maximise permeability throughout the Local Structure Plan and provide functional public transport outcomes at grade with the street.
- Development designed to be accessible for residents, employees and visitors of all ability levels.
- All areas of the Local Structure Plan will be seamlessly connected to the surrounding urban area by a safe and convenient pedestrian and cycle network.
- Development to address and activate the public realm to create a safe and comfortable environment that encourages social interaction and passive surveillance.
- The Local Structure Plan will provide for an inclusive, healthy, and engaged community with a high level of access to social infrastructure and community services and facilities.
- The Local Structure Plan will deliver infrastructure and essential services in a timely manner to support the future population and meet community needs.
- Higher density housing and mixed use development will be encouraged in close proximity to the Local Centre.

6.2 LOCAL STRUCTURE PLAN AREA

The Local Structure Plan area comprises three lots, being Lot 14 of 8.2422 hectares, Lot 15 of 9.3485 hectares and Lot 299 of 21.194 hectares. All lots have frontage to Kerosene Lane.

The Local Structure Plan area comprises a total area of approximately 38.7847 hectares and applies to land zoned 'Development' under the City's TPS2 and in which is contained within the Local Structure Plan Map boundary.

6.3 LAND USE ZONING AND USE CLASS PERMISSIBILITY

The Local Structure Plan Map identifies the zones to be applied to various sub precincts and areas. The zones applied align to those provided under TPS2, except for the proposed Commercial and Mixed Use sites, which will be progressed through separate Amendment to the City's TPS2 via Amendment No. 105.

All land use classifications, their permissibility and also corresponding development standards under the 'Residential' Zone for all proposed residential sites (R20, R30, R40 and R60) shall be as per the provisions of TPS2 and the Residential Design Codes of Western Australia (2002).

6.5 RETAIL FLOOR SPACE LIMIT

The maximum retail floor space for the 'Commercial' zone within the Local Structure Plan shall be 2,500m² Nett Lettable Area (NLA).

TPS2 'net lettable area' (NLA) definition shall apply to the Local Structure Plan, for the purposes of calculating NLA retail floor space.

7.0 ENVIRONMENTAL AND ENGINEERING CONSIDERATIONS

Liveable Neighbourhoods requires environmental management plans and engineering details which cover issues including, but not limited to, geotechnical, vegetation, wetland management, acid sulphate soils and local water management.

The above technical reports are to be submitted in support of a proposed Local Structure Plan (LSP). In this instance, the following reports are provided, as appendices, in support of the proposed LSP;

- Appendix 5: Environmental Assessment Report, ENV Australia;
- Appendix 6: Engineering Servicing Report, Cossill & Webley;
- Appendix 7: Transport Assessment Report, Transcore;
- Appendix 8: Local Water Management Strategy, prepared by ENV Australia; and,
- Appendix 9: Environmental Preliminary Site Investigation, ENV Australia; and,
- Appendix 10: Parmelia Gas Pipeline Risk Assessment and Protection Plan.

The detail of the supporting reports will not be duplicated here, however, key issues identified are summarised in this section for clarity as follows.

- Site is found on sand of yellow to brown colour derived originally from Tamala limestone origins, has good permeability and structural characteristics and is considered suitable for urban development purposes.
- No acid sulphate soils exist. Some minor contamination has been identified as a result of the sites historical use as a market garden (pesticides etc). ENV Australia has referred its findings in this regard to the relevant state government department for its further consideration.
- Relatively minor earthworks required to provide for required design standards on roads and building sites whilst still retaining much of the original land form.
- No impediment to the supply of electrical power, water, sewer, gas and telecommunications to the site.
- All lots to contain stormwater onsite, soak wells within drainage system to allow 'at source' infiltration, drainage sized to convey a 1 in 5 year ARI storm event and road reserve and drainage swales sized to retain and convey a 1 in 100 year storm event.
- Local water management practices to include non structural controls, such as xeriscaping, soil amendment and public education, soak wells and pervious pavements and gross pollutant traps prior to discharge into drainage swales within POS.
- No vegetation surveyed as being declared rare or priority flora worthy of retention.
- No significant environmental features required to be retained.
- No significant or specific traffic related issues.

8.0 RETAIL ANALYSIS SUPPORTING PROPOSED LOCAL CENTRE

It is considered Lots 14, 15 and 299 represent the ideal location for a single 'local centre' site servicing all lots within the Local Structure Plan (LSP) and future Light Industrial uses to the north of Kerosene Lane.

It is intended that the northern portion of the LSP area, along Kerosene Lane, be developed as a local centre accommodating commercial (including retail) and complimentary non retail based community services.

The provision of a 2500m² NLA retail local centre for the proposed LSP area is considered appropriate for the following reasons;

1. The local centre's location within the LSP area will provide a transitional buffer to future light industrial uses to the north of the Local Structure Plan area whilst appropriately interfacing with residential uses to the south, particularly from a land use segregation and resultant amenity protection perspective. The provision of a local centre will ensure it's role and function is maximised, through increased commercial viability and access.
2. Given recent development of the Baldivis (Stockland) District Shopping Centre approximately 3 kilometres to the south of this LSP area, the neighbourhood centre in its current location to the south of the LSP area is considered not to be commercially viable.
3. The provision of a local centre on the subject site satisfies Liveable Neighbourhood's to a much greater extent than the current location of the neighbourhood centre within the LSP over Lots 30 and 31 Kerosene Lane and Lot 308 Fifty Road, Baldivis. In particular, the subject site is:
 - Centrally located;
 - Supported by both mixed use and medium density residential development within walkable range;
 - Located at an intersection of relatively busy streets, both of which are planned public transport (bus) routes;
 - At the 'downstream' end of the anticipated daily movement pattern; and
 - On the 'going home' side of the road, for the majority of vehicle traffic.

As stated above, provision of retail floor space is examined in detail in the retail study undertaken by Shrapnel Planning and is contained within Appendix 4 of this report.

Whilst detailed design of the proposed local centre has not been undertaken at this stage, the subject site is considered to lend itself more favourably to 'main street' urban design and built form principles and outcomes, with these principles being given due regard in the centre's future design.

The subject site accords with the relevant principles, objectives and requirements of Liveable Neighbourhoods, which is the accepted manual for quality urban design in Western Australia. Preceding Sections detail the improved economic viability, employment opportunities and community services likely to result from consolidation on the subject site, which shall thereby foster a community that is sustainable, vibrant and efficient.

The proposed LSP is entirely consistent with relevant statutory and strategic planning documents and represents an opportunity to 'fast track' the establishment of a local centre in this locality.

Based on the above comments and the results of the Retail Study forming Appendix 4, it is therefore recommended that the City of Rockingham support the provision of a 2500m² NLA retail local centre within the LSP area, amend its TPS2 to provide for the necessary land use control and subsequent minor amendment to its Local Commercial Strategy in order to formalise its provision in this location.

9.0 CONCLUSION

The proposed Local Structure Plan (LSP), Amendment No. 105 to TPS2 for the proposed commercial and mixed use sites and resultant future minor amendment to the City's Local Commercial Strategy has been the product of detailed planning, research, discussion and negotiation over a period of over 3 years. As the various matters and justifications outlined in the preceding sections demonstrate, the proposal ensures all relevant planning considerations are addressed to ensure orderly and proper planning is achieved, through specific input from the City's town planners.

The proposed LSP, Amendment to the City's TPS2 and future minor amendment to the City's Local Commercial Strategy acknowledge conceptual planning undertaken by the City of Rockingham and through detailed site analysis seek to optimise the subject site's locational attributes, in comparison with the current endorsed neighbourhood centre location to the south of the LSP area.

In summary, the LSP, Amendment to the City's TPS2 to allow for the proposed centre and mixed use sites and also minor amendment to the City's Local Commercial Strategy to formally allocate 2500m² NLA retail to the proposed local centre within the LSP area warrants adoption and endorsement by the Council of the City of Rockingham and the Western Australian Planning Commission, respectively, for the following reasons:

- The proposal adopts the fundamental planning principles and ideologies associated with the existing approved Local Structure Plans;
- The proposal is consistent with the provisions of the Metropolitan Region Scheme;
- The proposal is consistent with the provisions of the City of Rockingham Town Planning Scheme No. 2;
- The proposal is consistent with the *State Sustainability Strategy*, and through integration of transport and land use, appropriate densification of the subject site, and optimisation of economic viability, community and commercial services shall be maximised;
- The proposal is consistent with the provisions of the WAPC's *Liveable Neighbourhoods: Community Design Code*, and encourage sustainable development through the application of modern urban design principles;
- The proposal is consistent with the provisions of *Network City: community planning strategy for Perth and Peel*. The subject proposal shall accommodate urban growth primarily within a Network City pattern, incorporating integration of transport and land use through a network of 'activity centres' connected by 'activity corridors';
- The proposed local centre satisfies the objectives of 'State Planning Policy No. 4.2 – Metropolitan Centres Policy Statement for the Perth Metropolitan Region';
- The proposed amendment shall not lead to an oversupply of retail floor space in the region, and shall not compromise the planned hierarchy of centres. The proposed local centre is anticipated to have greater economic viability than the current endorsed location of the neighbourhood centre to the south;
- The proposal is consistent with the objectives of 'State Planning Policy No. 3 - Urban Growth and Settlement', which seeks a strong, diversified and sustainable economic base, coordinated with the efficient and economic provision of transport; variety and choice in the size, type and affordability of housing; and the clustering of retail, employment, recreational and other activities in activity centres;

- The proposed local centre is entirely consistent with the objectives and strategies of the City of Rockingham Centres Strategy (Revised Final January 2005), which calls for a “*fresh approach*” to overcome the existing “*sterile*” shopping structure. The Centres Strategy specifically recommends the reallocation of endorsed floor areas to “*more strategically located sites on more important roads*”, such as the subject site; and,
- The proposal is consistent with the stated aims and strategies of other relevant City of Rockingham strategic plans.

In light of the above, there are strong and sound grounds for the provision of a ‘local centre’ upon the subject site.

As demonstrated in the detailed sections of this report, the subject proposal is consistent with the principles of orderly and proper planning.

Accordingly, the proposed Local Structure Plan warrants adoption and endorsement by the City of Rockingham and Western Australian Planning Commission, respectively.

APPENDIX 1
CERTIFICATES OF TITLE

WESTERN



AUSTRALIA

REGISTER NUMBER
14/D32035DUPLICATE
EDITION
N/ADATE DUPLICATE ISSUED
N/A

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
12FOLIO
110A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 14 ON DIAGRAM 32035

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

GALATI NOMINEES PTY LTD OF 2ND FLOOR, 34 COLIN STREET, WEST PERTH
(T E640283) REGISTERED 28 JUNE 1991

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

1. E640285 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 28.6.1991.
2. H335991 MORTGAGE TO ESANDA FINANCE CORPORATION LTD REGISTERED 14.1.2000.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 12-110A (14/D32035).
PREVIOUS TITLE: 1282-741.
PROPERTY STREET ADDRESS: 124 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

INDEXED

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Transfor 89332/66
Volume 1282 Folio 741

WESTERN

ORIGINAL
AUSTRALIA

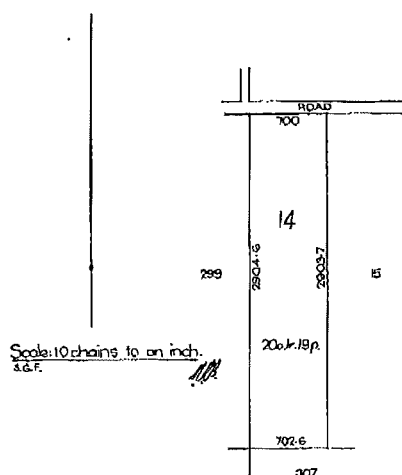
VOL 12 FOL 110A

Certificate of Title

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

Frank Paulik, Nurseryman, and Mary Paulik, his Wife, both of 54 Davilak Road, Hamilton Hill, are now the proprietors as joint tenants of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing twenty acres one rood and nineteen perches or thereabouts, being portion of Peel Estate Lot 298 and being Lot 14 on Diagram 32035.

Dated the 15th day of December, 1966.



[Signature]
REGISTRAR OF TITLES.

Application D184311 The registered proprietor is Mary Paulik of Lot 14 Kerosine Lane, Baldivis, Nurserywoman, by survivorship. (Frank Paulik died 9-11-1984).

20th January 1986

Transfer E640283 to Galati Nominees Pty Ltd, of 2nd Floor, 34 Colin Street, West Perth. Registered 28th June, 1991 at 8.17 hrs.



For encumbrances and other matters affecting the land see back

2020817/100-SCM-CYRAL

Received Time: 14. Nov. 2008 12:35 No. 6557 Printed Time: 14. Nov. 12:37

LANDGATE COPY OF ORIGINAL NOT TO SCALE Fri Nov 14 13:33:49 2008 JOB 31297184

Superseded - Copy for Sketch Only

EASEMENTS AND ENCUMBRANCES REFERRED TO

19/7/99
 Mortgage E640284 to ~~Mark~~ Mary Paulik, of care of Mark Balfour & Associates, Solicitors, 24 Riseley Street, Applecross.
 Registered 28th June, 1991 at 8.17 hrs.



Mortgage E640285 to Australia & New Zealand Banking Group Ltd. Registered 28th June, 1991 at 8.17 hrs.



Discharge H159091 of Mortgage E640284. Registered 6th July 1999 at 9.14 hrs.



Mortgage HJ35991 to Esanda Finance Corporation Ltd. Registered 14th January 2000 at 8.14 hrs.



CERTIFICATE OF TITLE

VOL. 12 FOL. 110A

CT 0012 0110A B



Superseded - Copy for Sketch Only

WESTERN



AUSTRALIA

REGISTER NUMBER
15/D32035DUPLICATE
EDITION
N/ADATE DUPLICATE ISSUED
N/A

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
16FOLIO
370A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 15 ON DIAGRAM 32035

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

GALATI NOMINEES PTY LTD OF CARE OF K.I. BRADBURY, 2ND FLOOR, 34 COLIN STREET, WEST PERTH
(T E165789) REGISTERED 8 AUGUST 1989

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

1. E165790 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 8.8.1989.
2. F267267 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 3.8.1993.
3. H335992 MORTGAGE TO ESANDA FINANCE CORPORATION LTD REGISTERED 14.1.2000.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.

* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.

Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 16-370A (15/D32035).
PREVIOUS TITLE: 1282-741.
PROPERTY STREET ADDRESS: 138 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

Superseded - Copy for Sketch Only

INDEXED

JT

Transfer 9427/67 WESTERN
Volume 1282 Folio 741



ORIGINAL
AUSTRALIA

REGISTER BOOK

VOL. 16 FOL. 370A

Certificate of Title

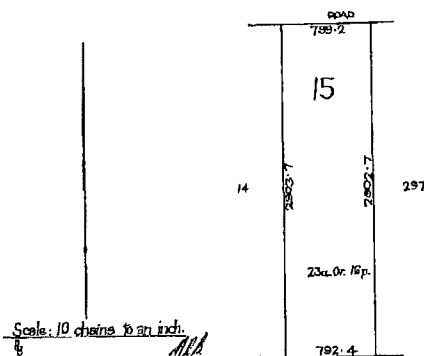
UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

CT 0016 0370A F



Vincenzo Trolio and Vincenzo Pietroniro both of Lot 34 Hamilton Road, Hamilton Hill, Nurserymen, are now the proprietors as tenants in common in equal shares of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing twenty-three acres and sixteen perches or thereabouts, being portion of Peel Estate Lot 298 and being Lot 15 on Diagram 32035.

Dated the 9th day of February, 1967.



as Registrar of Titles.

Transfer 1833390 to Frank Paulik, Nurseryman, and Mary Paulik his wife, both of lot 14 Kerosine Lane, Baldvies. Registered 7th June 1974 at 9.30 a.m.



Application D184309 The registered proprietor is Mary Paulik of Lot 14 Kerosine Lane, Baldvies, Nurserywoman, by survivorship. (Frank Paulik died 9-11-1984).



20th January 1986

Transfer E165789 to Galati Nominees Pty. Ltd. of 1st Floor, 885 Albany Highway, East Victoria Park. Registered 8th August 1989 at 8.00 hrs.



The correct address of the registered proprietor is now care of K.I. Bradbury, 2nd Floor, 34 Colin Street, West Perth. By F267267. Dated 3rd August 1993 at 8.04 hrs.



230817/08-SDM-Q/PAL

For encumbrances and other matters affecting the land see back

Received Time 14. Nov. 2008 12:35 No. 6557 Printed Time 14. Nov. 12:39

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Fri Nov 14 13:33:49 2008 JOB 31297184

EASEMENTS AND ENCUMBRANCES REFERRED TO

Mortgage 942867 to The Commercial Bank of Australia Limited Registered 9th February 1978 at 9.30 hrs.

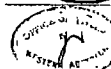
DISCHARGED

REGISTERED

Indemnity of Mortgage 942867 Registered 13th June 1978 at 9.00 hrs.



Mortgage E165790 to Australia & New Zealand Banking Group Ltd. Registered 8th August 1989 at 8.00 hrs.



Mortgage F267267 to Australia & New Zealand Banking Group Ltd. Registered 3rd August 1993 at 8.04 hrs.



Mortgage H335992 to Esanda Finance Corporation Ltd. Registered 14th January 2000 at 8.14 hrs.



CERTIFICATE OF TITLE

VOL. 16 FOL. 370A

CT DD16 0370A B



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WESTERN



AUSTRALIA

REGISTER NUMBER
299/DP202704DUPLICATE
EDITION
1DATE DUPLICATE ISSUED
25/7/2008

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
1276FOLIO
821

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

**LAND DESCRIPTION:**

LOT 299 ON DEPOSITED PLAN 202704

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ANTONINO GALATI
VINCENZO PASQUALINO GALATI
BOTH OF LOT 14 KEROSENE LANE, BALDIVIS
AS TENANTS IN COMMON IN EQUAL SHARES

(T H813288) REGISTERED 18 JULY 2001

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. A364182 EASEMENT TO AMPOL EXPLORATION LIMITED, SHELL DEVELOPMENT (AUSTRALIA) PTY. LIMITED, TEXACO OVERSEAS PETROLEUM COMPANY AND CALIFORNIA ASIATIC OIL COMPANY. SEE SKETCH ON VOL 1276 FOL 821, REGISTERED 18.1.1971.
K395712 NOTIFICATION. THE GRANTEE OF EASEMENT A364182 ARE NOW APT PARMELIA PTY LTD PURSUANT TO SECTION 20(5) OF THE PETROLEUM PIPELINES ACT 1969. REGISTERED 31.10.2007.
2. B944288 EASEMENT TO ALCOA OF AUSTRALIA (W.A.) LIMITED. SEE SKETCH ON VOL 1276 FOL 821. REGISTERED 27.6.1980.
3. K644968 MORTGAGE TO ST. GEORGE BANK LTD REGISTERED 2.7.2008.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1276-821 (299/DP202704).
PREVIOUS TITLE: 1215-813.
PROPERTY STREET ADDRESS: 120 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

END OF PAGE 1 - CONTINUED OVER

RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: 299/DP202704

VOLUME/FOLIO: 1276-821

PAGE 2

NOTE 1: A000001A LAND PARCEL IDENTIFIER OF PEEL ESTATE LOT 299 (OR THE PART THEREOF) ON
SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 299 ON DEPOSITED
PLAN 202704 ON 17-JUN-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.
NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE
OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

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Transfer 60063/63 (22929)

Volume 1215 Folio 813



WESTERN AUSTRALIA.

ORIGINAL
REGISTER BOOK.

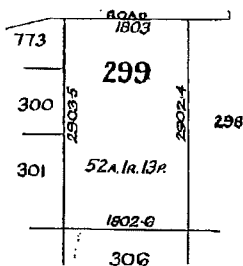
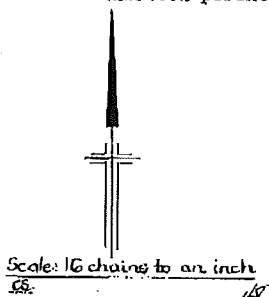
Vol. 1276 Fol. N° 821

Certificate of Title



under "The Transfer of Land Act, 1893" (36 Vic. 14. s. 5).

Bortolo Nicola Morzenti, Plant Attendant and Dora Angela Morzenti, Married Woman, both of 23 Hoyle Road, Naval Base, are now the proprietors as joint tenants of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing fifty-two acres one rood and thirteen perches or thereabouts, being Peel Estate Lot 299.



Dated the tenth day of October One thousand nine hundred and sixty-three.

Registrar of Titles.

Transfer F261262 to Antonino Galati of Lot 14 Kerosene Lane, Baldivis, Vincenzo Pasqualino Galati of Lot 15 Power Avenue, Baldivis and Sebastiano Galati of Lot 14 Kerosene Lane, Baldivis, as tenants in common. Registered 27th July 1993 at 15.42 hrs.



Transfer H813288 The one undivided third share of Sebastiano Galati is transferred to Antonino Galati and Vincenzo Pasqualino Galati. The registered proprietors are now Antonino Galati and Vincenzo Pasqualino Galati both of Lot 14 Kerosene Lane, Baldivis, as tenants in common in equal shares. Registered 18th July 2001 at 8.03 hrs.



641112162-48,500-111C

For encumbrances and other matters affecting the land see back.

RP

Received Time: 14. Nov. 2008 12:35 No. 6557

Printed Time: 14. Nov. 12:42

LANDGATE COPY OF ORIGINAL NOT TO SCALE

Fri Nov 14 13:33:49 2008 JOB 31297184

EASEMENTS AND ENCUMBRANCES REFERRED TO

Transfer B364182 Grants pursuant to the Petroleum Pipelines Act 1969 assigned to Ampol Exploration Limited Shell Development (Australia) Pty Limited, Texas Overseas Petroleum Company and California Maritime Oil Company the right to enter upon the portion of the within land coloured blue on the map in the margin for the purpose of laying, constructing and maintaining pipelines and other apparatus and for other purposes as set out in the said Transfer. Registered 15th January 1971 at 2.34 hrs.

As to portion only:
Caveat A422089 Lodged 15.1.1971 at 2.41 hrs.

Transfer B944288. Grants pursuant to Alumina Refinery (Pinjarra) Agreement Act 1976 to Alcoa of Australia (W.A.) Limited, the right to enter upon the portion of the within land coloured blue on the map in the margin for the purpose of laying constructing and maintaining pipelines and other apparatus and for other purposes as set out in the said Transfer. Registered 27th June, 1980 at 10.10 o'clock.

Withdrawal B944287 of Caveat A422089. Lodged 27th June, 1980 at 10.10 o'clock.

Caveat C878545 Lodged 17.10.1984 at 9.50 o'clock.

WITHDRAWN

Caveat D977037. Lodged 23.12.1988 at 10.04 hrs.

WITHDRAWN

NOTIFICATION E436143 PURSUANT TO SECTION 20(5) OF THE PETROLEUM PIPELINES ACT OF 1969 THE GRANTEES OF EASEMENT A364182 ARE NOW
SHELL DEVELOPMENT (AUSTRALIA) PTY. LTD., AUSTRALASIAN OIL
EXPLORATION LTD., TEXACO OIL DEVELOPMENT COMPANY, AND
CHUMCHEN ASIAN LTD.
LODGED 30.8.1990 AT 16.00 HOURS (DUP C/T NOT PRODUCED)

Withdrawal F261260 of Caveat D977037. Lodged 27.7.1993 at 15.42 hrs.

Withdrawal F261261 of Caveat C878546. Lodged 27.7.1993 at 15.42 hrs.

Mortgage F261263 to Bortolo Nicola Morzenti and Dora Angela Morzenti both of 4 Hoyia Road, Hope Valley.
Registered 27th July 1993 at 15.42 hrs.

DISCHARGE

As to portion only:

Memorial F850024. Soil and Land Conservation Act 1945. Registered 7th April, 1995 at 11.22 hrs.

WITHDRAWN

NOTIFICATION H11675 Pursuant to Section 20(5) of the Petroleum Pipelines Act 1969 the Grantee of Easement A364182 is now CMS Gas Transmission of Australia.
Lodged 18.6.1999 at 11.25 hours. (Dup. CT not produced)

Withdrawal H374040 of Memorial F850024. Lodged 28.2.2000 at 9.49 hrs.

Discharge H813287 of Mortgage F261263. Registered 18th July 2001 at 8.03 hrs.

Mortgage H813289 to Australia & New Zealand Banking Group Ltd. Registered 18th July 2001 at 8.03 hrs.

CT 1276 0821 B



CERTIFICATE OF TITLE

Vol. 1276

Fol.

No

821

APPENDIX 2

BALDIVIS (NORTH) DISTRICT STRUCTURE PLAN

Precinct 2

400m walkable catchment

Proposed primary school and associated active public open space

Walkable Catchment Node

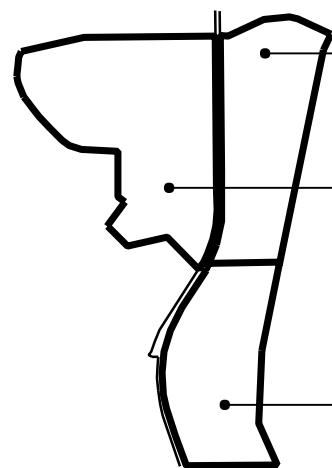
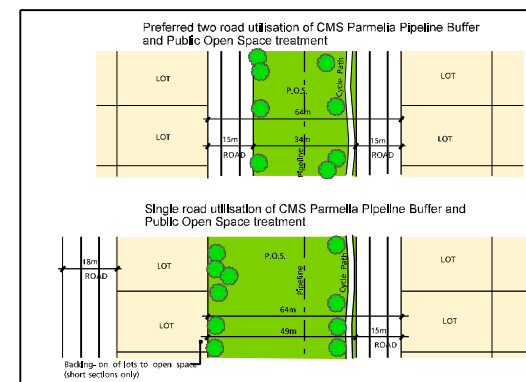
Dress Circle Lots - opportunity to design to capture long distance rural aspects

400m walkable catchment to Neighbourhood Centre

Neighbourhood Centre 5500m² nla max.

Significant Tuart trees to be protected, widen road reserve to accommodate in verge

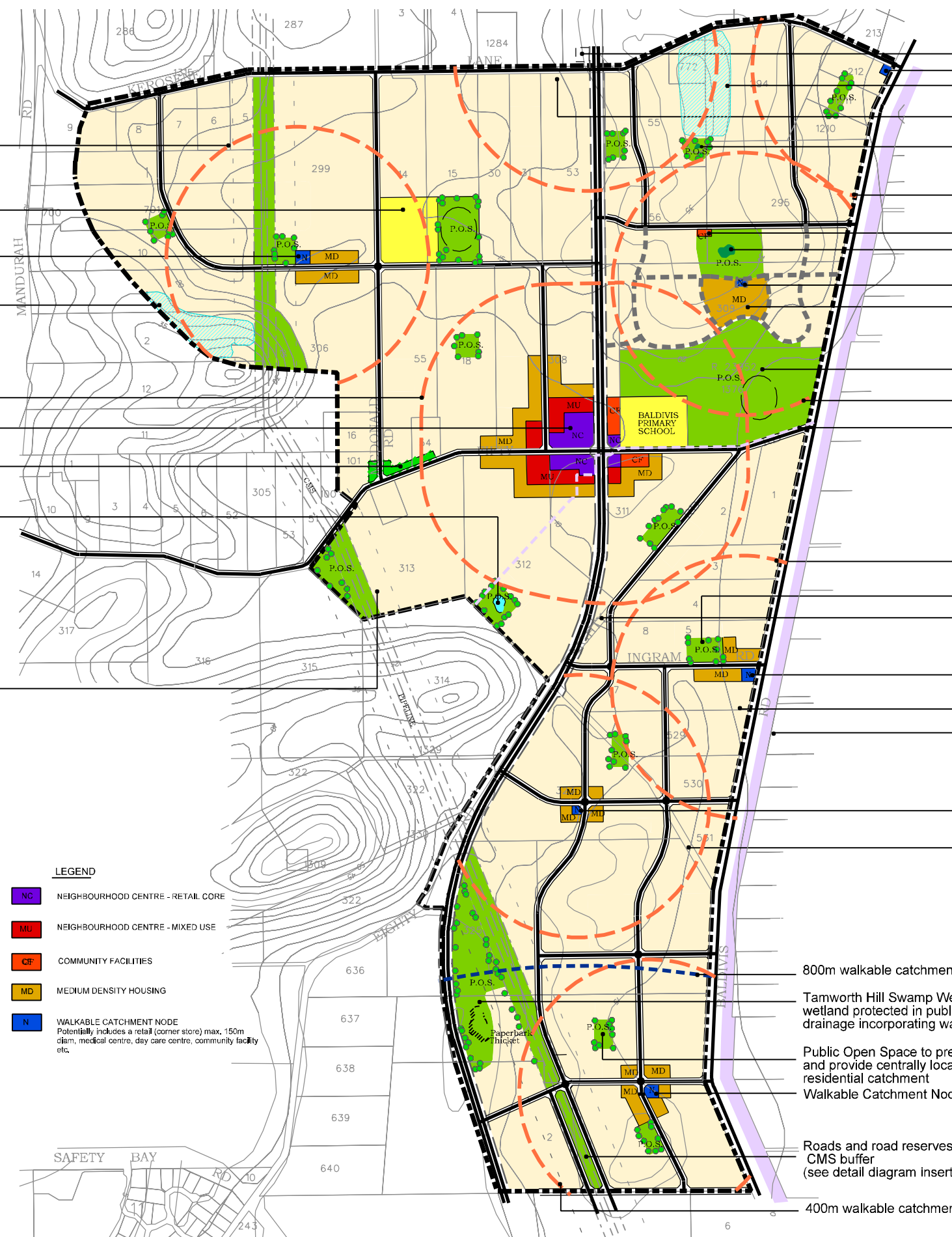
Existing wetland to be modified to create permanent lake and drainage feature encompassed within Public Open Space



PRECINCT 1.	
Total Area	123.21ha
Deductions	
Baldvis Primary School	3.17ha
Walkable Catchment Nodes	0.25ha
Neighbourhood Centre	0.25ha
Drainage (2%)	2.46ha
TOTAL	6.13ha
Total Developable Area	117.08ha
Public Open Space Requirement (10%)	11.71ha
Public Open Space Provided	11.71ha(10%)

PRECINCT 2.	
Total Area	184.75ha
Deductions	
Primary School	3.50ha
Neighbourhood Centre &	2.50ha
Walkable Catchment Nodes	0.25ha
CMS Buffer	3.62ha
Drainage	3.65ha
TOTAL	13.52ha
Total Developable Area	171.44ha
Public Open Space Requirement (10%)	17.14ha
Public Open Space Provided	17.14ha(10%)
Note : 50% credit only for areas within CMS 32m buffer subject to development. Refer section 6.3	

PRECINCT 3.	
Total Area	114.18ha
Deductions	
Walkable Catchment Nodes	0.50ha
CMS Buffer	2.70ha
Drainage (2%)	2.28ha
TOTAL	5.48ha
Total Developable Area	108.70ha
Public Open Space Requirement (10%)	10.87ha
Public Open Space Provided	13.33ha(12.2%)
Note : 50% credit only for areas within CMS 32m buffer subject to development. Refer section 6.3	



Precinct 1

Suggested location of Lunch Bar in proposed Light Industrial Area

Potential Rural Service Store site

Dress Circle Lots - opportunity to design to capture rural aspect to east

Design on south side of Kerosene Lane should recognise use of land north of Kerosene Lane for Light Industry

Landmark Public Open Space site. Public viewpoint on high point

400m walkable catchment to potential Rural Store

Community Facilities site

Public Open Space encompassing high point

Walkable Catchment Node

Approved subdivision area, western half affected by poultry farm buffer and pending reconsideration request

Existing Public Open Space containing District Level active and organised recreation

400m walkable catchment to local shopping

Pedestrian link between Tramway reserve and Tamworth Hill

400m walkable catchment

Public Open Space to preserve remnant bushland

Retain section of Fifty Road as services corridor

Precinct 3

Walkable Catchment Node

Proposed Coastal Christian Church community facilities site

400m walkable catchment

Former "Tramway" reserve

Walkable Catchment Node

Unconstructed road. Reserve to be closed

800m walkable catchment to Baldvis District Centre

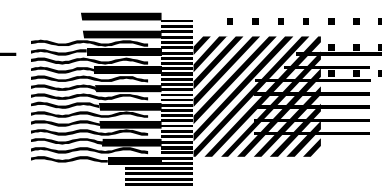
Tamworth Hill Swamp Wetland is 'conservation' category wetland protected in public open space and utilised for drainage incorporating water sensitive design techniques

Public Open Space to preserve some remnant bushland and provide centrally located recreation opportunity for residential catchment

Walkable Catchment Node

Roads and road reserves and public open space within CMS buffer (see detail diagram insert)

400m walkable catchment



Taylor Burrell

Town planning and design

187 Roberts Road Subiaco
PO Box 603 West Perth
Western Australia 6872
Telephone (09) 382 2911
Facsimile (09) 382 4586

BALDIVIS (NORTH) DISTRICT STRUCTURE PLAN

0 100 200 300 400 m



Fig.No.16

APPENDIX 3

LOCAL STRUCTURE PLAN LOTS 30, 31 KEROSENE LANE AND LOT 308 FIFTY ROAD, BALDIVIS



LOCAL STRUCTURE PLAN

Lots 30, 31 Kerosene Lane & Lot 308 Fifty Rd, BALDIVIS



PLAN 5

APPENDIX 4

RETAIL ASSESSMENT AND JUSTIFICATION REPORT

NORTH BALDIVIS LOCAL STRUCTURE PLAN (Lots 14, 15 & 299 Kerosene Lane)

Neighbourhood Centre Potential Assessment

Prepared for

PLANNING SOLUTIONS
on behalf of
SPUD SHED PROPERTY TRUST

March 2010

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SUMMARY AND CONCLUSIONS

1. The main purpose of this report is to provide an updated assessment of the retail floorspace potential of a planned neighbourhood centre in North Baldivis, which is located within the City of Rockingham. The centre forms part of a local structure plan (LSP) for part of North Baldivis.
2. The current Local Commercial Strategy envisages a neighbourhood centre with 2,500 sqm of retail floorspace at an unspecified location in North Baldivis. Practical implementation of the Local Commercial Strategy therefore requires that the neighbourhood centre be located through the current local structure planning process.
3. The LSP proposes the creation of 549 dwelling units which, at full development, would result in a total of approximately 4,595 dwelling units in North Baldivis as a whole, accommodating a population of about 12,866 people. This is 459 dwelling units more than was envisaged by the Local Commercial Strategy.
4. This estimate does not, however, include the future development potential within "Sub-Precinct 3" of North Baldivis, which is located between Baldivis Road and the Kwinana Freeway. This area could potentially accommodate up to 5,000 additional dwelling units – more than doubling the current estimate.
5. For the purposes of this report, however, the City of Rockingham's most recent estimate of 4,595 dwelling units in North Baldivis is used to estimate the future demand for retail floorspace in the proposed LSP neighbourhood centre, mainly in order to demonstrate the demand for the neighbourhood centre within the framework of the existing Local Commercial Strategy. There are, however, implications of the future development potential of North Baldivis that will need to be addressed in the future.
6. While all household income groups are represented, the average household income within North Baldivis is above the average for the Perth Metropolitan Region as a whole.
7. Development potential for a neighbourhood centre of some 2,500 sqm of shop retail floorspace is confirmed for the subject LSP area, at the location indicated in the LSP. The timing of the centre is difficult to determine at this stage, and will depend to some extent on the order and pace of residential development, not only within the LSP area itself, but within North Baldivis as a whole.
8. The basic composition of the future LSP neighbourhood centre could reasonably be as follows:
 - Medium-sized supermarket: 1,300 – 1,500 sqm;
 - Specialty Shops: 1,200 – 1,000 sqm;
 - Small retail showroom/s (within mixed use development): 400 sqm.
 Plus (non-retail)...
 - Local office/s;
 - Medical/ Dental centre;
 - Child Care centre;

- Other community services as may be required by relevant agencies;
 - Live/ Work accommodation (immediately adjacent to centre).
9. The detailed design of the proposed neighbourhood centre should occur closer to the time of the centre's actual development. Whenever that occurs, creation of a viable modern mixed-use neighbourhood centre in accordance with the LSP is likely to require substantial redevelopment of the existing Spud Shed.
 10. In order to demonstrate how the proposed neighbourhood centre could be designed to fit within the framework being created by the LSP, an indicative centre design has been prepared (Figure 10 in the main report).
 11. It is estimated that the neighbourhood centre could eventually employ some 150 people, thus providing net employment opportunities for 25 percent of the workforce residing in the LSP area.

1. INTRODUCTION

SHRAPNEL URBAN PLANNING has been engaged by Planning Solutions, on behalf of the Spud Shed Property Trust, to assess the development potential of a proposed neighbourhood centre in the suburb of Baldavis, which is located within the City of Rockingham, some 6.5 kilometres south-east of the Rockingham City Centre (Figure 1).

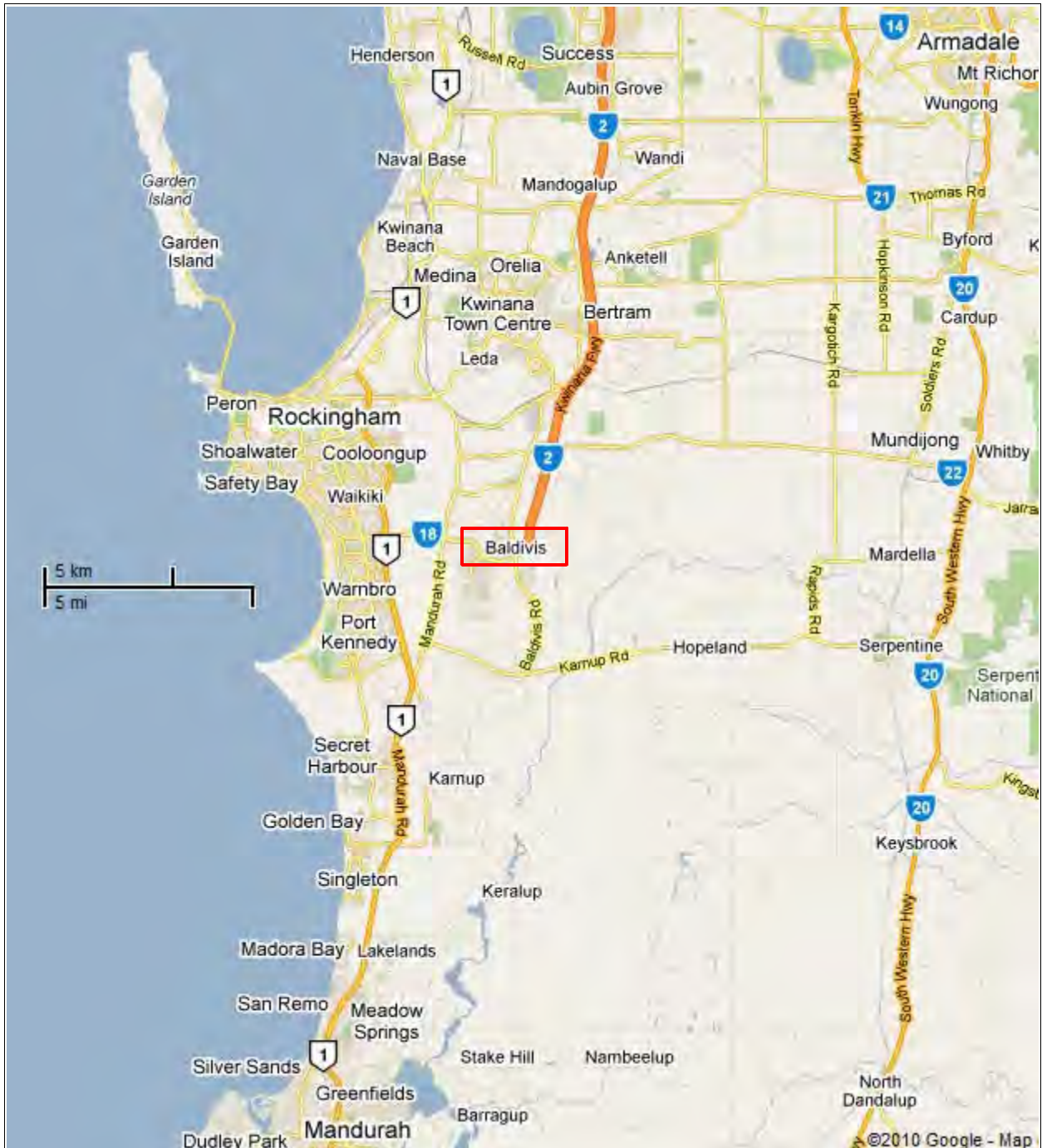


Figure 1: Location of Baldavis

The neighbourhood centre is part of a Local Structure Plan (LSP), which is being prepared for part of the area known as “North Baldavis” (Figure 2). The LSP area fronts Kerosene Lane, which defines its northern boundary.

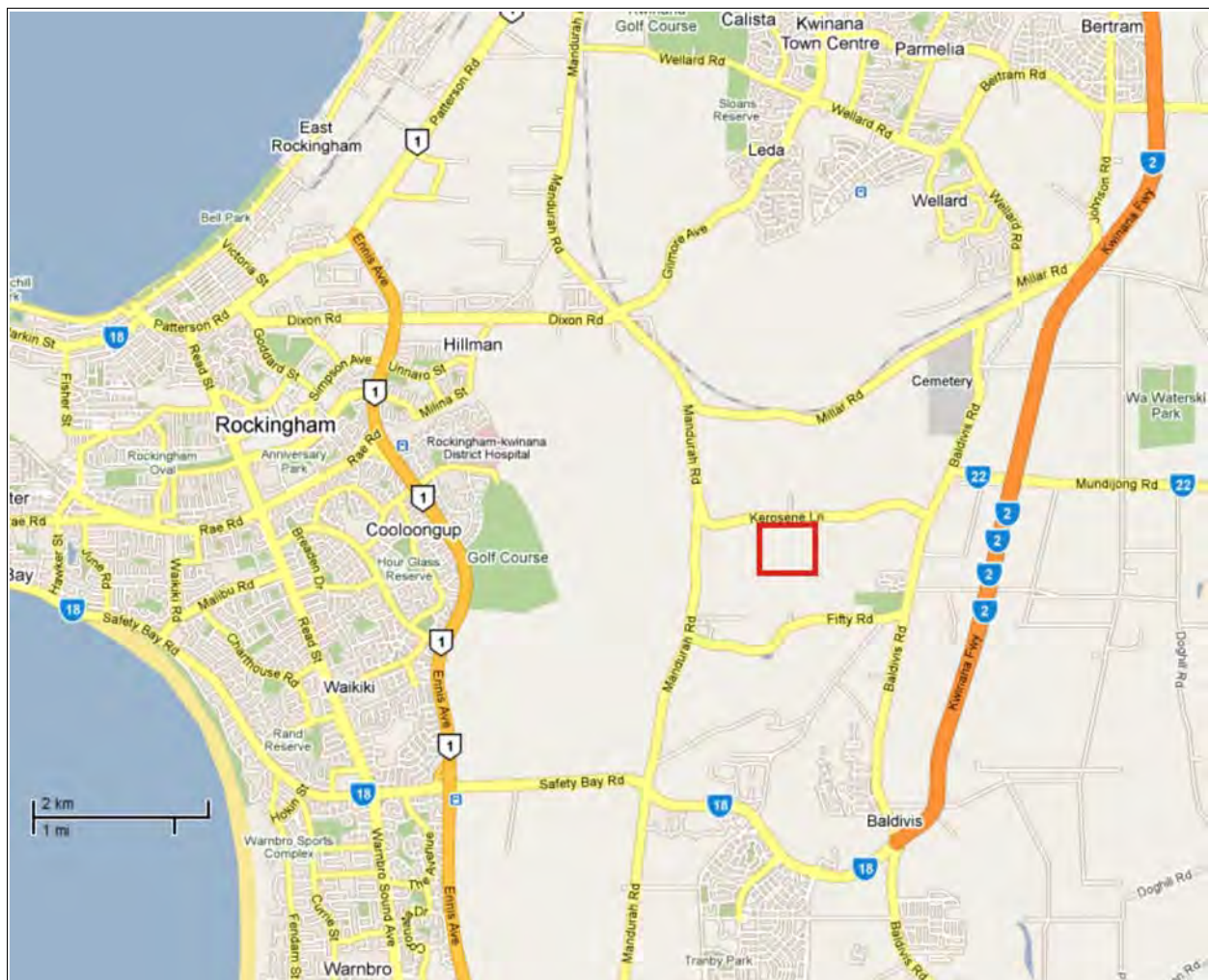


Figure 2: Structure Plan Area within District Context

1.1. Proposed Development

The neighbourhood centre forms part of a proposed LSP covering Lots 14, 15 and 299 Kerosene Lane, which are highlighted in red in Figure 2. A copy of the LSP itself is shown in Figure 3. Details of the LSP can be obtained from the main document being prepared by Planning Solutions. The LSP is one of several other similar plans that are being prepared for other parts of North Baldivis by other planning consultants.

As indicated in Figure 3, the LSP proposes a neighbourhood centre in the northern part of the area at the junction of the existing Kerosene Lane and a future internal north-south distributor road. Most of the neighbourhood centre is planned to be located on the western side of the distributor road, however, a secondary component comprising mixed-use development is also proposed on the eastern side, providing an opportunity to develop a pedestrian-friendly main street centre.

A considerable amount of medium density residential development is also planned in the immediate vicinity of the neighbourhood centre, which will help increase pedestrian activity and facilitate creation of a viable main street centre. A breakdown of the dwelling unit yield proposed by the LSP is presented in Table 1.

Table 1: Local Structure Plan Dwelling Units. (Source: Planning Solutions)

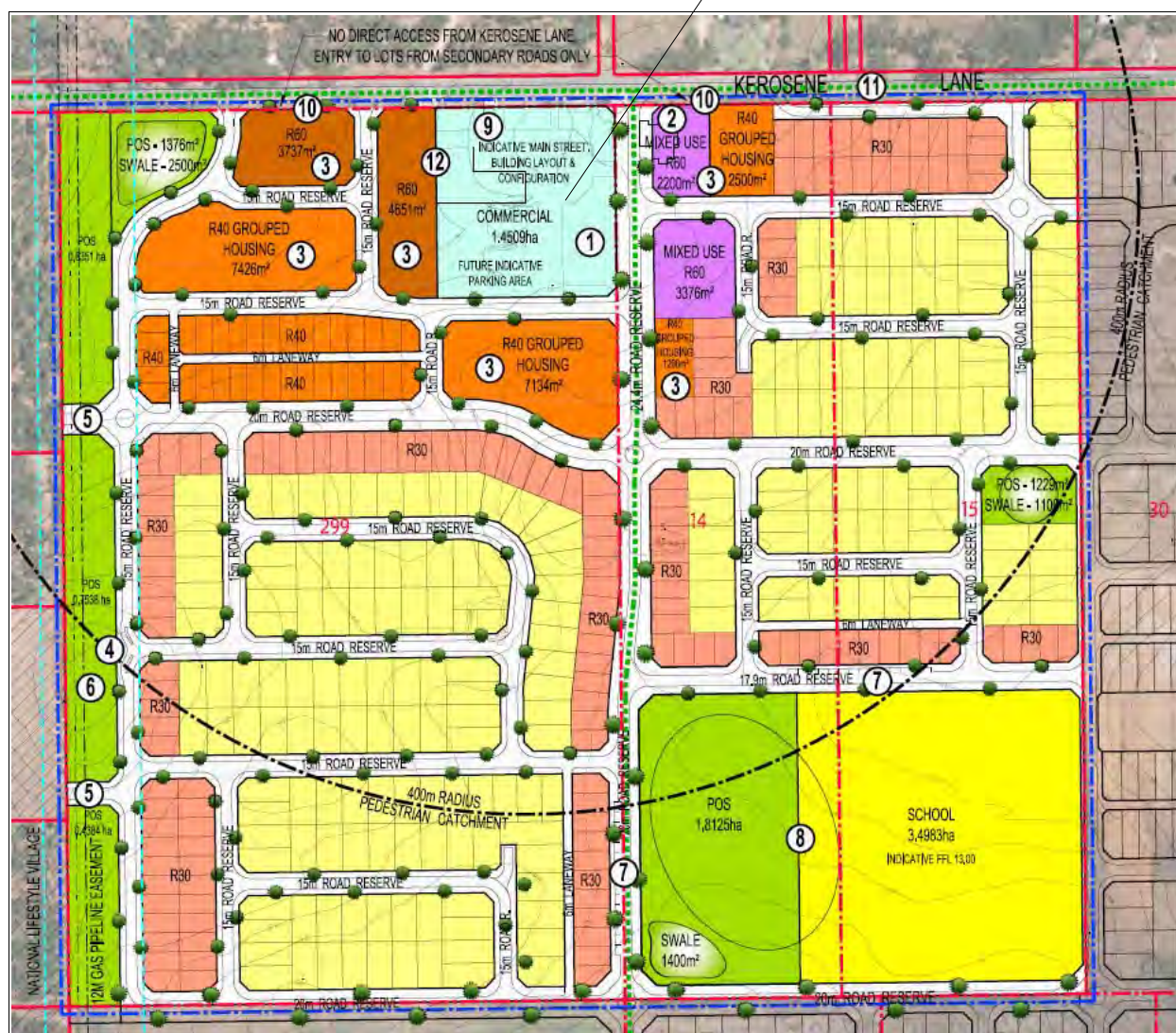


Figure 3: Proposed Local Structure Plan (Source: Planning Solutions)

The main purpose of this report is to provide an assessment of the retail floorspace potential of the planned neighbourhood centre. The report also discusses the rationale for the centre's proposed location, its configuration, and the potential contribution of the neighbourhood centre to local employment within North Baldivis.

2. CENTRES PLANNING CONTEXT

2.1. Local Commercial Strategy



Figure 4: Extract from Local Commercial Strategy Map (Source: City of Rockingham)

Centres planning within the City of Rockingham is guided by a Local Commercial Strategy approved in 2004. This strategy was prepared in accordance with SPP 4.2¹, which is still official WAPC policy, but will soon be replaced by an updated centres policy. There is nothing in the new (draft) policy that will affect the planning of the proposed neighbourhood centre, except for the increased encouragement under the new policy for centres to be planned and designed as mixed use activity centres (preferably with a main street) rather than as mere shopping centres. An extract from the City's Local Commercial Strategy Map is presented as Figure 4.

As indicated in Figure 4, North Baldvis is part of the Local Commercial Strategy's "Precinct 4". A considerable number of centres are planned in Baldvis as a whole, the most significant of which is a large centrally located district centre of 25,000 sqm fronting Safety Bay Road. The first major stage of this centre has been developed and is obviously trading very well.

North of the district centre, the Strategy Map depicts only one centre in North Baldvis – Centre 48 – a neighbourhood centre with planned retail floorspace (under the Strategy) of 4,500 sqm. However, a second, smaller neighbourhood centre of 2,500 sqm is also planned in North Baldvis, but has been "Not Located" on the Strategy Map, thus leaving the way open to determine its location through the more detailed structure

1 State Planning Policy 4.2 – Metropolitan Centres Policy Statement for the Perth Metropolitan Region; WAPC; October 2000

planning process now under way.

2.2. Structure Planning in North Baldivis

Planning for development in North Baldivis is occurring through a series of structure planning projects prepared to various degrees of detail. The overall guiding framework appears to be through the Baldivis (North) District Structure Plan (2000) prepared by Taylor Burrell Barnett, an extract of which is presented in Figure 5.

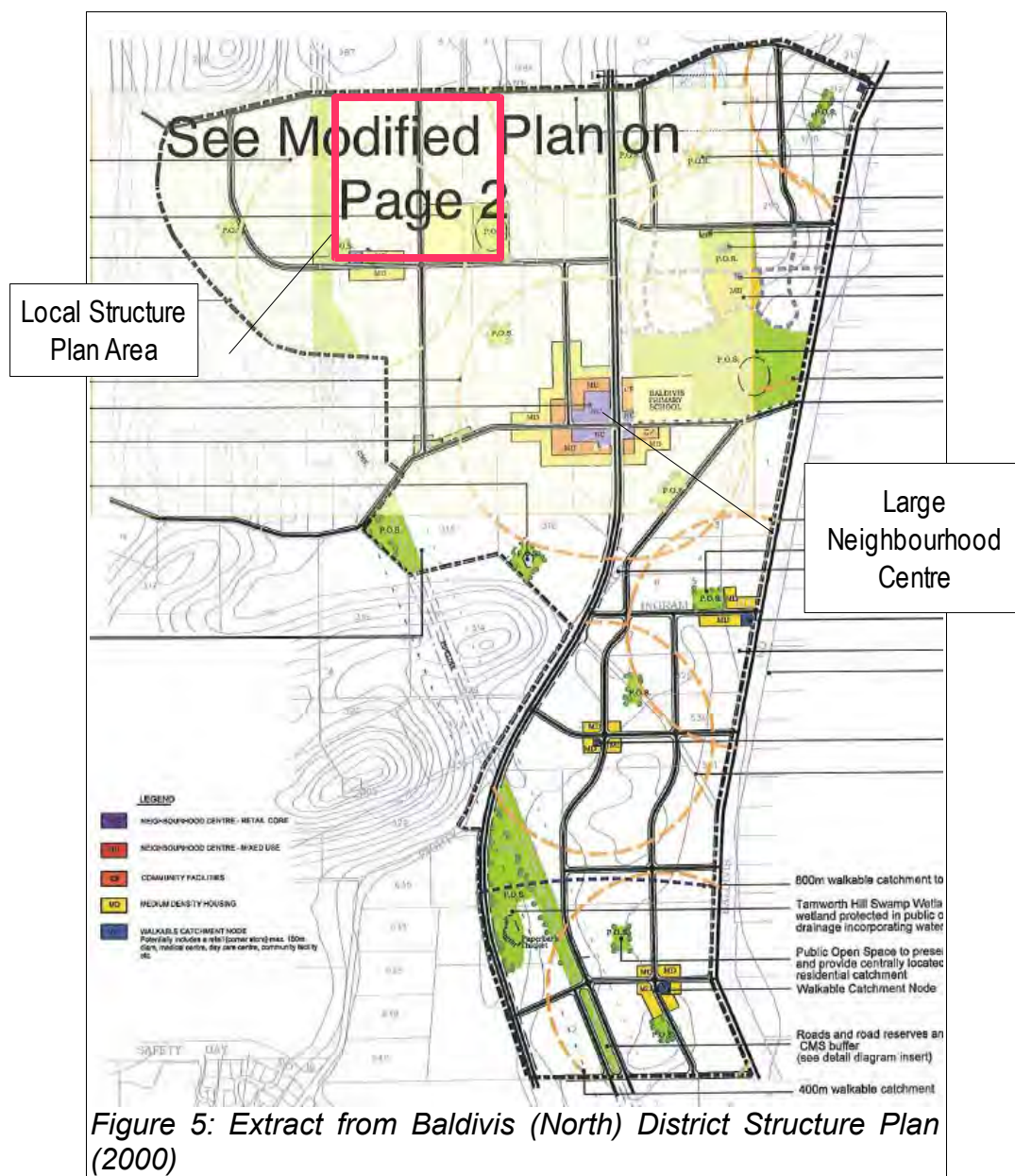


Figure 5 also shows the location of the subject LSP area within the framework of the district structure plan for North Baldivis. It also shows a schematic diagram of the proposed large neighbourhood centre (Centre Number 48 in Figure 4 on Page 7), planned at the intersection of Nairn Drive and Fifty Road. Notwithstanding that the Local Commercial Strategy specifies that this neighbourhood centre should have 4,500 sqm of retail floorspace, the Baldivis (North) District Structure Plan proposes that it will be

5,500 sqm. The District structure plan also identifies several “Walkable Catchment Nodes” (potentially local centres), one of which is near the lower left of the subject LSP boundary. This is clearly seen in a more detailed version of part of the district structure plan prepared by Allering & Associates, which also proposes a few changes to the original (Figure 6).

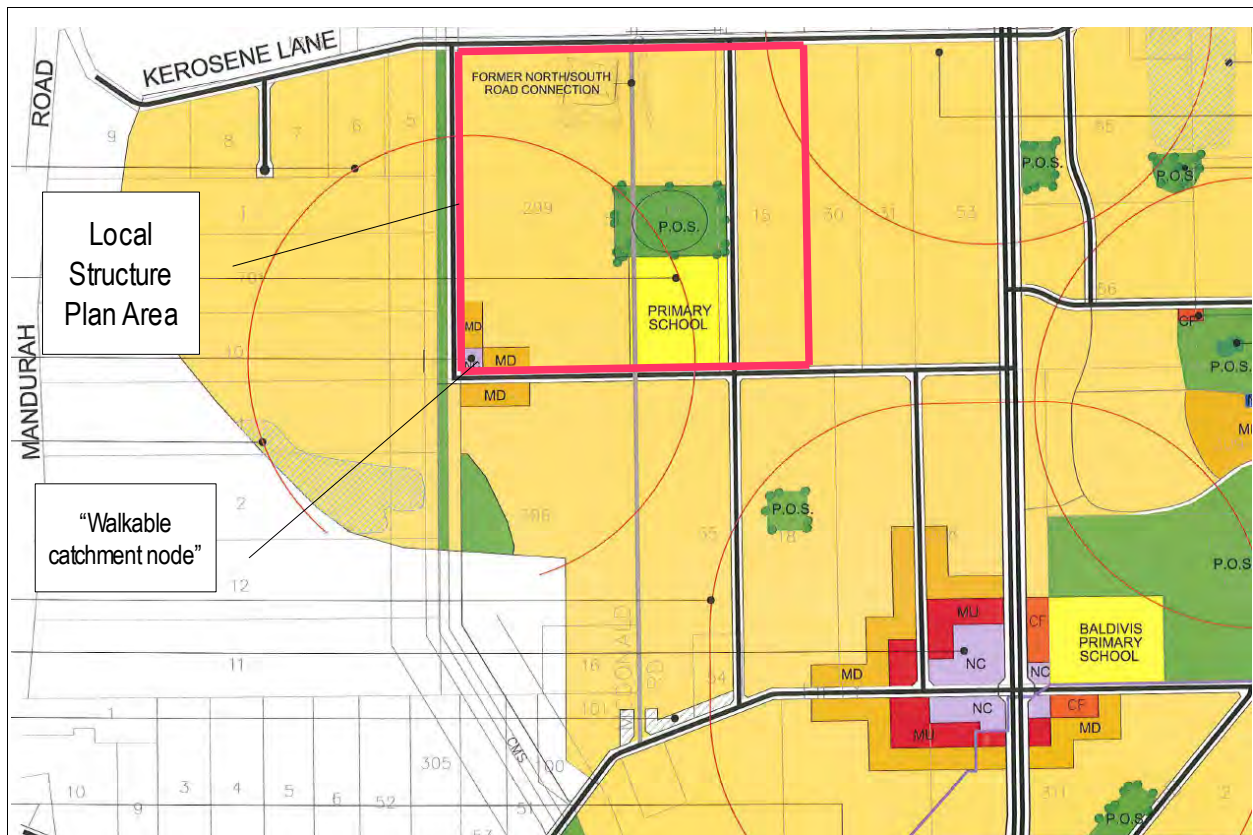


Figure 6: Extract from Modified Baldvis (North) District Structure Plan by Allering & Associates

The large neighbourhood centre can clearly be seen towards the bottom-right of Figure 6, as can the aforementioned walkable catchment node, located at the bottom-left of the subject LSP area. None of the “walkable catchment nodes” were specifically identified in the Local Commercial Strategy itself.

Now that it is proposed to locate the Commercial Strategy's “floating” neighbourhood centre within the subject LSP area, it is considered that the walkable catchment node envisaged in the earlier, more generalised, structure plans should be deleted from the planning of the area in favour of the larger and more conveniently located neighbourhood centre the subject of this report. It is also considered unlikely that any of the proposed “walkable catchment nodes” identified in the Baldvis (North) District Structure Plan) will prove to be viable local (retail) centres. The main reasons are their relative proximity to future significant centres and the ease of travel for all residential precincts to these major centres.

2.2.1. The Local Structure Plan

Any established centre obviously has a geographic location, however, as far as the Local Commercial Strategy is concerned, the future “floating” neighbourhood centre in

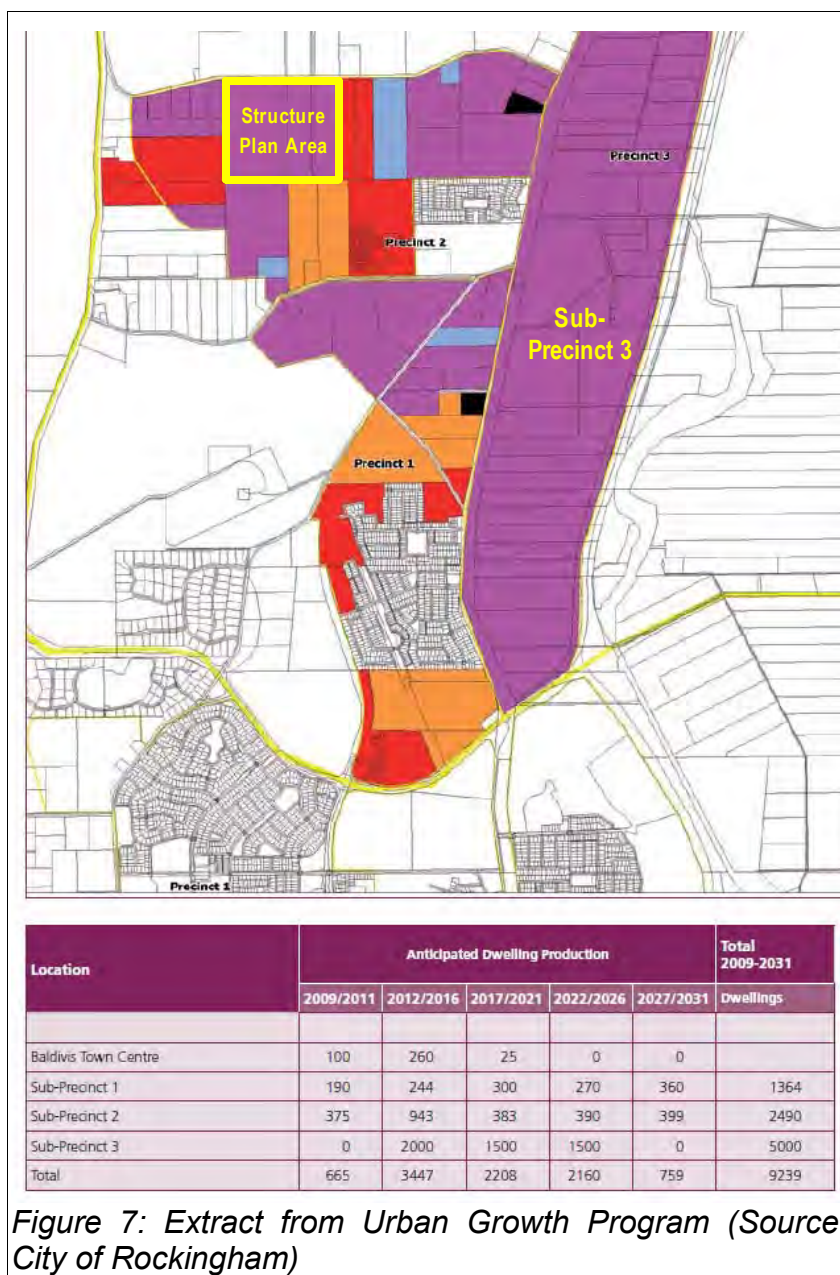
North Baldivis does not, as yet. Practical implementation of the Local Commercial Strategy in North Baldivis therefore requires that the planned neighbourhood centre be properly located through the current local structure planning process – which is exactly what is occurring. However, even though the current centre proposal, within the context of the local structure planning process is a clear case of implementing the Local Commercial Strategy (as distinct from seeking some alternative proposal); it is nevertheless important for the Local Commercial Strategy and LSP to be reconciled in light of the time that has now lapsed since the Local Commercial Strategy was prepared.

Of all the possible locations for an additional neighbourhood centre to complement the large one planned at the intersection of Nairn Drive and Fifty Road, the proposed Kerosene Road site is the obvious choice for the following reasons:

- It already contains a well known existing food and groceries outlet that can simply continue to operate in its current form (to the unusual advantage of new residents) until such time as its redevelopment into a modern neighbourhood centre becomes feasible.
- Kerosene Lane is an existing significant east-west distributor road, so the centre will be able, to some extent, to cater and benefit from passing traffic, as well as the local population. This role will in all likelihood assume greater significance in the longer term as light, service and general industrial development occurs to the north of Kerosene Lane.
- The proposed distributor road from Kerosene Lane into and through the LSP area creates a prominent location which will ensure maximum convenience to residents of the LSP area and its immediate surrounds. The distributor road also presents an enhanced opportunity to create a decent main street centre due to the relatively significant amount of traffic it will no doubt carry.
- The site is nevertheless reasonably well removed from the other planned centres, thus providing an optimum balance between convenience to residents and the competitive environment between all centres. Any other location would compromise one or the other of these two important location factors.

3. DEMOGRAPHICS

3.1. Dwellings and Population



The 2006 Census recorded a total of 2,133 dwellings in the whole of Baldivis, and an average occupancy ratio of 3.13 persons per dwelling. Since 2006 the rate of population growth in the area has obviously been substantial.

When the Local Commercial Strategy was produced, it was estimated that at full development Baldivis as a whole would accommodate some 40,800 people². North Baldivis itself would accommodate some 11,580 (28%) of this population.

Applying an assumed longer-term average occupancy ratio of 2.80 persons per dwelling to this projected North Baldivis population, produces an “ultimate” development potential estimate of approximately 4,136 dwelling units.

However, advice recently received from the City of

Rockingham indicates that the estimated total dwelling unit yield for North Baldivis at the present time is 4,595 dwelling units, which is 459 units more than the Local Commercial Strategy estimate. This estimate does not, however, include the future development potential within “Sub-Precinct 3” of North Baldivis, which is located between Baldivis Road and the Kwinana Freeway (see Figure 7). As indicated, this area could potentially accommodate up to 5,000 additional dwelling units – more than doubling the current estimate. It is recognised that this estimate for Precinct 3 cannot be accurately confirmed until more detailed planning has been carried out, but it is abundantly clear

² Source: City of Rockingham Local Commercial Strategy modelling data.

that the total additional population potential will be very substantial.

For the purposes of this report, however, it has been decided that the City of Rockingham's most recent estimate of 4,595 dwelling units will be used to estimate the future demand for retail floorspace in the proposed neighbourhood centre within the subject LSP area. This is in order to demonstrate the planning feasibility of the neighbourhood centre proposal within the framework of the existing Local Commercial Strategy. However, the implications of the projected additional population growth now anticipated for North Baldivis (Precinct 3) are quite significant and will be discussed in a later section.

It has also been assumed that the average dwelling occupancy ratio will decrease from its 2006 level of 3.13 persons per dwelling, at a decreasing rate, to level off at about 2.80 persons per dwelling at a theoretical "ultimate" development. This assumption takes account of the existing trend towards lower average occupancy ratios. However, it also assumes that more families with children are likely to settle in the new areas of North Baldivis (which will tend to increase average occupancy in single residential lots); but that there is also a significant amount of higher density development proposed in the LSP area and North Baldivis generally (which will have an off-setting effect on dwelling occupancy ratios).

3.2. Household Income

Household income is an important consideration in assessing the retail floorspace potential of a study area, and is therefore a key factor in the methodology used in this assessment. The future household income profile for North Baldivis is assumed to approximate that which existed in 2006 for all of Baldivis. This assumed household income profile, compared to the average for the Perth Metropolitan Region as a whole, is presented in Figure 8.

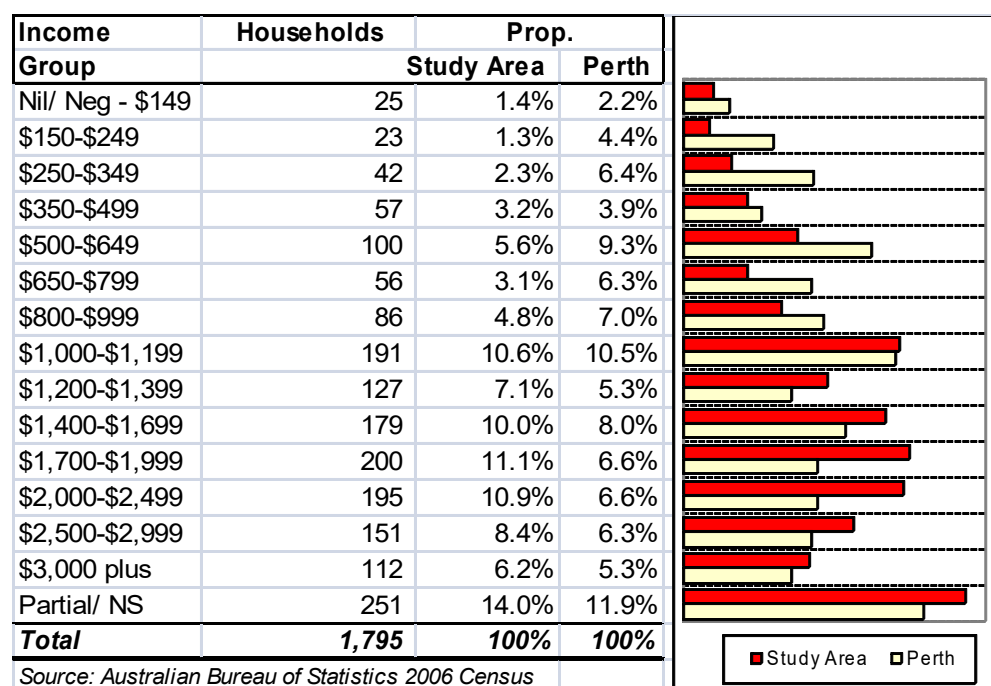


Figure 8: Household Income – Total Baldivis Study Area

Points worthy of note in this table and graph include:

- The proportion of study area households in the lower income groups (in this case less than \$1,000 per week (22%)) is significantly lower than the equivalent for the Perth region as a whole (40%).
- The proportion of study area households in the higher income groups (\$1,200 per week plus (54%)) is significantly higher than the equivalent for WA as a whole (38%).

This household income profile indicates that, while all income groups are represented, household incomes within Baldivis are noticeably above the average for the Perth Metropolitan Region as a whole.

Whilst it is recognised that new urban development in North Baldivis may not be uniformly as attractive as some parts of South Baldivis, it will still be very well located in relation to Rockingham to the west and the Kwinana Freeway to the east. It will also be created somewhat later than South Baldivis was, thus capitalising to some extent on the success of South Baldivis.

Also, development of North Baldivis will be occurring during what is projected to be an extended period of constraint in relation to metropolitan housing supply, which will put upward pressure on prices, thus requiring the majority of purchasers to have a reasonably high household income. For these reasons it is considered appropriate for the purposes of assessing retail floorspace demand in North Baldivis to assume the somewhat above-average household income profile illustrated in Figure 8.

4. RETAIL FLOORSPACE DEMAND

Given that the dwelling unit and population projections now anticipated as a result of the current structure planning process are somewhat different to those that underpinned the Local Commercial Strategy, a review of retail floorspace requirements in North Baldivis has been carried out. This review uses a Retail Expenditure Demand Model that relates household income to detailed retail expenditure data from the 2003/ 04 ABS Household Expenditure Survey (HES) to estimate the quantity and nature of retail floorspace that will be required to cater for the local North Baldivis community. The main inputs to the model are:

- The number of future households in the study area;
- The assumed Household Income profile for the study area; and
- The typical Retail Expenditure pattern of WA households with that income profile.

The model also includes several assumptions regarding turnover per sqm for various retail commodity groups, and the major components (DDS, supermarkets, etc) of shopping centres at various levels in the retail hierarchy, based on retail industry averages. The demand model also requires a household income profile as an input. The profile used for the purposes of this assessment is presented in Figure 8 on Page 12.

The results of the demand model's calculations for full development of North Baldivis are presented in the Demand Model's "Output Summary" and "Centre Composition Estimator" sheets presented in the following sub-sections.

4.1. Output Summary Sheet

Based on full development, the Output Summary Sheet (overleaf) breaks down the total number of households in North Baldivis into five separate income groups. Relating the average expenditure pattern of each income group to industry-based assumptions about viable retail floorspace turnover performance, calculated floorspace in the twelve HES retail categories is then distributed amongst the five income groups and totalled accordingly. The three tables in the sheet relate to Total Retail, Shop-type Retail and Showrooms/ Bulky-type Retail floorspace. It can be seen, for example, that the second income group generates a total demand for 1,849 sqm of retail floorspace of which 984 sqm is "Shop-type", and 864 sqm is "Showroom/ Bulky-type" floorspace.

The 4,595 households³ projected at full development generate demand for a total of 25,303 sqm of retail floorspace, of which 13,902 sqm is "Shop-type", and 11,401 sqm is "Showroom/ Bulky-type" floorspace. Of particular note are the relative quantities and types of floorspace generated by each of the income groups. Between them the two lowest income groups account for 20.9 percent of the trade area households, but generate only 11 percent of the retail floorspace demand. Conversely, the highest income group comprises 30.5 percent of the households, but generates a disproportionate 41.5 percent of the retail floorspace demand.

Obviously not all of the retail floorspace potential generated by the North Baldivis households should be provided within North Baldivis itself. Most of this potential will continue to be realised within the district centre on Safety Bay Road and the

3 For the purpose of this assessment "Households" and "Dwellings" are the same.

Retail Expenditure Demand Model
Output Summary Sheet

Study Area Name:

NORTH BALDIVIS

Year:

Full Development

STUDY AREA HOUSEHOLDS IN WA GROSS INCOME QUINTILE GROUPS							
RETAIL FLOORSPACE		Lowest \$0-\$495	Second \$496-\$846	Third \$847-\$1263	Fourth \$1264-\$1979	Highest \$1980-\$3000+	All Households
Study Area Households >>>		434	527	885	1,348	1,401	4,595
Prop. %		9.4%	11.5%	19.3%	29.3%	30.5%	100%
TOTAL RETAIL FLOORSPACE (SQM)							
Category							
Domestic fuel and power	Sqm	4	6	10	24	19	64
Food and non-alcoholic beverages	Sqm	246	467	981	1,934	2,566	6,194
Alcoholic beverages	Sqm	20	33	110	177	303	643
Tobacco products	Sqm	17	23	90	75	80	285
Clothing and footwear	Sqm	40	85	266	517	694	1,601
Household furnishings and equipment	Sqm	236	524	1,075	1,981	2,370	6,186
Household services and operation	Sqm	75	112	218	415	583	1,404
Medical care and health expenses	Sqm	27	32	74	211	191	534
Transport	Sqm	39	79	203	333	447	1,102
Recreation	Sqm	167	328	699	1,453	2,155	4,803
Personal care	Sqm	42	95	238	425	668	1,467
Miscellaneous goods and services	Sqm	30	63	161	341	424	1,020
Total Retail Floorspace	Sqm	943	1,849	4,125	7,886	10,500	25,303
Prop. %		3.7%	7.3%	16.3%	31.2%	41.5%	100%
Average Annual Turnover per sqm:							\$4,356
Average Floorspace/ Capita (sqm):							1.97
SHOP-TYPE RETAIL FLOORSPACE (SQM)							
Category							
Domestic fuel and power	Sqm	-	-	-	-	-	-
Food and non-alcoholic beverages	Sqm	246	467	981	1,934	2,566	6,194
Alcoholic beverages	Sqm	20	33	110	177	303	643
Tobacco products	Sqm	17	23	90	75	80	285
Clothing and footwear	Sqm	40	85	266	517	694	1,601
Household furnishings and equipment	Sqm	29	57	107	253	299	744
Household services and operation	Sqm	33	52	103	179	243	610
Medical care and health expenses	Sqm	23	30	64	109	172	399
Transport	Sqm	-	-	-	-	-	-
Recreation	Sqm	48	80	144	259	408	938
Personal care	Sqm	42	95	238	425	668	1,467
Miscellaneous goods and services	Sqm	30	63	161	341	424	1,020
Total Retail Floorspace	Sqm	529	984	2,263	4,268	5,857	13,902
Prop. %		3.8%	7.1%	16.3%	30.7%	42.1%	100%
Average Annual Turnover/ sqm:							\$6,087
Average Floorspace/ Capita (sqm):							1.08
SHOWROOM/ BULKY-TYPE RETAIL FLOORSPACE (SQM)							
Category							
Domestic fuel and power	Sqm	4	6	10	24	19	64
Food and non-alcoholic beverages	Sqm	-	-	-	-	-	-
Alcoholic beverages	Sqm	-	-	-	-	-	-
Tobacco products	Sqm	-	-	-	-	-	-
Clothing and footwear	Sqm	-	-	-	-	-	-
Household furnishings and equipment	Sqm	207	468	968	1,728	2,071	5,441
Household services and operation	Sqm	42	61	115	236	340	793
Medical care and health expenses	Sqm	3	2	10	102	19	136
Transport	Sqm	39	79	203	333	447	1,102
Recreation	Sqm	119	249	556	1,195	1,747	3,865
Personal care	Sqm	-	-	-	-	-	-
Miscellaneous goods and services	Sqm	-	-	-	-	-	-
Total Retail Floorspace	Sqm	414	864	1,861	3,618	4,643	11,401
Prop. %		3.6%	7.6%	16.3%	31.7%	40.7%	100%
Average Annual Turnover/ sqm:							\$2,245
Average Floorspace/ Capita (sqm):							0.89

Rockingham regional centre. The effect of this distribution on the North Baldivis centres is indicated on the second output sheet – the Centre Composition Estimator (see following sub-section).

It should also be noted that the “Average Floorspace/ Capita (sqm)” shown at the bottom-right of each of the tables in the Output Summary Sheet is not an input to the calculations; but is one of the **results** of the main estimate, which is presented for information purposes. It is derived by simply dividing the calculated retail floorspace demand by the North Baldivis population. Almost by definition these figures do not equate to the SPP 4.2 floorspace per capita guidelines, which are region-wide averages. Nor should it be assumed that the main “Shop-Type” and “Showroom Bulky-Type” retail floorspace categories are the exact equivalent of the Department of Planning “Shop/ Retail” and “Other Retail” floorspace categories. Whilst the categories are generally comparable, there are nevertheless some differences.

4.2. Centre Composition Estimator

The top table in this sheet (overleaf) groups the estimated floorspace demand in the detailed retail categories into the more general “Food”, Non-Food” and “Showroom” floorspace types. The subsequent tables show the results of applying various assumptions based on WA retail centre averages to the calculated floorspace, as well as to various categories of centre (clearly not all of which are represented in North Baldivis). Key assumptions that affect the outcome of the analysis have been shaded yellow in the Centre Composition Estimator sheet, namely:

- 40 percent of the “Shop-type” non-Food floorspace demand, and 50 percent of the “Showroom-type” Non-Food floorspace demand are expected to be met in regional facilities (e.g. Rockingham Regional Centre).
- 30 percent of the Food floorspace demand, 30 percent of the Non-Food (Shop) demand, and 40 percent of the Non-Food (Showroom) demand could reasonably be met within the Baldivis district centre.
- The two neighbourhood centres in North Baldivis (combined) are expected to account for 70 percent of the Food floorspace demand, 30 percent of the Non-Food (Shop) demand, and 10 percent of the Non-Food (Showroom) demand. These figures take into account the size of the proposed neighbourhood centres; plus their considerable distance from the district centre;
- At the present time it is assumed that there will be no local centres in North Baldivis.

It should be noted that these proportional estimates very largely determine the final outcome of the analysis and could be varied within reasonable limits to test alternative scenarios, if required. Based on these assumptions, however, the bottom two tables on the “Estimator” sheet indicate that, at full development, the proposed neighbourhood centres in North Baldivis are calculated to have a combined optimum retail floorspace of about (figures rounded) 8,160 sqm, comprising approximately 4,990 sqm of “Food” floorspace, 2,030 sqm of “Non-Food” floorspace, and 1,140 sqm of “Showroom” floorspace.

CENTRE COMPOSITION ESTIMATOR

Study Area Name:

NORTH BALDIVIS

Year:

Full Development

Major Commodity Groups:

TOTAL RETAIL FLOORSPACE (SQM)	Shop-Type Floorspace (sqm)			Showroom	Total
Category	Food	Non-Food	Total	Type	Retail
Domestic fuel and power	-	-	-	64	64
Food and non-alcoholic beverages	6,194	-	6,194	-	6,194
Alcoholic beverages	643	-	643	-	643
Tobacco products	285	-	285	-	285
Clothing and footwear	-	1,601	1,601	-	1,601
Household furnishings and equipment	-	744	744	5,441	6,186
Household services and operation	-	610	610	793	1,404
Medical care and health expenses	-	399	399	136	534
Transport	-	-	-	1,102	1,102
Recreation	-	938	938	3,865	4,803
Personal care	-	1,467	1,467	-	1,467
Miscellaneous goods and services	-	1,020	1,020	-	1,020
Total Retail Floorspace	7,123	6,779	13,902	11,401	25,303

(This table is a summary of the Main outputs)

Centre Hierarchy Distribution:			Shop-Type Floorspace (sqm)			Showroom	Total
FD	NF	Shop-Type	Food	Non-Food	Total	Type	Shop
-	0.40	Prop Regional	-	2,712	2,712	-	2,712
0.30	0.30	Prop District	2,137	2,034	4,171	-	4,171
0.70	0.30	Prop Neighbourhood	4,986	2,034	7,020	-	7,020
-	-	Prop Local	-	-	-	-	-
1.00	1.00	Total	7,123	6,779	13,902	-	13,902
FD	NF	Showroom-Type				Total	Showroom
-	0.50	Prop Regional	-	-	-	5,700	5,700
-	0.40	Prop District	-	-	-	4,560	4,560
-	0.10	Prop Neighbourhood	-	-	-	1,140	1,140
-	-	Prop Local	-	-	-	-	-
-	1.00	Total	-	-	-	11,401	11,401
All Floorspace			Shop-Type Floorspace (sqm)			Showroom	Total
			Food	Non-Food	Total	Type	Retail
		Total Regional	-	2,712	2,712	5,700	8,412
		Total District	2,137	2,034	4,171	4,560	8,731
		Neighbourhood	4,986	2,034	7,020	1,140	8,160
		Local	-	-	-	-	-
		Total Centres	7,123	6,779	13,902	11,401	25,303

Indicative Store-Type Floorspace Allocation:		Centre Categories (sqm)			
Store Formats	Regional	District	N'Hood	Local	Total
Department Store	819	-	-	-	819
DDS	523	1,620	-	-	2,143
Supermarkets/ Grocers	308	1,376	4,291	-	5,975
Mini-Majors	188	229	-	-	417
Specialties	874	945	2,729	-	4,548
Total Shop-Type	2,712	4,171	7,020	-	13,902
Showrooms	5,700	4,560	1,140	-	11,401
TOTAL RETAIL FLOORSPACE	8,412	8,731	8,160	-	25,303

5. NEIGHBOURHOOD CENTRE

Assuming that the estimated retail “Showroom” floorspace is not regarded as PLUC 5, then the “PLUC 5” component of the neighbourhood centres would be 7,020 sqm, which is about the same as the PLUC 5 floorspace proposed for North Baldivis in the Local Commercial Strategy, notwithstanding the more recent estimates of higher “ultimate” population. The main reason for this is that the methodology employed in this assessment seeks to ensure that retail floorspace is provided in a quantity, and with a distribution that will not only ensure its viability but, subject to average ability of retail operators, facilitate its prosperity. By matching household expenditure with relatively high sales turnover figures, retail floorspace calculated using this methodology will tend to appear “under-supplied” on a per capita basis when compared to Perth Metropolitan averages as a whole.

As previously noted, however, the Baldivis (North) District Structure Plan indicates that the large neighbourhood centre planned for the intersection of Fifty Road and Nairn Drive is now intended to accommodate 5,500 sqm of retail floorspace, rather than the 4,500 sqm envisaged in the Local Commercial Strategy. If there was no additional population growth planned for North Baldivis, then this larger neighbourhood centre (if accepted by the planning authorities) would leave the proposed LSP neighbourhood centre about 1,000 sqm “short” of retail floorspace. However, given the very substantial future additional population growth now planned for Precinct 3 (see Figure 7 on Page 11), it can be confidently predicted that the proposed neighbourhood centre of 2,500 sqm planned for the subject LSP area could comfortably co-exist with a 5,500 sqm neighbourhood centre at Nairn Drive/ Fifty Road.

In fact the additional population growth now planned in sub-Precinct 3 is so substantial that far more retail floorspace will eventually be needed in North Baldivis than is currently envisaged. Much of this should accrue to the district centre, however, additional neighbourhood centre floorspace will also be required – some of it in one or more neighbourhood/ local centres within Precinct 3 itself. There is also likely to be additional expansion potential available for both neighbourhood centres currently envisaged in the Local Commercial Strategy. For this reason, ***even though it is not requested at the present time***, it is proposed to design the subject neighbourhood centre in a manner that could facilitate some additional expansion in the future.

5.1. Composition

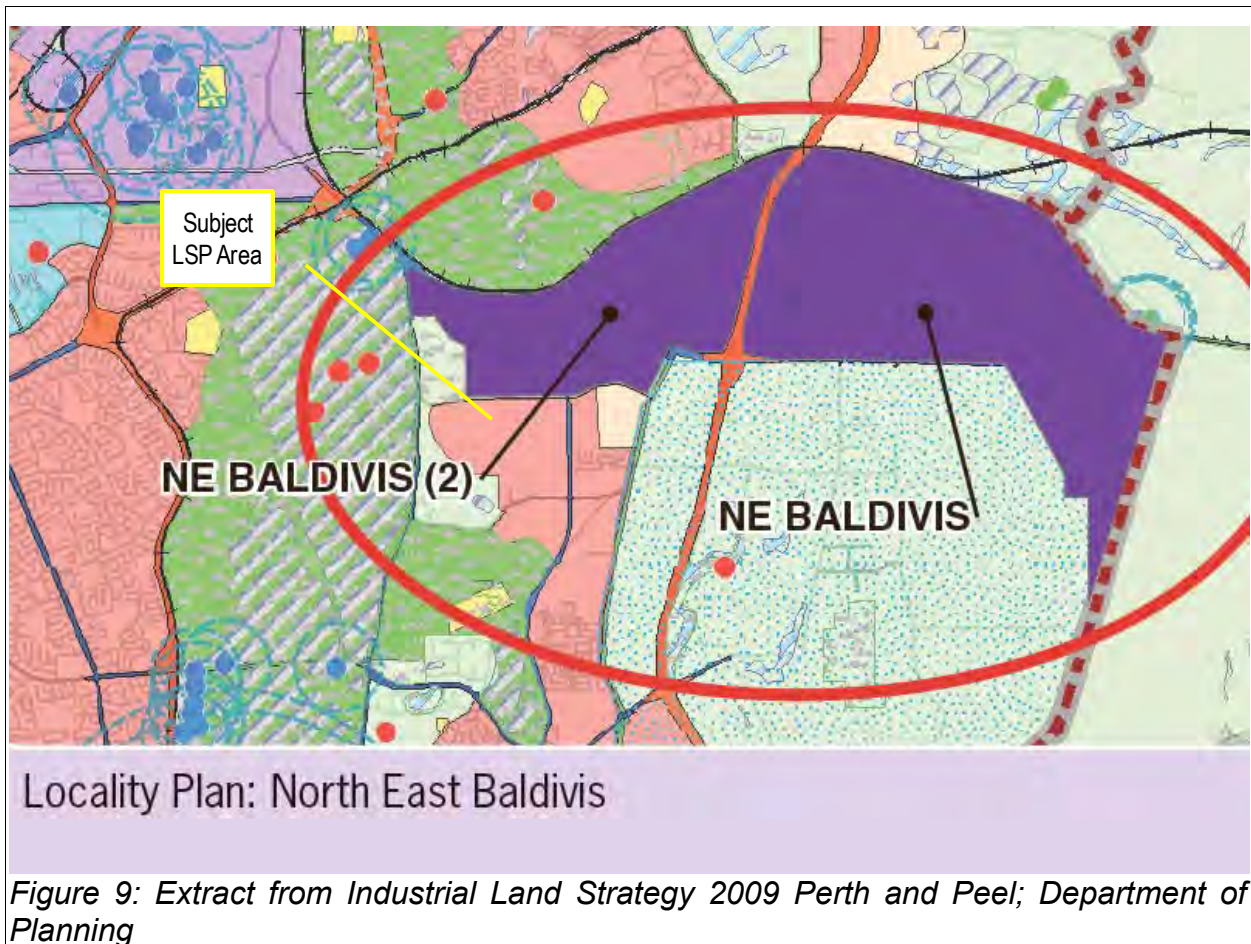
Based on the calculations presented in the preceding sub-section, a neighbourhood centre of some 2,500 sqm of shop retail floorspace could be developed in the subject LSP area. The timing of the centre is difficult to determine at this stage, and will depend to some extent on the order and pace of development, not only within the LSP area itself, but within North Baldivis as a whole. Based on the urban growth program, however, the likely timing of the centre will be sometime around 2016. In order to perform as a mixed use activity centre in accordance with the Liveable Neighbourhoods policy, its composition could reasonably be as follows:

- Small/ medium-sized supermarket: 1,300 – 1,500 sqm;
- Specialty Shops: 1,200 – 1,000 sqm;
- Small retail showroom/s (in mixed use development): 400 sqm.

Plus (non-retail)...

- Local office/s;
- Medical/ Dental centre;
- Child Care centre;
- Other community services as may be required by relevant agencies;
- Live/ Work accommodation (immediately adjacent to centre).

It should be noted that the retail showroom floorspace estimate is based largely on the potential of the LSP area households, and not upon any potential from other catchments captured via passing traffic on Kerosene Lane. No such additional showroom floorspace is specifically recommended (a regional or district centre location is generally preferred), however, if some additional showroom floorspace was indicated by future market conditions, or made sense in the practical rounding off of a particular showroom development, it would certainly be appropriate to allow it in this neighbourhood centre, which is not only on a reasonably significant east-west road, but is also likely to be opposite a significant industrial area in the future (Figure 9).



5.2. Centre Design

The extent to which urban development of the land to the immediate south of the

existing Spud Shed, which currently contains market gardens, might compromise the operation of the Spud Shed, or whether it will be able continue to operate in its current mode more-or-less indefinitely is unknown. Suffice it to say that, whenever it occurs, creation of a viable modern mixed-use neighbourhood centre in accordance with the LSP is likely to require substantial redevelopment of the existing Spud Shed. The detailed design of the proposed neighbourhood centre should occur closer to the time of the centre's actual development, whenever that is. However, in order to demonstrate how the proposed neighbourhood centre could be designed to fit within the framework being created by the LSP, an indicative centre design has been prepared (Figure 10).



Figure 10: Indicative Centre Design

The indicative centre design shown in Figure 10 is diagrammatic only and subject to modification during the detailed centre planning and design process that will, as per usual, precede any development. The indicative design does, however, incorporate several important principles that could be worthy of inclusion within any future detailed design of the centre:

- The centre is focussed on a north/ south main street, being the main distributor road into the LSP area from the north. Ideally this street will be quite busy, but with a central median and on-street parking contributing to a relatively safe, slow speed environment.
- The retail core, comprising the supermarket and most of the specialty shops, has space to the west for possible supermarket expansion following full assessment

of the future Precinct 3 population potential and a complete updating of the Local Commercial Strategy in this area.

- Mixed use development, envisaged as street-fronting commercial tenancies with residential units above, is also focussed on the main street. The ground level space could potentially suit a range of local offices, retail, restaurant/ cafes, showrooms, entertainment, medical centre and community uses.
- There are opportunities for some conveniently located live/ work units, which could be purpose-built, or as straightforward as choosing from the available residential designs that are most suitable for adaptation to live/ work purposes.
- A direct pedestrian link is envisaged from the western residential area to the main street through the retail core. This link should be wide, slightly elevated, and overlooked by some of the residential units envisaged to the west of the car park.
- A child care centre is also specifically envisaged. The judicious design of this and other community facilities focussed on the main street, rather than on more inward-looking sites, can add to the significance of the smaller main streets.
- Ample landscaped off-street parking, as well as opportunities for some on-street parking, is also envisaged. The large off-street parking area has been deliberately left open on its southern side to facilitate easy access and passive surveillance.

5.3. Employment

An estimate of the employment potential of the proposed North Baldivis neighbourhood centre is presented in Table 2.

LSP Area Only		Dwellings	Occ. Ratio	Population	Workforce
Total >>>		549	2.8	1,537	722
Average employees per dwelling >>>>>					1.32
		Sqm per	Employees	Prop.	
Floorspace sqm		Employee*		Workforce	
Neighbourhood Centre					
Retail	2,500	30	83	11.5%	
Office	600	25	24	3.3%	
Other	1,900	40	48	6.6%	
Sub-Total	5,000	32	155	21.4%	
Home-based (dwellings)**	58	1	58	8.0%	
Total Employment			213	29.4%	

NOTES:

*Based on analysis of DoP Commercial & Industrial Land Use Surveys and other sources

**Source: ABS Catalogue 6275.0; November 2005

Table 2: Estimate of Local Employment Potential

As indicated in the table, it is estimated that the neighbourhood centre itself could potentially employ some 150 people, thus providing net employment opportunities for a little over 21 percent of the workforce residing within the LSP area. The amount of home-based employment will, if in line with ABS survey averages, account for some 8

percent of the LSP workforce. Home-based employment not only includes individual home-based businesses, but people working for companies from home (full or part time); as well as mobile workers such as tradespeople, who are out and about most of the day, but use their home as their administrative base.

It should be noted in Table 2 that the quantity of non-retail floorspace assumed is indicative only and not intended as a firm proposal or control target like the retail floorspace. These figures are seen as representing a longer term potential at full development of the LSP, and surrounding areas. The figures do, however, approximate the floorspace potential indicated in the indicative centre design shown in Figure 10.

APPENDIX 5
ENVIRONMENTAL ASSESSMENT REPORT

ENVIRONMENTAL REPORT FOR LOTS 14,15 & 299 KEROSENE LANE BALDIVIS

Prepared for:

PLANNING SOLUTIONS PTY LTD

Job No: 08.199

Report No: RP001



Australia

ENVIRONMENTAL REPORT FOR LOTS 14, 15 & 299 KEROSENE LANE BALDIVIS

Prepared for:

PLANNING SOLUTIONS

Prepared by:

ENV Australia Pty Ltd
Level 7, 182 St George's Terrace
PERTH WA 6000
Phone: (08) 9289 8360
Fax: (08) 9322 4251
Email: env@env.net.au

Prepared by:	<i>Greg Ryan, Ashton Betti, Margaret Dunlop</i>
Status:	<i>Final</i>
QA Review:	<i>Dale Newsome</i>
Technical Review:	<i>Dale Newsome</i>
Content Review:	<i>Dale Newsome</i>
Date:	<i>16 February 2009</i>

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FIGURE 3	ACID SULFATE SOILS RISK
FIGURE 4	MAXIMUM GROUNDWATER LEVELS
FIGURE 5	ADJACENT ENVIRONMENTAL FEATURES AND LANDUSES

APPENDICES

APPENDIX A	MINISTERS STATEMENT 527
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STATEMENT OF LIMITATIONS

Scope of Services

This environmental site assessment report (“the report”) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) (“scope of services”). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, ENV has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report (“the data”). Except as otherwise stated in the report, ENV has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (“conclusions”) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. ENV will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to ENV.

Environmental Conclusions

In accordance with the scope of services, ENV has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions. Also it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. ENV assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of ENV or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

ENV will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

EXECUTIVE SUMMARY

Lots 14, 15 and 299 Kerosene Land Baldivis comprises an area of 39 ha located approximately 38 km south west of the Perth Central Business District. The site has been cleared for market gardens and related processing activities. The site is adjacent to areas supporting native vegetation and sand extraction activities to the north-east.

The site is zoned 'Urban' in Metropolitan Region Scheme and as 'Development' in the Town of Kwinana Town Planning Scheme. A structure plan is being developed to facilitate development of the site as mixed use residential.

The sites soils are described as sand with a pocket of limestone and sand in the south west corner. The site is gently undulating and is located at approximately 14 m Australian Height Datum (AHD).

Acid Sulfate Soils risk mapping indicates that the site is located in an area of "no known risk of ASS occurring within three metres of the natural soil surface". An assessment of the site and the preliminary Local Structure Plan design indicates that the level of disturbance involved in developing the site is unlikely to affect the groundwater table and therefore ASS management is not likely to be required.

No permanent surface water features are found on the site. Surface water is not expected to occur on the site except during extreme rainfall events, due to the high infiltration rate of the sandy limestone soils. Lake Cooloongup is approximately 750 m to the east and Kerosene Lane Swamp less than 100 m to the north.

Groundwater flow on the site is considered to be in a generally westerly direction, towards Lake Cooloongup. The depth to groundwater on the site varies from 3.5 m in the north-west corner of the site to 15 m in the north-east corner of the site.

As market garden, it is likely the land has been treated with various pesticides and chemicals which increase of the risk of potential contamination. A number of areas of potential contamination were identified by a Preliminary Site Investigation including sheds used for storage of various chemicals and fertilizers, wastewater infiltration pond and an above ground petrol tank.

A high pressure natural gas pipeline traverses north–south along the western boundary of the site. The pipeline is lies central within a 12 m easement and is protected by two buffers which restrict certain levels of development. No residential development may be permitted within 32 m either side of the pipeline. No use where large numbers of people congregate may be located within 96 m either side of the pipeline.

Several poultry farms were previously located approximately 300 m to the south and south-east of the site, however it is understood that these are no longer in operation. Several sand mining quarries are located to the north and north–east of the site and market garden operations to the south and west. Buffer separation distances would apply to any proposed development of 300–500 m depending on the size of the quarry.

operations according to State government policy. Buffer distances to market gardens are able to be reduced to a 20 m vegetated buffer, appropriate fencing and other measures.

ENV recommends the following:

- Sufficient buffers, in accordance with State government policy, to the gas pipeline, sand quarries, poultry farms and neighbouring market gardens be afforded in the design;
- A Local Water Management Strategy (LWMS) is being developed to integrate drainage design and water management for the site through Water Sensitive Design to accompany the Local Structure Plan;
- a Detailed Site Investigation (DSI), involving soil and groundwater sampling and analysis, be undertaken to more adequately characterise the potential for soil and groundwater contamination identified for the site prior to commencement of works for subdivision or development.

1 INTRODUCTION

Lots 14, 15 and 299 Kerosene Land Baldivis ('the site') comprises an area of 39 ha located approximately 38 km south west of the Perth Central Business District (Figure 1). The site lies within the area encompassed by the Baldivis North District Structure Plan which was prepared for the City of Rockingham in 2000.

The City of Rockingham commissioned the preparation of a District Structure Plan (DSP) for the proposed urban areas of Baldivis located north of Safety Bay Road. The structure Plan area includes all the 'Urban' and 'urban Deferred' zoned land located within Kerosene Lane, Baldivis Road, Safety Bay Road and Mandurah Road.

A contextual analysis was undertaken in preparation of the DSP including an assessment of the existing natural environment. The analysis included the physical and biological environment as well as environmental issues and policies affecting the land. The main issues from the DSP report which affect the site are discussed below in the context of the Local Structure Plan (LSP) for the site.

The site has been cleared to support intensive agriculture (market gardens) and related processing activities. The site is adjacent to areas supporting native vegetation and sand extraction activities to the north east and market gardens and poultry farms to the south and east.

The site is zoned 'Urban' in Metropolitan Region Scheme and as 'Development' in the Town of Kwinana Town Planning Scheme. A structure plan is being developed to facilitate development of the site as mixed use residential.

The following report provides a general environmental review of issues affecting the site to provide opportunities and constraints assessment for development of the LSP.

2 BACKGROUND

2.1 SCOPE OF WORKS

ENV. Australia has undertaken the following scope of works to support the development of a local structure plan for the site:

- Collate and review of relevant existing data on groundwater levels and water quality;
- A desktop assessment of Acid Sulphate Soils (ASS) in accordance with DEC's *Draft Identification and Investigation of Acid Sulphate Soils*, and assessment of the likelihood of ASS being present within the site and recommendations for further work;
- A Preliminary Site Investigation (PSI) for potential contamination consistent with the general requirements of the Department of Environment and Conservation (DEC);
- Background research local and state environmental policies and scheme requirements relevant to the site and the proposed development; and
- Assessment of the interaction of the proposed development with adjacent environmental features and land uses, in the context of any impact on the developable area or management requirements.

The PSI has been produced separately from this report for submission to regulators.

3 SITE DESCRIPTION

3.1 SOILS AND GEOLOGY

The sites soils are identified by Gozzard (1987) as consisting of Sand derived from Tamala Limestone (S7) with a pocket of Limestone and Safety Bay sand (Ls) in the south west corner (Figure 2). These soils are described as:

S7 – Sand Pale Yellowish brown, medium to coarse grained, sub angular quartz, trace of feldspar, moderately sorted, of residual origin.

Ls – pale yellowish brown, fine to coarse grained, sun angular to well rounded quartz, trace of feldspar, shell debris, variably lithified, surface kanker of aolian origin.

3.2 TOPOGRAPHY

Land within the site is gently undulating and is located at approximately 14 m Australian Height Datum (AHD).

3.3 BUSH FOREVER

There is no native vegetation on the site, however, an area of bushland to the north east of the site is identified as Bush Forever site No 356 which is part of Lake Cooloongup, Lake Walyungup and adjacent Bushland, Hillman to Port Kennedy (Figure 5). No buffers to development apply to Bush Forever sites.

4 ACID SULPHATES SOILS

A preliminary Acid Sulphate Soils (ASS) investigation of the site was conducted. This involved GIS-based, desktop assessment reviewing available aerial photography, topography, geology, hydrogeology and acid sulphate soils databases.

4.1 TERMINOLOGY

Following DEC Guidelines (2006), the term 'Acid Sulphate Soils' (ASS) includes both Potential Acid Sulphate Soils (PASS) and Actual Acid Sulphate Soils (AASS). The definitions for each of these are reproduced from DEC (2006) as follows:

- *Potential acid sulphate soils (PASS) are soils or sediments which contain iron sulphides and/or other sulphidic minerals that have not been oxidised by exposure to air. The field pH of these soils in their undisturbed state is more than pH 4 and is commonly neutral to alkaline (pH 7 to pH 9). These soils or sediments are invariably saturated with water in their natural state. The waterlogged layer may be peat, clay, loam, silt, or sand and is usually dark grey and soft but may also be dark brown, or medium to pale grey to white.*
- *Actual acid sulphate soils (AASS) are soils or sediments which contain iron sulphides and/or other sulphidic minerals that have previously undergone some oxidation to produce sulfuric acid. This results in existing acidity (pH <4) and often a yellow and/or red mottling (jarosite/iron oxide) in the soil profile. AASS commonly also contain residual un-oxidised iron sulphides or potential acidity as well as existing acidity.*

4.2 ASS RISK MAPPING

ASS risk mapping in relation to the site is shown in Figure 3 (taken from Western Australian Planning Commission (WAPC) Bulletin 64, (Western Australian Planning Commission 2004, Amended 2006). The mapping indicates that the site is located in an area of "no known risk of ASS occurring within three metres of the natural soil surface". There is a small area located approximately 200 m to the north of the site, which has a "high to moderate risk of ASS occurring within three metres of the natural soil surface".

The ASS risk mapping was largely a desktop exercise based on reinterpretation of existing geological, topographic and other data sets. The maps produced are generally accepted as being indicative only, with incomplete "ground truthing" of the mapping. However, where high ASS risk is indicated, this flags the likely requirement for further detailed ASS investigations and possibly the preparation of an ASS management plan in the future.

Department of Environment and Conservation (2006) notes that sites should be investigated for acid sulphate soils if any of the following works are proposed:

- Soil or sediment disturbance greater than 100 m³ in the ASS high risk areas (e.g. construction of roads, foundations, drainage works, land forming works, dams and aquaculture ponds or sand or gravel extraction); or
- Lowering of the watertable, whether temporary or permanent (e.g. for groundwater abstraction, dewatering, installation of new drainage, modification to existing drainage) in areas depicted in the ASS risk map as “high risk of AASS or PASS occurrence” or dewatering operations in areas depicted in the ASS risk map as “moderate to low risk of AASS or PASS occurrence” within 500 m from the high risk areas; or
- Where there is evidence of a significant risk of disturbing acid sulphate soils in the “moderate to low risk” areas exceeding 3.0 m below natural surface.

4.3 CONCLUSIONS AND RECOMMENDATIONS

An assessment of the site and the preliminary Local Structure Plan design indicates that dewatering is unlikely to be required for development. The level of disturbance involved in developing the site is unlikely to affect the groundwater table, which is at least 10 m below ground level (bgl). It is therefore considered that no further ASS investigations are required for the site. If development plans change in the future to include dewatering operations, further ASS investigations may be required.

5 HYDROLOGY

Due to the soils and topography, no permanent surface water features or drains are found on the site.

5.1 LOCAL WETLANDS

The site is approximately 750 m to the east of Lake Cooloongup and less than 100 m south of Kerosene Lane Swamp which is a small wetland to the north of Kerosene Lane (Figure 5). Both Lake Cooloongup and Kerosene Lane swamp are Conservation Category wetlands which are also identified by the Environmental Protection (Swan Coastal Lakes) Policy 1992 giving them protection under the *Environmental Protection Act* (1986).

The Environmental Protection Authority (EPA) management objectives for Conservation Category wetlands are: to preserve and enhance the existing conservation values of the wetlands (Environmental Protection Authority 2008). Buffer separation distances of 50–100 m from development apply to conservation category wetlands. The separation distances, including the presence of Kerosene Lane are such that buffer requirements do not affect the site.

5.2 SURFACE WATER

There are no surface water features on the site. Because of the high hydraulic conductivity of the sandy soils of the site, it is considered that all rain falling on the site will infiltrate on site, except during extreme rainfall events.

5.3 GROUNDWATER

Groundwater monitoring was undertaken in 2008. One Department of Water (DoW) groundwater monitoring well is located adjacent to the site and five monitoring wells were installed by ENV Australia within the site (Figure 6). The wells were monitored for water level and quality. The groundwater levels measured in the DoW bore since installation in 1975 (full records shown in Appendix C) were also reviewed to provide maximum and minimum groundwater levels (Figure 6). The calculated maximum groundwater levels on the site varied from 2.98 mAHD at MW4 in the southeast to 2.87 mAHD at MW1 in the centre of the site. The minimum groundwater levels measured onsite varied from 1.84 mAHD at MW4 in the southeast to 1.47 mAHD at MW1 in the centre of the site (Appendix D). The bore records are shown in Table 1. Full monitoring records may be found in Appendix D.

The groundwater levels measured by ENV did not indicate a clear flow direction. Geology mapping also reveals that the site is situated mostly on sand derived from limestone with pockets of limestone rock situated throughout the site

(Gozzard 1983). Such geology typically has very high hydraulic conductivity. Under such conditions groundwater flow direction can be difficult to determine, particularly on small sites such as Lots 14, 15 and 299, Kerosene Lane. The Kerosene Lane area also has many market gardens with bores extracting groundwater. The impact of drawdown from these bores can change and reverse local flow directions, leading to complex groundwater patterns of the type seen at Kerosene Lane. Regardless of this it is considered that the regional flow direction is towards the west (Figure 3).

The smallest depth to the calculated maximum groundwater level is 3.51 m (bore MW3). The largest depth to the calculated maximum groundwater level is 16.63 m (DoW 3035) (Table 1).

Table 1: Maximum Groundwater Levels at Site Bores

Bore	Calculated Maximum Groundwater Level (mAHD)	Depth to Calculated Maximum Groundwater Level (m)
MW1	2.87	8.02
MW2	2.94	15.07
MW3	2.92	3.51
MW4	2.98	9.65
MW5	2.90	10.03
DoW 3035	2.93	16.63

Further information on this matter is provided in the Local Water Management Strategy (ENV, 2009).

5.4 CONCLUSIONS AND RECOMMENDATIONS

Given the sandy soils and topography of the site disposal of stormwater is not considered a constraint to development on the site. Further information on the management of stormwater on the site is provided in the Local Water Management Strategy (ENV, 2009).

6 POTENTIAL FOR CONTAMINATION

The Department of Environment and Conservation (DEC) identifies Market Gardens and being “a potentially contaminating landuse” (Department of Environment 2004b). The site currently supports Market gardens and related processing activities. This land use has been in operation on lots 14 and 15 since the early 1978 and on lot 299 since 1996. A Preliminary Site Investigation (PSI) was undertaken by ENV for the site. The PSI requirements include a site walkover inspection, desktop research and historical investigations to ascertain the likelihood of contamination. This report summarises the findings of the PSI assessment. The full PSI is provided as a separate report by ENV.

The primary objective of the investigation was to ascertain the likelihood of onsite soil and groundwater contamination and for migration of contamination from neighbouring properties. An additional objective was to provide a report compliant with the requirements of a DEC PSI, such that the report can be submitted to the DEC in the future via an audit process as part of any planning condition and *Contaminated Sites Act* (2003) requirements.

Based on the PSI a number of areas of potential contamination were identified. These were:

- Sheds located across the site, used for storage of various chemicals and fertilizers;
- Land used as market garden likely to have been treated with various pesticides and chemicals;
- Wastewater infiltration pond; and
- An above ground petrol tank located behind the main shed may be linked to possible hydrocarbon contamination.

6.1 CONCLUSIONS AND RECOMMENDATIONS

Given the results of the PSI including the history of the site, the various sheds and storage of chemicals and fertilizers, the land use involving the application of those chemical and fertilisers, the infiltration pond and the above ground petrol tank it is considered that there is risk of potential contamination of soil and or groundwater.

ENV recommends that:

- a Detailed Site Investigation (DSI) involving soil and groundwater sampling and analysis be undertaken to more adequately characterise the potential for

soil and groundwater contamination identified for the site prior to commencement of works for subdivision or development.

7 ADJACENT LANDUSES

7.1 HIGH PRESSURE GAS PIPELINE

A high pressure natural gas pipeline traverses north south through the Structure Plan areas along the western boundary of Lot 299. The pipeline owned by CMS Gas Transmission Australia is buried approximately 760–850 mm underground and lies central within a 12 m easement.

The DEC undertook an assessment of buffer requirements for the gas pipeline during the rezoning for the Baldivis Town Centre (Amendment 295) with the resulting following environmental conditions:

2. High Pressure Natural Gas Pipeline

The following activities, land uses and developments are prohibited within the high pressure natural gas pipeline easement:

- 1. ground disturbing activities, other than for the purpose for which the easement was created, and for uses and developments that comply with condition 2-2.*
- 2. temporary residence (including caravans, camping and similar);*
- 3. storage of materials and equipment;*
- 4. fires and barbecues;*
- 5. explosives, inflammables and corrosives (including storage of liquefied petroleum gas and fuel oil);*
- 6. refuse disposal and landfill;*
- 7. service stations, fuel lines and storage of fuel;*
- 8. vegetation with an expected growth exceeding one metre in height, and plantings within one metre of the centre of the pipeline with the exception of lawn ;and*
- 9. large obstructions to line of sight along the easement.*

The following land uses and developments may be permitted within the high pressure natural gas pipeline easement, with the written approval of the local government on advice of the pipeline operator, subject to compliance with the Pipeline Protection Plan:

- 1. Cycleways and footpaths;*

2. *Roads and road crossings (with a minimum depth of cover over the pipe of 1.2 metres);*
3. *Public Open Space;*
4. *signage and other facilities that are necessary to comply with the Pipeline Protection Plan referred to in condition;*
5. *car parking during the time that the adjoining land is being developed (with a minimum depth of cover over the pipeline of 1.2 metres) minimum cover of 1.2 metres over the pipe).*

Minimum setbacks for land uses and developments from the centre of the high pressure natural gas pipeline shall be:

1. *96 metres, in case of sensitive development as determined by the local government on advice of the Department of Environmental Protection and the pipeline operator, and including aged persons accommodation, childcare centres, schools and hospitals;*
2. *32 metres to the boundary of each residential lot, in the case of residential development; and*
3. *at the local governments discretion, following consultation with the Department of Environmental Protection and the pipeline operator, in the case of all gathering of people within 96 metres of the centre of the pipeline.*

(Ministers Statement No.527, 1999)

7.1.1 Conclusions and Recommendations

The high pressure gas pipeline restricts development within two buffer distances of 32 m and 96 m from the middle of the pipeline easement to the west of the site.

7.2 POULTRY FARMS

Several poultry farms previously operated approximately to the south and south-east of the site. These are understood to have been progressively closed and therefore would no longer require buffers to prevent potential impacts on development of the site (pers. communication Ross Underwood, City of Rockingham). An indicative buffer of 300 m is shown (Figure 5) until it can be confirmed that the poultry farms have ceased operations.

7.2.1 Conclusions and Recommendations

An indicative buffer of 300 m be afforded the development until it can be confirmed that the poultry farms to the south have ceased operations.

7.3 SAND AND LIMESTONE QUARRIES

Several sand mining quarries are also located to the north and north-east of the site (Figure 5). Buffer separation distances will apply to any proposed development depending on the size of the quarry operations according to State Government policy.

For industrial land uses such as sand extraction, the EPA preferred method for determining buffers to sensitive land uses involves site-specific technical studies. However, in some instances an alternative is to apply generic separation distances, typically in the order of 300–500 m for sand and limestone extraction. The role and limitation of generic buffers are outlined in *Separation Distances Between Industrial and Sensitive land uses EPA Guidance Statement No. 3* (Environmental Protection Authority, 2008). Further advice on buffers can also be found in SPP 4.1 State Industrial Buffer Policy (Government of Western Australia 1997).

7.3.1 Conclusions and Recommendations

An indicative 300 m buffer to development is recommended assuming the land use of sand quarry or similar continues to the north of the site.

7.4 MARKET GARDENS

Buffer distances also apply to urban development near market gardens due to the potential for offsite impacts such as chemical spray drift. The Western Australian Planning Commission Planning Bulletin Number 63 *Policy for Dealing with Potential Conflicts Between Residential Subdivision and Market Gardens in East Wanneroo* established a mechanism by which reduction in the generic buffer distances can be considered where residential subdivision is near market gardens. Under this policy, separation distance can be reduced to a protected and maintained 20 m vegetated buffer, together with adequate additional land for access for maintenance and firebreaks, and specially designed fencing (Western Australian Planning Commission 2003).

7.4.1 Conclusions and Recommendations

A 20 m vegetated buffer together with adequate additional land for access for maintenance and firebreaks, and specially designed fencing be afforded to the development from neighbouring market gardens.

7.5 ENVIRONMENT MANAGEMENT PLANS

The Ministers Statement for the City of Rockingham Town Planning Scheme No. 1 Amendment No 295 (Baldivis Town Centre) includes the preparation of the following Environmental Management Plans prior to development:

- Drainage and Nutrient Management Plan
- Soils and Groundwater Contamination Remediation Plan
- Pipeline Protection Plan.

7.5.1 Conclusions and Recommendations

The requirement for a Drainage and Nutrient Management Plan (DNMP) will met by the Local Water Management Strategy (LWMS) that will be required to accompany the LSP. The requirement for a Soils and Groundwater Contamination Remediation Plan will be met by PSI and the resulting Detailed Site Investigation (DSI) and further work in accordance with the DEC Contaminated Sites assessment process. The Pipeline Protection Plan will be required in accordance with Attachment 1 of the Statement That A Scheme May Be Implemented for the City of Rockingham Town Planning Scheme No. 1 Amendment No.295.

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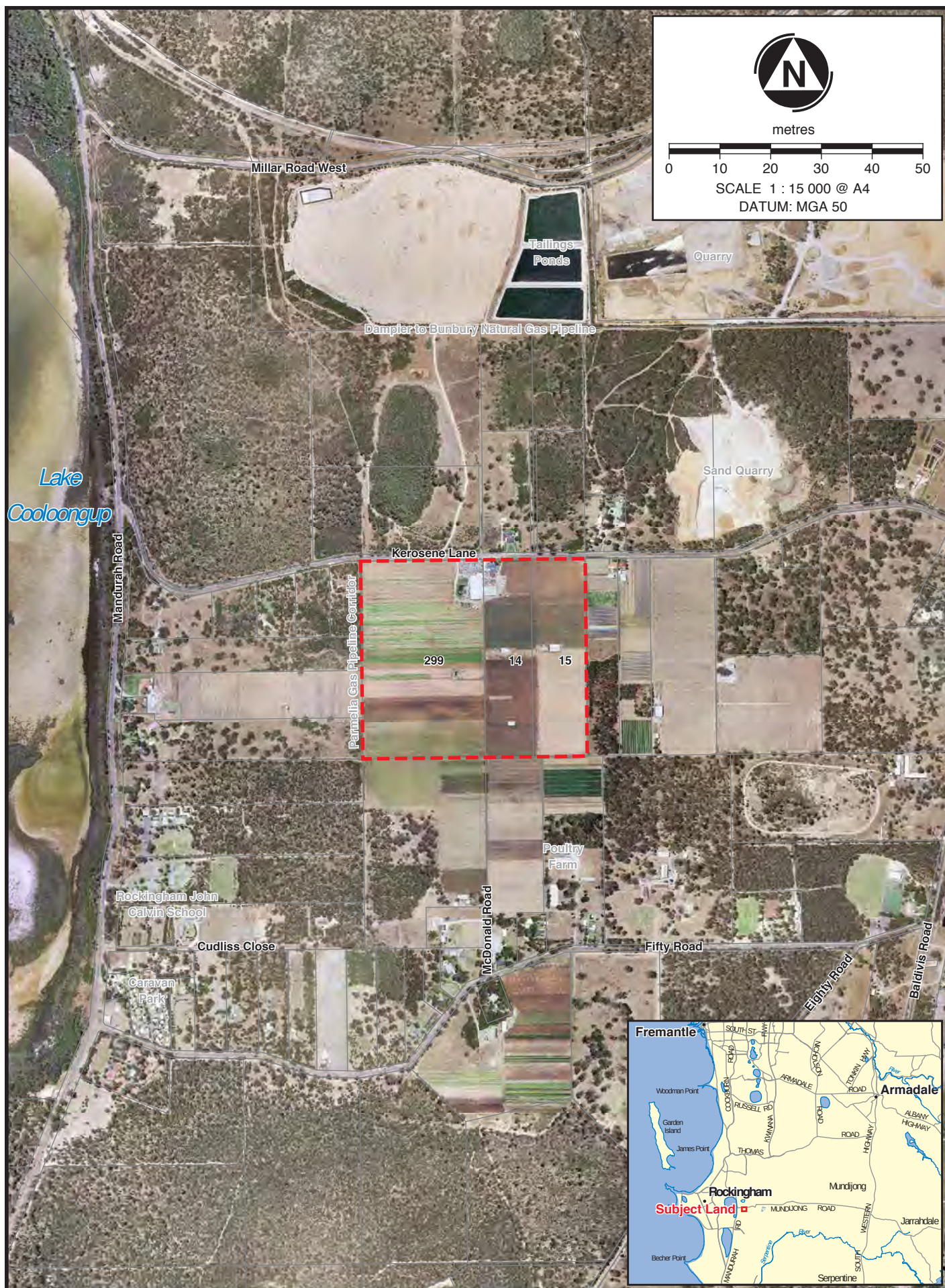
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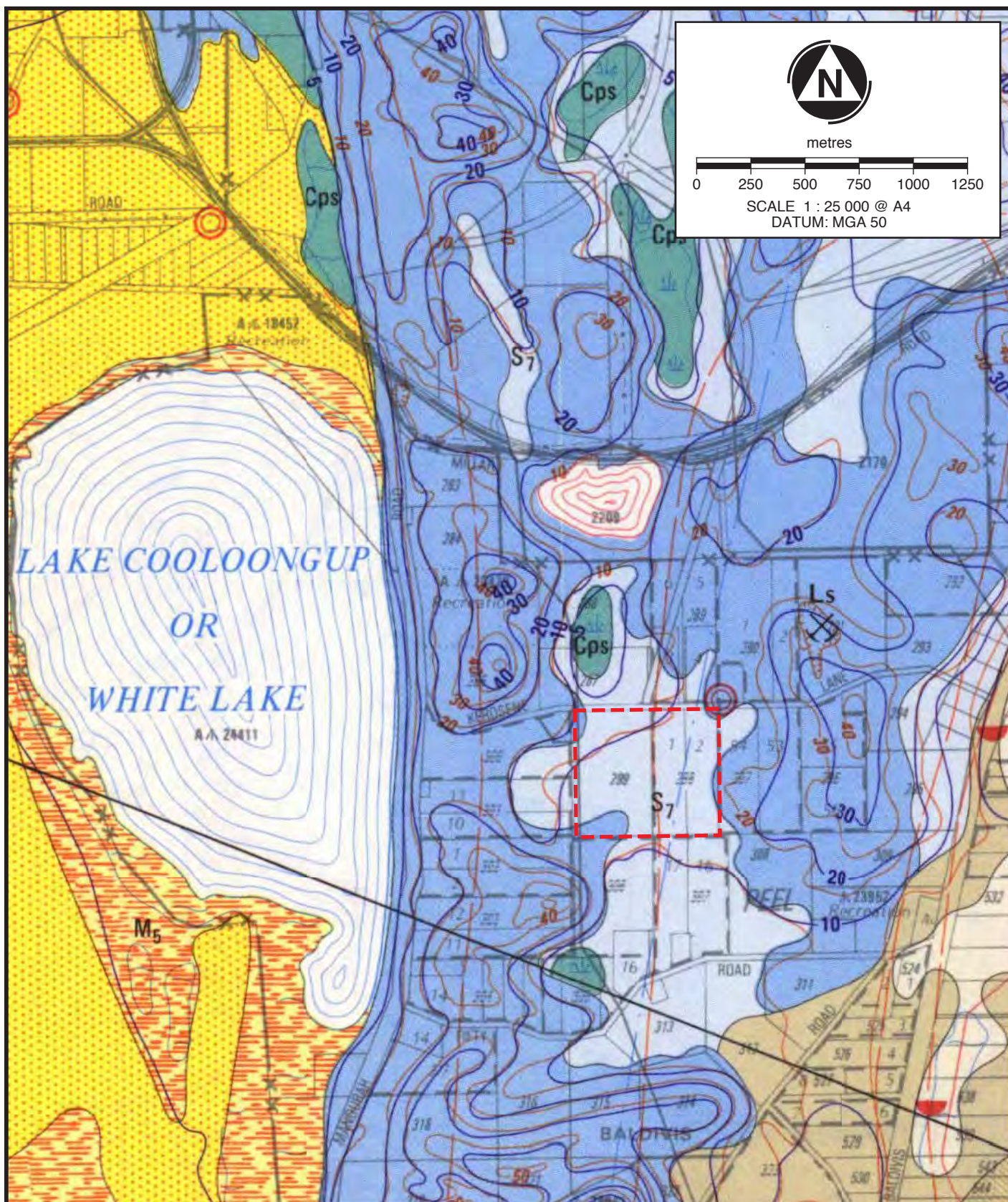
FIGURES



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 AUTHOR: GR 16-09-08

Planning Solutions Pty Ltd
 LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS
 ENVIRONMENTAL REPORT
LOCATION
 FIGURE 1





LEGEND

--- Subject Land Boundary

S 7 SAND - pale yellowish brown, medium to coarse-grained, sub-angular quartz, trace of feldspar, moderately sorted, of residual origin.

L S LIMESTONE - pale yellowish brown, fine to coarse grained, sub-angular to well-rounded quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin.

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DRAWN: TE 11-09-08
AUTHOR: GR 11-09-08

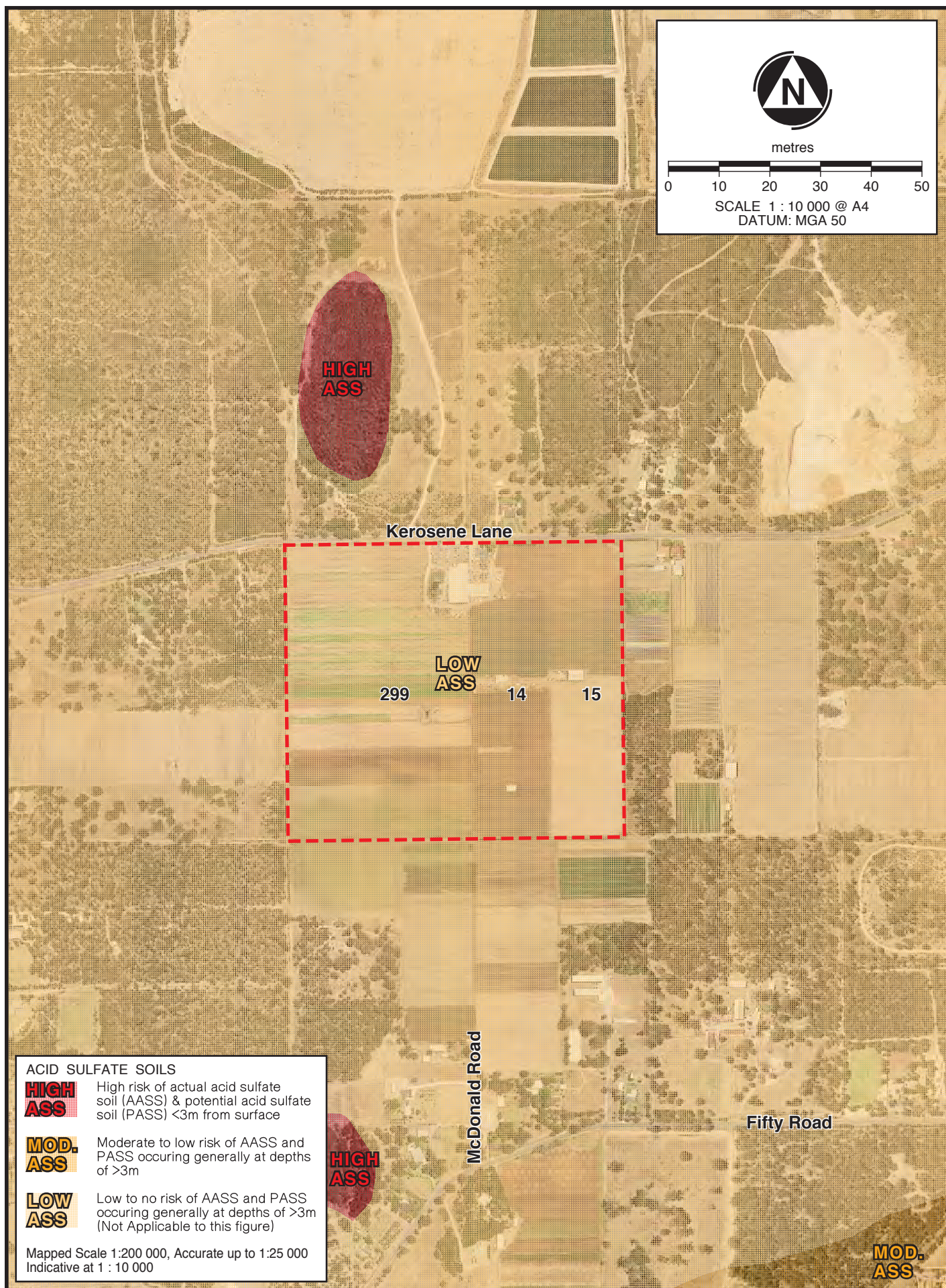
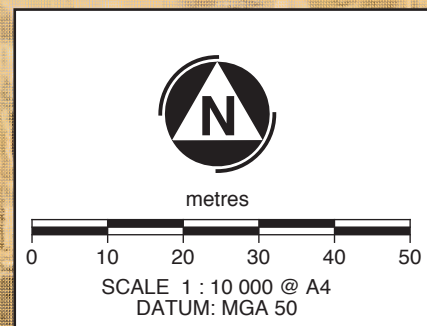
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LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS
ENVIRONMENTAL REPORT
SOILS AND GEOLOGY



GEOLOGY SOURCE: Geological Survey of WA, 1:50 000 Environmental Geology Series

FIGURE 2

Australia



ACID SULFATE SOILS

HIGH ASS

High risk of actual acid sulfate soil (AASS) & potential acid sulfate soil (PASS) <3m from surface

MOD. ASS

Moderate to low risk of AASS and PASS occurring generally at depths of >3m

LOW ASS

Low to no risk of AASS and PASS occurring generally at depths of >3m (Not Applicable to this figure)

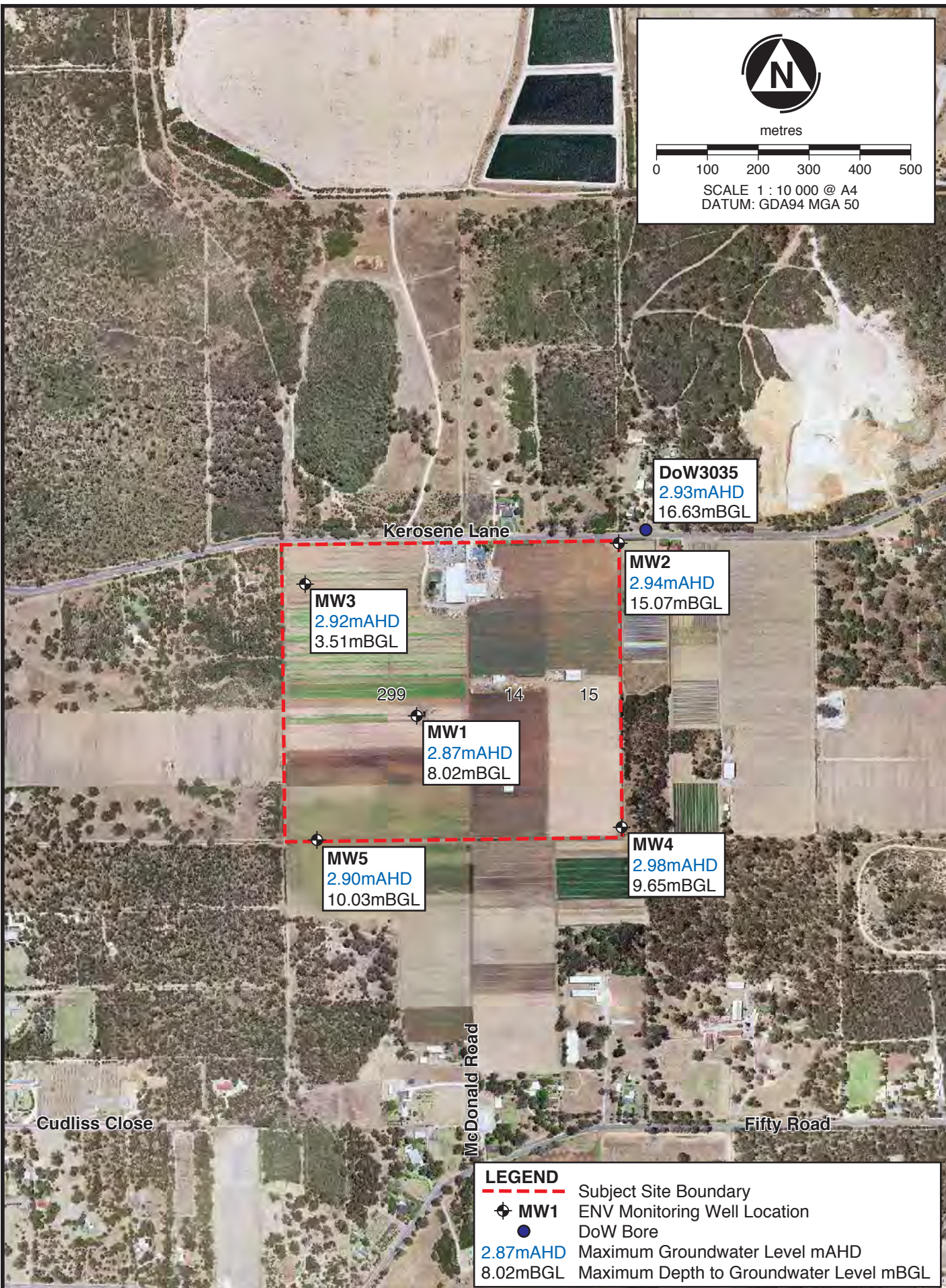
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Indicative at 1 : 10 000

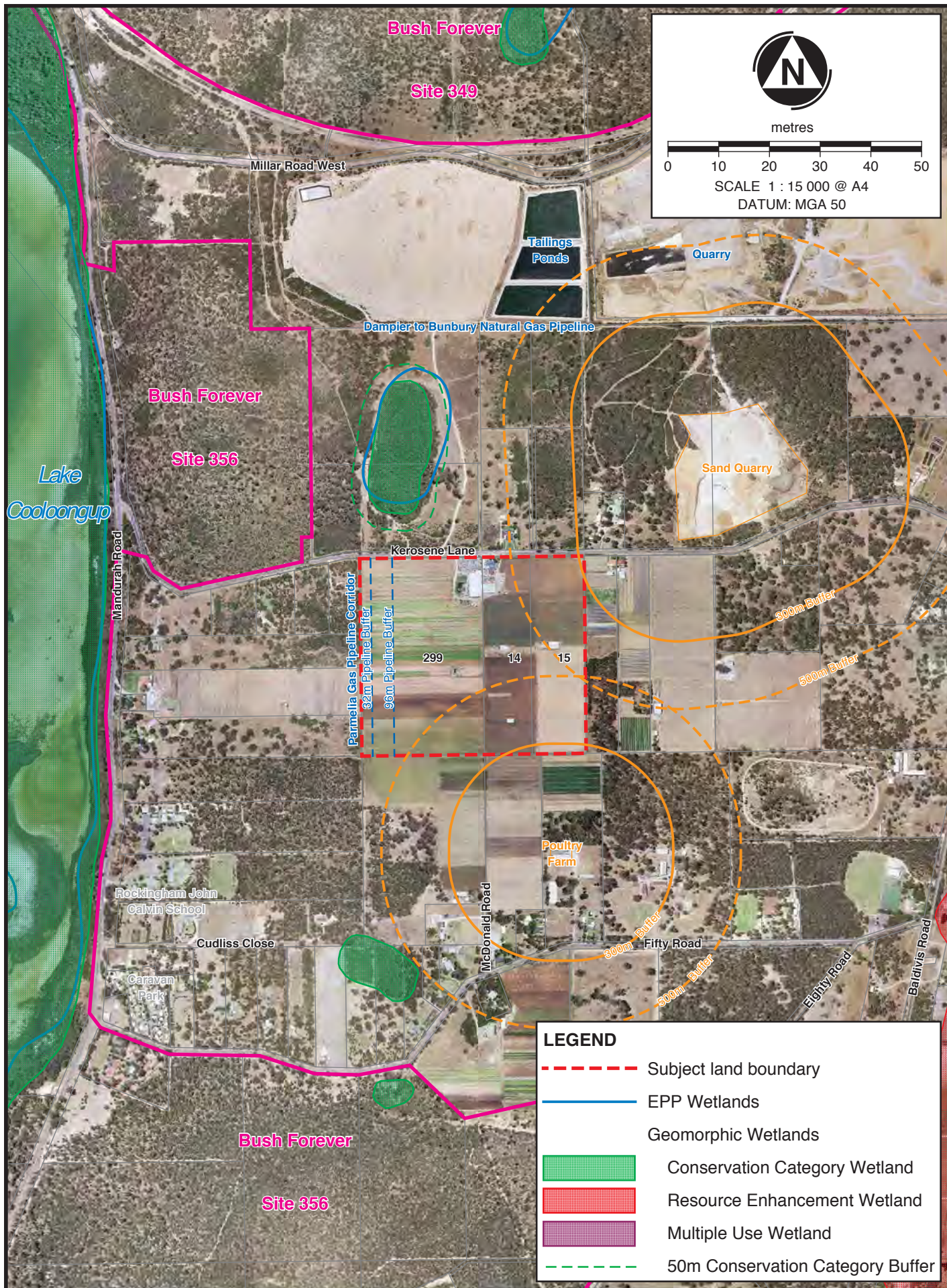
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AUTHOR: GR 11-09-08

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LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS
ENVIRONMENTAL REPORT
ACID SULFATE SOIL RISK

FIGURE 3







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 AUTHOR: GR 16-09-08

Planning Solutions Pty Ltd
 LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS
 ENVIRONMENTAL REPORT

ADJACENT ENVIRONMENTAL FEATURES AND LAND USES

Aerial Photo supplied by Landgate

FIGURE 5



APPENDIX A

MINISTER'S STATEMENT 527



MINISTER FOR THE ENVIRONMENT;
LABOUR RELATIONS

Statement No.

000527

**STATEMENT THAT A SCHEME MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF DIVISION 3 OF PART IV OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

**CITY OF ROCKINGHAM TOWN PLANNING SCHEME NO. 1
AMENDMENT NO. 295 (BALDIVIS TOWN CENTRE)**

Scheme Purpose:

- (a) to rezone Lot 6, Lot 13, Part Lot 10 and Part Lot 26, corner Nairn Road and Safety Bay Road, Baldivis, from 'Rural' zone to 'Baldivis Town Centre' zone, and to amend the Scheme Maps accordingly; and
- (b) to introduce provisions for the Baldivis Town Centre in the Scheme Text.

Responsible Authority: City of Rockingham

Responsible Authority Address: PO Box 2142, Rockingham DC WA 6967

Assessment Number: 1120

Report of the Environmental Protection Authority: Bulletin 906

Subject to the following conditions, there is no known environmental reason why the town planning scheme amendment to which the above report of the Environmental Protection Authority relates should not be implemented:

- 1 The following clauses shall be inserted into the City of Rockingham Town Planning Scheme No. 1 Scheme Text:

“ Part X Environmental Conditions

10.1 In accordance with Section 7A4 of the Town Planning and Development Act, environmental conditions imposed by the Minister for the Environment on the Scheme or amendments to the Scheme and contained in Statements under Section 48F Environmental Protection Act, are incorporated into the Scheme by:

- Clauses 10.1 to 10.3 inclusive;
- Table XI; and
- appropriate modifications to the Scheme Maps.

Published on

13 DEC 1999

- 10.2 Where appropriate, the environmental conditions are indicated on the Scheme Map by the symbol EC to indicate that environmental conditions apply to the land.
- 10.3 The local government shall maintain a register of all the Statements published under Section 48F referred to in sub-clause 10.1 which shall be made available for public inspection at the offices of the local government."
- 2 The following Table shall be inserted into the City of Rockingham Town Planning Scheme No. 1 Scheme Text:

"Table XI Environmental Conditions

Amendment No.	Location of Land	Environmental Conditions Associated with the Area Identified in "Location of Land"
295	Baldivis Town Centre - Lot 6, Lot 13, Part Lot 10 and Part Lot 26, corner Nairn Road and Safety Bay Road, Baldivis	1 Environmental Management Plans 1-1 The following Environmental Management Plans shall be prepared in accordance with the specifications set out in Attachment 1 of the Minister for the Environment's "Statement that a Scheme may be Implemented" No. [insert relevant Statement number] published on [insert date]: • Drainage and Nutrient Management Plan; • Soil and Groundwater Contamination Remediation Plan; and • Pipeline Protection Plan. 1-2 The above Environmental Management Plans shall be implemented in accordance with the provisions of the Plans, to the requirements of the local government. 2 High Pressure Natural Gas Pipeline 2-1 The following activities, land uses and developments are prohibited within the high pressure natural gas pipeline easement: 1 ground-disturbing activities, other than for the purposes for which the easement was created, and for uses and developments that comply with condition 2-2 of this Table; 2 temporary residence (including caravans, camping and similar); 3 storage of materials and equipment; 4 fires and barbecues; 5 explosives, inflammables and corrosives (including storage of liquefied petroleum gas and fuel oil); 6 refuse disposal and land fill;

		7 service stations, fuel lines and storage of fuel; 8 vegetation with an expected growth exceeding one metre in height, and plantings within one metre of the centre of the pipeline (with the exception of lawn); and 9 large obstructions to line of sight along the easement. 2-2 The following land uses and developments may be permitted within the high pressure natural gas pipeline easement, with the written approval of the local government on advice of the pipeline operator, subject to compliance with the Pipeline Protection Plan referred to in condition 1-1 of this Table: 1 cycleways and footpaths; 2 road crossings and services (with minimum depth of cover over the pipeline of 1.2 metres); 3 public open space; 4 signage and other facilities that are necessary to comply with the Pipeline Protection Plan referred to in condition 1-1 of this Table; and 5 car parking during the time that the adjoining land is being developed (with minimum depth of cover over the pipeline of 1.2 metres). 2-3 Minimum setbacks for land uses and developments from the centre of the high pressure natural gas pipeline shall be: 1 96 metres, in the case of sensitive development as determined by the local government on advice of the Department of Environmental Protection and the pipeline operator, and including aged persons accommodation, child care centres, schools and hospitals; 2 32 metres to the boundary of each residential lot, in the case of residential development; and 3 at the local government's discretion, following consultation with the Department of Environmental Protection and the pipeline operator, in the case of all other land uses and developments which facilitate the gathering of people within 96 metres of the centre of the pipeline.
--	--	---

- 3 The Scheme Map for the City of Rockingham Town Planning Scheme No. 1 shall be amended by inserting the symbol EC and an appropriate modification to the legend of the Scheme Map, to show that environmental conditions apply to the subject land.

NOTES

The Responsible Authority has undertaken to prepare a Wetland Management Plan for that portion of the Parks and Recreation Reserve that abuts the Baldivis Town Centre.

The Management Plan is to include:

- 1 a description of the potential impacts of the development of the Baldivis Town Centre Zone on the wetland;
- 2 specific measures to manage the impacts on the wetland, associated vegetation and fauna habitats; and
- 3 a timeline and responsibilities for the implementation of those measures identified in 2.

CHERYL EDWARDES (Mrs) MLA
MINISTER FOR THE ENVIRONMENT

13 DEC 1993

**Attachment 1 of the 'Statement That A Scheme May Be Implemented'
for the City of Rockingham Town Planning Scheme No. 1 Amendment
No. 295**

1 Drainage and Nutrient Management Plan

- 1-1 Prior to commencement of site works for subdivision or development, the subdivider or developer shall prepare a Drainage and Nutrient Management Plan for the whole of the amendment area to ensure that the rate, quantity and quality of water leaving the amendment area will not adversely impact on Tamworth Hill Swamp, the Stakehill Groundwater Area groundwater supply and the Peel-Harvey estuarine system, to the requirements of the local government with the concurrence of the Water and Rivers Commission, on advice from the Department of Environmental Protection and the Department of Conservation and Land Management.

This Plan shall:

- 1 define the catchment of Tamworth Hill Swamp in relation to the amendment area;
- 2 provide measures to facilitate the removal of pollutants and nutrients in accordance with Water Sensitive Urban Design best practices;
- 3 incorporate Water Sensitive Urban Design best practice principles to maximise on-site water infiltration generally;
- 4 include measures to prevent surface water runoff from entering Tamworth Hill Swamp and the Peel-Harvey estuarine system;
- 5 review the siting, design and size of the stormwater infiltration basin adjacent to Tamworth Hill Swamp so as to achieve a satisfactory separation between the bottom of the basin and groundwater;
- 6 ensure that the objectives of the Statement of Planning Policy No 2: The Peel-Harvey Coastal Plain Catchment and the Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992 are met;
- 7 include a monitoring program to measure the performance of the implemented Plan against objectives and performance criteria; and
- 8 include contingency plans in the event that criteria are not achieved.

2 Soil and Groundwater Contamination Remediation Plan

- 2-1 Prior to commencement of site works for subdivision or development on any land that has previously been used for intensive horticulture purposes, the subdivider or developer shall prepare a Soil and Groundwater Contamination Remediation Plan to the requirements of the local government with the concurrence of the Department of Environmental Protection for the portion of the land previously utilised for intensive horticulture purposes.

This Plan shall:

- 1 identify the extent and nature of the soil and groundwater contamination;

- 2 identify areas where contamination levels exceed criteria recognised by the Environmental Protection Authority;
- 3 specify actions to ensure that remediation:
 - occurs prior to the commencement of any subdivision or development;
 - is to a standard that is suitable for the intended land uses; and
 - is consistent with remediation guidelines recognised by the Environmental Protection Authority; and
- 4 specify management plans for contaminated areas, where necessary.

3 Pipeline Protection Plan

- 3-1 Prior to commencement of site works for subdivision or development on any land within or abutting the high pressure natural gas pipeline easement, the subdivider/developer shall prepare a Pipeline Protection Plan to the requirements of local government with the concurrence of the Department of Minerals and Energy on advice from the Department of Environmental Protection and the high pressure natural gas pipeline operator.
- 3-2 The Plan referred to in 4-1 shall detail measures to ensure public safety and protection of the high pressure natural gas pipeline in accordance with the Petroleum Pipelines Act 1969-70, the Australian Pipeline Code AS 2885-1997, SAA HB105 and the Environmental Protection Authority's guidance statement for achieving its risk criteria for development in proximity to existing and proposed high pressure gas transmission pipelines, or the most recent equivalents recognised by the Environmental Protection Authority.

APPENDIX 6

ENGINEERING SERVICING ASSESSMENT REPORT

Cossill & Webley Pty Ltd
Level 2
431 Roberts Road
Subiaco WA 6008
PO Box 680
Subiaco WA 6904
T (08) 9422 5800
F (08) 9422 5801
E admin@cosweb.com.au



25 March 2010

cjh/5955_Lot 299 Kerosene Lane Revised Eng Notes.doc

Planning Solutions
PO Box 8701
PERTH WA 6849

Attention: Mr Paul Ellenbroek

Dear Paul

**RE: LOT 14, 15 AND 299 KEROSENE LANE BALDIVIS
STRUCTURE PLAN REVISED ENGINEERING NOTES**

We refer to your request for revised engineering notes in regards to the new Structure Plan layout and responding to comments by the City of Rockingham dated 23rd February 2010 on the structure plan prepared for the subject land. We are pleased to provide the following details:-

1) Gas Pipeline

The Lot 299 Kerosene Lane, Baldivis site is bounded on the west by a regional gas pipeline, the Parmelia Gas Pipeline (PGP) owned by the APA Group (formerly the Dongara to Pinjarra WANG pipeline). This pipeline is not suitable for direct connection for residential reticulated gas. The PGP is a high pressure gas transmission pipeline and was constructed in 1971. To ensure planning certainty and provide guidance on development in the vicinity of regional gas pipelines without placing unnecessary risk levels on the adjoining community the Western Australian Planning Commission issued Planning Bulletin 87 in October 2007 which is referred to here for easement and set back requirements.

Planning Bulletin 87 Table 1 states for the PGP south of Caversham the standard setback distance for residential land use is 65m. However, guidance is also provided in Bulletin 87 on measures to reduce risk within the setback distance and therefore reduce the required setbacks. The LSP for this land assumes a concrete cover will be installed together with access bollards to reduce or remove the risk of pipeline damage through third party interference. These works would be undertaken in consultation with the pipeline owner APA. With the proposed measures the setback requirement for residential use is reduced to the boundary of the pipeline easement, refer Table 6 from Bulletin 87. The LSP makes provision for containing the existing easement in a strip of public open space on the western boundary. The easement known as the CMS easement is 12 metres wide within the lot 299 vicinity, refer to the diagram in the figures section. In recognition of the limitations on land use and activities within the easement there are no drainage swales or other services proposed to be jointly located in the easement.

The APA Group will require a risk assessment on the existing pipeline and the proposed adjoining development to confirm the measures proposed will mitigate the risk to facilitate development in

the setback area prior to subdivision of the land. The land developer as the 'applicant' will organise the risk assessment in consultation with the pipeline owner, APA Group. The cost of the risk assessment and improvements will need to be met by the land developer.

2) Earthworks

The indicative finished levels as shown on the concept earthworks plan for the site have been revised to accommodate the modified layout and to address councils specific concern in regards to the need to show the school site as 'relatively flat'. Please refer to drawing 5955-00-101-A which depicts the revised proposed finished levels.

The earthworks plan also regrades the roads and allotments to eliminate two of the previously shown drainage basins, consolidating stormwater drainage runoff management for the site to two infiltration basin sites.

3) Stormwater Drainage

The distribution of stormwater drainage basins has been revised to eliminate two of the four original basins, the plan now proposes two basins serving the structure plan area. The revised basin parameters are given below and shown on drawing 5955-00-302-A.

LOT 299 KEROSENE LANE BALDIVIS

CATCHMENT PARAMETERS	BASIN 1	BASIN 2
Equivalent Impervious Area EIA ha	6.85	2.55
Storm Volume 1 yr S1 m3	1120	420
Storm Volume 5 yr S5 m3	1720	640
Storage Volume 10 yr S10 m3	4110	1536
Storage Volume 100 yr S100 m3	9110	3405
Area of water at TWL 10 yr m2	7776	2907
Area of water at TWL 100 yr m2	9296	3890

Storm Volume 1 yr S1 m3

Storm Volume 5 yr S5 m3

Storage Volume 10 yr S10 m3

Storage Volume 100 yr S100 m3

Assumes a 1 year ARI storm 1 hour duration

Assumes a 5 year ARI storm 1 hour duration

Assumes a 10 year ARI storm 10 hour duration

Assumes a 100 year ARI storm 24 hour duration

We understand the City of Rockingham does not support steep sided fenced drainage sumps where it is possible to have shallow open access basins with relatively gentle side slopes (1 vertical in 8 horizontal batters). The proposed basin parameters are based on the provision of open access drainage basins with a maximum depth of water of 1.2m in the 1 in 100 year average recurrence interval storm of 24 hours duration.

The other servicing strategies, waste water, electrical power, gas and telecommunications remain unchanged as a result of the amended structure plan.

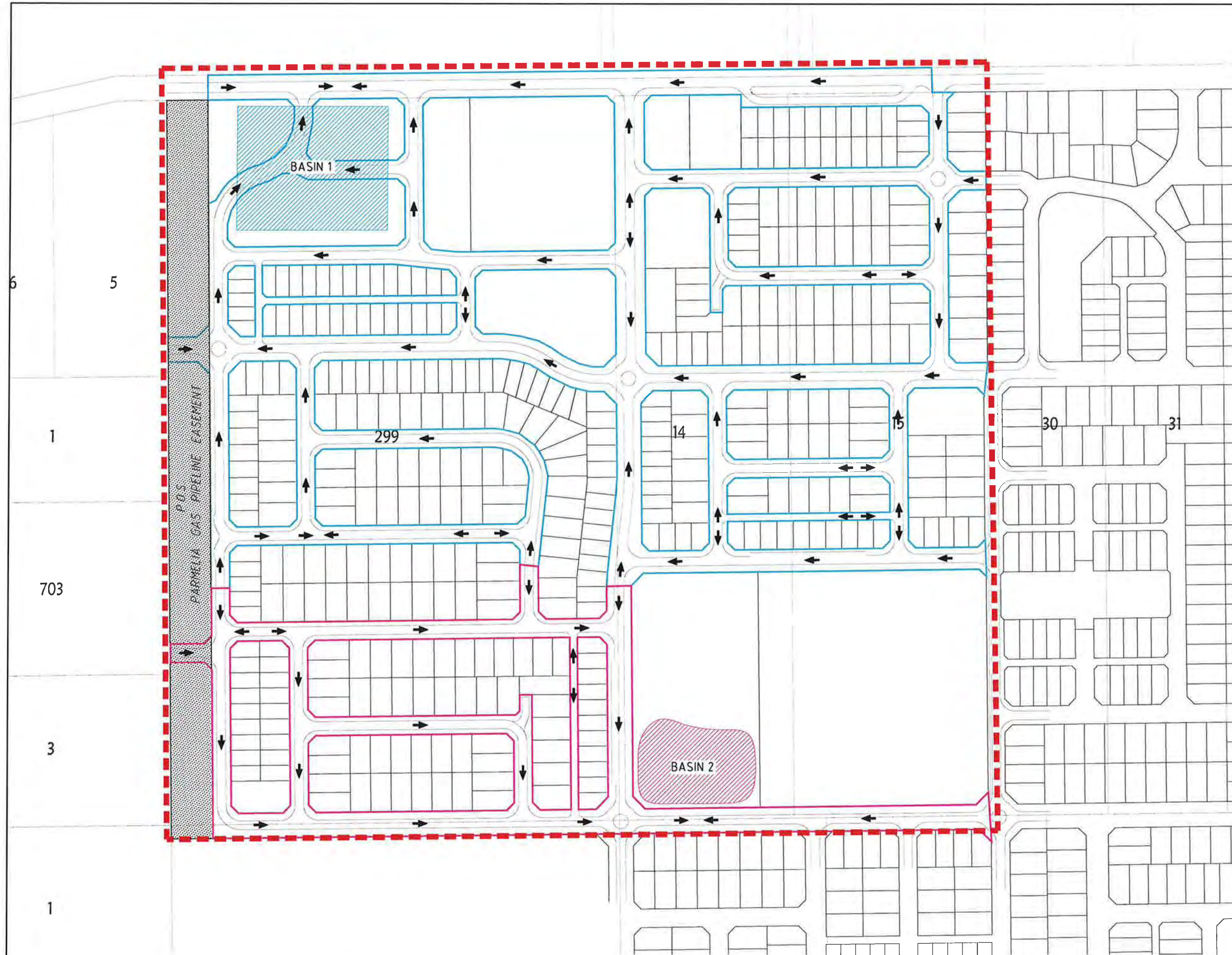
We trust the details supplied address the changes to the structure plan and issues raised by the City of Rockingham. Should you wish to discuss any aspect of the above, please do not hesitate to contact the undersigned.

Yours faithfully
COSSILL & WEBLEY PTY LTD



CRAIG HANSEN
Director

Enc.



BASIN 1 - SWALE	
EIA	68472m ²
S10	4110m ³
S100	9111m ³
TWL 10	7776m ²
TWL 100	9296m ²
SITE AREA	11781m ²

BASIN 2 - SWALE	
EIA	25511m ²
S10	1536m ³
S100	3405m ³
TWL 10	2907m ²
TWL 100	3890m ²
SITE AREA	5581m ²

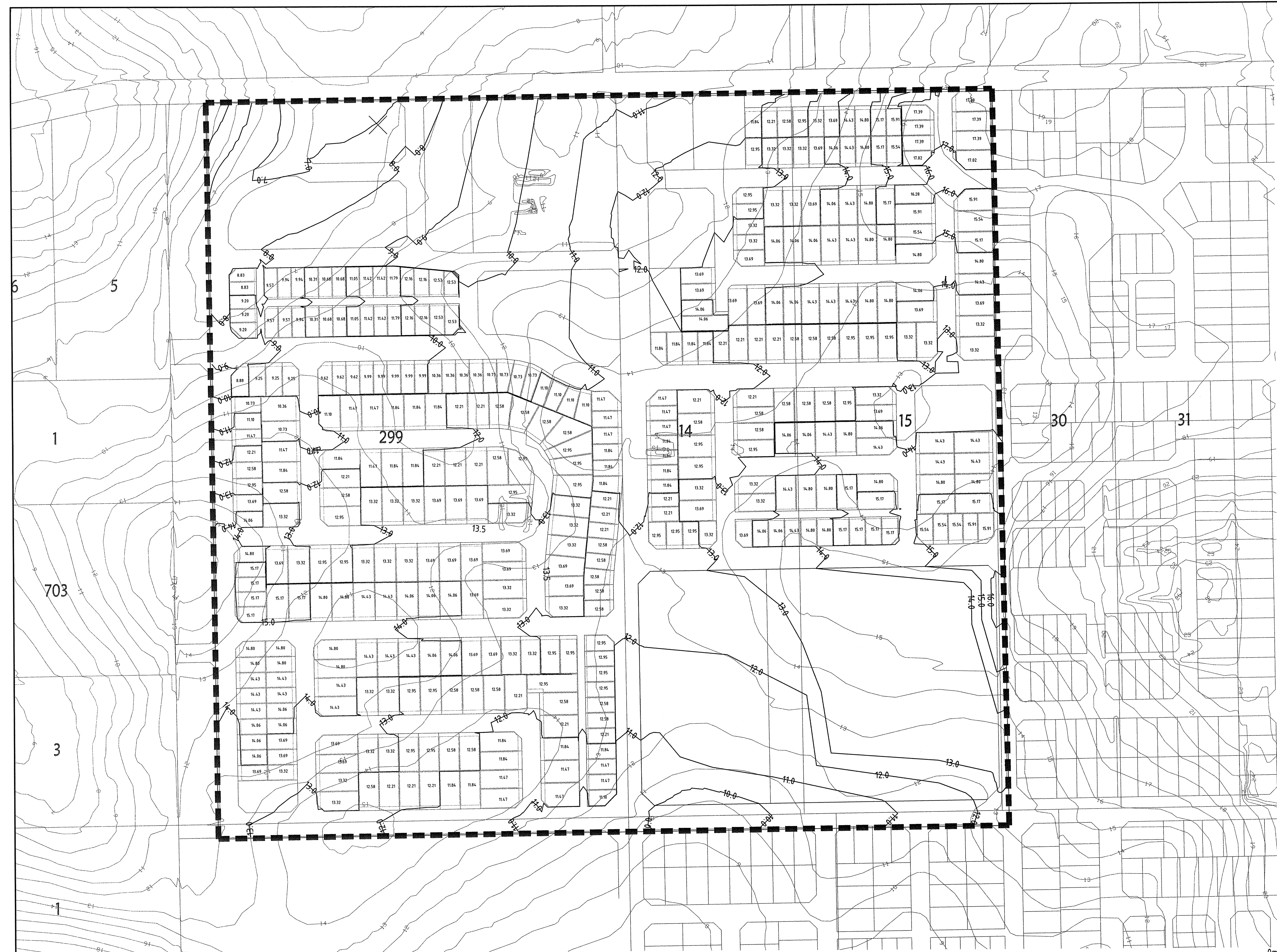
LEGEND

- SUBJECT SITE BOUNDARY
- TWL TOP WATER LEVEL
- S STORAGE VOLUME
- GROSS POLLUTANT TRAP TO BE INSTALLED UPSTREAM OF BASIN
- AREA OF INUNDATION FOR A 1 IN 10 YEAR EVENT

NOTES

- SWALE SIDE SLOPES - 1:8
- MAX DEPTH, TWL 100 IN SWALE AREAS - 12m
- SIDE ENTRY PITS AND MANHOLES TO HAVE PERMEABLE BASES
- P.O.S. IN THE PARMELIA GAS PIPELINE EASEMENT NOT TO BE USED FOR DRAINAGE IN ACCORDANCE WITH PLANNING BULLETIN 87 (WAPC, 2007 HIGH PRESSURE GAS TRANSMISSION PIPELINES IN THE PERTH METROPOLITAN REGION)
- IT IS ASSUMED THAT RUNOFF FROM EXTERNAL LOTS WILL BE INFILTRATED ONSITE AND THEREFORE WILL NOT INCREASE SUBJECT SITE DRAINAGE
- DETAILS OF LANDSCAPING DESIGN TO BE PROVIDED AT SUBDIVISION STAGE

0m 30 60 90m
1:1500
Filename 595500302.DWG
WAPC No.



WAPC No.

[illegible]

The map displays the proposed Kerosene Pipeline and its associated infrastructure. The pipeline is shown as a purple line, with the right-of-way (yellow line) and alignment (blue line) also indicated. The map includes various land parcels, roads, and vegetation. Key features include the Kerosene Pipeline (purple line), the Kerosene Pipeline Right-of-Way (yellow line), and the Kerosene Pipeline Alignment (blue line). The map also shows the Kerosene Pipeline Stationing (0 to 14) and the Kerosene Pipeline Stationing (0 to 14). The map includes a north arrow and a scale of 1:3,500.



Produced by J. Dash

 Parmelia_Pipeline
 Easement
 Line Marker Sign

**LOT 299 KEROSENE LANE
BALDIVIS
ENGINEERING SERVICING REPORT
MARCH 2009**



Level 2, 431 Roberts Road
SUBIACO WA 6008
T: 9422 5800
F: 9422 5801
E: cosweb@cosweb.com.au

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- Figure 3 - Drainage Concept Plan
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1. INTRODUCTION

This report has been prepared by Cossill & Webley Pty Ltd (CW) for the Local Structure Plan of Lot 299 Kerosene Lane, Baldavis. It summarises the results of a review of the civil engineering issues which have influenced the form of the structure plan and which relate to the future servicing of the development as proposed in the Planning Solutions Local Structure Plan.

The Lot 299 Kerosene Lane, Baldavis Local Structure Plan has been prepared by a team of consultants led by Planning Solutions on behalf of the land owners, Galati Nominees.

The local structure plan area comprises lots 299, 14 and 15 all with road frontage to Kerosene Lane.

This engineering review has covered siteworks, roads, stormwater drainage and utility services in accordance with the requirements of the Department for Planning and Infrastructure's Liveable Neighbourhoods document.

2. DESCRIPTION OF THE LAND

2.01 Topography and Ground Conditions

The land is relatively elevated land on the Baldivis ridge between Lake Cooloongup located 800m to the west and Baldivis Road 1200m to the east. It is gently undulating and has previously been cleared of native vegetation for agricultural purposes.

The state geological maps suggest the site is found on sand of yellow to brown colour derived originally from Tamala limestone origins. The sand generally has good permeability and structural characteristics. The ground conditions are considered suitable for urban development purposes. Although the soils maps do not depict limestone outcrops in this area there may be underlying Tamala limestone at depth based on experience at other similar sites in this locality. Near surface rock may occur as cap rock and is usually well cemented for a thin layer of say 0.5m thickness. Below the cap rock, limestone is usually weakly cemented to form a low strength rock and is easily excavated.

It is proposed to undertake relatively minor earthworks to provide for required design standards on roads and building sites whilst still retaining much of the original land form, refer to the preliminary earthworks plan 5955-00-100 in the attached figures.

3. ELECTRICAL POWER SUPPLY

3.01 Electrical Power Network

There is an existing 22kV high voltage electrical overhead power line on the south side of Kerosene Lane road reserve. This line serves the existing properties both north and south of Kerosene Lane.

Western Power will require the developers of lot 299 to underground the overhead line at the time of development. Under the current contribution rules Western Power will fund the cable, the developer will be required to fund the installation and pole removal. The other existing connections will need to be undergrounded and supply maintained.

Lot 299 has an existing HV feed to a 200kVA pole top transformer, this will need to be removed at the developers cost at the time of development.

Current planning by Western Power does not indicate a need for a 132kV alignment in the vicinity of the site, although development generally in the north Baldivis area will result in Western Power upgrading their major infrastructure to meet supply demands.

Underground electrical power can be extended from Kerosene Lane and from the adjoining new developments as they proceed.

Street lighting will be provided with the underground electricity supply to conform with Western Power and Local Authority lighting standards.

There is no current impediment to the supply of electrical power to this site.

4. WASTEWATER

4.01 Wastewater Collection and Treatment

The Water Corporation of WA's (WCWA) planning for the future waste water collection and treatment for Lot 299 Kerosene Lane, and adjacent areas in Baldivis is dependent on approval and development of the East Rockingham Waste Water Treatment Plant (WWTP). The WCWA is currently seeking preliminary approvals for a treatment plant site to be located near Chesterfield Road west of Mandurah Road and north of Day Road in the East Rockingham industrial area. The WCWA has experienced problems in the past with other sites that have not been approved on environmental grounds. Hence the WCWA have been reluctant recently to support rezoning proposals (to urban) under the Metropolitan Region Scheme within the East Rockingham WWTP catchment until there is certainty with the treatment plant site.

Notwithstanding the lack of certainty with the ultimate treatment facility the WCWA have prepared a scheme plan for the north Baldivis area. The land associated with this structure plan and the surrounding land is proposed to be served by conventional gravity sewer, gravitating to a permanent 'type 180' waste water pumping station denoted by the WCWA as Baldivis Pumping Station B. The pumping station site is proposed on the north side of Kerosene Lane opposite the north eastern boundary of lot 299. The out let for the pressure main from the pump station is proposed to traverse north along the eastern boundary of lot 287 and ultimately to the proposed waste water treatment plant. The waste water pumping station will need a site of between 1600m² and 2500m² (depending on storage requirements) and a buffer of 50m, if situated as proposed by the Water Corporation on lot 287, buffer requirements by way of set backs and the Kerosene Lane road reserve will satisfy the buffer requirement.

If the ultimate site for pumping station site B is not available at the time of development of lot 299, a temporary pumping station may need to be provided on lot 299 or the permanent site may need to be moved to lot 299. Either of these options could be accommodated from an engineering perspective with minor modification to the structure plan.

The WCWA have made provision for a 375mm diameter gravity main receiving both gravity and future pumped flow from south of this site running in a generally south to north direction. An alignment for the 375mm main can be provided within the proposed subdivisional road network.

There is a second proposed 375mm diameter gravity main receiving both gravity and future pumped flow from east of the site to be constructed within the Kerosene Lane road reserve.

Based on the assumption of the provision of the East Rockingham Waste Water Treatment Plant and the construction of the WCWA waste water pumping station 'B' or an alternative temporary pumping station the site can be served with conventional gravity sewer reticulation with all flows treated to WCWA standards.

The WCWA may seek developer contributions to prefund some or all of the 'headworks' items (waste water pumping station and pressure main and the two 375mm gravity mains) depending on the timing of the development and the program for works by the WCWA and their available funding.

The use of treated waste water effluent is possible, the WCWA has implemented nearby an effluent treatment and reuse plant for the Kwinana industrial area. Further reuse strategies including at the proposed East Rockingham plant are likely. However, these sustainability measures are outside of the control of this development.

5. STORMWATER MANAGEMENT

5.01 Integrated Urban Water Management

ENV Australia Environmental Consultants inputs to the LSP include the preparation of a Local Water Management Strategy (LWMS). This will provide a basis for ongoing development to ensure that appropriate allowances are made for total water management including the minimisation of scheme water use, the maximisation of wastewater reuse, and other water efficient measures.

Stormwater drainage management is a major component of the overall LWMS for which the achievement of the principals of the plan may be facilitated through the application of Water Sensitive Urban Design (WSUD) techniques. Objectives of WSUD include:-

- Detention and infiltration of stormwater rather than rapid conveyance;
- Use of stormwater to conserve potable water;
- Use of vegetation for filtering purposes; and
- Water efficient landscaping.

For the LSP and broader Baldvis area, the main WSUD practices which should be incorporated into the ongoing implementation of LSP proposals are as follows:-

Stormwater Management

The maximisation of stormwater recharge of the shallow aquifer is through the adoption of 'Best Management Practices', which promote the dispersion and infiltration of runoff. These include the use of porous paving for roads and carparks, leaky piped drainage (or bottomless pits), the diversion of runoff into road medians and road-side swales, drainage soakwells to infiltrate runoff from buildings and private open space areas and the disposal of road runoff into infiltration basins within POS areas.

Water Quality Management

The maximisation of the quality of recharge water through the adoption of "Best Management Practices", which promote the disposal of runoff via water pollution control facilities (including vegetated swales and basins, detention storage and gross pollutant traps) and the implementation of non-structural source controls (including urban design, street sweeping, community education, low fertiliser landscaping regimes, etc).

5.02 Stormwater Collection and Disposal

The Baldvis land is generally free draining with no low-lying areas with high groundwater levels or defined watercourses. The existing ground consists of permeable sands and the depth from the ground surface to groundwater is sufficient to allow local stormwater recharge.

Overall, therefore, the land is highly suited to the implementation of the WSUD management practices outlined above.

In all areas of development, it is expected that runoff within developed sites will be contained within the lots. Stormwater disposal will be via soakwells or other infiltration facilities which form a part of the building and private open space development.

Drainage from public roads and lanes could be dealt with in a number of ways depending on the nature of the adjacent land uses, the extent of traffic and pedestrians and the objectives for drainage management.

For the development of this LSP area it is proposed to adopt the WSUD approach where local street drainage incorporates bottomless pits or permeable bases, whereby runoff from small frequent storms are largely infiltrated at the first pit, with larger storm flows conveyed through the drainage catchments to the local low points where drainage swales will be co-located with local public open space. This method has been approved by the City of Rockingham on other projects and from initial discussion with them we expect it would be their preferred approach on this site.

Roads and areas of public open space would be designed to cater for the surface overflow for more severe storms with building pads constructed at least 300 millimetres above the 1 in 100 year ARI flood or storage level at any location as per accepted engineering design standards.

The dispersion of stormwater disposal will maximise the area of recharge down through the soil profile to the shallow aquifer, thereby, maximising the potential for nutrient stripping and water quality improvements.

Whilst dispersion of infiltration within the catchment would result in a minor reduction of low point basin sizes, the proposed method does not involve wider road reserves needed with road side swales and therefore does not conflict with other urban planning development density objectives. In addition the proposed drainage basins are well dispersed within the site resulting in no one section of road being more than approximately 300m from a drainage basin.

Drainage basins will be situated within areas of public open space with shallow swales with side slopes of generally 1 vertical in 8 horizontal grade allowing a safe and easily maintained surround to the drainage swale, except where they are noted as "fenced" in which case the basins will be fenced with 1 in 1 ½ side slopes and have no public access. Further nutrient stripping would be possible with appropriate soil amendment and vegetation planting. The swales would be designed such that the maximum depth of water in the swales would be 1.2m in a 100 year event for an unfenced swale located in POS. The City of Rockingham has many examples of unfenced swales operating with similar design criteria.

Drawing 5955-00-301 depicts the drainage catchments, indicative storm runoff volumes and top water area for each basin site, repeated in the table below.

CATCHMENT PARAMETERS	BASIN 1 (Fenced)	BASIN 2 (Fenced)	BASIN 3	BASIN 4
Equivalent Impervious Area (EIA) ha	5.15	0.71	1.77	1.02
Storm Volume 1 yr S1 m3	840	120	290	170
Storm Volume 5 yr S5 m3	1290	180	440	260
Storage Volume 10 yr S10 m3	3090	426	1062	612
Storage Volume 100 yr S100 m3	6850	944	2354	1357
Area of water at TWL 10 yr m2	1740	360	2000	1200
Area of water at TWL 100 yr m2	2250	510	2800	1800

Storm Volume 1 yr S1 m3

Assumes a 1 year ARI storm 1 hour duration

Storm Volume 5 yr S5 m3

Assumes a 5 year ARI storm 1 hour duration

Storage Volume 10 yr S10 m3

Assumes a 10 year ARI storm 10 hour duration

Storage Volume 100 yr S100 m3

Assumes a 100 year ARI storm 24 hour duration

6. WATER SUPPLY

6.01 Water Scheme

The Lot 299 Kerosene Lane, Baldivis is within the Perth south west coastal area and is covered by the Water Corporation's Tamworth reservoir gravity water supply zone. Tamworth is an existing reservoir in north Baldivis. There is also a proposed reservoir in southern Baldivis known as the Karnup reservoir site. The WCWA is currently undertaking scheme reviews for this area with one option under consideration being that Karnup reservoir may not be constructed due to bush forever conservation issues. This will influence scheme planning and distribution network requirements between Tamworth and Karnup. The Tamworth reservoir is fed by water from Stirling Dam through the 1400 mm diameter Stirling Trunk Main (dam transfer main).

The subject land is north of the Tamworth reservoir site and is largely unaffected by the future use of the Karnup reservoir site. WCWA has undertaken extensive planning in this area for a network of distribution and reticulation size water mains. However, the uncertainty with Karnup is preventing the WCWA from finalising the broader area distribution network planning.

WCWA has indicated for the proposed development there is unlikely to be sufficient capacity in the existing reticulation mains in the adjoining roads and developments to service this area. In particular the capacity of the 250mm diameter main in Eighty Road from Tamworth reservoir north to Fifty Road is at capacity. The WCWA are considering a route for a 500mm diameter or larger main (size yet to be determined) that may need to be installed in Eighty Road and north along the future Nairn Drive extension through to Kerosene Lane to service the broader area. This 500mm or larger water main would represent headworks funded by the WCWA although depending on the timing of this project and the timing of other developments in the area the water main may need to be prefunded by developers if required in advance of the WCWA requirements and their ability to fund the works.

Local water reticulation will be designed and installed to service every property in the development. The reticulation design includes fire hydrant provisions in accordance with agreed standards between the WCWA and Fire and Emergency Services Authority.

7. GAS

The Lot 299 Kerosene Lane, Baldvis site is bounded on the west by a regional gas pipeline, the Parmelia Gas Pipeline (PGP) owned by the APA Group (formerly the Dongara to Pinjarra WANG pipeline). This pipeline is not suitable for direct connection for residential reticulated gas. The PGP is a high pressure gas transmission pipeline and was constructed in 1971. To ensure planning certainty and provide guidance on development in the vicinity of regional gas pipelines without placing unnecessary risk levels on the adjoining community the Western Australian Planning Commission issued Planning Bulletin 87 in October 2007 which is referred to here for easement and set back requirements.

Planning Bulletin 87 Table 1 states for the PGP south of Caversham the standard setback distance for residential land use is 65m. However, guidance is also provided in Bulletin 87 on measures to reduce risk within the setback distance and reduced setbacks. The LSP for this land assumes a concrete cover will be installed together with access bollards to limit the likelihood of impact by excavators on the pipeline. These works would be undertaken in consultation with the pipeline owner APA. With the proposed measures the setback requirement for residential use is reduced to the boundary of the pipeline easement. The LSP makes provision for containing the existing easement in a strip of public open space on the western boundary. The easement known as the CMS easement is 12 metres wide within the lot 299 vicinity, refer to the diagram in the figures section. In recognition of the limitations on land use and activities within the easement there are no drainage swales or other services proposed to be jointly located in the easement.

The APA Group will require a risk assessment on the existing pipeline and the proposed adjoining development to determine what actions will be required to protect the pipeline and local community. The cost of the risk assessment and improvements will need to be met by the developer.

Alinta Gas has advised the subject land does not abut existing gas infrastructure for domestic supply. However, there are proposed gas distribution mains to be installed in the planned adjoining residential developments. These reticulation mains are generally only 40mm diameter and do not have the capacity to service the entire LSP area. Alinta Gas is planning a 160mm diameter gas main extension from Fifty Road via the extension of McDonald Road north. The supply of gas from the south and via McDonald Road relies on the development to the south proceeding prior to the subject land. Alternatively, if extension of gas mains from the south were not possible in the required timeframe a gas main extension could be arranged from Baldvis Road near the intersection of Zig Zag Road north to Kerosene Lane and west along Kerosene Lane to the site. This alternative supply option would require a contribution from the developer to the cost of the extension in the order of \$450,000.00.

The most likely outcome is development south of this site will proceed first and gas supplies will be extended incrementally from the adjoining developments.

8. TELECOMMUNICATIONS

8.01 Telecommunications

Telstra has advised that they are currently planning the installation of services to adjoining developments to the south east and through these developments full Telstra services will be available to this site. Staging of the development will therefore need to take account of the availability of Telstra services being in the south east (similar to the preferred servicing point for gas supply). Availability of services with sufficient capacity in Kerosene Lane will be limited until adjoining land is developed.

9. UTILITIES - GENERAL

9.01 Service Alignments

The traffic assessment prepared by Transcore for this LSP proposes road cross sections consistent with Liveable Neighbourhoods including minimum verge widths of 4.1m. All public utilities both existing and proposed can be contained in the proposed road reserves in accordance with the Liveable Neighbourhoods document and the Utilities Providers Code of Western Australia.

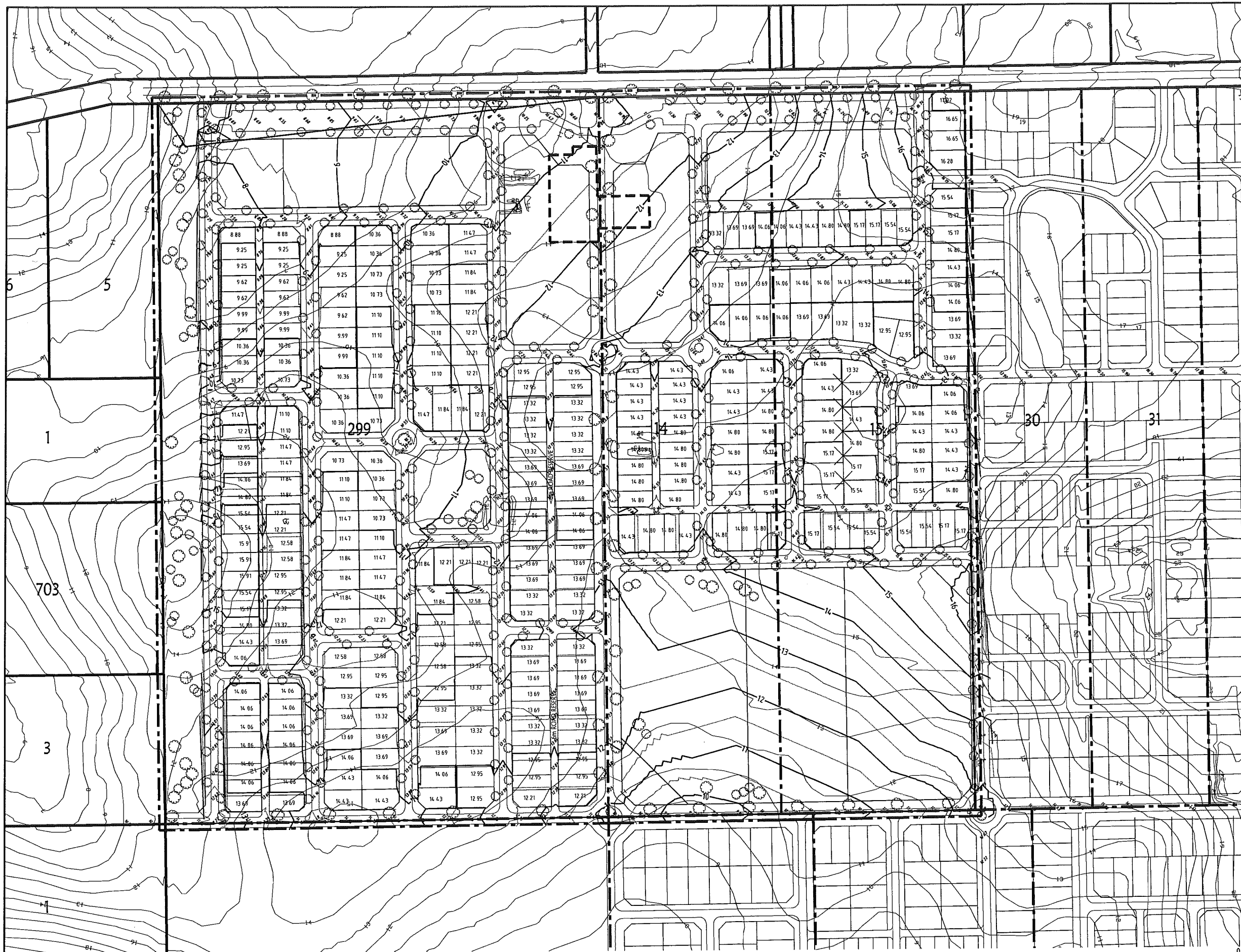
Separate provision has been made to contain the CMS Easement for the Parmelia Gas Pipeline in public open space.

9.02 Life Cycle Impacts of Public Utilities

The design and provisioning (both initial installation and ongoing maintenance) of public utilities including sewerage, water, electricity, street lighting, gas and communications services are provided in accordance with the current respective service authority requirements and standards.

Each of the service authorities operating in the Perth metropolitan area are constantly reviewing their respective service standards in terms of material selection, design and maintenance procedures to continue to provide services which when taking the whole of life cost into account represents the most cost effective service delivery. In terms of how the final whole of life standards adopted relates to sustainability in terms of energy savings and green house gas emissions it is difficult for external consultants to assess. The design standards are set by the authorities and compliance is compulsory.

Figure 1
Preliminary Earthworks Strategy



0m 30 60 90m
1:1500
Filename: 595500100.DWG
WAPC No.

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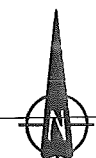
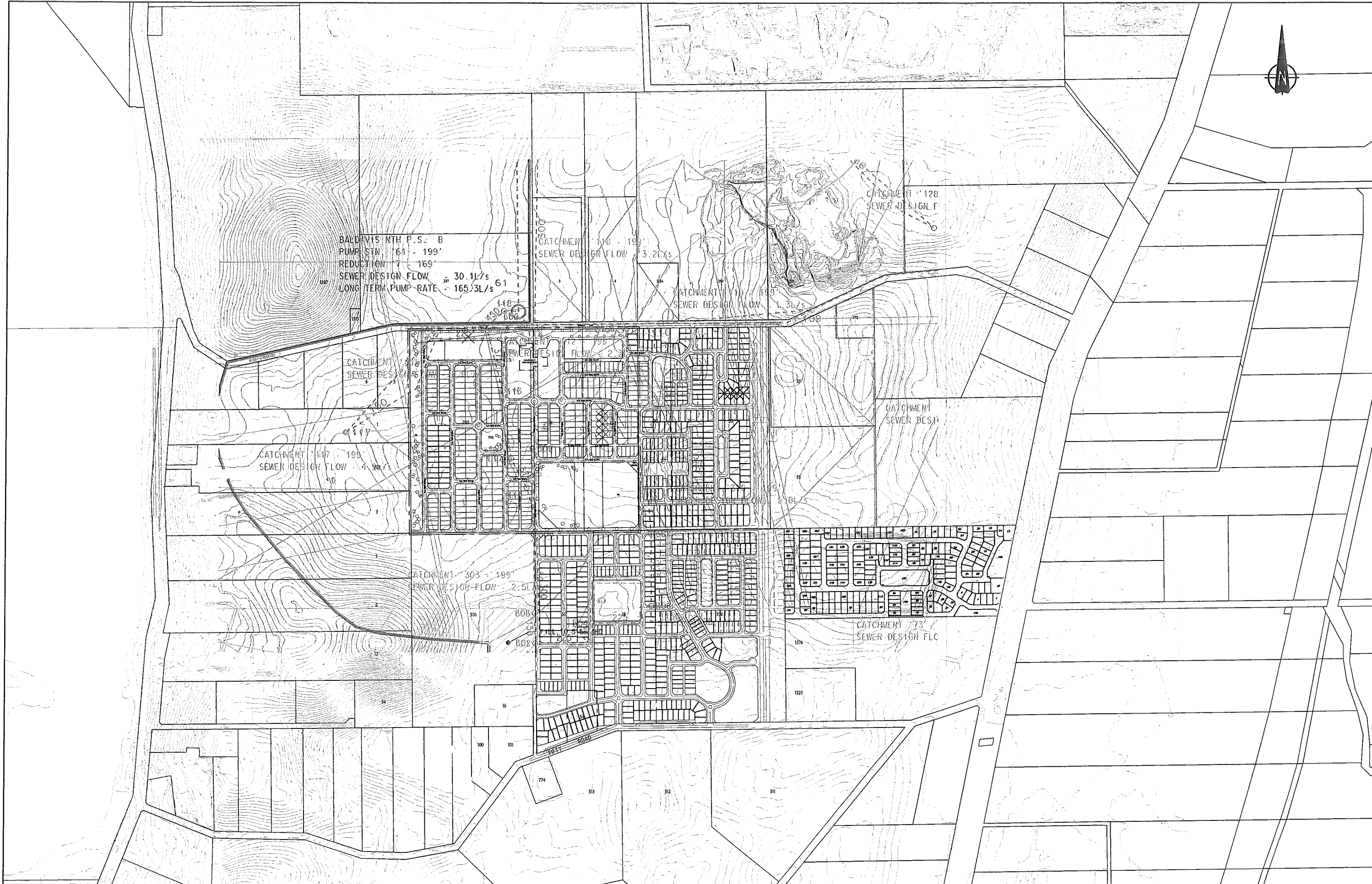
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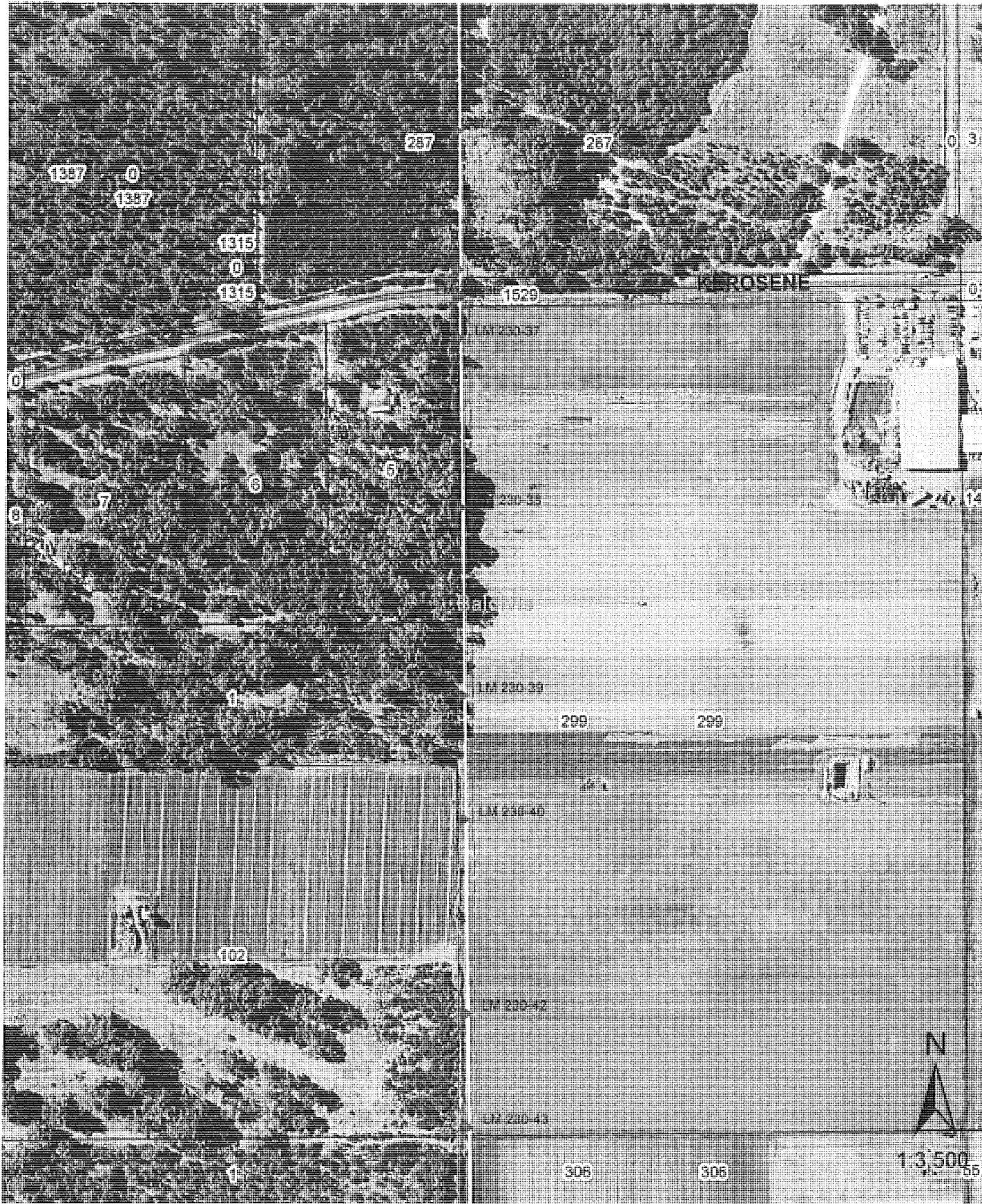
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Figure 3
Drainage Catchment Plan

Figure 4
Parmelia Pipeline Easement

Map of Lot 299 Kerosene Lane, Baldivis



APA Group

Legend

Date: 21 Jan 2009

Produced by J. Dash

Parmelia_Pipeline

--- Easement

▲ Line Marker Sign

APPENDIX 7
TRAFFIC ASSESSMENT REPORT



**LOTS 14, 15 AND 299 KEROSENE LANE,
BALDIVIS**

PROPOSED LOCAL STRUCTURE PLAN

TRAFFIC ASSESSMENT REPORT

transport planning • traffic engineering • project management

Lots 14,15 and 299 Kerosene Lane, Baldivis

Proposed Local Structure Plan

Traffic Assessment Report

Prepared for:
Galati Nominees

June 2010

Prepared by:
TRANSCORE PTY LTD
61 York Street, Subiaco WA 6904
PO Box 42, Subiaco WA 6904
Telephone (08) 9382 4199
Facsimile (08) 9382 4177

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1 INTRODUCTION

Planning Solutions (Aust) Pty Ltd on behalf of Galati Nominees, has requested Transcore to undertake a Traffic Assessment Report with regard to a proposed Local Structure Plan (LSP) for Lots 14, 15 and 299 Kerosene Lane, Baldivis. The LSP will be based around the provisions of the Baldivis North District Structure Plan as adopted by the City of Rockingham and the Western Australian Planning Commission (WAPC).

During the course of the preparation of this traffic assessment, Transcore has consulted with the relevant State and Local Government agencies, including Main Roads WA (MRWA) Public Transport Authority (PTA) and the City of Rockingham.

Transcore has also worked closely with other consulting team members to ensure that the proposed access system to the subject site and the internal movement network proposed under the LSP will operate safely and satisfactorily.

2 EXISTING SITUATION

The subject site is located on the southern side of Kerosene Lane, approximately 1 kilometre east of Mandurah Road/ Kerosene Lane intersection and 1.6km west of Baldivis Road/Kerosene Lane intersection in Baldivis (refer to below).

Figure 1: Locality Plan



At present, part of the subject site hosts an existing Spud Shed retail operation consisting of shared retail/warehouse building, 158 bay customer car park (including 4 ACROD bays) and adjoined 43 bay staff parking area (refer Figure 2). There are 2 crossovers on Kerosene Lane servicing the customer and staff parking lots. There is an informal (limestone paved) service/delivery vehicles crossover on Kerosene Lane at its western end that leads to a L-shaped driveway that traverses the site perimeter at its western and southern end. Figure 3 illustrates the Aerial photo of the existing spud shed.

Figure 2: Existing Spud Shed Retail Outlet



Figure 3: Arial Photo of the Existing Spud Shed Retail Outlet



3 EXISTING ROAD NETWORK

Kerosene Lane

Kerosene Lane is a 7m wide single undivided carriageway with a sign-posted speed limit of 80km/hr in the vicinity of the subject site. There are no footpaths on either side of this road. Kerosene Lane entails a local road widening in the vicinity of the existing spud shed crossovers (directly opposite). This facility was constructed to alleviate the impact of spud shed inbound traffic and allow the passage of through traffic on Kerosene Lane (refer Figures 4 and 5).

Based on the Metropolitan Functional Road Hierarchy document (Main Roads WA), Kerosene Lane is classified as a District Distributor (B) road and is under care and control of the City of Rockingham. Based on traffic counts sourced from the City of Rockingham (2006), Kerosene Lane carried an average weekly traffic volume of approximately 2,600 vehicles per day.

During the weekdays, the peak morning and evening traffic periods occur between 10:00AM and 11:00AM (270 vehicles per hour), and 4:00PM to 5:00PM (280 vehicles per hour) respectively. During the weekends, particularly Saturday, the morning peak hour usually occurs later than that of the weekday and was recorded between 12:00PM and 01:00PM with approximately 320 vehicles per hour.

Figure 4: Eastbound View along Kerosene Lane.



Figure 5: Westbound View along Kerosene Lane.



4 PROPOSED LOCAL STRUCTURE PLAN

A copy of the proposed LSP for the subject site is provided in Appendix 1. According to the LSP, the subject site entails approximately 226 R20 and 150 R30 residential lots, 16 R40 and 119 R60 in the form of group housing sites. Some mixed use developments are proposed within the northern portion of the site. It is expected that the mixed use developments would entail 76 R60 residential lots and about 1000m² non retail land uses (offices, medical centre, child care centre, etc). Also, within the northern portion of the LSP area, commercial land of about 1.45 ha is proposed. A school of about 3.5ha in size is proposed within the south east area of the LSP.

The subject site forms part of the Baldivis (North) District Structure Plan (DSP). According to the DSP two more residential precincts are planned to the east and south east of the subject site. Appendix 2 illustrates the latest DSP for Baldivis North.

The access system to the LSP includes a main access point on Kerosene Lane which links to the main north south road within the LSP area. Two secondary access points are also proposed on Kerosene Lane (to the east of the main access point), which provide access to the R30 residential lots, and another secondary access point on Kerosene Lane is proposed to the west.

5 TRAFFIC VOLUME ESTIMATION

The internationally recognised EMME/3 software package has been used to estimate the future traffic on the internal and external roads associated with the LSP.

For this application, a 24-hour average weekday model was developed. The process of developing the transport model is described in the following sections of the report.

5.1 *Model structure*

The traffic model uses the traditional four-stage model processes which includes the following stages:

- Trip generation;
- Mode split;
- Trip distribution; and
- Trip assignment.

5.2 *Trip generation*

The residential traffic generation rate used in this transport assessment is 8 vehicles per day per dwellings (NSW RTA Guide to Traffic Generating Developments, 2002), resulting in an overall traffic generation of about 4,696vpd for the LSP area.

The traffic generation of the Commercial area is based on a trip rate of 10 vpd per 100m² of the commercial Gross Floor Area (NSW RTA Guide to Traffic Generating Developments, 2002).

The primary school is estimated to generate 2vpd per student based on information provided in the WAPC Transport Assessment Guidelines (2006).

Trip generation of the residential dwellings within the LSP area has been split into three different trip purposes: work, education and other trips. Separate OD matrices have been compiled through the trip distribution macro in the EMME model for each individual trip purpose. A master matrix, which includes all trips, was calculated and assigned to the road network.

5.3 Mode Split

The trip generation within this model considered only private vehicle trips and therefore the mode split process was not required.

5.4 Trip Distribution

The trip distribution to the external zones (developments) used in this transport assessment is shown in Table 1.

Table 1: Trip distribution to external zones

External Zone	Trip Distribution
Perth	40%
Armadale	10%
Rockingham	40%
Mandurah	10%
Total	100%

5.5 Traffic Assignment

The EMME/3 transport modelling software has been used to assign the traffic to the local road network. EMME/3 uses the equilibrium auto assignment principal to assign the traffic to the road network.

The behavioural assumption of the equilibrium traffic assignment is that each user chooses the route that he or she perceives to be the best.

5.6 Modelled Outputs

Figure 6 illustrates the modelled daily traffic volumes on the road network. It must be noted that Figure 6 shows only the traffic generated from the LSP and it does not include the trips from external to external zones (through traffic). For the purpose of the access analysis the through traffic on Kerosene Lane would be added manually to the traffic volumes resulting from the EMME/3 model to determine the total traffic for all movements.

Figure 6: Modelled Daily Traffic Volumes on the LSP Internal and External Roads.



6 ROAD NETWORK STANDARDS

6.1 Key intersections

The main access to the development is proposed to be a full movement access point on Kerosene Lane in the form of a T-intersection. This main access point is considered as the key intersection and therefore have been analysed in this section of the report.

6.1.1 Traffic Volumes for Intersection Analysis

The EMME/3 model has been established to estimate the daily traffic volumes on the major internal and external LSP road network. Therefore, to estimate peak hour traffic volumes the modelling results need to be adjusted to present the peak hours.

For the purpose of access analysis, peak hourly traffic volume has been estimated for morning and afternoon peak hours using the trip generation calculation and the modelling results.

According to the information obtained from City of Rockingham, the projected traffic volumes for Kerosene Lane (based on the Main Roads ROM model) is estimated to be in the order of 500vpd and 600vpd, in 2011 and 2021 respectively. This level of traffic is much lower than the existing traffic volumes on Kerosene Lane. Construction of the extension of Mundijong Road could be a possible reason for the modelled traffic decrease on Kerosene Lane. However, to undertake a robust and conservative assessment and for the purpose of this study, it has been assumed that Kerosene Lane would carry about 4,600vpd, which is the total of the existing traffic (2,600vpd) and the LSP traffic (2,000vpd)

6.1.2 Intersection Analysis

Industry standard SIDRA software has been used to analyse the future performance of the main access point during the road networks typical peak operational period. There are a number of intersection analysis criteria that can be compared from the SIDRA analysis and a summary is reported here for reference.

- **Degree of Saturation:** is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The Degree of Saturation ranges from close to zero for varied traffic flow up to one for saturated flow or capacity.
- **Level of Service:** is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. In general, there are 6 levels of services, designated from A to F, with Level of Service A representing the best operating condition (i.e. free flow) and Level of Service F the worst (i.e. forced or breakdown flow).
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection.

- **95% Queue:** is the queue length below which 95% of all observed queue lengths fall.

Analysis has been undertaken for AM and PM peak hours for the ultimate traffic of the LSP area. For the purpose of this study, it has been assumed that about 80% of the trips will depart the LSP area in the morning and about 20% will arrive at the LSP area during the morning peak hour, the opposite would be the case in the afternoon.

Degree of saturation and level of service has been used to present the performance of the intersection and the queue distance has been checked for the critical movements.

Table 2 summarises the performance of the Main Access point on Kerosene Lane. Appendix 3 summarises the detailed intersection analysis for the main access point.

Table 2: Main Access Intersection Performance

Approach	Movement Type	Degree of Saturation	Level of Service	Average Delay (sec)	95 % Queue (m)
Main Access on Kerosene Lane (AM Peak Hour)					
Main N-S Road	L	0.07	A	8.8	3
	R	0.419	C	15	19
Kerosene Lane East	L	0.023	A	8.2	0
	R	0.097	A	0	0
Kerosene Lane West	L	0.227	A	0	0
	R	0.036	A	9	1
Main Access on Kerosene Lane (PM Peak Hour)					
Main N-S Road	L	0.04	B	10.2	2
	R	0.093	B	14.5	3
Kerosene Lane East	L	0.125	A	8.2	0
	R	0.227	A	0	0
Kerosene Lane West	L	0.097	A	0	0
	R	0.15	B	12	5

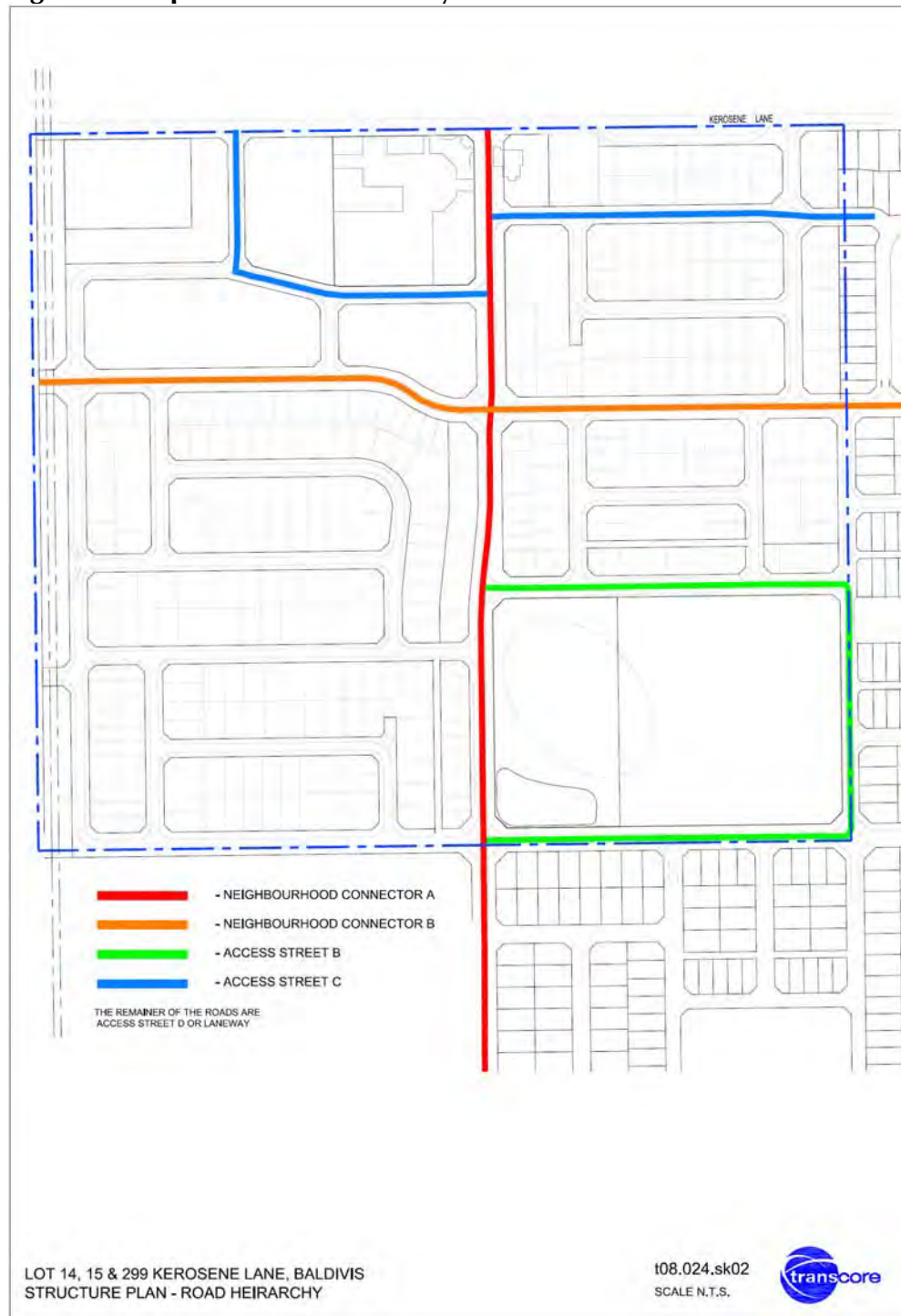
Intersection analysis indicates that the T- intersection will work satisfactorily and within its capacity, with an overall level of service B during the AM and PM peak hours. However, in order to improve legibility, convenience and safety and satisfy Austroads guidelines a channelised T-intersection (left and right turn pockets on Kerosene Lane and separate left and right turn lane on the main access) or a roundabout should be considered at this intersection.

7 INTERNAL TRANSPORT NETWORK

7.0 Internal Road Network

The road hierarchy in the Western Australian Planning Commission *Liveable Neighbourhoods* (LN) document (October 2007) has been adopted for the road network in the LSP area. Figure 7 shows the proposed road hierarchy for LSP area in accordance with projected traffic volumes.

Figure 7: Proposed Road Hierarchy for the LSP



The main north-south road through the LSP area is expected to carry more than 3,000vpd and therefore it is proposed to be classified as Neighbourhood Connector A, with a typical cross section of 24.4m as illustrated in LN document Figure 17. Also, the main east-west road is proposed as a Neighbourhood Connector B with a typical cross section of 19.4m as illustrated in LN document Figure 18.

The access streets abutting the primary school is recommended to be constructed to 17.9-metre Access Street B cross-section (LN document Figure 20), which allows for on street parking on both sides of the street.

Two of the access streets that carry higher level of traffic (more than 1000vpd) are recommended to have the 15.4-metre Access Street C cross-section (LN document Figure 21).

The remainder of the local road network is proposed to have typical 14.2-metre Access Street D cross-section (LN document Figure 22) or 6 metres wide lane way (LN document Figure 24).

7.1 *Public Transport Network*

According to the other works undertaken for the area and based on liaison with Public Transport Authority, it is expected that two bus routes would serve North Baldivis area. These routes are shown in Figure 8 and are likely to link into Rockingham Transit Station via Kerosene Lane and Dixon Road. Once Warnbro station is upgraded to a Bus/ Train Interchange, both routes would probably extend to terminate there.

The 'Western Route' is expected to run along McDonald and Fifty Roads as well as along one of the Neighbourhood Connectors located between Nairn Drive and Baldivis Road. The outer terminus would probably be in the vicinity of the District Centre at the corner of Safety Bay and Nairn Drive, subject to the availability of a suitable turnaround facility. This terminus would be shared with the 'eastern route' described below.

The 'Eastern Route' is expected to run along Kerosene Lane and a (yet to be identified) Neighbourhood Connector running parallel to and to the east of Baldivis Road. This route will probably terminate in the vicinity of the District Centre at the shared terminus with the Western Route.

Figure 8: Proposed Bus Routes Through the LSP



7.2 Pedestrian and Cyclist Network

Figure 9 illustrates the proposed path system within the LSP area. This path system has been developed to provide good connectivity with the school site and the retail land uses.

In accordance with the *Liveable Neighbourhoods* document shared paths are proposed on one side of the main north south road and a footpath on the other side..

The two Access Roads abutting the primary school will have shared paths on one side and footpaths on the other sides and all other Access Roads in the LSP area are proposed to have footpath at least on one side of the road.

Figure 9: Pedestrian and Cycle Network



7.3 *Intersection Treatments*

The proposed intersection controls for the key internal and external intersections within the LSP are shown in Figure 10. In establishing the proposed intersection controls, consideration was given to the road network layout and classifications, estimated traffic volumes and traffic management with regards to traffic routing and road safety.

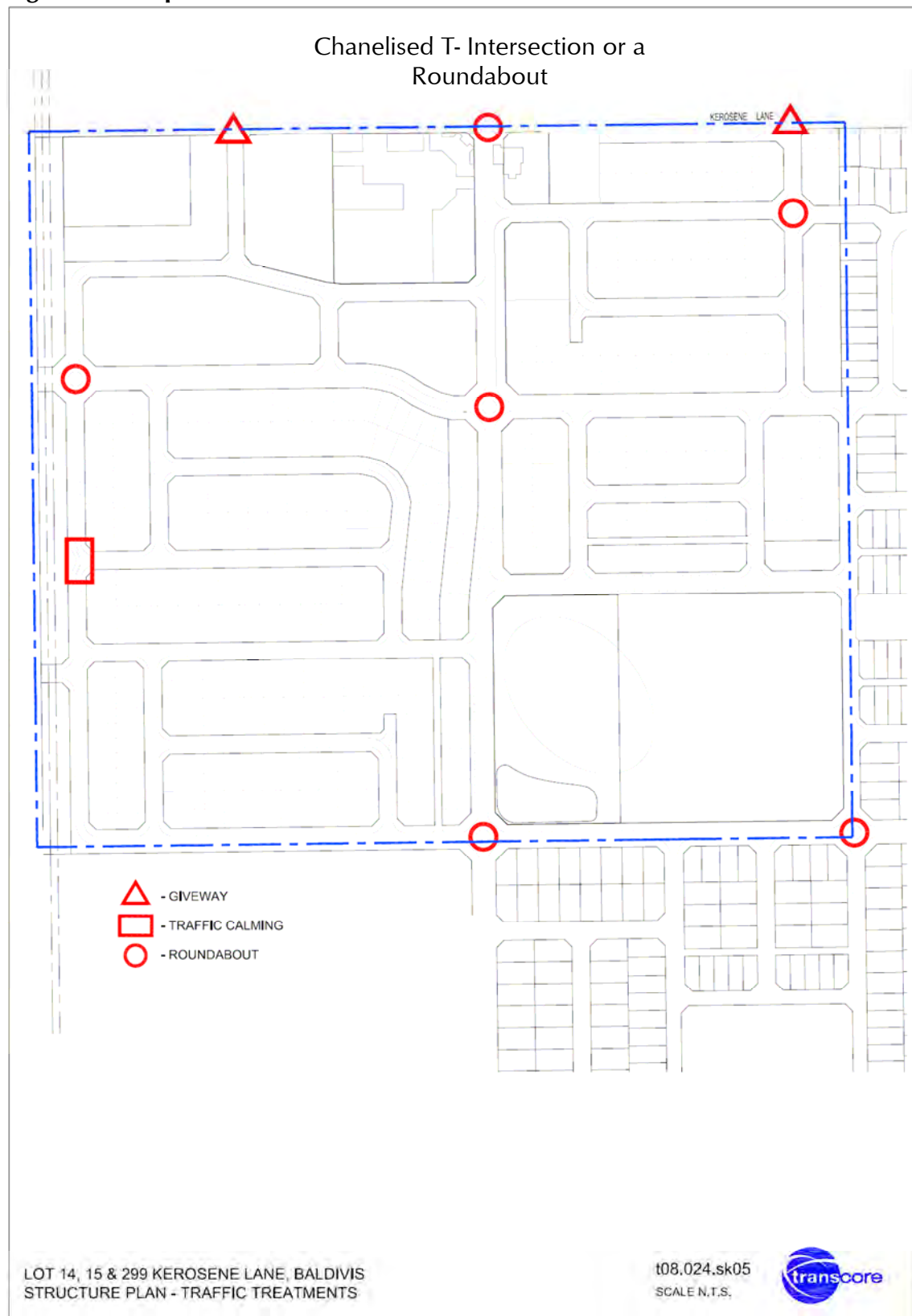
Each of the internal intersections is adequately spaced and located to ensure sufficient sight lines with consideration given to the site topography.

The internal intersections will be Give-Way priority controlled except where roundabouts have been proposed. Some minor legs of these intersections would have splitter islands with pedestrian refuge and Give-Way line markings and signs. These islands and markings would help to demarcate the priority at the intersections and also provide for pedestrian crossing movements. All legs of the roundabouts are also proposed to be treated with splitter islands with pedestrian refuge to facilitate pedestrian/cyclist crossing movements. These details will be finalised during the subdivision design stage.

For the main Local Structure Plan access point on Kerosene Lane a channelised T- Intersection or a single lane roundabout is proposed to maximise safety and traffic operation efficiency.

The other access points on Kerosene lane (west and east of the main access) are proposed to operate as priority intersections.

Figure 10: Proposed Intersection Treatments

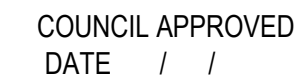


APPENDIX 1 – PROPOSED STRUCTURE PLAN

- 1 Spud Shed Commercial Premises - (2500m² retail NLA max)
- 2 Existing House (to be demolished).
- 3 Grouped housing, Mixed use and Commercial sites subject to DAP to ensure high quality main street built form and streetscape is achieved.
- 4 Traffic calming treatment at intersection.
- 5 Potential future east-west road linkages across gas pipeline.
- 6 On-street carparking surrounding school site.
- 7 POS (active playing field) and school site. Site to be flat as per City of Rockingham and Department of Education and Training requirements.
- 8 Single access for Commercial premises shown on plan.
- 9 No direct access from Kerosene Lane, entry to lots from secondary roads only.
- 10 Future upgrading of Kerosene Lane as per Baldivis Road, needs Study.
- 11 Slip lane servicing Residential Lots fronting Kerosene Lane as shown. Acoustic and visual buffer between mixed use development and commercial premises.

Total Structure Plan Area		38.7847 ha
Deductions for Calculating Net Site Area		
Primary School	3.4983 ha	
Commercial Site 1	1.4505 ha	
Restricted POS (1.7285 ha provided restricted open space - 0.6767 ha maximum permitted)	1.0518 ha	
Total	6.0006 ha	
Net Area		32.7841 ha
10 % POS	3.2784 ha	
<i>8% unrestricted</i>	<i>2.6227 ha</i>	
Joint School POS	1.6618 ha	
Pipeline Buffer	0.5920 ha	
NW Pocket Park	0.6148 ha	
Total	2.8686 ha	
<i>2% restricted</i>	<i>0.6767 ha</i>	
Pipeline Easement	0.6602 ha	
Basin 1	0.7776 ha	
Basin 2	0.2907 ha	
Total	1.7285 ha	
8% unrestricted	2.8686 ha	
2% restricted	0.6557 ha	
Total	3.5243 ha (10.75%)	

 Residential - R20
 Residential - R30
 Residential - R40
 Residential - R60
 School
 Public Open Space
 Drainage Swale incorporated into POS
 Existing Lot Boundary
 Structure Plan Boundary
 Future Bus Routes
 Gas pipeline setback
 500m Buffer from Extractive Sand Industry
 All Commercial and mixed use sites are excluded and are to be progressed through separate Amendment to Town Planning Scheme No. 2.



APPROVED ENDORSED BY
WAPC ON ____ / ____ / ____

TOWN PLANNING SCHEME NO. 1



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[illegible]

**LOT 14, 15 & 299 KEROSENE LANE
BALDIVIS
WESTERN AUSTRALIA**

SCALE	1:3,000 @ A3
DATE	8 June 2010
FILE	100608 1391 Structure Plan.dwg
REVISION	H

APPENDIX 2 –BALDIVIS NORTH DISTRICT STRUCTURE PLAN

Precinct 2

400m walkable catchment

Proposed primary school and associated active public open space

Walkable Catchment Node

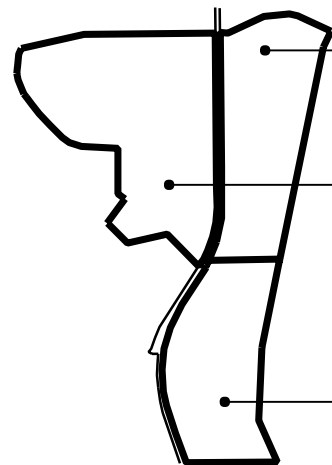
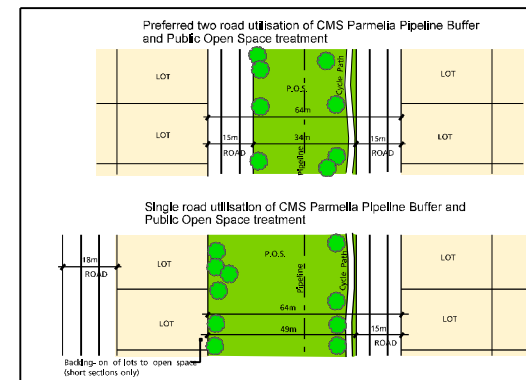
Dress Circle Lots - opportunity to design to capture long distance rural aspects

400m walkable catchment to Neighbourhood Centre

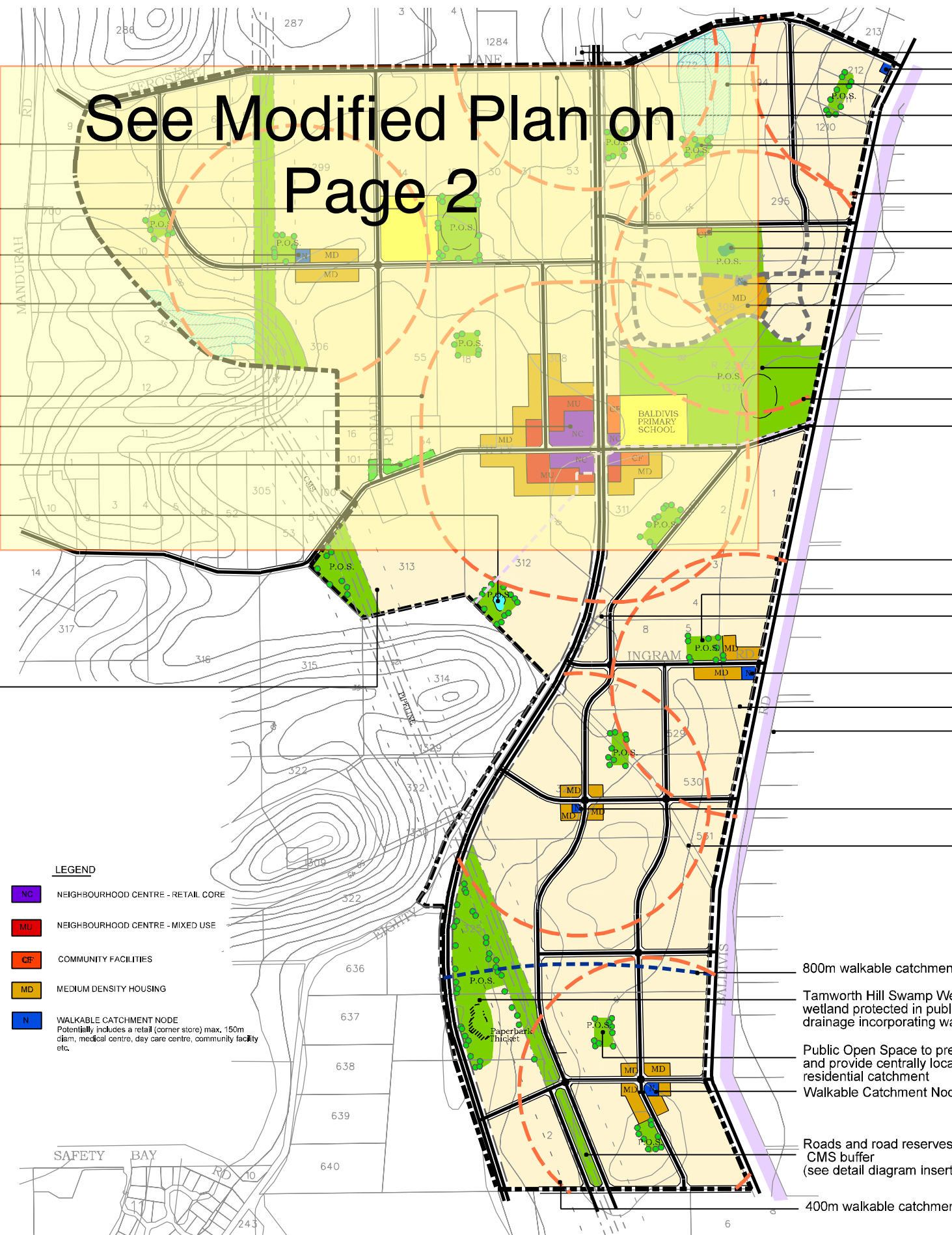
Neighbourhood Centre 5500m² nla max.

Significant Tuart trees to be protected, widen road reserve to accommodate in verge

Existing wetland to be modified to create permanent lake and drainage feature encompassed within Public Open Space



PRECINCT 1.	
Total Area	123.21ha
Deductions	
Baldvis Primary School	3.17ha
Walkable Catchment Nodes	0.25ha
Neighbourhood Centre	0.25ha
Drainage (2%)	2.46ha
TOTAL	6.13ha
Total Developable Area	117.08ha
Public Open Space Requirement (10%)	11.71ha
Public Open Space Provided	11.71ha(10%)
PRECINCT 2.	
Total Area	184.75ha
Deductions	
Primary School	3.50ha
Neighbourhood Centre &	2.50ha
Walkable Catchment Nodes	0.25ha
CMS Buffer	3.62ha
Drainage	3.65ha
TOTAL	13.52ha
Total Developable Area	171.44ha
Public Open Space Requirement (10%)	17.14ha
Public Open Space Provided	17.14ha(10%)
PRECINCT 3.	
Total Area	114.18ha
Deductions	
Walkable Catchment Nodes	0.50ha
CMS Buffer	2.70ha
Drainage (2%)	2.28ha
TOTAL	5.48ha
Total Developable Area	108.70ha
Public Open Space Requirement (10%)	10.87ha
Public Open Space Provided	13.33ha(12.2%)
Note : 50% credit only for areas within CMS 32m buffer subject to development. Refer section 6.3	



Precinct 1

Suggested location of Lunch Bar in proposed Light Industrial Area
Potential Rural Service Store site
Dress Circle Lots - opportunity to design to capture rural aspect to east

Design on south side of Kerosene Lane should recognise use of land north of Kerosene Lane for Light Industry
Landmark Public Open Space site. Public viewpoint on high point

400m walkable catchment to potential Rural Store

Community Facilities site
Public Open Space encompassing high point

Walkable Catchment Node

Approved subdivision area, western half affected by poultry farm buffer and pending reconsideration request

Existing Public Open Space containing District Level active and organised recreation

400m walkable catchment to local shopping

Pedestrian link between Tramway reserve and Tamworth Hill

400m walkable catchment

Public Open Space to preserve remnant bushland
Retain section of Fifty Road as services corridor

Precinct 3

Walkable Catchment Node
Proposed Coastal Christian Church community facilities site

400m walkable catchment

Former "Tramway" reserve

Walkable Catchment Node

Unconstructed road. Reserve to be closed

800m walkable catchment to Baldvis District Centre

Tamworth Hill Swamp Wetland is 'conservation' category wetland protected in public open space and utilised for drainage incorporating water sensitive design techniques

Public Open Space to preserve some remnant bushland and provide centrally located recreation opportunity for residential catchment

Walkable Catchment Node

Roads and road reserves and public open space within CMS buffer (see detail diagram insert)

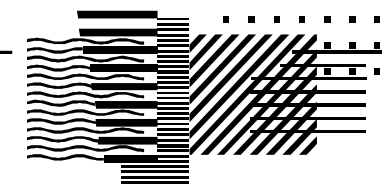
400m walkable catchment

BALDIVIS (NORTH) DISTRICT STRUCTURE PLAN

0 100 200 300 400 m



Fig.No.16



Taylor Burrell

Town planning and design

187 Roberts Road Subiaco
PO Box 603 West Perth
Western Australia 6872
Telephone (09) 382 2911
Facsimile (09) 382 4586

APPENDIX 8

LOCAL WATER MANAGEMENT STRATEGY



02 JUL 2010

29 June 2010

Our Ref: 08.406 L001

Planning Solutions
PO Box 8701
PERTH BC WA 6849
ATTENTION: Paul Ellenbroek

Dear Paul,

SUBJECT : REVISIONS TO LOT 14, 15 AND 299 KEROSENE LANE, BALDIVIS, LOCAL WATER MANAGEMENT STRATEGY

This letter has been prepared in response to the comments received from the City of Rockingham and Department of Water (DoW) on the Local Water Management Strategy (LWMS) for Lot 14, 15 and 299 Kerosene Lane, Baldivis.

City of Rockingham

The Structure Plan approved for advertising by the City is different in some respects from the original Structure Plan that the LWMS was based on. The City of Rockingham's letter dated 26 May 2010 requests that the LWMS be modified to reflect the changes to the Structure Plan and the drainage design. The main revisions to the drainage design are:

- The rationalisation of Public Open Space, which has reduced the number of POS areas from four to two. This has resulted in a rationalisation of the drainage design, with two catchments now being present rather than four; and
- The changing of the drainage sump in Catchment 1 (northwest corner of the site) to a drainage basin or swale.

Revisions have been accordingly made to the LWMS to reflect these changes. In particular, the sections describing the Structure Plan and Stormwater Management Strategy (Sections 2 and 6) have been revised.

Department of Water

The DoW's comments on the LWMS were provided in a letter to ENV dated 9 April 2009. The letter outlined eight points of concern from the DoW. The following points outline ENV's response to this letter.

PO Box 7480, Cloisters Square
PERTH WA 6850

email	env@env.net.au	telephone	(08) 9289 8360
web	www.env.net.au	facsimile	(08) 9322 4251
		ENV Australia ABN 72 091 839 520	

1. Use of a Sump for Drainage in Catchment 1 The Structure Plan has now been changed to provide a Basin, rather than a Sump, in Catchment 1. Section 6 has been altered to reflect this change.
2. Approach to Swale Design Figure 9 has been updated to reflect a more up-to-date swale design, with a bubble up pit.
3. Nutrient Export (Section 4.4) Biofiltration areas with an equivalent area of 2% of the directly connected constructed impervious area will be installed.
4. Rainwater Infiltration at Source Rainwater infiltration at source will be accommodated through the use of open bottomed manholes and road swales (Section 6.1.1).
5. Potential for Swales The use of swales will be considered at the Urban Water Management Plan (UWMP) Stage (Section 6.1.2). A figure showing potential swale locations has been provided in Figure 11.
6. Figure Showing Post-development Water Movement has been provided in Figure 10.
7. Section 9.1 The word 'complete' was intended to include monitoring undertaken subsequent to the LWMS. The word has been removed.
8. Low Phosphorus Retention Index The use of soil amendments will be considered at the UWMP stage (Section 7.4.1).

We hope that these comments meet with your satisfaction. Should you have questions regarding the above please contact the undersigned on 9289 8360.

Yours sincerely
ENV Australia Pty Ltd



MARGARET DUNLOP
Senior Environmental Engineer

LOTS 14, 15 & 299 KEROSENE LANE,
BALDIVIS:

LOCAL WATER MANAGEMENT STRATEGY

Prepared for:

Galati Nominees



Job No: 08.406

Report No: RP001

LOTS 14, 15 & 299 KEROSENE LANE, BALDIVIS

LOCAL WATER MANAGEMENT STRATEGY

Prepared for:

Galati Nominees

Prepared by:

ENV Australia Pty Ltd
Level 7, 182 St George's Terrace
PERTH WA 6000
Phone: (08) 9289 8360
Fax: (08) 9322 4251
Email: env@env.net.au

Prepared by:	<i>Halinka Lamparski</i>
Status:	<i>Final</i>
QA Review:	<i>Neil McGuinness</i>
Technical Review:	<i>Margaret Dunlop</i>
Content Review:	<i>Margaret Dunlop</i>
Date:	<i>20 October 2010</i>

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STATEMENT OF LIMITATIONS

Scope of Services

This environmental site assessment report (“the report”) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) (“scope of services”). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, ENV has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report (“the data”). Except as otherwise stated in the report, ENV has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (“conclusions”) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. ENV will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to ENV.

Environmental Conclusions

In accordance with the scope of services, ENV has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions. Also it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. ENV assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of ENV or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

ENV will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

EXECUTIVE SUMMARY

This report has been prepared to support the submission of a Local Structure Plan for the land located in Lots 14, 15 and 299, Kerosene Lane, Baldivis.

Under *Better Urban Water Management (BUWM)* (WAPC 2008a), a Local Water Management Strategy (LWMS) is required to support a Local Structure Plan prior to subdivision and development of land zoned Urban. The BUWM sets out the requirements for a LWMS, which must be approved by the Western Australian Planning Commission on advice of the Department of Water as part of the Local structure Plan Approval.

The objective of the LWMS is to ensure that sustainable management of the total water cycle at the Kerosene Lane development occurs through Water Sensitive Urban Design. This includes water conservation, stormwater management and groundwater management. Galati nominees aim to manage these issues at Lots 14, 15 and 299, Kerosene Lane, through the following initiatives:

Water Conservation

- Providing front yard Waterwise landscaping packages for residential lots that include waterwise plants, soil amendments to improve water and nutrient retention, minimal turf areas and water efficient irrigation; and
- Providing information packages to educate landowners on ex-house and in-house waterwise measures.

Stormwater Management

- Implementing a drainage design that ensures no flow off the site in the 1 in 100 year event from the development to pre-development levels through storage and infiltration on site; and
- Maximising infiltration on the subject site by constructing infiltration basins in POS where possible, planted with vegetation or grasses to encourage nutrient and suspended solids uptake and removal prior to infiltration. Side entry pits and associated manholes will also be open based to maximise infiltration.

Groundwater Management

- Ensuring infiltration basins are planted with vegetation or grass in frequently inundated areas to strip nutrients prior to infiltration;
- Limiting the use of fertilisers in POS; and
- Providing information packages to educate landowners on fertilise wise gardening through provision of information at settlement.

This LWMS demonstrates that Lots 14, 15 and 299, Kerosene Lane, Baldivis can be developed in a way that manages hydrological constraints. The outstanding issues can be resolved at the Urban Water Management Plan stage to create a development that meets the goals and ideals of *Better Urban Water Management*.

1 INTRODUCTION

This Local Water Management Strategy (LWMS) has been prepared to support the submission of a Local Structure Plan for Lots 14, 15 and 299, Kerosene Lane, Baldivis (the site). The total area of the site is approximately 39 Ha. The site is located approximately 38 km south west of the Perth Central Business District and is bounded to the north by Kerosene Lane, to the south by market gardens, to the west by markets gardens and uncleared bushland and to the east by market gardens, existing residential and proposed residential areas. The site is adjacent to areas supporting native vegetation and sand extraction activities to the north-east (Figure 1). Lake Cooloongup is approximately 750 m to the east and Kerosene Lane Swamp more than 50 m to the north. The site is currently used for market gardens and related processing activities and thus contains little remnant vegetation.

The site lies within the Baldivis (North) District Structure Plan (DSP) area and within the City of Rockingham. Under *Better Urban Water Management* (BUWM) (WAPC, 2008a) and *Planning Bulletin 92* (WAPC 2008b) a Local Water Management Strategy (LWMS) is required to support a Local Structure Plan. The LWMS provides strategic information regarding the management of water in the development while outlining and demonstrating the feasibility of the proposed design. This work is then refined and details confirmed at the Subdivision Stage, through Urban Water Management Plans. *BUWM* sets out the requirements for a LWMS, which must be reviewed and approved by the City of Rockingham and Department of Water prior to development proceeding.

1.1 TOTAL WATER CYCLE MANAGEMENT – PRINCIPLES AND OBJECTIVES

The process of managing the total water cycle in an urban scenario is referred to as Water Sensitive Urban Design (WSUD). A Local Water Management Strategy seeks to support WSUD by assisting to design, develop and maintain urban water systems that are sensitive to the total water cycle. The principles of WSUD as outlined in the *Better Urban Water Management* (BUWM) (WAPC 2008a) have been used here. These principles are to:

- Protect natural systems – protect and enhance natural water systems and their hydrological regimes in urban developments;
- Integrate stormwater treatment into the landscape – use stormwater in the landscape by incorporating multiple use corridors that maximise the visual and recreational amenity of developments;

- Protect water quality – protect the water quality draining from urban development and minimise outputs of phosphorus and nitrogen and other pollutants;
- Manage run-off and peak flows – reduce peak flows from urban developments by using local detention measures and minimising impervious areas; and
- Add value while minimising development costs – minimise the drainage infrastructure cost of development.

1.2 PLANNING BACKGROUND

1.2.1 Metropolitan Region Scheme

Under the provisions of the Metropolitan Region Scheme (MRS), the subject site is zoned 'Urban'. Land located immediately to the north of the subject site is currently zoned 'Rural'. An 'other regional road' reservation (extension of Eighty Road) is located to the east of this LSP area.

1.2.2 City of Rockingham Town Planning Scheme No. 2

The City of Rockingham Town Planning Scheme No. 2 (TPS2) was gazetted on 19 November 2004.

Under the provisions of TPS2 the subject site is currently zoned 'Development' with an applicable residential density of 'R20/40'. Lot 299 also has an additional use which allows for the retail sale of fruit and vegetables and associated incidental items from the site.

1.2.3 Baldivis (North) District Structure Plan

The Baldivis (North) District Structure Plan (DSP) was approved by the City of Rockingham in 2000 to support the urbanisation of the land.

The City of Rockingham commissioned the preparation of the DSP for the proposed urban areas of Baldivis located north of Safety Bay Road. The Structure Plan area includes all the 'Urban' and 'Urban Deferred' zoned land located within Kerosene Lane, Baldivis Road, Safety Bay Road and Mandurah Road.

A District Water Management Strategy was not developed as part of the DSP, as there was no requirement for such reports when the DSP was written.

1.3 PREVIOUS STUDIES

Previous studies into land and water management in the area are:

- Baldivis (North) District Structure Plan (Taylor Burrell et al. 2000)
- Lot 14, 15 and 299, Kerosene Lane, Baldivis Local Structure Plan: Environmental Report (ENV Australia 2008a)
- Lot 14, 15 and 299, Kerosene Lane, Baldivis Environmental Preliminary Site Investigation (ENV Australia 2008b)

2 PROPOSED DEVELOPMENT

2.1 KEY POINTS OF STRUCTURE PLAN

The Local Structure Plan represents a mixed use residential development including low (R20) and medium (R30 to R60) densities, a commercial precinct and a school (Figure 2).

The area of Public Open Space (POS) meets the normal 10% gross land area requirement.

2.2 ENVIRONMENTAL REPORT AND MANAGEMENT PLAN

An Environmental Assessment of Lots 14, 15 and 299, Kerosene Lane was undertaken by ENV Australia and included in the Local Structure Plan. The report is based on the work done for a Preliminary Site Investigation (PSI), Acid Sulphate Soil (ASS) Investigation and Hydrology Investigation carried out by ENV Australia on Lots 14, 15 and 299. The report includes recommendations for environmental management of the site related to the proposed development such as provision of sufficient buffers for a neighbouring gas pipeline, sand quarries, poultry farms and neighbouring market gardens. The lack of native vegetation is not a constraint to the proposed development.

3 PRE-DEVELOPMENT ENVIRONMENT

3.1 TOPOGRAPHY

The topographic height of the site ranges from 6-18 m Australian Height Datum (AHD). The landscape is gently undulating (Figure 3). The highest point occurs in the north-east corner of the site and the lowest point occurs in the north-west of the site (Figure 3).

3.2 SOILS AND GEOLOGY

The sites soils are identified by Gozzard (1983) as consisting of mostly Sand derived from Tamala Limestone (S₇) with a pocket of Limestone and Safety Bay sand (LS) in the south west corner (Figure 4). These soils are described as:

- *Sand derived from Tamala Limestone (S₇)* – Sand, pale and olive yellow, medium to coarse-grained, sub-angular quartz with a trace of feldspar, moderately sorted, of residual origin; and
- *Limestone (L_S)* – Pale yellowish brown, fine to coarse grained, sub-angular to well rounded, quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin. This land unit may have limestone rock present at the surface.

Geology mapping matches the observations of the soil profile taken when drilling the monitoring bores (Appendix A). The soil types on the site are generally highly permeable apart from some of the limestone rock outcrops. The sands in the site are expected to have a hydraulic conductivity of 8-50 m/day (Davidson 1995).

3.2.1 Acid Sulfate Soils

Acid Sulfate Soil (ASS) risk mapping (shown in Figure 5) indicates that the site is located in an area of “no known risk of ASS occurring within three metres of the natural soil surface” (WAPC 2003). A small area located approximately 200 m to the north of the site is present which has a “high to moderate risk of ASS occurring within three metres of the natural soil surface” (WAPC 2003). Based on this risk ASS is not considered to be a constraint on this site.

3.2.2 Contaminated Sites Assessment

An assessment of contamination is required for the site under the Contaminated Sites Act (2003) because it has been used as a market garden. A Preliminary Site Investigation (PSI) following Department of Environment and Conservation (DEC) guidelines was completed for Lots 14, 15 and 299, Kerosene Lane in July 2008 (ENV Australia 2008b), as required by the DEC *Contaminated Sites*

Management Series – Reporting on Site Assessments (DEP 2001). Based on this PSI, areas of potential contamination were identified at the subject site.

Because the site has historically been a market garden, a contaminated sites condition may be imposed for the subdivision of the site. If required, this work will be undertaken to the satisfaction of the Department of Environment and Conservation (DEC).

3.2.3 Phosphorus Retention Index

The Phosphorus Retention Index (PRI) is an index to classify the phosphorus adsorption capacity of soils. Soil samples were collected at each bore from a depth of 0.05m and sent to a laboratory for PRI analysis. Mean results are presented in Table 1 and full results are shown in Appendix B. According to Allen and Jeffery (1990) the soil at all bores may be classed as 'very weakly adsorbing or desorbing' when the PRI is less than 2. These results suggest that site soils do not retain phosphorus. This has implications for the use of fertilisers on the site, particularly with regards to leaching into groundwater and potentially increasing nutrient levels.

Table 1: Mean Phosphorus Retention Index Results (PRI)

Bore	Mean PRI
MW1	0.95
MW2	0.9
MW3	1.05
MW4	1.6
MW5	1.1

3.3 SURFACE WATER QUANTITY AND QUALITY

There are no ephemeral or permanent surface water bodies within the site. The nearest wetlands are Kerosene Lane Swamp (more than 50 m north of the site) and Lake Cooloongup (approximately 750 m west of the site) (Figure 1). Both Lake Cooloongup and Kerosene Lane Swamp are Conservation Category Wetlands which are also identified by the Environmental Protection (Swan Coastal Lakes) Policy 1992 (as EPP Lakes).

The site is currently cleared and used as market gardens with a soil profile consisting of medium grained sand at the surface. Thus the site soils maintain a high hydraulic conductivity. Hydraulic processes are dominated by infiltration

with little to no surface run-off following rainfall except during extreme events. As a result there are no dedicated drainage lines in the site due to the high infiltration capacity and topography of the site (ENV Australia 2008a).

3.4 GROUNDWATER QUANTITY AND QUALITY

The site is located within the area defined in the Perth Groundwater Atlas (PGWA) (WRC 1997 and DoE 2004a). The PGWA shows groundwater flow to be in a westerly direction (DoE 2004a). Minimum groundwater levels are presented in the PGWA as approximately 1 mAHD across the site (DoW 2004a), while maximum groundwater levels are shown to be between 3 and 4 mAHD (WRC 1997). The hydraulic gradient shown across the site is approximately 1 in 1000 or 1 m in 1 km which is very low. This is typical of limestone formations found in the Baldivis area.

Groundwater monitoring was undertaken in 2008. One Department of Water (DoW) groundwater monitoring well is located adjacent to the site and five monitoring wells were installed by ENV Australia within the site (Figure 6). The wells were monitored for water level and quality. The groundwater levels measured in the DoW bore since installation in 1975 (full records shown in Appendix C) were also reviewed to provide maximum and minimum groundwater levels (Figure 6). The calculated maximum groundwater levels on the site varied from 2.98 mAHD at MW4 in the southeast to 2.87 mAHD at MW1 in the centre of the site. The minimum groundwater levels measured onsite varied from 1.84 mAHD at MW4 in the southeast to 1.47 mAHD at MW1 in the centre of the site (Appendix D). The bore records are shown in Table 2. Full monitoring records may be found in Appendix D.

The groundwater levels measured by ENV did not indicate a clear flow direction. Geology mapping also reveals that the site is situated mostly on sand derived from limestone with pockets of limestone rock situated throughout the site (Gozzard 1983). Such geology typically has very high hydraulic conductivity. Under such conditions groundwater flow direction can be difficult to determine, particularly on small sites such as Lots 14, 15 and 299, Kerosene Lane. The Kerosene Lane area also has many market gardens with bores extracting groundwater. The impact of drawdown from these bores can change and reverse local flow directions, leading to complex groundwater patterns of the type seen at Kerosene Lane. Regardless of this it is considered that the regional flow direction is towards the west (Figure 3).

The shortest distance between the calculated maximum groundwater level and the natural surface is 3.51 m (bore MW3). The largest distance between the calculated maximum groundwater level and the natural surface is 16.63 m (DoW 3035) (Table 2).

Table 2: Maximum Groundwater Levels at Site Bores

Bore	Calculated Maximum Groundwater Level (mAHD)	Depth to Calculated Maximum Groundwater Level (m)
MW1	2.87	8.02
MW2	2.94	15.07
MW3	2.92	3.51
MW4	2.98	9.65
MW5	2.90	10.03
DoW 3035	2.93	16.63

Salinity levels measured in groundwater are in the 'fresh water' range (0-500 mg/L TDS) (DoE 2004a) and pH is generally stable and neutral (Table 3). Full physical parameter results may be found in Appendix D.

Table 3: Mean Physical Parameters

Bore	EC (mS/cm)	TDS (mg/L)	pH
MW1	4.08	135	6.75
MW2	0.63	95	7.29
MW3	3.53	154	6.94
MW4	1.32	115	7.23
MW5	2.63	129	7.15

Groundwater on the site is generally low in phosphorus with average total phosphorus (TP) varying between 0.06 and 0.91 mg/L (Table 4 and Figure 7). The TP concentrations exceeded the Short Term Swan-Canning Cleanup Program (SCCP) target of 0.2 mg/L (SRT 1999) at two bores (MW3 and MW5) (Table 4). The total nitrogen (TN) concentrations exceeded the Short Term SCCP target of 2 mg/L at all bores (Table 4 and Figure 7). High TN and nitrate concentrations may be due to impacts from upgradient market gardens. An investigation into laboratory analysis was conducted to confirm these levels. Duplicate and triplicate samples were taken at MW2 to determine the intra and inter-laboratory accuracy, respectively. Relative Percentage Differences (RPDs) were calculated for both the duplicate and triplicate samples. RPDs for all duplicate nutrient analyses were less than 50% and the majority of the RPDs for the triplicate nutrient analyses were less than 50%, which is considered within

acceptable error range (Standards Australia 1998). Full nutrient results and RPD calculations may be found in Appendix D.

Table 4: Mean Nutrient Results

Bore	Total P	PO ₄	Total N	NO ₃ -N	NH ₃ -N	TKN
MW1	0.06	0.02	177	177	0.06	<0.2
MW2	0.19	0.01	6.25	5.6	0.05	0.7
MW3	0.91	0.01	117	113	0.06	4.4
MW4	0.17	<0.01	13.4	12.3	0.05	1.1
MW5	0.60	<0.01	145	141	0.07	4.1
SCCP ¹ Long Term Target	0.1		1			
SCCP ¹ Short Term Target	0.2		2			
DoE 2003 ²				11.3 ³		

¹Swan River Trust (2003)

²DoE (2003)

³The NO₃-N assessment level has been calculated from the total NO₃ assessment level for water (50 mg/L) in DoE (2003).

3.5 ENVIRONMENTAL ASSETS

This section represents a brief summary of the environmental assets and water dependent ecosystems on the site.

3.5.1 Bush Forever

There is no native vegetation on the site; however, an area of bushland approximately 100 m north east of the site is identified as Bush Forever site No 356. This site is part of Lake Coo loongup, Lake Walyungup and adjacent Bushland, Hillman to Port Kennedy (Figure 8). No buffers to development apply to Bush Forever sites.

3.5.2 Water Dependant Ecosystems

The site is approximately 750 m to the east of Lake Cooloongup and more than 50 m south of Kerosene Lane Swamp, a small wetland to the north of Kerosene Lane (Figure 1). Both Lake Cooloongup and Kerosene Lane Swamp are Conservation Category wetlands which are also identified by the Environmental Protection (Swan Coastal Lakes) Policy 1992 giving them protection under the Environmental Protection Act (1986).

The Environmental Protection Authority (EPA) requires that buffer separation distances of 50–100 m from development apply to conservation category wetlands (EPA 2008). The separation distances, including the presence of Kerosene Lane swamp, are such that buffer requirements do not affect the site.

4 DESIGN CRITERIA

The principles, design objectives and criteria shown here are from *Better Urban Water Management (BUWM)* (WAPC 2008a) which is the appropriate guidance document for the Kerosene Lane area. Quotes from BUWM are shown in italics.

4.1 WATER CONSERVATION - AND EFFICIENCY

Principle

No potable water should be used outside of homes and buildings with the use of water to be as efficient as possible (WAPC 2008a).

Design Objectives

Consumption target for potable water of 100 kL/person/year (State Water Plan Target), including not more than 40-60 kL/person/year scheme water (WAPC 2008a).

Site Response

The 40-60 kL/person/year scheme water target is well below the State Water Plan target of 100 kL/person/year scheme water use. At the time of preparation of the State Water Plan, the average Perth Water Use was 153 kL/person/year (Government of Western Australia 2007). As approximately half of domestic water use is for ex-house purposes (Coghlan and Loh 2003), meeting this target requires that no potable water is used outside the home. The development will achieve the 100 kL/person/year State Water Plan target.

4.2 WATER QUANTITY MANAGEMENT

Principle

Post-development annual discharge volume and peak flows will be maintained relative to pre-development conditions, unless otherwise established through determination of Ecological Water Requirements for sensitive environments (WAPC 2008a).

Criteria

Ecological Protection - For the critical one year average recurrence interval (ARI) event, the post-development discharge volume and peak flow rates shall be maintained relative to pre-development conditions in all parts of the catchment. Where there are identified impacts on significant ecosystems, maintain or restore desirable environmental flows and/or hydrological cycles as specified by the DoW.

Flood Management - Manage the catchment run-off for up to the 1 in 100 year ARI event in the development area to pre-development peak flows, unless otherwise indicated in an approved strategy or as negotiated with the relevant drainage service provider (WAPC 2008a).

Site Response

In the pre-development case, there is not considered to be any flow off the site because of the high hydraulic conductivity of the site soils.

The post-development drainage strategy is based on infiltration of all stormwater on-site in events up to the 1 in 100 year event, which maintains the pre-development condition.

4.3 WATER QUALITY MANAGEMENT

These are intended to apply to run-off from impervious areas and should be met in addition to the groundwater design objectives.

Principle

Maintain surface and groundwater quality at pre-development levels (winter concentrations) and, if possible, improve the quality of water leaving the development area to maintain and restore ecological systems in the sub-catchment in which the development is located (WAPC 2008a).

Criteria

Contaminated Sites – To be managed in accordance with the Contaminated Sites Act 2003.

All other Land – If the pollutant outputs from the development (measured or modelled concentrations) exceed catchment ambient conditions, the proponent shall achieve water quality improvements in the development area or, alternatively, arrange equivalent water quality improvement offsets inside the catchment. If these conditions have not been determined, the development

should meet relevant water quality guidelines stipulated in the National Water Quality Management Strategy (ARMCANZ & ANZECC 2000) (WAPC 2008a).

Site Response

The development proposes to use Best Management Practices in line with the Stormwater Management Manual (DoW 2004-2007) to manage water quality on the site. Any groundwater contamination found on the site will be managed in accordance with the Contaminated Sites Act (2003).

4.4 STORMWATER MODELLING CRITERIA

Principle

If it is proposed to use a stormwater modelling tool to demonstrate compliance with design objectives, the following design modelling parameters are recommended.

As compared to a development that does not actively manage stormwater quality:

- *At least 80% reduction in the average annual load of total suspended solids;*
- *At least 60% reduction in the average annual load of total phosphorus;*
- *At least 45% reduction in the average annual load of total nitrogen; and*
- *At least 70% reduction in the average annual load of gross pollutants (WAPC 2008a).*

Site Response

Stormwater modelling is not proposed for the site at this stage because currently there is no commercially available tool approved by the DoW to undertake such modelling for this area. Should such a tool become available, modelling will be undertaken at an Urban Water Management Plan stage.

Biofiltration areas with an equivalent area of 2% of the directly connected constructed impervious area will be installed.

4.5 DISEASE VECTOR AND NUISANCE INSECT MANAGEMENT

Principle:

To reduce health risks from mosquitoes, retention and detention treatments should be designed to ensure that between the months of November and May,

detained immobile stormwater is fully infiltrated in a time period not exceeding 96 hours.

Permanent water bodies are discouraged, but where accepted by DoW, must be designed to maximise predation of mosquito larvae by native fauna to the satisfaction of the local government on advice of the Departments of Water and Health (WAPC 2008a).

Site Response

The system has been designed to ensure that detained immobile stormwater is fully infiltrated in a time period not exceeding 96 hours.

Permanent water bodies are not proposed for this site.

5 WATER CONSERVATION STRATEGY

5.1 INTRODUCTION

This section provides a summary of water conservation measures that will be undertaken in the Kerosene Lane development. Water conservation criteria for Water Sensitive Urban Design (WSUD) in *Better Urban Water Management* (BUWM) (WAPC 2008a) provide a consumption target of 100 kL/person/year, including not more than 40-60 kL/person/year of scheme water. At a minimum, the Kerosene Lane will meet the State Water Strategy target of 100 kL/person/year for the LWMS to be approved.

This section also addresses the provision of water for the irrigation of areas of Public Open Space (POS) within the development and the servicing of potable water and wastewater supplies and sources. Water conservation issues are summarised and relevant matters to be addressed at the subdivision stage are presented.

5.2 WATER CONSERVATION MEASURES

Approximately half of all household water use is for maintaining gardens; therefore minimising water demand for landscaping is an essential water conservation measure for residential areas. Ex-house irrigation controls can be easily implemented through developer provided landscaping packages and are therefore easy to enforce.

It is intended that waterwise landscaping packages will be provided by Galati nominees and will include the verge and front yards. These packages will include the use of soil amendments (such as mulch or clayey/loamy soils to improve water and nutrient retention), waterwise plants (with native options), paving or mulched surfaces and minimal turf areas.

Support will also be provided to residents to educate them on how to minimise their water use. Packages of information will be provided to individual homeowners at the sale of lots and will include information on reducing fertiliser use and other water conservation and environmental management measures, including but not limited to:

- Using Water Efficiency Labelling and Standards (WELS) to choose fixtures with greater than four stars for tap fittings and three stars for shower heads, as well as advice about choosing flow regulators, washing machines and relevant rebates available from DoW;

- Water efficiency measures for ex-house use including how to operate waterwise irrigation systems, frequency and timing of irrigation, landscaping packages and timing and the use of pool covers;
- Rainwater tanks, requirements, regulatory approvals and information about installation of tanks, switching systems and plumbing to toilets and/or laundry and relevant rebates; and
- Greywater systems including requirements, approved products, regulatory approvals, installation of infrastructure for irrigation and relevant rebates available.

5.3 PROJECTED POTABLE WATER CONSUMPTION

The 100 kL/person/year target can be achieved as shown in Table 5, according to current water yields calculated from given lot yields, Water Corporation Waterwise Calculator assumptions and dwelling statistics. It is estimated that a resident living in the Kerosene Lane development will potentially use 84 kL/year on average of scheme water. This is 260 kL/year for the average house of 2.44 people. This number was calculated assuming that front yard waterwise landscaping was adopted and irrigation not over applied. These assumptions were based upon likely take up of in-house and ex-house waterwise measures from methods described in distributed information packages. Full potable demand calculations may be found in Appendix E.

Table 5: Average Predicted Scheme Water Usage

SCENARIO: FRONT YARD WATERWISE LANDSCAPING PACKAGE

		Volume Per Resident (L)	Annual Usage (kL/resident/yr)	Total Usage (kL/year)
Low	In-house	160	58	61,848
	Ex-house	78	28	29,961
	Total	238	87	91,809
Medium	In-house	167	61	23,339
	Ex-house	43	16	6,049
	Total	211	77	29,388
			In-house	85,187
			Ex-house	36,009
			Total	121,196

Average scheme water usage (kL/yr/resident)
= Total Usage/ Total Residents

84.20

Average scheme water usage (kL/yr/dwelling)
= Total Usage/ Total Residents

205.42

5.4 PUBLIC OPEN SPACE (POS)

Galati nominees submitted a successful licence application to the Department of Water (DoW) for an allocation of 250 ML/year to irrigate Lot 299, Kerosene Lane and 206.15 ML/year to irrigate Lots 14 and 15, Kerosene Lane.

The groundwater allocation provided by the DoW will be sufficient to ensure the irrigation of the proposed POS within the Kerosene Lane development at conventional irrigation rates. It is worth noting that a total POS area of 4.59 Ha at the subject site (Figure 1) irrigated at a rate of 7,500 kL/ha/yr as per DoW requirements, requires 34.4 ML/year.

5.5 WATER BALANCE

An increase in recharge volume of approximately 590% is estimated post-development as shown in Appendix F. The pre-development recharge is estimated at 29 ML/year. Water balance calculations indicate that approximately 173 ML/yr additional recharge will occur on site once developed (Appendix F).

5.6 POTABLE WATER SERVICING

Lot 299, Kerosene Lane, Baldivis is within the Perth south west coastal area and is covered by the Water Corporation (WC) Tamworth reservoir gravity water supply zone (Cossil and Webley 2009). Tamworth is an existing reservoir in north Baldivis. There is also a proposed reservoir in southern Baldivis known as the Karnup reservoir site. The WC is currently undertaking scheme reviews for this area which may result in a cancellation of Karnup reservoir construction due to bush forever conservation issues. This will influence scheme planning and distribution network requirements between Tamworth and Karnup. The Tamworth reservoir is fed by water from Stirling Dam through the 1400 mm diameter Stirling Trunk Main (dam transfer main).

The subject site is north of the Tamworth reservoir site and is largely unaffected by the future use of the Karnup reservoir site (Cossil and Webley 2009). The WC has undertaken extensive planning in this area for a network of distribution and reticulation size water mains. However, the uncertainty around Karnup is preventing the WC from finalising the broader area distribution network planning.

The WC has indicated that it is unlikely that sufficient capacity will be available in the existing reticulation mains in the adjoining roads and developments to service the proposed development area (Cossil and Webley 2009). In particular, the capacity of the 250mm diameter main in Eighty Road from Tamworth reservoir north to Fifty Road is at capacity. The WC are considering a route for a 500 mm diameter or larger main (size yet to be determined) that may need to be installed in Eighty Road and north along the future Nairn Drive extension through to

Kerosene Lane to service the broader area. This 500 mm or larger water main would represent additional headworks to be funded by the WC. Depending on the timing of this project and the timing of other developments in the area, the water main may need to be prefunded by developers if required in advance of WC requirements and their ability to fund the works.

Local water reticulation will be designed and installed to service every property in the development (Cossil and Webley 2009). The reticulation design includes fire hydrant provisions in accordance with agreed standards between the WC and Fire and Emergency Services Authority.

5.7 WASTEWATER SERVICING

Water Corporation (WC) planning for the future waste water collection and treatment for Lot 299, Kerosene Lane, and adjacent areas in Baldivis is dependent on approval and development of the East Rockingham Waste Water Treatment Plant (WWTP) (Cossil and Webley 2009). The WC is currently seeking preliminary approvals for a treatment plant site to be located near Chesterfield Road west of Mandurah Road and north of Day Road in the East Rockingham industrial area. Problems have been experienced in the past with other sites that have not been approved on environmental grounds. As a result, the WC has been recently reluctant to support rezoning proposals (to urban) under the Metropolitan Region Scheme within the East Rockingham WWTP catchment until there is certainty with the treatment plant site.

Notwithstanding the lack of certainty with the ultimate treatment facility location the WC have prepared a scheme plan for the north Baldivis area (Cossil and Webley 2009). The land associated with this structure plan and the surrounding land is proposed to be served by conventional gravity sewer, gravitating to a permanent 'type 180' waste water pumping station denoted by the WC as Baldivis Pumping Station B. The pumping station site is proposed on the north side of Kerosene Lane opposite the north eastern boundary of Lot 299. The outlet for the pressure main from the pump station is proposed to traverse north along the eastern boundary of lot 287 and ultimately to the proposed waste water treatment plant. The waste water pumping station will need a site of between 1600 m² and 2500 m² (depending on storage requirements) and a buffer of 50 m. If situated as proposed by the Water Corporation on Lot 287, buffer requirements by way of set backs and the Kerosene Lane road reserve will satisfy the buffer requirement.

If the ultimate site for pumping station site B is not available at the time of development of Lot 299, a temporary pumping station may need to be provided on Lot 299 or the permanent site may need to be moved to Lot 299 (Cossil and Webley 2009). Either of these options could be accommodated from an engineering perspective with minor modification to the LSP.

The WC have made provision for a 375 mm diameter gravity main receiving both gravity and future pumped flow from south of this site running in a generally south to north direction. (Cossil and Webley 2009) An alignment for the 375 mm main can be provided within the proposed subdivisional road network.

There is a second proposed 375mm diameter gravity main receiving both gravity and future pumped flow from east of the site to be constructed within the Kerosene Lane road reserve (Cossil and Webley 2009).

Based on the assumption of the provision of the East Rockingham Waste Water Treatment Plant and the construction of the WC waste water pumping station 'B' or an alternative temporary pumping station the site can be served with conventional gravity sewer reticulation with all flows treated to Water Corporation standards (Cossil and Webley 2009).

The recycling of treated waste water is possible, and the WC has implemented nearby an effluent treatment and reuse plant for the Kwinana industrial area (Cossil and Webley 2009). Further recycling strategies including some directly at the proposed East Rockingham plant are likely. However, these sustainability measures are beyond the scope and control of this development.

5.8 MATTERS TO BE ADDRESSED AT THE SUBDIVISION STAGE

Matters to be addressed at the subdivision stage in the Urban Water Management Plan(s) (UWMPs) are:

- Provide further details on waterwise landscaping packages to be implemented at the site;
- Finalise details to be included in the information packages;

6 STORMWATER MANAGEMENT STRATEGY

The stormwater management strategy for the Kerosene Lane site is based on infiltration of stormwater on site and maintaining water quality. As the local soils are generally highly permeable, it is considered that there would not be any surface water flow off the site in a 1 in 100 year event prior to development. To maintain this no flow condition, stormwater will be infiltrated on site in events up to the 1 in 100 year event. Both structural and non-structural Best Management Practices (BMPs) are proposed to achieve this, including infiltration basins incorporated in Public Open Space (POS) and bottomless manholes.

A Drainage Concept Plan for the site summarising the drainage concept is included in Figure 10. The text below explains the concepts behind this plan.

6.1 SURFACE WATER QUANTITY AND MANAGEMENT

6.1.1 Stormwater Management in Road Reserves

Stormwater within road reserves will be collected through side entry pits and swales (where appropriate). Pits and associated manholes will have open bases to increase infiltration locally from the system.

Major flow paths will be provided along road reserves for the 1 in 100 year flow. A minimum freeboard of 0.3 m will be provided between the 1 in 100 year water level and building floor levels.

6.1.2 Flood Management in Public Open Space

The site has been divided into two catchments for flood management purposes (Figure 10 and Table 6) based on approximate topographic catchments.

The site will utilise pits with open bases and drainage swales in POS to increase infiltration of stormwater throughout the drainage network. The use of open bottomed pits will increase infiltration at source. Swale type basins in POS will be utilised. A conceptual design of the swale infiltration basins is presented in Figure 9.

Drainage area and swales within POS is restricted at the subject site due to the presence of a gas easement for the Parmelia Gas Pipeline, running along the western edge of the site (Figure 2). Planning Bulletin 87 states that stormwater compensating basins are not permitted in the gas pipeline corridor/easements (WAPC 2007). Therefore this section of POS cannot be used for drainage.

The areas and volumes of storage required in the 1 in 100 year event are shown in Table 6 below. These areas represent the storage for the whole 1 in 100 year

event, without allowances for losses through drainage pits. This is seen as a maximum area for inundation. Efforts will be made to reduce this area by maximising infiltration within the road reserve and other areas prior to water entering the basins.

Table 6: Catchment areas, peak volumes and approximate basin areas for each catchment.

Catchment Parameter	Catchment 1	Catchment 2
Equivalent Impervious Area (Ha)	6.85	2.55
Storm Volume 1 yr (m ³)	1120	420
Storm Volume 5 yr (m ³)	1720	640
Storage Volume 10 yr (m ³)	4110	1536
Storage Volume 100 yr (m ³)	9110	3405
Area of water at TWL 10 yr (m ²)	7776	2907
Area of water at TWL 100 yr (m ²)	9296	3890

The total impervious area subject to inundation in a 1 in 10 year ARI event is estimated at 1.22 Ha. The area of inundation is shaded in each catchment in Figure 10. The swale type infiltration basins themselves will be shaped and located to maximise the useability of the Public Open Space (POS) while maintaining acceptable depths of inundation. Basins will be designed so that the base will be at least 0.5 m above maximum groundwater levels (Figure 9). A maximum depth of water of 1.2 m has been adopted in the swale design for calculating the effect of a 1 in 100 year flood event.

Basins will be vegetated with either grass or native plants to be decided upon at later stages in the development. Discussions with the City of Rockingham confirmed that the council has no preference in this matter (Darren Dropulich, City of Rockingham, 03/02/09).

The construction of swales will be considered in wider road reserves, where the location of driveways does not form a constraint, such as areas adjacent to POS or where road widths are adequate for the use of swales to be considered. A map showing potential for swales is provided in Figure 11.

6.1.3 Household Drainage

The drainage from households will be managed on the lots through the use of soakwells or other onsite infiltration structures. Lots will not be provided with a direction connection to the road drainage system. This is considered appropriate as the hydraulic conductivity of the local soils is high.

6.2 SURFACE WATER QUALITY

Stormwater quality on the site will be maintained through the use of infiltration basins to remove nutrients and sediments and by maximising infiltration through open bottom side entry pits and manholes. The drainage basins will be planted with vegetation to encourage nutrient and suspended solids uptake and removal prior to infiltration. Gross Pollutant Traps (GPTs) will also be used prior to discharge to basins or Public Open Space. This forms a treatment train of open bottomed manholes, GPTs and infiltration structures, in line with the concepts of the Stormwater Management Manual (DoW 2004-2007) and BUWM (WAPC 2008a).

The package of information provided to landowners at settlement of their property will include information on reducing fertiliser use and other water conservation and environmental management measures. Fertiliser use within the POS will be minimised as part of the development.

6.3 IMPACT ON WATER DEPENDANT ECOSYSTEMS

There are no water dependant ecosystems (WDEs) within or adjacent to the site. The closest WDE is Kerosene Lane swamp, approximately 100 m north of the site. As all stormwater is infiltrated on site, no surface water will leave the site. Surface water from the site will therefore not impact on surrounding areas.

6.4 MATTERS TO BE ADDRESSED AT THE SUBDIVISION STAGE

Matters to be addressed at the subdivision stage in the Urban Water Management Plan(s) (UWMPs) are:

- Provision of a detailed drainage design and planning for the subdivision area and confirmation of sizing and location of structures; and
- Details of landscaping, including vegetation using grasses/native plants, for basins and POS.

7 GROUNDWATER MANAGEMENT STRATEGY

7.1 GROUNDWATER LEVELS

Because of the significant depth to groundwater over the site (greater than 4.5 m below ground level), depth to groundwater is not considered to be a constraint on this site. At least 1.2 m of clearance to groundwater is available throughout the site and therefore, subsoil drainage and fill are not required to ensure adequate clearance from finished lot levels to groundwater levels.

7.2 IMPACT ON WATER DEPENDANT ECOSYSTEMS

There are no water dependent ecosystems (WDEs) in the area as outlined in Section 3.5.2. The groundwater flow direction on the site is generally westerly, away from the nearest wetland to the site, Kerosene Lane Swamp. It is therefore considered that there will be no impact to WDEs from groundwater flowing from the development.

7.3 IMPLICATIONS FOR FILL

Fill is not required for ensuring adequate depth to groundwater on the site. Cut to fill will be undertaken on the site for aesthetic purposes and to ensure that lots are suitably graded for house construction.

7.4 GROUNDWATER QUALITY MANAGEMENT

7.4.1 Nutrient Management

Nutrient concentrations entering groundwater will be reduced through the use of a mixture of structural and non-structural Best Management Practices including:

- Basins with vegetation or grass in frequently inundated areas to strip nutrients prior to infiltration;
- Limiting the use of fertilisers in POS; and
- Provision of education to householders on fertilise wise gardening through provision of information at settlement.

A Detailed Site Investigation (DSI), including water quality testing, will be undertaken in line with the Contaminated Sites Act (2003) to further investigate groundwater contamination issues on the site will be undertaken if required by the Department of Environment and Conservation (DEC) as a condition of subdivision.

It is noted that the phosphorus retention index (PRI) of the existing soils is less than two. This is likely to be due to the current use of the land as a market garden. The soils on the site are derived from limestone, which would be generally expected to have a PRI of 5 -20 (Allen and Jeffrey, 1990). A PRI of 15 is generally considered to be the target for binding phosphorus in soils. The use of soil amendments for POS and residential gardens should be considered at the subdivision stage.

7.5 MATTERS TO BE ADDRESSED AT THE SUBDIVISION STAGE

Matters to be addressed at the subdivision stage in the Urban Water Management Plan(s) (UWMPs) are:

- Confirmation of finished lot levels;
- Details of landscaping and education packages to be provided to householders;
- Details of landscaping, swale and basin design, including vegetation and soils amendments for POS,
- Undertake contaminated sites investigations and management the satisfaction of the DEC, if required as a condition of subdivision; and
- Consideration of the need for soil amendments for POS and residential gardens on the site.

8 MATTERS TO BE ADDRESSED AT THE SUBDIVISION STAGE

The following section summarises all matters presented in this report that have to be addressed at the subdivision stage in the Urban Water Management Plan(s) (UWMPs).

These are:

- Provide further details on waterwise landscaping packages to be implemented at the site;
- Finalise details to be included in the information packages;
- Provision of a detailed drainage design and planning for the subdivision area and confirmation of sizing and location of structures;
- Details of landscaping, including vegetation using grasses/native plants, for basins and POS;
- Confirmation of finished lot levels;
- Details of landscaping and education packages to be provided to householders;
- Details of landscaping, swale and basin design, including vegetation and soils amendments for POS;
- Undertake contaminated sites investigations and management the satisfaction of the DEC, if required as a condition of subdivision; and
- Consideration of the need for soil amendments for POS and residential gardens on the site.

9 MONITORING

9.1 PROGRAM FOR URBAN WATER MANAGEMENT PLAN PREPARATION (UWMP)

Four months of groundwater monitoring has been undertaken at the Kerosene Lane site, including a peak winter event in September 2008. A baseline for post-development groundwater quality and levels will be provided as part of the first UWMP.

9.2 POST-DEVELOPMENT MONITORING

It is expected that this program will run for two years until handover of the drainage assets to the council and will include sampling of groundwater and surface water for pH, electrical conductivity and nutrients.

The post-development monitoring program will be determined as part of the UWMP process. It is considered too early at this stage to determine the final post-development monitoring program.

10 IMPLEMENTATION

10.1 ROLES AND RESPONSIBILITIES

Item	Scheme Development	Interim Maintenance (Minimum of two years) –	Long-term Maintenance
Waterwise Landscaping Packages	Developer	Residents and strata companies.	Residents and strata companies.
Householder education packages	Developer	Developer	Council, as part of any existing or possible future City-wide schemes.
Drainage system, including GPTs and basins	Developer	Developer for at least 2 years as per Council requirements	Council
Public Open Space	Developer	Developer for at least 2 years as per Council requirements	Council
Monitoring of the development	Developer	Developer for two years until handover of asset to council	Developer for monitoring in compliance with groundwater licensing conditions. Council for other items.

10.2 FUNDING

No external funding is being sought for this project.

10.3 REVIEW

It is expected that the UWMP for this site will comply with the LWMS. However, if changes are made to the subdivision design, or alternative methods of water management are considered more appropriate, changes may be made at the UWMP stage. Any changes will be approved by the City of Rockingham and Department of Water as part of the planning process.

11 CONCLUSIONS

The objective of the Local Water Management Strategy (LWMS) is to ensure that sustainable management of the total water cycle at Lots 14, 15 and 299 Kerosene Lane, occurs through Water Sensitive Urban Design. This includes water conservation, stormwater management and groundwater management. Galati nominees aim to manage these issues at the Kerosene Lane site through the following initiatives:

Water Conservation

- Providing front yard Waterwise landscaping packages for residential lots that include waterwise plants, soil amendments to improve water and nutrient retention, minimal turf areas and water efficient irrigation; and
- Providing information packages to educate landowners on ex-house and in-house waterwise measures.

Stormwater Management

- Implementing a drainage design that ensures no flow off the site in the 1 in 100 year event from the development to pre-development levels through storage and infiltration on site; and
- Maximising infiltration on the subject site by constructing infiltration basins in POS where possible, planted with vegetation or grasses to encourage nutrient and suspended solids uptake and removal prior to infiltration. Side entry pits and associated manholes will also be open based to maximise infiltration.

Groundwater Management

- Ensuring infiltration basins are planted with vegetation or grass in frequently inundated areas to strip nutrients prior to infiltration;
- Limiting the use of fertilisers in POS; and
- Providing information packages to educate landowners on fertilise wise gardening through provision of information at settlement.

This LWMS demonstrates that Lots 14, 15 and 299 Kerosene Lane can be developed in a way that manages hydrological constraints. The outstanding issues can be resolved at the Urban Water Management Plan stage to create a development that meets the goals and ideals of *Better Urban Water Management*.

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APPENDIX 9

ENVIRONMENTAL PRELIMINARY SITE INVESTIGATION

ENVIRONMENTAL PRELIMINARY SITE INVESTIGATION

LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS, WA

Prepared for:

PLANNING SOLUTIONS (AUST) PTY LTD



Job No: 08.196

Report No: RP001



ENVIRONMENTAL PRELIMINARY SITE INVESTIGATION

LOTS 14, 15 AND 299 KEROSENE LANE, BALDIVIS, WA

Prepared for:

PLANNING SOLUTIONS (AUST) PTY LTD

Prepared by:

ENV Australia Pty Ltd
Level 7, 182 St George's Terrace
PERTH WA 6000
Phone: (08) 9289 8360
Fax: (08) 9322 4251
Email: env@env.net.au

Prepared by:	<i>Ashton Betti</i>
Status:	<i>Final</i>
QA Review:	<i>Greg Ryan</i>
Technical Review:	<i>Paul Robinson</i>
Content Review:	<i>Paul Robinson</i>
Date:	<i>31 March 2009</i>

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APPENDIX F	SITE PHOTOGRAPHS

STATEMENT OF LIMITATIONS

Scope of Services

This environmental site assessment report (“the report”) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and ENV.Australia Pty Ltd (ENV) (“scope of services”). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, ENV has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report (“the data”). Except as otherwise stated in the report, ENV has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (“conclusions”) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. ENV will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to ENV.

Environmental Conclusions

In accordance with the scope of services, ENV has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions. Also it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of Client

The report has been prepared for the benefit of the Client and no other party. ENV assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of ENV or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other Limitations

ENV will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

EXECUTIVE SUMMARY

ENV.Australia (ENV) was commissioned by Planning Solutions (Aust) Pty Ltd to prepare a Preliminary Site Investigation (PSI) for Lots 14, 155 and 299 Kerosene Land, Baldivis. The PSI requirements include a site walkover inspection, desktop research and historical investigations to ascertain the likelihood of contamination. This report describes the findings of the PSI assessment.

It is likely that the proposed redevelopment will be subject to environmental planning conditions, subject to review by the Department of Environment and Conservation (DEC). As part of this work, ENV have completed a DEC compliant PSI as required by the DEC *Contaminated Sites Management Series for investigating and managing contaminated land* (DEP 2001).

The primary objective of the investigation was to ascertain the likelihood of onsite soil and groundwater contamination and for migration of contamination from neighbouring properties. An additional objective was to provide a report compliant with the requirements of a DEC PSI, such that the report can be submitted to the DEC in the future via an audit process as part of any planning condition requirements.

Conclusions and Recommendations

Based on the PSI a number of areas of potential contamination were identified. These were:

- Sheds located across the site, used for storage of various chemicals and fertilizers;
- Land used as market garden likely to have been treated with various pesticides and chemicals;
- Infiltration pond; and
- An above ground petrol tank located behind the main shed may be linked to possible hydrocarbon contamination.

ENV recommends a Detailed Site Investigation (DSI) involving soil and groundwater sampling and analysis is required to more adequately characterise potential soil and groundwater contamination identified for the site. A Sampling Analysis Program (SAP) would be designed to focus on areas of potential contamination identified in this study taking into account potential contaminants listed above.

1 INTRODUCTION

1.1 BACKGROUND

ENV.Australia (ENV) was commissioned by Planning Solutions (Aust) Pty Ltd to prepare a Preliminary Site Investigation (PSI) for Lots 14, 15 and 299 Kerosene Lane Baldivis (the site). The PSI requirements include a site walkover inspection, desktop research and historical investigations to ascertain the likelihood of contamination. This report describes the findings of the PSI assessment.

It is understood that the proposed development will most likely attract a planning condition from the City of Rockingham that requires the potential for soil and groundwater contamination to be investigated; normally subject to review by the Department of Environmental and Conservation (DEC). As part of this work, ENV has complied with the requirements of the DEC *Contaminated Sites Management Series for investigating contaminated land* (DEP, 2001).

1.2 OBJECTIVES

The primary objective of the investigation is to ascertain the likelihood of onsite soil and groundwater contamination and for migration of contamination to the site from neighbouring properties. An additional objective is to provide a report compliant with the requirements of a DEC PSI, such that the report can be submitted to the DEC in the future via an audit process as part of any planning condition requirements. As such it is assumed that all lots (Lot 14, 15 and 299) will be part of the one planning submission.

1.3 SITE IDENTIFICATION

The site is located approximately 40 km to the south of the Perth CBD (Figure 1).

The identification details for the subject land, including the site address, site name and certificate of title information are included in the DEC Site Summary Form (Appendix A). Copies of the Certificate of Titles are also included in Appendix A.

Additional site identification information is included in the table below.

Site Address	Lots 14, 15 and 299 Kerosene Lane, Baldivis
Local Government Authority	City of Rockingham
Metropolitan Region Scheme Zoning	Urban
Local Government Authority Zoning	Development
Site NW Corner GDA 94 Co-ordinates	Z: 50 N: 6425952 E: 387471
Site SE Corner GDA 94 Co-ordinates	Z: 50 N: 6425377 E: 388141
Site Area	38.78 ha

2 SCOPE OF WORK

The scope of the Preliminary Site Investigation (PSI) includes:

- Determination of the characteristics of the site and surrounding land;
- Review of current and historic site plans;
- Review of historical state records and title information;
- Review of historic aerial photographs;
- Review of Aboriginal and heritage databases;
- Search of DEC register of notices, pollution complaints and prosecutions and DEC contaminated sites database;
- Site walk over inspection;
- Interviews with persons knowledgeable of past and present site activities;
- Development of a Preliminary Conceptual Site Model to determine likely sources, pathways, receptors and pertinent assessment guidelines for a Tier 1 risk assessment; and
- Report preparation.

3 NON SUBSURFACE CONSTRAINTS

Although not relating to subsurface contamination, Aboriginal and heritage searches were completed with a view that these may constrain future works at the site.

The following web sites were reviewed:

- Department of Indigenous Affairs:
<http://www.dia.wa.gov.au/Heritage/SitesSurveysSearch.aspx>
- Heritage Council of Western Australia
<http://register.heritage.wa.gov.au/index.html>

No registered Aboriginal or heritage sites were listed within the site boundaries (Appendix B).

4 POTENTIAL CONTAMINATION SOURCES

Current and historic land uses/activities both onsite and offsite and potential contamination sources are detailed in Tables 1 and 2, respectively. The tables also detail the specific areas of environmental interest and the associated potential common contaminants. The DEC gives guidance on common contaminant types for various industries as part of the Contaminated Sites Management Series in *Potentially Contaminating Activities, Industries, and Landuses* (DoE 2004a).

The current aerial photograph and layout of the site are shown in Figure 2.

The data in the tables and figures was provided by the followings methods.

4.1 HISTORICAL LAND TITLE SEARCH

Historical property titles were provided by Landgate (former Department of Land Information). Copies of historical titles are included in Appendix A.

Lot 14

Certificate of Title Volume / Folio	Landholder Name	Occupation	Date of Purchase
1276/822	Emily Jane Malaxos	Married Woman	10 October 1963
1282/741	Andrew Charles Kingsbury & Helen Kingsbury	Medical Practitioner & Married Woman	17 April 1964
12/110A	Frank Paulik & Mary Paulik	Nurseryman & Wife	15 December 1966
12/110A	Galati Nominees Pty Ltd	-	28 June 1991

Lot 15

Certificate of Title Volume / Folio	Landholder Name	Occupation	Date of Purchase
16/307A	Vincenzo Trollo & Vincenzo Pietroniro	Nurserymen	9 February 1967
16/307A	Galati Nominees Pty Ltd	-	8 August 1989

Lot 299

Certificate of Title Volume / Folio	Landholder Name	Occupation	Date of Purchase
1215/813	Emily Jane Malaxos	Married Woman	10 April 1959
1276/821	Bortolo Nicola Morzenti & Dora Angela Morzenti	Plant Attendant & Married Woman	10 October 1963
1276/821	Antonino Galati & Vincenzo Pasqualino Galati	-	18 July 2001

4.2 HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs provided by Landgate from 1960, 1968, 1978, 1988 and 2007 are included in Appendix C.

A summary of observations of the historical aerial photographs is included in Table 1 (onsite) and Table 2 (offsite).

4.3 CURRENT PLANS AND RECORDS

Current infrastructure is shown in Figure 2.

Current plans were provided by:

- Landgate – Aerial photograph (2007) and lot boundaries;
- Site Walkover, July 2008.

4.4 GOVERNMENT DATABASE SEARCHES**DEC Contaminated Sites Database**

The *Contaminated Sites Act 2003* was proclaimed in December 2003. Where sites have reported to the DEC, a site classification is assigned by the DEC under the Act. The DEC can allocate any one of seven possible classifications to a site. The DEC Contaminated Sites Database includes information on sites classified as 'contaminated – remediation required', 'contaminated – restricted use', 'remediated for restricted use', 'possibly contaminated – investigation required' and 'decontaminated'. Members of the public can access the database by going to www.dec.wa.gov.au/contaminatedsites.

A search of DEC records of known and suspected contaminated site was undertaken. The site has not been classified under the *Contaminated Sites Act 2003* (Appendix D).

A search of the Contaminated Sites Database identified one site down hydraulic gradient of the site that was listed as ‘remediated for restricted use’. The location of this registered site is shown in Figure 3.

DOW WIN Database for Bores

The Department of Water (DoW) WIN database lists registered bores. A search of bores within 500 m of the site identified ten bores. Locations and information on the groundwater bores is presented in Appendix E. The information is discussed in Section 5.4.

4.5 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

ENV did not identify any previous environmental investigations undertaken at the site.

4.6 SITE WALKOVER

A site walkover was completed by an experienced Environmental Scientist on 2 July 2008. All current infrastructure and features were noted and documented in Table 1 and Figure 2. Site photographs are presented in Appendix F. The following are the main observations from the site walkover:

- The majority of the site is used as market gardens, growing lettuces and carrots at the time of the site visit.
- Various sheds are located across the site. These are used for a variety of purposes including fertilizer storage, chemical storage, fruit packing and machinery maintenance.
- A large asphalt hardstand is located to the front of Lot 299, which is used as a car park.
- An infiltration pond is located to the west of the main packing shed.
- The main fuel storage area is located on Lot 299.
- There are a number of locations around the site that have evidence of permissive dumping of disused equipment and chemical drums.

4.7 INTERVIEWS

An interview was conducted with Mr Tony Galati, the current owner of the site, during the site walkover in June 2008. Mr Galati has 17 years knowledge of the site.

Mr Galati reported that he has owned and operated market gardens on Lots 14 and 15 for the last 15 and 17 years, respectively. Prior to their purchase Lots 14 and 15 were used as market gardens, growing mainly flowers. Lot 299 was purchased by Mr Galati 12 years ago. Prior to the purchase of Lot 299 the site was uncleared bushland. A number of sheds and a large asphalt hardstand have been added to the site since Mr Galati purchased it. Mr Galati reported that a variety of produce has been grown on the site, including lettuces, carrots, broccoli, cauliflowers, potatoes and celery.

Mr Galati reported that wastewater from the wash down of fruit and vegetables was discharged into an infiltration pond to the west of the main warehouse; however, this was being upgraded to an underground septic system in the coming months.

5 POTENTIAL EXPOSURE PATHWAYS AND FACTORS CONTROLLING CHEMICAL MIGRATION

The major factors that affect migration of chemicals are the environmental settings of the site and surrounds (namely topography, geology and hydrogeology) and the presence/absence of man-made infrastructure such as surfacing, trenches and utility conduits. Factors affecting migration of potential contaminants are detailed below.

5.1 TOPOGRAPHY AND STORMWATER

Site Topography

Land within the site is generally flat, and is located approximately 12 m Australian Height Datum (AHD).

Site Surfaces and Stormwater Drainage

The current site surfaces and layout are shown in Figure 2.

Approximately 80% of the site consists of exposed surfaces, which are used as market gardens, growing a variety of vegetables. Stormwater would be expected to infiltrate directly within this open space.

The main buildings are located in the northern portion of the site, and encompass approximately 5% of the site. A bitumen hardstand and car parks surround the buildings, and comprise of approximately 5% of the site area. The bitumen and concrete were in good condition with no substantial cracks or signs of damage to facilitate downward migration of the discharges into the subsurface.

Stormwater would be expected to be infiltrated onsite via drains into soakwells.

5.2 REGIONAL GEOLOGY

Regional geological information was obtained from the 1:50,000 Environmental Geology Series Maps (Gozzard 1986).

Regional mapping indicates sand derived from Tamala Limestone underlies the site. A description of this geological unit is as follows:

S₇ SAND – pale yellowish brown, medium to coarse grained, sub-angular quartz, trace of feldspar, moderately sorted, of residual origin.

5.3 LOCAL HYDROGEOLOGY

The site is located approximately 750 m to the east of Lake Cooloongup. Due to the proximity to Lake Cooloongup, the site is located in a groundwater development risk area (DoE 2004b).

The site is underlain by an unconfined superficial aquifer that extends to a depth of approximately 27–32 m below ground level (bgl).

Several factors will affect the migration of fluids in the surface, these include:

Potential Preferred Pathways

The S₇ sand unit is expected to be relatively homogeneous with little potential for preferred pathways.

Depth to Groundwater and Level Fluctuations

Based on the Perth Groundwater Atlas (DoE 2004b), groundwater is expected to be approximately 7.5–10.0 m bgl. Seasonal and spatial watertable fluctuations of up to 2m are possible.

Local Groundwater Flow Direction

The Perth Groundwater Atlas indicates that the regional groundwater flow direction in the superficial aquifer is westerly towards Lake Cooloongup, 750 m to the west (DoE 2004b).

Hydraulic Conductivity

Davidson (1995) provides a hydraulic conductivity of 50.0 m/day for medium to coarse grained sands. In summary, the soil underlying the site has a high permeability.

5.4 GROUNDWATER BORES

The DoW WIN database lists registered bores in WA. The locations and a summary of data available for local registered bores are included in Appendix E, and the table below.

REGISTERED GROUNDWATER BORE DATA

WIN Site ID	Owner	Depth (m)	Use	Water Level (m AHD)	Status	Approximate Distance & Direction from Site
3027	DoW	38.0	Investigation	2.10	Not Operating	20m N
3035	DoW	40.0	Observation	1.50	Operating	20m N
3036	DoW	42.0	Observation	2.10	Not Operating	20m N
20023725	-	3.35	Domestic	-	-	-
20023830	-	15.24	Domestic	-	-	50m NE
20023842	-	13.11	Vegetables / Domestic	-	-	Onsite
20023894	-	-	-	-	-	50m W
20023895	Polak	11.28	Irrigation	-	-	Onsite
20024019	Paullik	21.34	Domestic	-	Operating	Onsite
20024081	Western Mining Corporation	32.0	Observation	-	-	Onsite
20024082	Western Mining Corporation	32.0	Observation	-	-	20m N
20024102	Western Mining Corporation	29.0	Observation	-	-	250m N
20024285	Withnall	22.0	-	-	Operating	100m N

Source: DoW WIN Database

Ten groundwater bores are registered within a 500 m radius of the site, of which only three are in use.

Two of the operational bores are up-hydraulic gradient of the site and so are unlikely to be impacted by potential impacts to groundwater on the site, along with four operational non-registered groundwater irrigation bores.

One operational bore is registered onsite, this bore was not identified during the site visit. However, its location is shown in Figure 2.

Based on proximity to the site, the groundwater flow direction (south westerly) and bore use, no offsite bores were identified to be at risk from potential groundwater impacts considered for the site. It should be noted that the

information provided is only indicative of registered groundwater bores. The DEC estimates that the majority of domestic garden irrigation bores are unregistered in the Perth Metropolitan Region (i. e. that do not fall within statutory licensing requirements). It is possible that unregistered bores exist in the vicinity of the site.

5.5 TRENCHES, BARRIERS AND CONDUITS

No recognisable trenches, barriers, tunnels, shafts or other potential man made preferred pathways were identified at the site, with the exception of utility conduits.

Onsite utility plans were examined. A main open wastewater line running through the middle of the site was identified. This was upgraded to an underground sewer line in 2006.

Based on site infrastructure, the following minimal domestic buried utilities are expected under the site:

- Power;
- Water;
- Sewer; and
- Telestra.

6 POTENTIAL RECEPTORS

Two groups of potential receptors are discussed, human and ecological.

Potential human receptors identified include the future occupants of the proposed development and occupants of surrounding properties (including consumers of groundwater).

Potential ecological receptors include terrestrial species that could inhabit unpaved areas in the proposed development (such as worms) and the ecologies of the surrounding area, both terrestrial and aquatic.

6.1 PROPOSED DEVELOPMENT AREA (ONSITE)

The proposed development plan for the site was not available. It is understood that the site will be developed for residential and associated retail and educational facilities.

6.1.1 Future Onsite Human Receptors

Potential human receptors for soil and groundwater impacts include workers at the site (installation of service trenches etc) and occupants of proposed development.

6.1.2 Future Onsite Ecological Receptors

Potential ecological receptors include terrestrial species (including plants, invertebrates and their predators) that could inhabit unpaved areas in the development.

Groundwater underneath the site is also considered to be an ecological receptor due to its potential influence on ecosystems down-gradient of the site.

6.2 SURROUNDING LAND USE AND OCCUPANTS

Table 2 and Figure 2 present the surrounding area land use. Surrounding land uses at the time of the site visit by ENV include:

- North: Market gardens / residential;
- East: Market gardens / residential/ proposed residential;
- South: Market gardens; and
- West: Market gardens and uncleared bushland.

6.2.1 Surrounding Human Occupation

Currently, the closest sensitive human occupation (i.e. residences, schools or child care centres) is over 2 km from the site and therefore not considered to be impacted by activities at the site.

6.2.2 Surrounding Sensitive Ecological Receptors

Terrestrial Ecosystems

Bush Forever Site 356 is located 750 m to the west of the site. Due to the distance from the site it is unlikely that it would be affected by possible groundwater contamination from the site.

Since groundwater onsite is considered an ecological receptor, its flow offsite is duly considered as an ecological receptor itself. Terrestrial ecosystems that are subjected to, or rely on groundwater abstraction are therefore also considered as potential receptors.

Aquatic Ecosystems

There are no open water bodies /wetlands or sensitive aquatic ecologies on the site.

Based on the expected westerly direction of groundwater flow, the closest sensitive ecological receptor down hydraulic gradient of the site is Lake Cooloongup, 750 m to the west. Due to the distance from the site, Lake Cooloongup is unlikely to be affected by possible contamination on the subject site.

6.3 PRELIMINARY CONCEPTUAL SITE MODEL

Based on a review of potential sources, pathways and receptors, a conceptual model was developed for the site and the surrounding area.

The schematic conceptual site model is presented in Figure 4.

6.4 SUMMARY

Following a review of the potential contamination sources, possible migration pathways, and potential receptors a summary table is provided below.

Potential Source/Migration Route	Potential Contaminant	Pathway/Mode of Migration	Potential Receptor/s
Site uses as a market garden. Via soil	Metals, OCP, OPP, Carbamates, TPH, BTEX, Asbestos, Calcium Phosphate, Calcium Sulphate, Nitrates, Ammonium Sulphate, Potassium, Sulphur, Ammonium Thiocyanate, Herbicides, Solvents, Chlorinated Hydrocarbons, Synthetic Pyrethroids, Acid Herbicides, Nutrients	Airborne dust inhalation and contact, ingestion	Human, terrestrial ecology (flora and fauna)
Site uses as a market garden. Via groundwater	Metals, OCP, OPP, Carbamates, TPH, BTEX, Asbestos, Calcium Phosphate, Calcium Sulphate, Nitrates, Ammonium Sulphate, Carbonates, Potassium, Sulphur, Ammonium Thiocyanate, Herbicides, Solvents, Chlorinated Hydrocarbons, Synthetic Pyrethroids, Acid Herbicides, Nutrients	Groundwater use via irrigation, contact, ingestion	Human, aquatic and terrestrial ecology (flora and fauna)

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Based on the PSI, the following is concluded.

The history of the site indicates:

- < 1978-1988: Lots 14 and 15 – Vacant Land
- < 1996: Lots 299 – Vacant Land
- 1978 – present: Lots 14 and 15 Market Gardens
- 1996 – present: Lot 299 Market Gardens

Areas of Environmental Interest

1. Sheds located across the site, used for storage of various chemicals and fertilizers;
2. Land used as market garden likely to have been treated with various pesticides and chemicals;
3. Infiltration pond; and
4. An above ground petrol tank located behind the main shed may be linked to possible hydrocarbon contamination.

7.2 RECOMMENDATIONS

ENV recommends a Detailed Site Investigation (DSI) involving soil and groundwater sampling and analysis is required to more adequately characterise potential soil and groundwater contamination identified for the site. A Sampling Analysis Program (SAP) would be designed to focus on areas of potential contamination identified in this study taking into account potential contaminants listed above.

8 REFERENCES

Davidson, WA. 1995. Hydrology and Groundwater Resources of the Perth Region, Western Australia. Western Australian Department of Mines, Perth.

DEP. 2001. Reporting of Site Assessments – Contaminated Sites Management Series. Department of Environmental Protection, Perth.

DoE. 2004a. Potentially Contaminating Activities, Industries and Land Uses – Contaminated Sites Management Series. Department of Environment, Perth.

DoE. 2004b. Perth Groundwater Atlas. Department of Environment, Perth.

Gozzard, JR. 1986. Perth, Sheet 2034 II and part 2034 III and 2134 III. Perth Metropolitan Region Environmental Geology Series, Geological Survey of Western Australia.

WAPC. 2007. Central Metropolitan Region Scheme Acid Sulphate Soils. Western Australian Planning Commission, Perth.

FIGURES

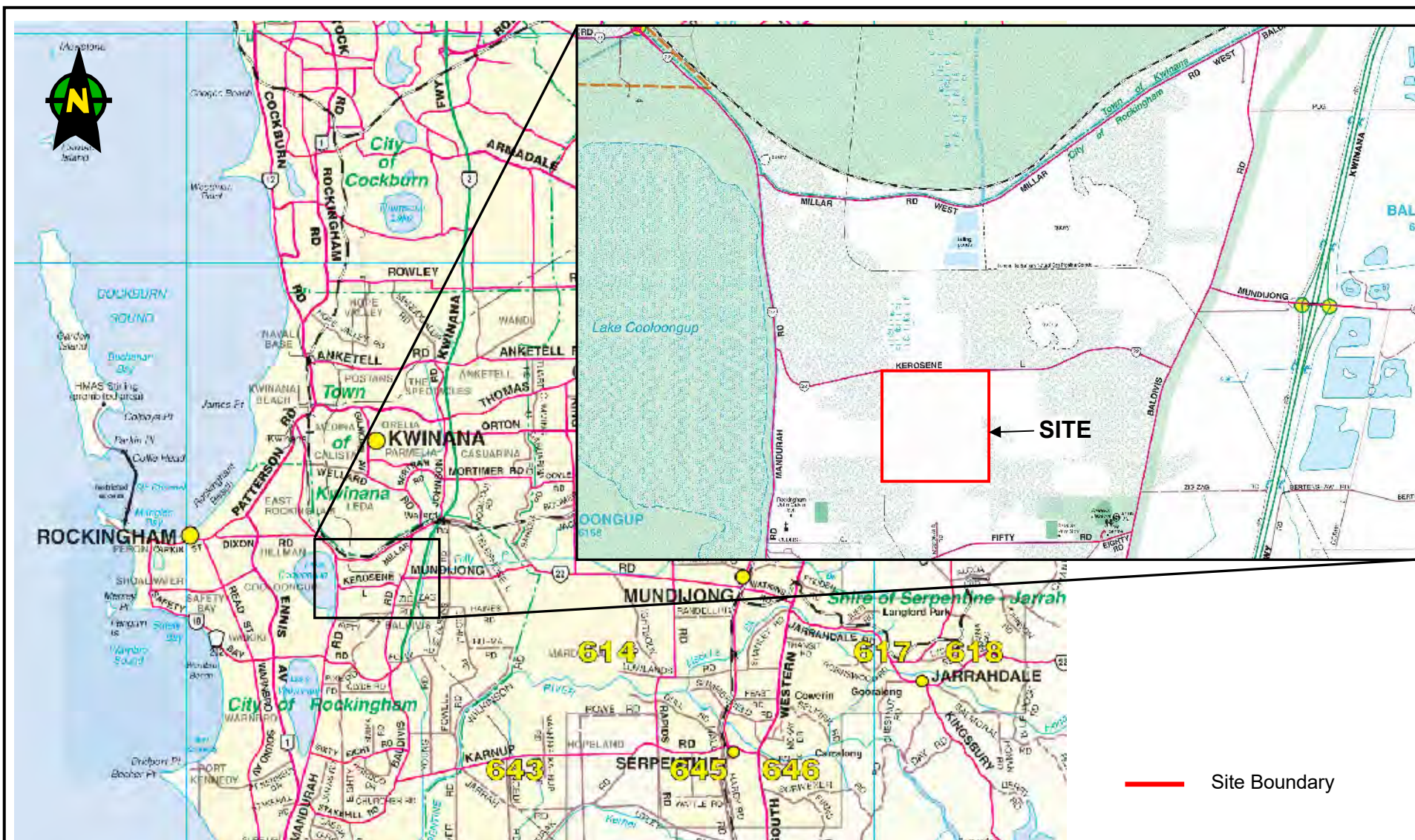


FIGURE 1: Site Location

Job No: 08.196

Drawn By: AB

Client: Planning Solutions (Aust) Pty Ltd

Checked By: PR

Scale: NTS

Project: Lots 14, 15 and 299 Kerosene Lane, Baldvis

Source: Landgate, 2008

Date: 7 July 2008



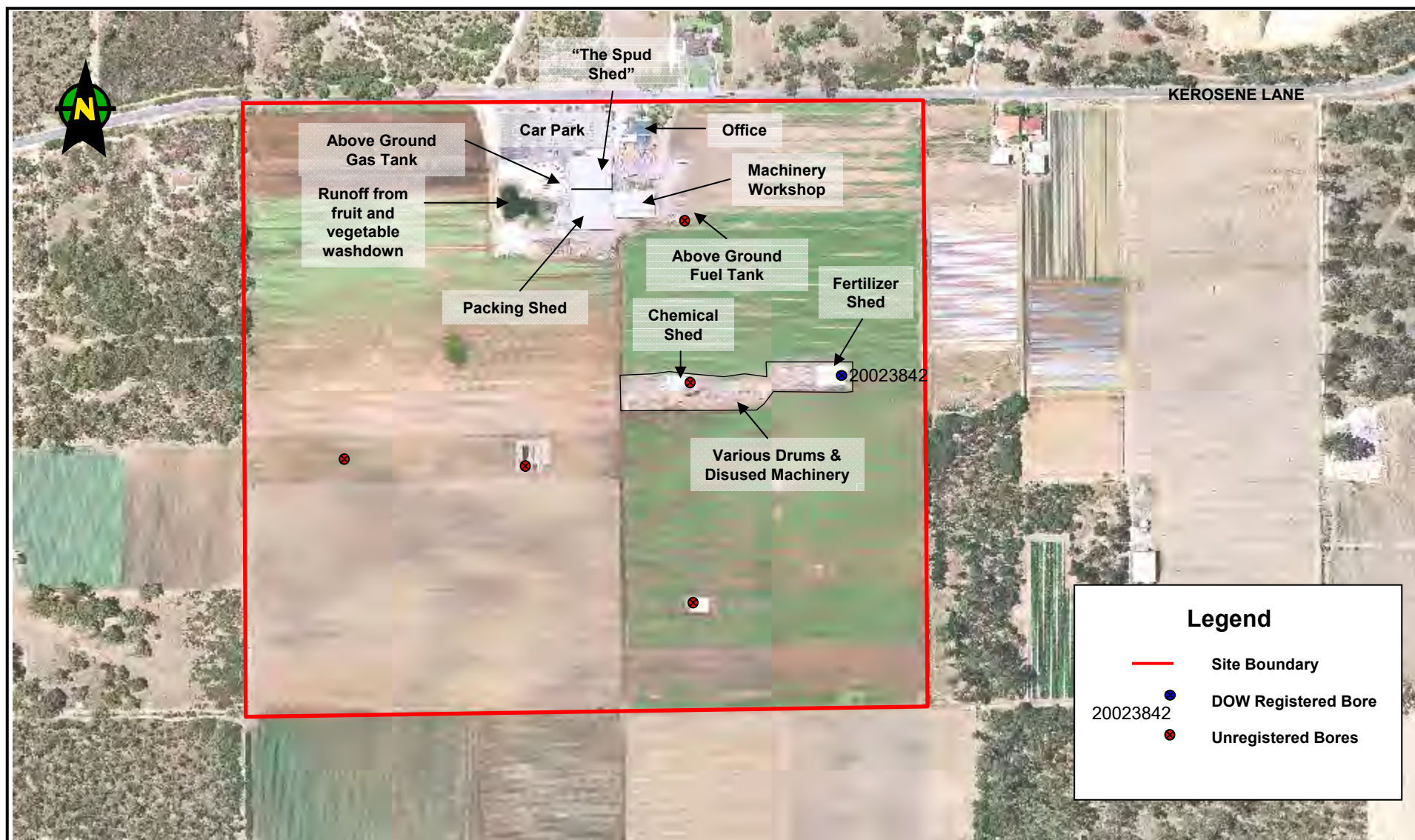


FIGURE 2: Site Layout and Surrounding Land Use

Job No: 08.196

Drawn By: AB

Client: Planning Solutions (Aust) Pty Ltd

Checked By: PR

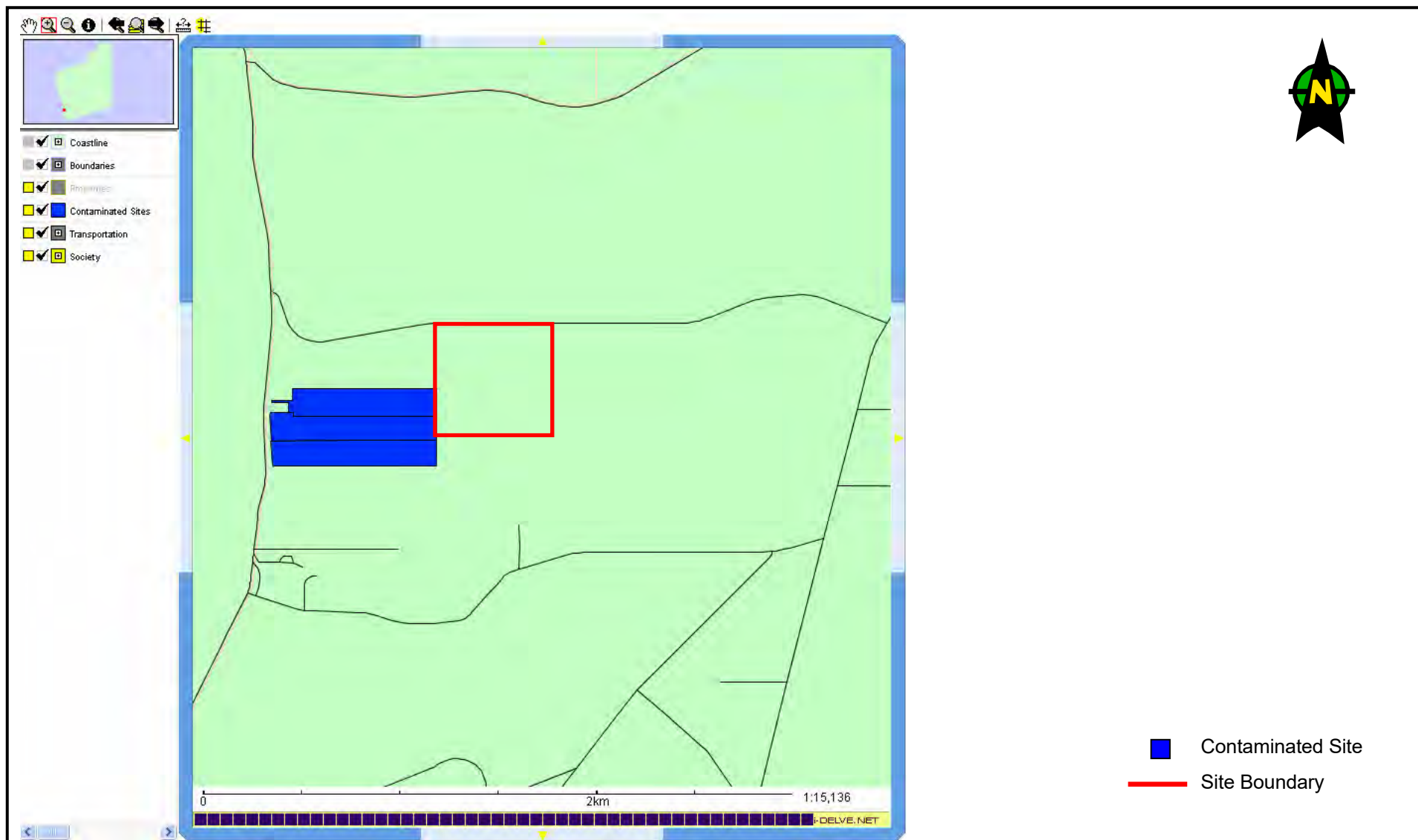
Scale: NTS

Project: Lots 14, 15 and 299 Kerosene Lane, Baldavis

Source: Landgate, 2008

Date: 25 June 2008





Contaminated Site
 Site Boundary

FIGURE 3: DEC Contaminated Sites Database Search

Job No: 08.196

Drawn By: AB

Client: Planning Solutions (Aust) Pty Ltd

Checked By: PR

Scale: As shown.

Project: Lots 14, 15 and 299 Kerosene Lane, Baldavis

Source: DEC CS Database

Date: 26 June 2008



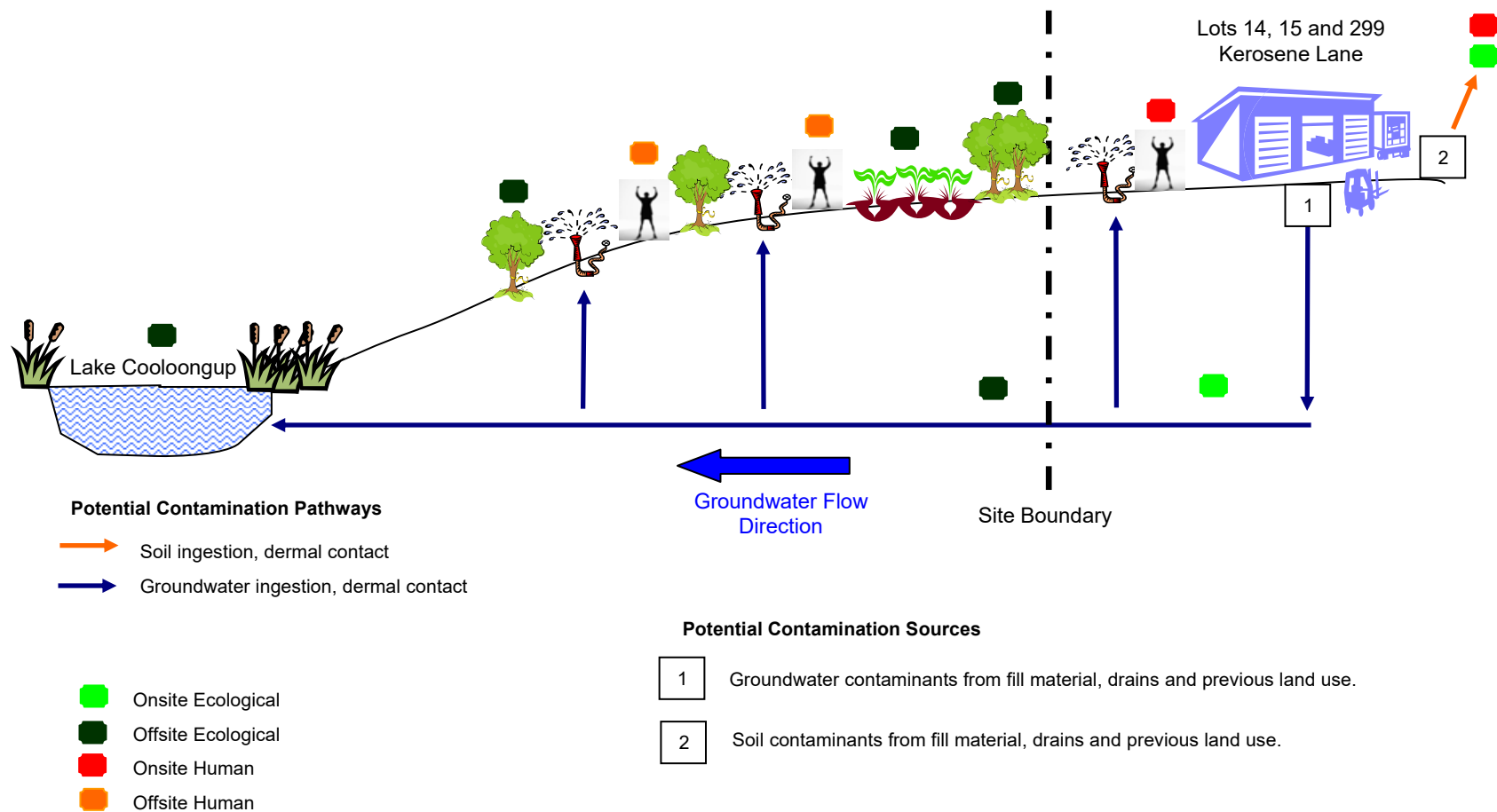


FIGURE 4: Schematic Conceptual Site Model

Job No: 08.196

Drawn By: AB

Client: Planning Solutions (Aust) Pty Ltd

Checked By: PR

Scale: NTS

Project: Lots 14, 15 and 299 Kerosene Lane, Baldavis

Source: ENV

Date: 16 July 2008



TABLES

TABLE 1: POTENTIAL CONTAMINATION SOURCES – ONSITE

DATE	DATA PROVIDER	LAND USE OR ACTIVITY	AREAS OF ENVIRONMENTAL INTEREST	POTENTIAL CONTAMINANTS
Prior to 1968	Aerial Photograph	Undeveloped bushland.	Non identified	Non identified
1978 - 1996	Aerial Photograph & Interview	Lots 14 and 15: Land cleared for market gardens. Various infrastructure onsite, including sheds (used for chemical mixing). Some evidence of a sand quarry. Lot 299: Uncleared bushland.	Market gardens Sheds None identified	Metals, OCP, OPP, Carbamates, TPH, BTEX Asbestos, Metals, Calcium Phosphate, Calcium Sulphate, Nitrates, Ammonium Sulphate, Carbonates, Potassium, Carbamates, Sulphur, Ammonium Thiocyanate, Herbicides, Solvents, Chlorinated Hydrocarbons, Synthetic Pyrethroids, Acid Herbicides, Nutrients None identified
1996 - 2008	Aerial Photograph & Interview	Lots 14, 15 and 299: Lot 299 cleared and developed into a market garden. All lots now operating as market gardens. Various infrastructure installed onsite, including a packing shed, various chemical sheds and a house.	Market gardens	See above
July 2008	Site Walkover & Interview	The site is operated as a market garden. Site infrastructure is shown in Figure 2, and described below.	Market gardens	See above

TABLE 1: POTENTIAL CONTAMINATION SOURCES – ONSITE

DATE	DATA PROVIDER	LAND USE OR ACTIVITY	AREAS OF ENVIRONMENTAL INTEREST	POTENTIAL CONTAMINANTS
July 2008	Site Walkover & Interview	Lot 15: - The area was mostly vacant at the time of the site visit; however it has previously been used to grow a variety of vegetables. - Shed 1 – used to store old machinery and fertilizer. Also contains petrol operated well. Constructed of corrugated tin sheeting. Various drums and old machinery parts are scattered around the exterior of the shed.	Market gardens Shed	As above As above
		Lot 14: - The area is mostly used as a market garden, with lettuces growing at the time of the site visit. - Office – located to the north of Lot 14, used as an administration building. - Fuel Storage Area – no visible sump surrounding tank, some staining around refuelling area. - Shed 2 – used as a workshop for the servicing of vehicles, various drums containing oils and hydraulic fluid scattered around shed. - Shed 3 – petrol operated well. - Shed 4 – used for chemical storage and mixing. Also contains petrol operated well. Constructed of corrugated tin sheeting. Various drums and old machinery parts are scattered around the exterior of the shed. - Shed 5 – stores petrol operated well. Used for storage of old machinery.	Market garden None identified Fuel Storage Workshop Sheds	As above None identified TPH, BTEX, PAH Solvents, TPH, BTEX, Phenol, Chlorofluorocarbons, Metals, Acids, Alkalis As above

TABLE 1: POTENTIAL CONTAMINATION SOURCES – ONSITE

DATE	DATA PROVIDER	LAND USE OR ACTIVITY	AREAS OF ENVIRONMENTAL INTEREST	POTENTIAL CONTAMINANTS
		Lot 299: - The majority of the area is used as a market garden, and was growing carrots at the time of the site visit. - Hardstand (bitumen) used as parking area for “The Spud Shed”. - Shed 6 – used as a packing shed for various fruit and vegetable produce. Front half of shed is used as “The Spud Shed” retail outlet. - Infiltration Pond – collects runoff from fruit and vegetable washing.	Market Garden Hardstand Shed Infiltration pond	As above Metals, Pesticides, Herbicides, Nutrients, Carbamates, Hydrocarbons As above Metals, Pesticides, Herbicides, Nutrients

TABLE 2: POTENTIAL CONTAMINATION SOURCES – OFFSITE

Offsite landuses and activities can be a source of contamination that migrates onto a site. The most recognised pathway for contaminants to migrate onto a site is with groundwater and hence offsite potential contamination sources are divided into those located in the possible up hydraulic direction (East) and those located cross or down gradient (West) of the site.

POTENTIAL UP HYDRAULIC GRADIENT OFFSITE CONTAMINATION SOURCES

DATE	DATA PROVIDER	LAND USE OR ACTIVITY	AREAS OF ENVIRONMENTAL CONCERN	POTENTIAL CONTAMINANTS
1960-1968	Aerial Photograph	West – Undeveloped Bushland East – Undeveloped Bushland South – Undeveloped Bushland North – Undeveloped Bushland	None identified	None identified
1978	Aerial Photograph	West – Undeveloped Bushland East – Market Gardens South – Market Gardens North – Undeveloped Bushland	Market Gardens	Metals, OCP, OPP, Carbamates, TPH, BTEX
1988-2007	Aerial Photograph	West – Undeveloped Bushland & Market Gardens East – Market Gardens South – Market Gardens North – Market Gardens	As Above.	As above.
2008	Aerial Photograph + Site Visit	West – Undeveloped Bushland & Market Gardens East – Market Gardens South-West – Market Gardens South-East – Residential Development North – Market Gardens	As Above.	As above.

APPENDIX A

DEC SITE SUMMARY FORM AND CERTIFICATES OF TITLE



Site Summary Form – Contaminated Site Assessment

For completion by the person(s) submitting a report(s) to be assessed by the Department of Environment and Conservation (DEC) as per the information requirements of the DEC *Reporting on Site Assessments (2001)* guideline. Completing this form enables DEC to maintain accurate records for the site.

Please note: A completed site summary form must accompany each report submitted to DEC for assessment.

Each box must be filled out appropriately. Please do not write "refer to report" in any section.

Copies of all relevant/current Certificates of Title must accompany this form.

Site location details:

Site name (e.g. where site may be known by a common/ business name)

Lot no. **House no.** **Street**

Suburb **State** **Postcode**

Crown Reserve (if applicable)

Certificate(s) of Title (or equivalent)

Where the subject site comprises of multiple certificates of title, please list all certificates: Volume/Folio: 12/110A, 16/370A and 1276/821.

Where substances have migrated beyond the cadastral boundaries of the subject site, please provide the addresses, relevant Certificates of Title documentation and owners details for all offsite properties impacted (includes soil and/or groundwater), as an attachment to this form.

Is a hard copy of Certificate of Title and associated sketch for all listed sites attached? (Y/N)

WAPC reference no. (where applicable)

Current Owner/Occupier details:

Site owner (Name and address)

Site owner company ACN/ABN

Site occupier (name and address)

Site occupier company ACN/ABN

Site status (at time of reporting):

Proposed land use (e.g. high density residential/child care facility)

Identified substances and relevant media (e.g. benzene in soil and groundwater, xylene in soil only)

Asbestos (Y/N)	N	Health Risk Assessment (Y/N)	N	Community health concerns identified (Y/N)	N	Radiological issues (Y/N)	N
Air quality issues (Y/N)	N	Past/present landfill (Y/N)	N	Potential human exposure to identified substances > DEC's Health Investigation Levels or equivalent (Y/N)	N	Other human health issues (Y/N)	N

Specify other health issues.....

Where 'yes' is recorded for at least one of the above categories, please submit two copies of the report(s) (relevant documentation) to DEC for referral to the Department of Health (or Radiological Council, in the case of radiological issues)

Are site activities licensed under the *Environmental Protection Act 1986*? (Y/N)

N

Where laboratory analysis has been undertaken, is the laboratory NATA accredited for all analytes and analytical methodologies used? (Y/N) (If not, why not?)

N – PSI only

Community Consultation: (as per the DEC's *Community Consultation (December 2006)* guideline)

Community consultation program commenced/proposed (Y/N)

N – PSI only; pending results

Are consultation program details (e.g. community consultation plan) provided in attached report (Y/N)

Pending

History of Investigation:

Have previous site investigations been undertaken? (Y/N - if yes, please provide details below)

N

Report title, date and author:

Declaration:

The information contained in this site summary form is a true representation of the information contained in the attached report(s)/document(s).

Full name (print)

Ashton Betti

Position held

Environmental Scientist

Signature

Date

Please ensure that a hardcopy of the current Certificate(s) of Title and associated sketch accompanies the site summary form. DEC cannot proceed with the assessment of the report if this information is not provided.

DEC Registrar Only

Registrar name:

Signature:

CoT verified (Y/N)

Owner details verified (Y/N)

Complete form (Y/N)

Awaiting Classification (Y/N)

Awaiting Re-Classification (Y/N)

Incomplete Form (Y/N)

LWQB Assessment Officer:

Comments/Actions:

Date of data entry:

WESTERN



AUSTRALIA

RECORD OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

REGISTER NUMBER	
299/DP202704	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

VOLUME
1276FOLIO
821

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

Robert
REGISTRAR OF TITLES

**LAND DESCRIPTION:**

LOT 299 ON DEPOSITED PLAN 202704

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ANTONINO GALATI
VINCENZO PASQUALINO GALATI
BOTH OF LOT 14 KEROSENE LANE, BALDIVIS
AS TENANTS IN COMMON IN EQUAL SHARES

(T H813288) REGISTERED 18 JULY 2001

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. A364182 EASEMENT TO AMPOL EXPLORATION LIMITED, SHELL DEVELOPMENT (AUSTRALIA) PTY. LIMITED, TEXACO OVERSEAS PETROLEUM COMPANY AND CALIFORNIA ASIATIC OIL COMPANY. SEE SKETCH ON VOL 1276 FOL 821. REGISTERED 18.1.1971.
*K395712 NOTIFICATION. THE GRANTEE OF EASEMENT A364182 ARE NOW APT PARMELIA PTY LTD PURSUANT TO SECTION 20(5) OF THE PETROLEUM PIPELINES ACT 1969. REGISTERED 31.10.2007.
2. B944288 EASEMENT TO ALCOA OF AUSTRALIA (W.A.) LIMITED. SEE SKETCH ON VOL 1276 FOL 821. REGISTERED 27.6.1980.
3. H813289 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 18.7.2001.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1276-821 (299/DP202704).
PREVIOUS TITLE: 1215-813.
PROPERTY STREET ADDRESS: 120 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

END OF PAGE 1 - CONTINUED OVER

RECORD OF CERTIFICATE OF TITLE

REGISTER NUMBER: 299/DP202704

VOLUME/FOLIO: 1276-821

PAGE 2

NOTE 1: A000001A LAND PARCEL IDENTIFIER OF PEEL ESTATE LOT 299 (OR THE PART THEREOF) ON
SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 299 ON DEPOSITED
PLAN 202704 ON 17-JUN-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.
NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE
OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.
NOTE 3: K395712 DUP C/T NOT PRODUCED FOR DOCUMENT K395712.

Superseded - Copy for Sketch Only

Transfer 60063/63 (22929)
Volume 1215 Folio 013



WESTERN AUSTRALIA.

ORIGINAL
REGISTER BOOK.

Vol. 1276 Fol. N° 821

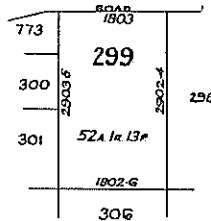
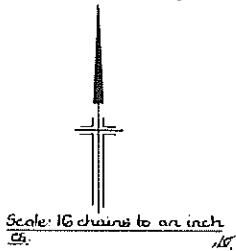
Certificate of Title

CT 1276 0821 F



under "The Transfer of Land Act, 1893" (38 Vic. 14, s. 5).

Bortolo Nicola Morzenti, Plant Attendant and Dora Angela Morzenti, Married Woman, both of 23 Hoyle Road, Naval Base, are now the proprietors as joint tenants of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing fifty-two acres one rood and thirteen perches or thereabouts, being Pool Estate Lot 299.



Dated the tenth day of October One thousand nine hundred and sixty-three.

[Signature]
Registrar of Titles.

Transfer F261262 to Antonino Galati of Lot 14 Kerosene Lane, Baldvis, Vincenzo Pasqualino Galati of Lot 15 Power Avenue, Baldvis and Sebastiano Galati of Lot 14 Kerosene Lane, Baldvis, as tenants in common. Registered 27th July 1993 at 15.42 hrs.



Transfer H013288 The one undivided third share of Sebastiano Galati is transferred to Antonino Galati and Vincenzo Pasqualino Galati. The registered proprietors are now Antonino Galati and Vincenzo Pasqualino Galati both of Lot 14 Kerosene Lane, Baldvis, as tenants in common in equal shares. Registered 18th July 2001 at 8.03 hrs.

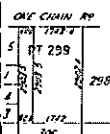


64191/1212-49,300-540

For encumbrances and other matters affecting the land see back.

Superseded - Copy for Sketch Only

EASEMENTS AND ENCUMBRANCES REFERRED TO



Transfer H354112 Grants pursuant to the Petroleum Pipelines Act 1969 as amended to Argal Exploration Limited, 800147 and 800148 (Australia) Pty. Limited, Overseas Petroleum Company and California Maritime Oil Company the right to enter upon the portion of the within land coloured blue on the map in the margin for the purpose of laying, constructing and maintaining pipelines and other apparatus and for other purposes as set out in the said Transfer. Registered 10th July 1971 at 2.34 hrs.



Do to portion only:
Caveat A 422 087 Lodged 18.1.1971 at 2.41 hrs.



Transfer H944288 Grants pursuant to Alumina Refinery (Pitjajarra) Agreement Act 1976 to Alcoa of Australia (W.A.) Limited, the right to enter upon the portion of the within land coloured blue on the map in the margin for the purpose of laying constructing and maintaining pipelines and other apparatus and for other purposes as set out in the said Transfer. Registered 27th June, 1980 at 10.10 a.m.



Withdrawal B944287 of Caveat A422087. Lodged 27th June, 1980 at 10.10 a.m.



Caveat C878546 Lodged 17.10.1986 at 9.50 a.m.

WITHDRAWN



Caveat D977037. Lodged 23.12.1988 at 10.04 hrs.

WITHDRAWN



NOTIFICATION E136143 PURSUANT TO SECTION 20(5) OF THE PETROLEUM PIPELINES ACT OF 1969 THE GRANTEES OF EASEMENT A364182 ARE NOW WELL DEVELOPMENT (AUSTRALIA) PTY. LTD., AUSTRALASIAN OIL EXPLORATION LTD., TEXACO OIL DEVELOPMENT COMPANY, AND HENCKS ASSET LTD.
LODGED 30.8.1993 AT 16.00 HOURS (DUP. CT NOT PRODUCED)



Withdrawal F261260 of Caveat D977037. Lodged 27.7.1993 at 15.42 hrs.



Withdrawal F261261 of Caveat C878546. Lodged 27.7.1993 at 15.42 hrs.



Mortgage F261263 to Bortolo Nicola Morzenti and Dora Angela Morzenti both of 4 Hoyle Road, Hope Valley.
Registered 27th July 1993 at 15.42 hrs.

DISCHARGE



As to portion only:

Memorial F850024. Soil and Land Conservation Act 1945. Registered 7th April, 1995 at 11.22 hrs.

WITHDRAWN



NOTIFICATION H111675 Pursuant to Section 20(5) of the Petroleum Pipelines Act 1969 the Grantee of Easement A364182 is now GMS Gas Transmission of Australia.
Lodged 18.6.1999 at 11.25 hours. (Dup. CT not produced)



Withdrawal H374040 of Memorial F850024. Lodged 28.2.2000 at 9.49 hrs.



Discharge H413287 of Mortgage F261263. Registered 18th July 2001 at 8.03 hrs.



Mortgage H413288 to Australia & New Zealand Banking Group Ltd. Registered 18th July 2001 at 8.03 hrs.



CT 1276 0821 B



CERTIFICATE OF TITLE

Vol. 1276 Fol. N° 821

EASEMENTS AND ENCUMBRANCES REFERRED TO

Mortgage 3977/1958. Emily Jane Malanos to The West Australian Stars - Bowbell Investment Benefit Building Society to secure loan. Registered 10th April 1958 at 13.02.00.

Blackmore
ASSISTANT REGISTRAR OF TITLES

Instrument stamped 15/-
Mortgage 13138/1959 Emily Jane Malanos to The West Australian Stars - Bowbell Investment Benefit Building Society. Registered 5th November 1959 at 12.40.00

Instrument stamped 15/-
Mortgage 1771/1960 Emily Jane Malanos to The West Australian Stars - Bowbell Investment Benefit Building Society. Registered 16th February 1960 at 10.40.00

Blackmore
ASSISTANT REGISTRAR OF TITLES

Instrument stamped 17/6/-
Mortgage 55283/63 Emily Jane Malanos to The West Australian Savings and Building Society. Registered 22nd June 1963 at 9.17.00.

O.S. Brindall
ASSISTANT REGISTRAR OF TITLES

Depts 20522 only
Mortgage 3977/1958. Lodged 11.10.1963 at 9.20.00

O.S. Brindall
ASSISTANT REGISTRAR OF TITLES

Also Mortgages 3977/1958, 13138/1959 and 1771/1960
Application 60062/63. The correct name and address of the mortgagee is now The West Australian Savings and Building Society of "Savings House"
9, St Georges Terrace Perth.

10th October 1963. O.S. Brindall
ASSISTANT REGISTRAR OF TITLES

Depts 20522 only
Mortgage 60062/63 of mortgages 3977/1958, 13138/1959, 1771/1960 and 55283/63. Registered 10th October 1963 at 9.25.00.

O.S. Brindall
ASSISTANT REGISTRAR OF TITLES

TRANSFER 60063/63. Lot 299 to
Dorinda Nicola Morganti and Rosa Angela Morganti.
Registered 10th October 1963 at 9.25.00.
276.00.00. Registrar of Titles

Cancelled

CT 1215 0813 D



CROWN GRANT

Vol. _____ Fol. _____

WESTERN



AUSTRALIA

REGISTER NUMBER

15/D32035DUPLICATE
EDITION
N/ADATE DUPLICATE ISSUED
N/A**RECORD OF CERTIFICATE OF TITLE**
UNDER THE TRANSFER OF LAND ACT 1893VOLUME
16FOLIO
370A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

R. Roberts

REGISTRAR OF TITLES

**LAND DESCRIPTION:**

LOT 15 ON DIAGRAM 32035

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

GALATI NOMINEES PTY LTD OF CARE OF K.I. BRADBURY, 2ND FLOOR, 34 COLIN STREET, WEST PERTH
(T E165789) REGISTERED 8 AUGUST 1989

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. E165790 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 8.8.1989.
2. F267267 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 3.8.1993.
3. H335992 MORTGAGE TO ESANDA FINANCE CORPORATION LTD REGISTERED 14.1.2000.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.

* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 16-370A (15/D32035).
PREVIOUS TITLE: 1282-741.
PROPERTY STREET ADDRESS: 138 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

Superseded - Copy for Sketch Only

INDEXED  JT

Transfer 9427/07
Volume 1282 Folio 741

WESTERN AUSTRALIA

ORIGINAL REGISTER BOOK
VOL 16 FOL 370A

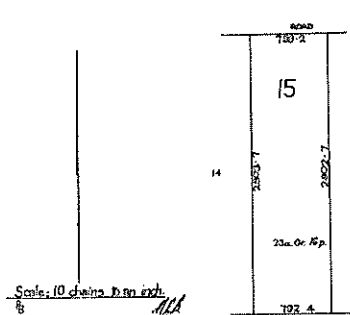
ET 0016 0370A F

Certificate of Title

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

Vincenzo Trolio and Vincenzo Pietroniro both of Lot 34 Hamilton Road, Hamilton Hill, Nurserymen, are now the proprietors as tenants in common in equal shares of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing twenty-three acres and sixteen perches or thereabouts, being portion of Peel Estate Lot 298 and being Lot 15 on Diagram 32035.

Dated the 9th day of February, 1967.



Scale: 10 chains to an inch

15

14

23.00.00 p.

297

307

Transfer E165709 to Galati Nominees Pty. Ltd. of 1st Floor, 885 Albany Highway, East Victoria Park.
Registered 8th August 1989 at 8.00 hrs.

Application D184309 The registered proprietor is Mary Paulik of Lot 14 Kerosine Lane, Baldavia, Nurserywoman, by survivorship. (Frank Paulik died 9-11-1984).

20th January 1986

The correct address of the registered proprietor is now care of K.I. Bradbury, 2nd Floor, 34 Colin Street, West Perth.
By F267267. Dated 3rd August 1993 at 8.04 hrs.

For encumbrances and other matters affecting the land see back

Superseded - Copy for Sketch Only

EASEMENTS AND ENCUMBRANCES REFERRED TO

Mortgage 962867 to The Commercial Bank of Australia Limited Registered 9th February 1967 at 9.30 hrs

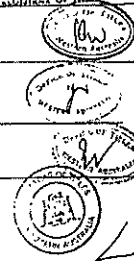
DISCHARGE

Discharge of Mortgage 962867 Registered 12th June 1977 at 9.03.0

Mortgage E165790 to Australia & New Zealand Banking Group Ltd. Registered 8th August 1989 at 8.00 hrs.

Mortgage F267267 to Australia & New Zealand Banking Group Ltd. Registered 3rd August 1993 at 8.04 hrs.

Mortgage H335992 to Esanda Finance Corporation Ltd. Registered 14th January 2000 at 8.14 hrs.



CT 0016 0370A B

CERTIFICATE OF TITLE

VOL 16 FOL 370A

WESTERN



AUSTRALIA

REGISTER NUMBER

14/D32035DUPLICATE
EDITION**N/A**

DATE DUPLICATE ISSUED

N/A**RECORD OF CERTIFICATE OF TITLE**
UNDER THE TRANSFER OF LAND ACT 1893VOLUME
12FOLIO
110A

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

Robert

REGISTRAR OF TITLES

**LAND DESCRIPTION:**

LOT 14 ON DIAGRAM 32035

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

GALATI NOMINEES PTY LTD OF 2ND FLOOR, 34 COLIN STREET, WEST PERTH
(T E640283) REGISTERED 28 JUNE 1991

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. E640285 MORTGAGE TO AUSTRALIA & NEW ZEALAND BANKING GROUP LTD REGISTERED 28.6.1991.
2. H335991 MORTGAGE TO ESANDA FINANCE CORPORATION LTD REGISTERED 14.1.2000.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 12-110A (14/D32035).
PREVIOUS TITLE: 1282-741.
PROPERTY STREET ADDRESS: 124 KEROSENE L, BALDIVIS.
LOCAL GOVERNMENT AREA: CITY OF ROCKINGHAM.

Superseded - Copy for Sketch Only

INDEXED *JA* JT

Transfer 89332/66
Volume 1282 Folio 741

WESTERN AUSTRALIA

CT 0012 0110A F
VOL 12 FOL 110A

Certificate of Title

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

Frank Paulik, Nurseryman, and Mary Paulik, his Wife, both of 54 Davilak Road, Hamilton Hill, are now the proprietors as joint tenants of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing twenty acres one rood and nineteen perches or thereabouts, being portion of Peel Estate Lot 298 and being Lot 14 on Diagram 32035.

Dated the 15th day of December, 1966.

as Registrar
REGISTRAR OF TITLES.

Application D184311 The registered proprietor is Mary Paulik of Lot 14 Kerosine Lane, Baldvis, Nurserywoman, by survivorship. (Frank Paulik died 9-11-1984).

20th January 1986

Transfer E640283 to Galati Nominees Pty Ltd, of 2nd Floor, 34 Colin Street, West Perth. Registered 28th June, 1991 at 8.17 hrs.

Scale 10 chains to an inch

For encumbrances and other matters affecting the land see back

Superseded - Copy for Sketch Only

EASEMENTS AND ENCUMBRANCES REFERRED TO

Mary
Mortgage E640284 to ~~Mark~~ Paulik, of care of Mark Balfour & Associates, Solicitors, 24 Riseley Street, Applecross.
Registered 28th June, 1991 at 8.17 hrs.



Mortgage E640285 to Australia & New Zealand Banking Group Ltd. Registered 28th June, 1991 at 8.17 hrs.



Discharge H159091 of Mortgage E640284. Registered 6th July 1999 at 9.14 hrs.



Mortgage H335991 to Esanda Finance Corporation Ltd. Registered 14th January 2000 at 8.14 hrs.



CERTIFICATE OF TITLE

VOL. 12 FOL. 110A

CT 0012 0110A B



Transfer 23898/64 (65327)
Volume 1276 Folio 822

MH



WESTERN AUSTRALIA.

ORIGINAL

REGISTER BOOK.

Vol. 1282 Fol. N° 741

INDEXED

Diagram 32035

CT 1282 0741 F

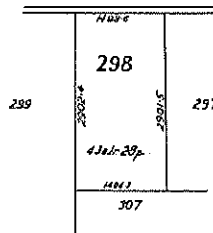
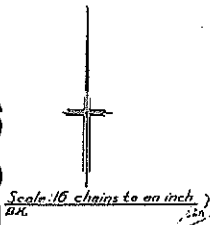


Certificate of Title

under "The Transfer of Land Act, 1893" (56 Vol. 14, Sec. 3).

Andrew Charles Kingsbury, Medical Practitioner and Helen Kingsbury, Married Woman, both of 53 Keane Street, Peppermint Grove, are now the proprietors as joint tenants of an estate in fee simple subject to the easements and encumbrances notified hereunder in the natural surface and therefrom to a depth of two hundred feet of all that piece of land delineated and coloured green on the map hereon containing forty-three acres one rood and twenty-eight perches or thereabouts, being Pool Estate Lot 298.

Cancelled



Dated the seventeenth day of April One thousand nine hundred and sixty-four.

Registrar of Titles.

CANCELLED

TOTALLY CANCELLED	
TRANSFER 9427/67	
Registered 9th February 1967 at 9.30 a.m.	
Balance - Lot 15 on diagram 32035	
To Vol. 16	Fol. 370A
ASSISTANT REGISTRAR OF TITLES	

CANCELLED

44154/1282-48,500-14C

For encumbrances and other matters affecting the land see back.

EASEMENTS AND ENCUMBRANCES REFERRED TO

TRANSFER 99332/66
Registered 15th December 1966 at 9.176c.
Lot 14 on diagram 32035.
To Vol. 12 Fol. 110 A. *J. Brimble*
ASSISTANT REGISTRAR OF TITLES

Cancelled

CT 1282 0741 D



CERTIFICATE OF TITLE

Vol. 1282 Fol. N^o 741

EASEMENTS AND ENCUMBRANCES REFERRED TO

Mortgage 3977/1958. Emily Jane Malanos to The West Australian Star-Bowdell Investment, Building Society Ltd. secure £200. Registered 10th April 1958 at 12.02.02.

Instrument 13138/1959. Emily Jane Malanos to The West Australian Star-Bowdell Investment, Building Society Ltd. Registered 5th November 1959 at 15.08.02.

Instrument 1771/1960. Emily Jane Malanos to The West Australian Star-Bowdell Investment, Building Society Ltd. Registered 16th February 1960 at 11.04.02.

Instrument 3358/1963. Emily Jane Malanos to The West Australian Savings and Building Society. Registered 20th June 1963 at 9.17.02.

Lease 5994/1963. Lease 11-10-1963 at 9.21.02.

Lease 5994/1963. Lease 11-10-1963 at 9.21.02.

Re-transfer 23898/1964. on lease 5994/1963 on 20/4/1964. Limit 5/5/1964.

Discharge 23898/1964. dot 2 78.

Andrew Charles Kingsbury and Helen Kingsbury

Registered 17th April 1964 at 4.29.02

1282-141

Cancelled



CERTIFICATE OF TITLE

Vol. 1276 Fol. N° 822

APPENDIX B

DETAILS OF ABORIGINAL SITES



Search Criteria

0 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6425000	387228
6426072	388155

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register of Aboriginal Sites established and maintained under the Aboriginal Heritage Act 1972 (AHA).

Legend

Restriction	Access	Status	Coordinate Accuracy
N No restriction	C Closed	L Lodged	Accuracy is shown as a code in brackets following the site coordinates.
M Male access only	O Open	I Insufficient Information	[Reliable] The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
F Female access	V Vulnerable	P Permanent register	[Unreliable] The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.
		S Stored data	

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code "closed" or "vulnerable". Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.



Legend

- Highlighted Area
- Town
- Map Area
- Search Area

Copyright for base map information shall at all times remain the property of the Commonwealth of Australia, Geoscience Australia - National Mapping Division. All rights reserved.

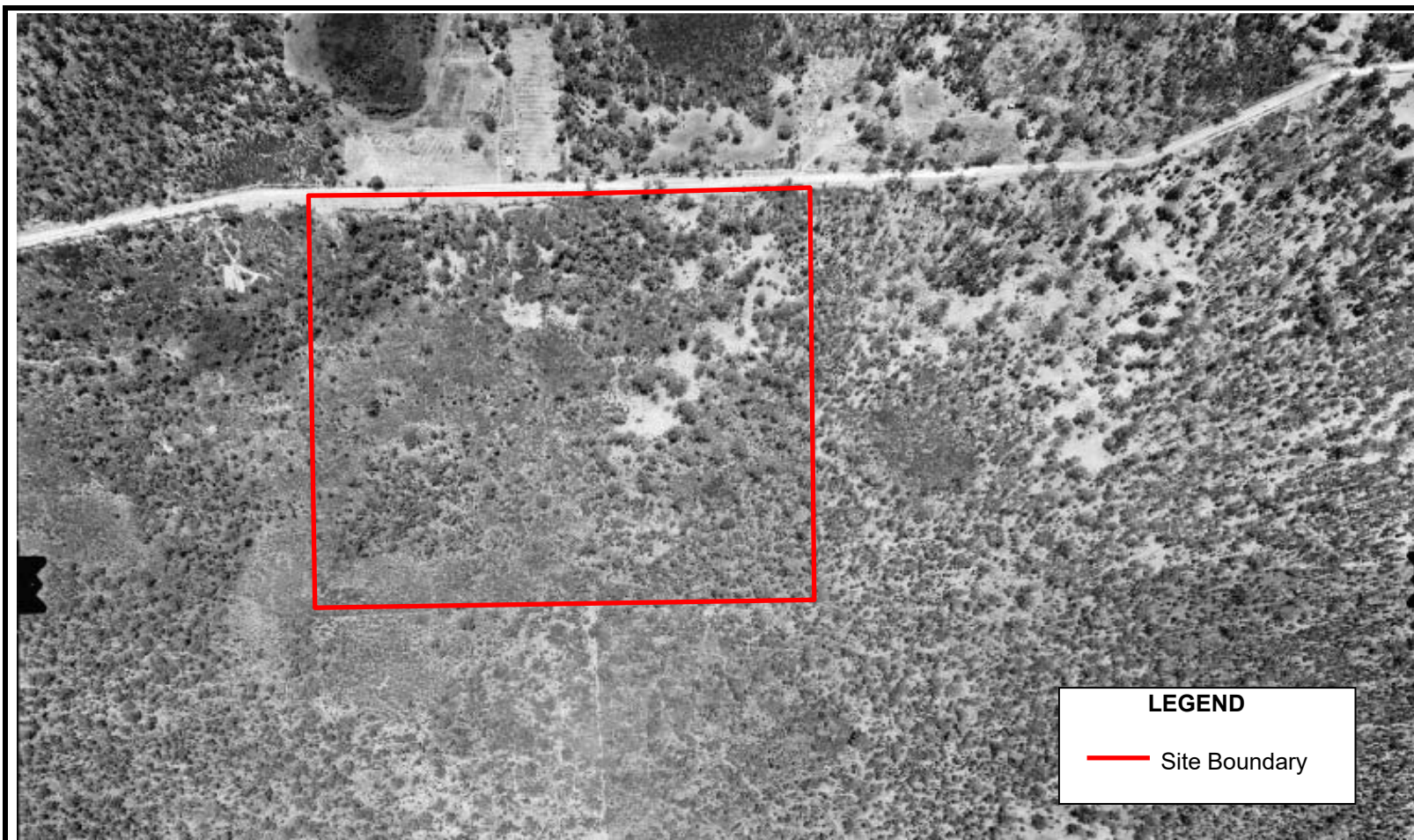
Copyright for Native Title Land Claim, Local Government Authority, Mining Tenement boundaries shall at all times remain the property of the State of Western Australia, All rights reserved.

For further important information on using this information please see the Department of Indigenous Affairs' Terms of Use statement at <http://www.dia.wa.gov.au/Terms-Of-Use/>

APPENDIX C

HISTORICAL AERIAL

PHOTOGRAPHS



AERIAL PHOTOGRAPH 1960

Client: Planning Solutions (Aust) Pty Ltd

Project: Lots 14, 15 & 299 Kerosene Lane, Baldivis

Job Number: 08.196

Drawn By: A. Betti 25/6/2008

Source: Landgate





AERIAL PHOTOGRAPH 1968

Job Number: 08.196

Client: Planning Solutions (Aust) Pty Ltd

Drawn By: A. Betti 25/6/2008

Project: Lots 14, 15 & 299 Kerosene Lane, Baldivis

Source: Landgate





AERIAL PHOTOGRAPH 1978

Job Number: 08.196

Client: Planning Solutions (Aust) Pty Ltd

Drawn By: A. Betti 25/6/2008

Project: Lots 14, 15 & 299 Kerosene Lane, Baldivis

Source: Landgate





AERIAL PHOTOGRAPH 1988

Client: Planning Solutions (Aust) Pty Ltd

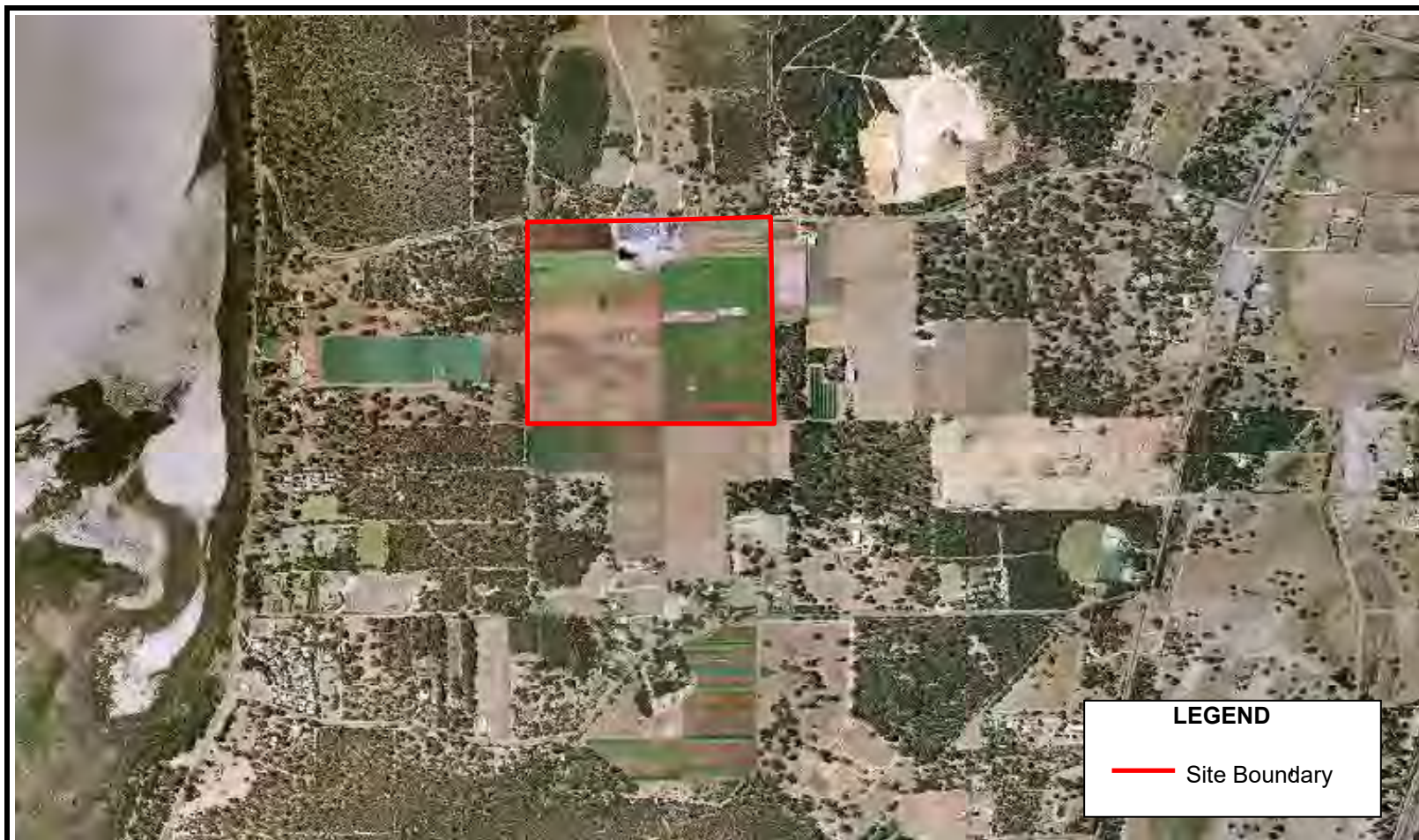
Project: Lots 14, 15 & 299 Kerosene Lane, Baldivis

Job Number: 08.196

Drawn By: A. Betti 25/6/2008

Source: Landgate





AERIAL PHOTOGRAPH 2007

Client: Planning Solutions (Aust) Pty Ltd

Project: Lots 14, 15 & 299 Kerosene Lane, Baldivis

Job Number: 08.196

Drawn By: A. Betti 25/6/2008

Source: Landgate



APPENDIX D

DEC CONTAMINATED SITE DATABASE SEARCH



Department of
Environment and Conservation

RECEIVED
30 MAY 2008

BY:

Your ref:

Our ref:

Enquiries:

Phone:

Fax:

Email:

DMO 3396

Registrar

1300 762982

Ashton Betti
ENV Australia
PO Box 7480 Cloisters Square,
Perth WA 6850

Dear Sir/Madam

BASIC SUMMARY OF RECORDS REQUEST

Thank you for your Basic Summary of Records request for the site consisting of the following parcel(s) of land:

- LOT 15 ON DIAGRAM 32035 as shown on certificate of title 16/370A known as 138 Kerosene L, Baldivis WA 6171 ("the Site"),

which Department of Environment and Conservation ("DEC") received on 20/05/2008.

A search of DEC's records of known and suspected contaminated sites was undertaken however, our records indicate that as of 29/05/2007 this Site has not been reported to DEC as a known or suspected contaminated site either prior to or after the commencement of the *Contaminated Sites Act 2003*.

Please note, however, that a large number of known or suspected contaminated sites were reported to DEC in late May 2007, and DEC is still in the process of identifying and capturing these sites. The search of DEC records undertaken in this case therefore does not consider any sites which may have been reported after 29/05/2007.

For general enquiries, please contact the Registrar on 1300 762982.

Yours sincerely

Andrew Miller, A/SECTION MANAGER

CONTAMINATED SITES BRANCH
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

27/05/2008

Enc. Receipt Number 053248

DIRECTOR GENERAL AND ENVIRONMENTAL SERVICES DIVISIONS: The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Phone: (08) 6467 5000 Fax: (08) 6467 5562 TTY: 1880 555 630

PARKS AND CONSERVATION SERVICES DIVISIONS: Executive: Corner of Australia II Drive and Hackett Drive, Crawley, Western Australia 6009
Phone: (08) 9442 0300 Fax: (08) 9386 1578 Operations: 17 Dick Perry Avenue, Technology Park, Kensington, Western Australia 6151
Phone: (08) 9334 0333 Fax: (08) 9334 0498 TTY: 9334 0546

Information Request
CSSID = 3396

POSTAL ADDRESS FOR ALL DIVISIONS: Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
www.dec.wa.gov.au

XDDECL001



Department of Environment and Conservation

Your ref:

Our ref:

Enquiries:

Phone:

Fax:

Email:

DMO 3396

Registrar

1300 762982

Ashton Betti
ENV Australia
PO Box 7480 Cloisters Square,
Perth WA 6850

Dear Sir/Madam

BASIC SUMMARY OF RECORDS REQUEST

Thank you for your Basic Summary of Records request for the site consisting of the following parcel(s) of land:

- PEEL ESTATE LOT 299 as shown on certificate of title 1276/821 known as 120 Kerosene L, Baldivis WA 6171 ("the Site"),

which Department of Environment and Conservation ("DEC") received on 20/05/2008.

A search of DEC's records of known and suspected contaminated sites was undertaken however, our records indicate that as of 29/05/2007 this Site has not been reported to DEC as a known or suspected contaminated site either prior to or after the commencement of the *Contaminated Sites Act 2003*.

Please note, however, that a large number of known or suspected contaminated sites were reported to DEC in late May 2007, and DEC is still in the process of identifying and capturing these sites. The search of DEC records undertaken in this case therefore does not consider any sites which may have been reported after 29/05/2007.

For general enquiries, please contact the Registrar on 1300 762982.

Yours sincerely

Andrew Miller, A/SECTION MANAGER

CONTAMINATED SITES BRANCH
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

27/05/2008

Enc. Receipt Number 053247

DIRECTOR GENERAL AND ENVIRONMENTAL SERVICES DIVISIONS: The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Phone: (08) 6467 5000 Fax: (08) 6467 5562 TTY: 1880 555 630

PARKS AND CONSERVATION SERVICES DIVISIONS: Executive: Corner of Australia II Drive and Hackett Drive, Crawley, Western Australia 6009
Phone: (08) 9442 0300 Fax: (08) 9386 1578 Operations: 17 Dick Perry Avenue, Technology Park, Kensington, Western Australia 6151
Phone: (08) 9334 0333 Fax: (08) 9334 0498 TTY: 9334 0546

Information Request
CSSID = 3396

POSTAL ADDRESS FOR ALL DIVISIONS: Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
www.dec.wa.gov.au



Department of Environment and Conservation

Your ref:

Our ref:

Enquiries:

Phone:

Fax:

Email:

DMO 3396

Registrar

1300 762982

Ashton Betti
ENV Australia
PO Box 7480 Cloisters Square,
Perth WA 6850

Dear Sir/Madam

BASIC SUMMARY OF RECORDS REQUEST

Thank you for your Basic Summary of Records request for the site consisting of the following parcel(s) of land:

- LOT 14 ON DIAGRAM 32035 as shown on certificate of title 12/110A known as 124 Kerosene L, Baldivis WA 6171 ("the Site"),

which Department of Environment and Conservation ("DEC") received on 20/05/2008.

A search of DEC's records of known and suspected contaminated sites was undertaken however, our records indicate that as of 29/05/2007 this Site has not been reported to DEC as a known or suspected contaminated site either prior to or after the commencement of the *Contaminated Sites Act 2003*.

Please note, however, that a large number of known or suspected contaminated sites were reported to DEC in late May 2007, and DEC is still in the process of identifying and capturing these sites. The search of DEC records undertaken in this case therefore does not consider any sites which may have been reported after 29/05/2007.

For general enquiries, please contact the Registrar on 1300 762982.

Yours sincerely

Andrew Miller, A/SECTION MANAGER

CONTAMINATED SITES BRANCH
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

27/05/2008

Enc. Receipt Number 053246

DIRECTOR GENERAL AND ENVIRONMENTAL SERVICES DIVISIONS: The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Phone: (08) 6467 5000 Fax: (08) 6467 5562 TTY: 1880 555 630

PARKS AND CONSERVATION SERVICES DIVISIONS: Executive: Corner of Australia II Drive and Hackett Drive, Crawley, Western Australia 6009
Phone: (08) 9442 0300 Fax: (08) 9386 1578 Operations: 17 Dick Perry Avenue, Technology Park, Kensington, Western Australia 6151
Phone: (08) 9334 0333 Fax: (08) 9334 0498 TTY: 9334 0546

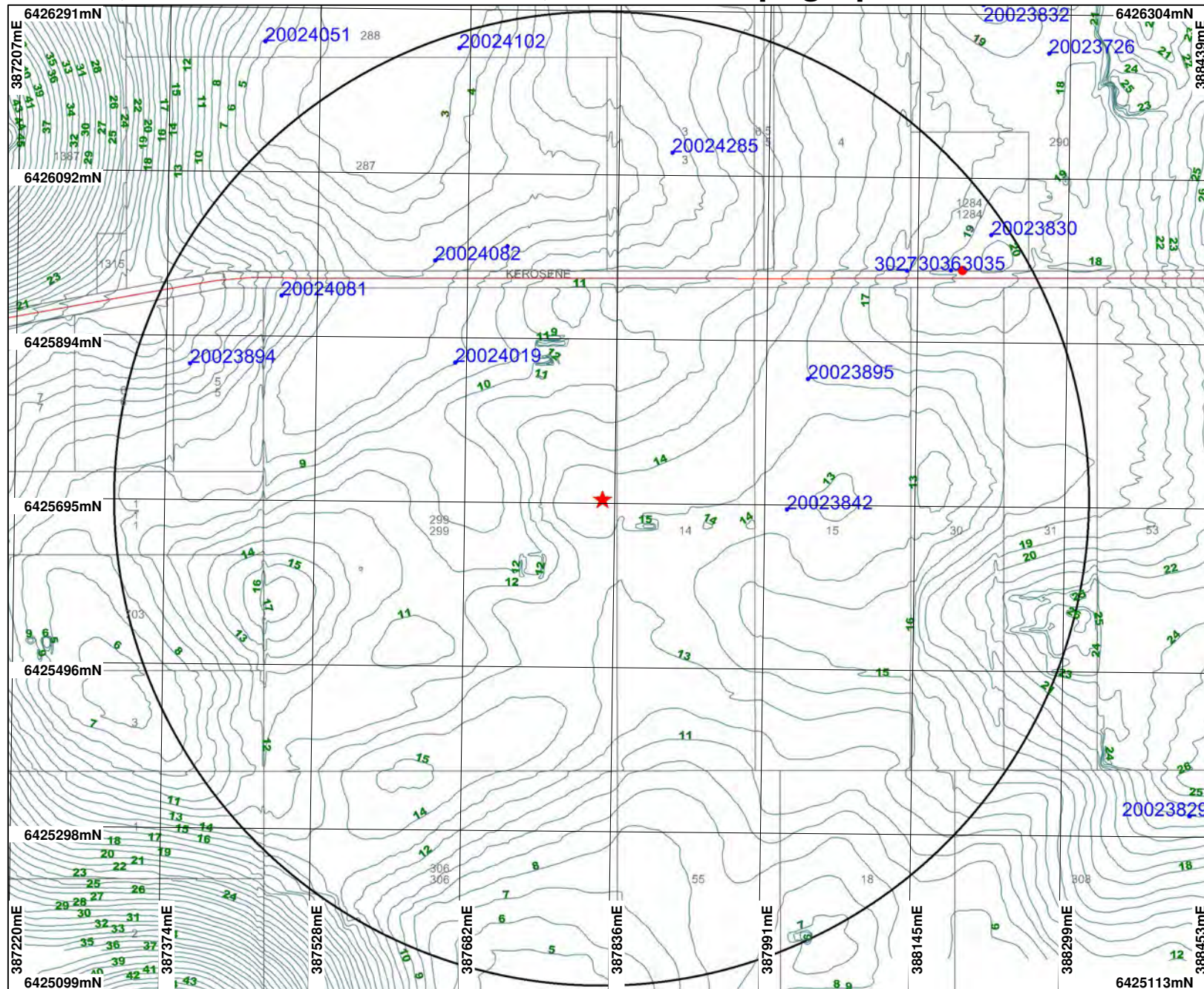
Information Request
CSSID = 3396

POSTAL ADDRESS FOR ALL DIVISIONS: Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
www.dec.wa.gov.au

APPENDIX E

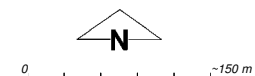
WIN DATABASE INFORMATION

Lots 14, 15 & 299 Kerosene Lane, Baldivis. Topographic Contours m AHD



LEGEND

- Topographic Contours, Metropolitan Area - DLI
- Road Centrelines - DLI 1/5/04
- Cadastre - DLI
- WIN Sites - All Sites
- WIN Groundwater Sites, Monitoring - DoW
- WA Coastline Water Mark - DLI 11/6/04
- High Water Mark
- Low Water Mark



Scale 1:6195
(Approximate when reproduced at Letter)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: BrayJ
Prepared for:
Date: 30/05/2008 8:54:55 AM

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

APPENDIX F

SITE PHOTOGRAPHS

APPENDIX F - PHOTOGRAPHS



PLATE 1 – Fuel storage area.



PLATE 2 – Drums stored in machinery maintenance shed.



PLATE 3 – Chemical drums stored outside chemical shed.



PLATE 4 – Chemical shed on Lot 14 Kerosene Lane, Baldivis.



PLATE 5 – Rubbish scattered around the exterior of the fertilizer and chemical sheds.



PLATE 6 – Carrots growing on Lot 299 Kerosene Lane, Baldivis.



PLATE 7 – The “Spud Shed” fruit and vegetable retail outlet.



PLATE 8 – Stormwater drains located in the car park on Lot 299 Kerosene Lane, Baldivis.



PLATE 9 – Infiltration pond / runoff from fruit and vegetable processing.



PLATE 10 – Petrol tank and motor for well in shed on Lot 14 Kerosene Lane, Baldivis.

APPENDIX 10

PARMELIA GAS PIPELINE RISK ASSESSMENT AND PROTECTION PLAN

Planning Solutions
Baldivis Development
Lots 14, 15, and 299
Kerosene Lane, Baldivis

AS2885 Pipeline Protection Plan



A10526-PSO-RX-001

REV 0

REVISION RECORD

Revision	Date	Description	Originator	Checked	Approved
A	11 June 2010	Issued for client review	TD	DFB	BPF
0	2 July 2010	Issued for use	TD	IMM	PMB



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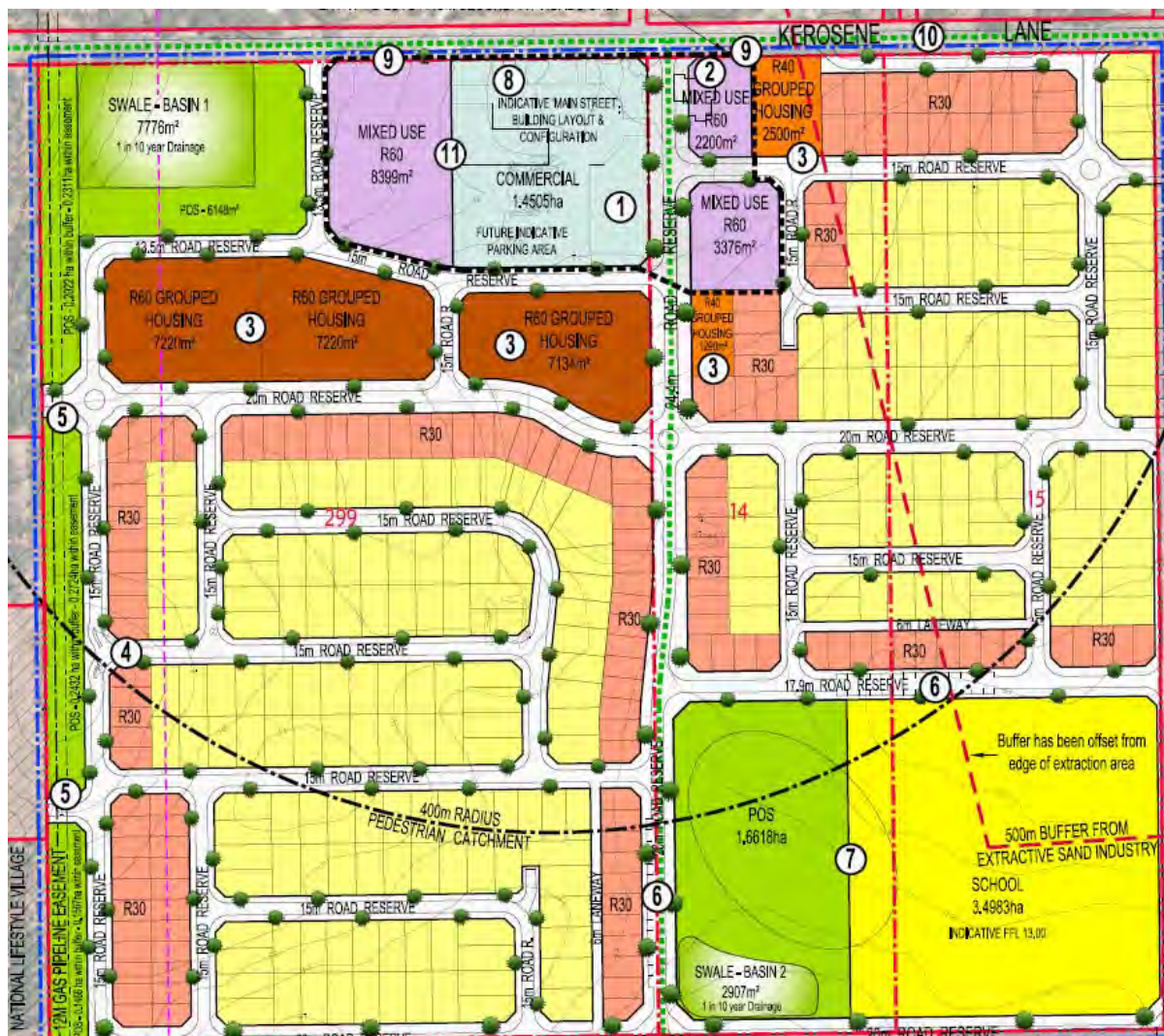
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1. INTRODUCTION

Galati Nominees Pty Ltd (the developer) is proposing to subdivide a section of land into separate property dwellings and commercial operations at Lots 14, 15 and 299 Kerosene Lane, Baldvis, in Perth WA. The proposed development interfaces directly with the Parmelia Gas Pipeline (PGP) easement adjacent to Lot 299. A general schematic is shown as Figure 1.1 below:

Figure 1.1 Lots 14, 15 and 299 Kerosene Lane, Baldvis, in Perth WA



STRUCTURE PLAN NOTES	
1	Spud Shed Commercial Premises - (2500m² retail NLA max)
2	Existing House (to be demolished).
3	Grouped housing, Mixed use and Commercial sites subject to DAP to ensure high quality main street built form and streetscape is achieved.
4	Traffic calming treatment at intersection.
5	Potential future east-west road linkages across gas pipeline.
6	On-street carparking surrounding school site.
7	POS (active playing field) and school site. Site to be flat as per City of Rockingham and Department of Education and Training requirements.
8	Single access for Commercial premises shown on plan.
9	No direct access from Kerosene Lane, entry to lots from secondary roads only.
10	Future upgrading of Kerosene Lane as per Baldvis Road, needs Study.
11	Slip lane servicing Residential Lots fronting Kerosene Lane as shown. Acoustic and visual buffer between mixed use development and commercial premises.



Vanguard Solutions Pty Ltd has been contacted by Planning Solutions on behalf of Galati Nominees Pty Ltd to prepare a Pipeline Protection Plan (PPP) for the pipeline located adjacent to the development area (Lot 299).

This report details the Pipeline Protection Plan based on the findings of the pipeline risk assessment (Appendix B) and other supporting technical documents such as Stress Analysis / Fracture Control Plan, Isolation Plan etc. (Refs. 3 and 4).



1.1. Purpose

The purpose of the Pipeline Protection Plan is to:

- Ensure compliance with the safety management requirements of AS2885.1–2007 Pipelines – Gas and Liquid Petroleum, Part 1: Design and Construction (Ref. 1);
- Describe the risk assessment process, hazard controls in terms of physical means, administrative controls and procedures etc. to ensure public safety and pipeline protection during the proposed development and post development activities associated with Lots 14, 15 and 299; and
- Assist in planning approvals and compliance with Western Australian Planning Commission, Planning Bulletin 87, High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region; October 2007 (Ref. 5).

1.2. Scope

The scope of work for this AS2885 Pipeline Protection Plan includes:

- The buried PGP adjacent to the proposed development of Lots 14, 15 and 299;
- The construction of two road crossings over the easement namely (named north and south crossings);
- Construction of a storm water drainage swale adjacent to the easement at the north of the development;
- Construction of the road reserve at the western edge of the development adjacent to the pipeline easement;
- Future maintenance and operational access to the PGP; and
- Other miscellaneous features associated with the project.

1.3. Definitions

The definitions used in this report or relevant references are listed below.

Table 1.1: Definitions

Item	Definition
As Low As Reasonably Practicable (ALARP)	ALARP means the cost of further risk reduction measures is grossly disproportionate to the benefit gained from the reduced risk that would result.
Failure	Failure has occurred if one or more of the of the following conditions apply: (a) There is any loss of containment; (b) Supply is restricted; (c) Maximum Allowable Operating Pressure (MAOP) is reduced; (d) Immediate repair is required in order to maintain safe operation; and NOTE: It is emphasised that failure is not restricted to loss of containment.
Gas	Any hydrocarbon gas or mixture of gases, possibly in combination with liquid petroleum, condensates or water.
Piping	An assembly of pipes, valves and fittings associated with a pipeline.



Item	Definition
Pressure, design	The pressure nominated in the Design Basis for the purpose of performing calculations on the mechanical and process design of the pipeline.
Protection measures, physical	Measures for protection of a pipeline which prevent external interference from causing failure, either by physically preventing contact with the pipe or by providing adequate resistance to penetration in the pipe itself.
Protection measures, procedural	Measures for protection of a pipeline which minimize the likelihood of human activities with potential to damage the pipeline.
Regulatory authority	An authority with legislative powers relating to petroleum pipelines.
Rupture	Failure of the pipe such that the cylinder has opened to a size equivalent to its diameter.
Threat	A threat is any activity or condition that can adversely affect the pipeline if not adequately controlled.
Wall thickness, design pressure _(tp)	The wall thickness of pipe required to contain the design pressure, based on steel grade and design factor.
Wall thickness, required _(tw)	The greatest of the wall thicknesses required to meet the various design requirements nominated in Section 5.4.2.(AS2885.1)
Wall thickness, nominal _(tN)	The wall thickness nominated for pipe manufacture or certified on supplied pipe.



2. PIPELINE PROTECTION PLAN REQUIREMENTS

The Pipeline Protection Plan will be validated to ensure it complies with the agreed elements of the pipeline operator's engineered systems and management of safety objectives as required under AS2885.1. The following section identifies the standard requirements that will be applied.

2.1. AS 2885 Standard Requirements

AS 2885:1 2007 Section 2 – Safety was examined to determine the key Standard Requirements (SR) deemed pertinent to this development including, but may not be limited to, the following table:

Table 2.1: AS 2885.1:2007 Standard Requirements

AS 2885:1 2007 Standard Requirements		AS2885:1 Standard Section
SR-01	Implementation - All actions arising from the safety management study shall be implemented and the implementation documented. Where ongoing action is required, a reporting mechanism to demonstrate action shall be established, implemented and audited.	2.2.3
SR-02	Safety Management Study Validation - Each detailed safety management study shall be validated by a properly constituted workshop which shall critically review each aspect of the safety management study.	2.2.4
SR-03	Operational Review - An assessment of the implementation and effectiveness of all threat controls shall be made at each operational review.	2.2.5
SR-04	Safety Management Process – The pipeline safety management process consists of the following: • Threat identification; • Application of physical, procedural and design measures to identified threats; • Review and control of failure threats; and • Assessment of residual risk from failure threats.	2.3.1
SR-05	External Interference Protection-The pipeline shall be protected from external interference by a combination of physical and procedural controls at the location of each identified threat. All reasonably practicable controls should be applied.	2.3.3.2
SR-06	Control by Design and/or Procedures - Design and/or procedures shall be applied to threats other than external interference threats in accordance with Standard	2.3.3.3
SR-07	Failure Analysis – where controls may not prevent failure for a particular threat, the threat shall be analysed to determine the damage that it may cause to the pipeline.	2.3.4.1
SR-08	Treatment of Failure Threats – where a failure event is identified additional controls to prevent failure shall be investigated and applied where applicable.	2.3.4.2



AS 2885:1 2007 Standard Requirements		AS2885:1 Standard Section
SR-09	Documentation –The failure analysis for the specific threat shall be documented.	2.3.4.3
SR-10	Demonstration of Fault Tolerance – To demonstrate the fault tolerance of the pipeline design, a situation where failure of threat control measures leads to pipe damage or loss of containment shall be considered as a threat.	2.3.6
SR-11	Environmental Management – The threats to the environment from each part of the life cycle of the pipeline to be identified and control measures shall be given to ensuring environmental threats are managed by avoidance.	2.5
SR-12	Environmental Management – An environmental impact assessment shall be conducted in accordance with standard along with length of pipeline route. The environmental impact assessment report shall form the basis of the environmental management plan.	2.5
SR-13	Environmental Management –Threat of damage to the environment from operational maintenance and abandonment activities shall be identified and control measures developed.	2.5
SR-14	Electrical – A pipeline in the vicinity of electricity supply power lines or facilities shall be analysed to determine if controls are required to provide for electrical safety.	2.6
SR-15	Construction Safety – A construction safety plan shall be prepared, reviewed by appropriate personnel, and approved. This review shall take the form of a construction safety plan workshop.	2.7.1
SR-16	Testing Safety – The construction safety plan shall address safety through all phases of testing of the pipeline during construction.	2.7.2
SR-17	Commissioning Plan – The commissioning plan shall consider the safety of the activities undertaken through all phases of commissioning and, where required, develop specific procedures to manage the safety during commissioning of the pipeline.	2.7.3

2.2. AS 2885 Compliance

Refer to Appendix A for AS2885.1 Compliance table with respect to table 2.1 above and the proposed development.



3. FORMAL SAFETY STUDIES

3.1. Formal Risk Assessment Studies

The following study has been carried out as part of the risk assessment process:

- Pipeline Risk Assessment (including Hazard Identification).

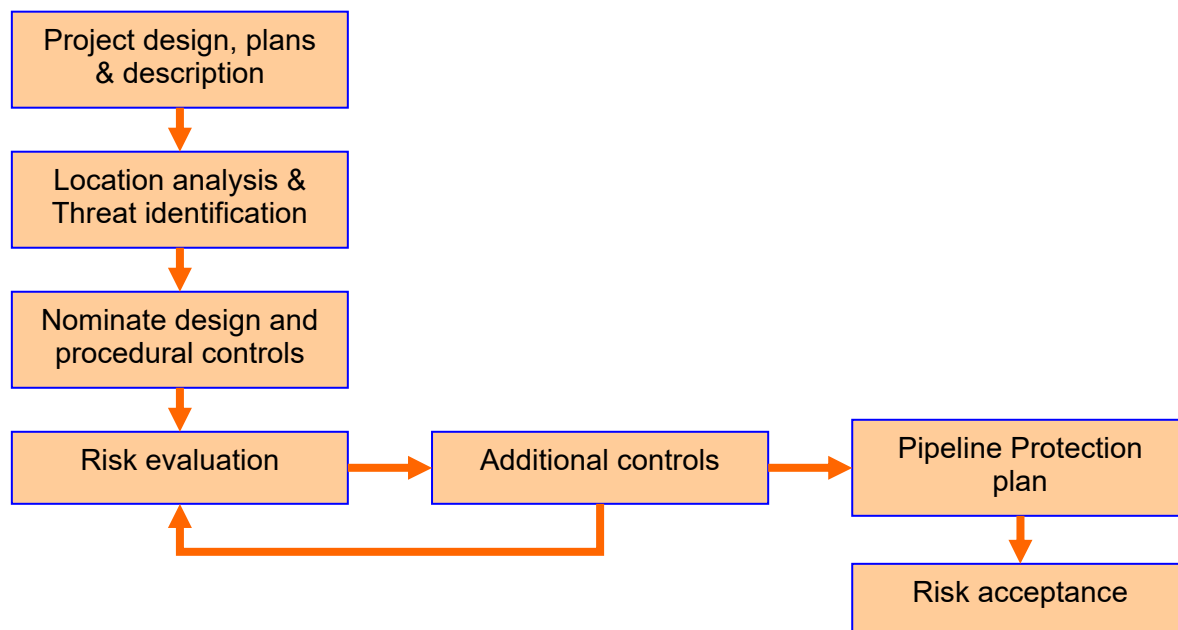
In addition APA have previously conducted Stress Analysis study on the pipeline to determine its resistance to events that may cause stress and potentially lead to pipeline failure (Ref. 3).

3.1.1. Threat Identification, Risk Assessment and Control

Threats were identified by conducting a formal risk assessment workshop with the involvement of relevant parties. Attendees at the workshop are listed in Appendix C. A site survey was carried out (prior to the workshop) and inputs from all relevant APA Group personnel were also used to identify the possible hazards.

From the hazard, threat scenarios / risks were identified along with their likelihood and consequence severity. Risk management controls were proposed and if they were not considered sufficient further actions were recorded and assigned to relevant personnel. Figure 3.1 below illustrates the risk assessment process:

Figure 3.1: Simplified overview of the AS 2885 Risk Assessment Process



The risk assessment data was collected in a worksheet which can be found in Appendix B.



4. RISK ASSESSMENT PROCESS

4.1. Risk Identification

The AS2885 risk assessment methodology requires that a location and threats analysis is performed for the area affecting the pipeline. The intention of this is to identify the possible causes of failure of the pipeline and the mitigation measures that are or need to be in place. The AS2885 risk identification process can be broadly defined into the following activities:

- Location analysis;
- Threat analysis;
- Mitigation by design and procedures;
- Failure analysis;
- Risk evaluation; and
- Risk Management.

4.1.1. Location Analysis

For this project the key locations that have potential to impact upon the PGP are the:

- Swale drainage basin;
- The construction of two road crossings over the easement; and
- The construction of the normal to medium density residential areas and adjacent roads parallel to the easement ;

4.1.2. Threat Analysis

This process is the identification of possible threats from the project, which may impact the pipeline. The analysis includes both location specific and overall non-location specific threats. Location specific threats could be external interference activities, such as deep excavation for adjacent services, or effects on corrosion protection from high voltage transmission lines. Non-location specific threats refer to a broader range of potential threats that could have an impact on the pipeline, such as internal/external corrosion, pressures in excess of design pressure or natural disasters such as earthquakes or cyclones.

4.1.3. Threat Assessment / Consequence Analysis

Failure analysis combines the design features of the pipeline with the identified threats to determine the failure mode. Threats that have not been eliminated or reduced to a level as low as reasonably practicable (ALARP) must be subject to further analysis.

4.1.4. Mitigation by Design and Procedures

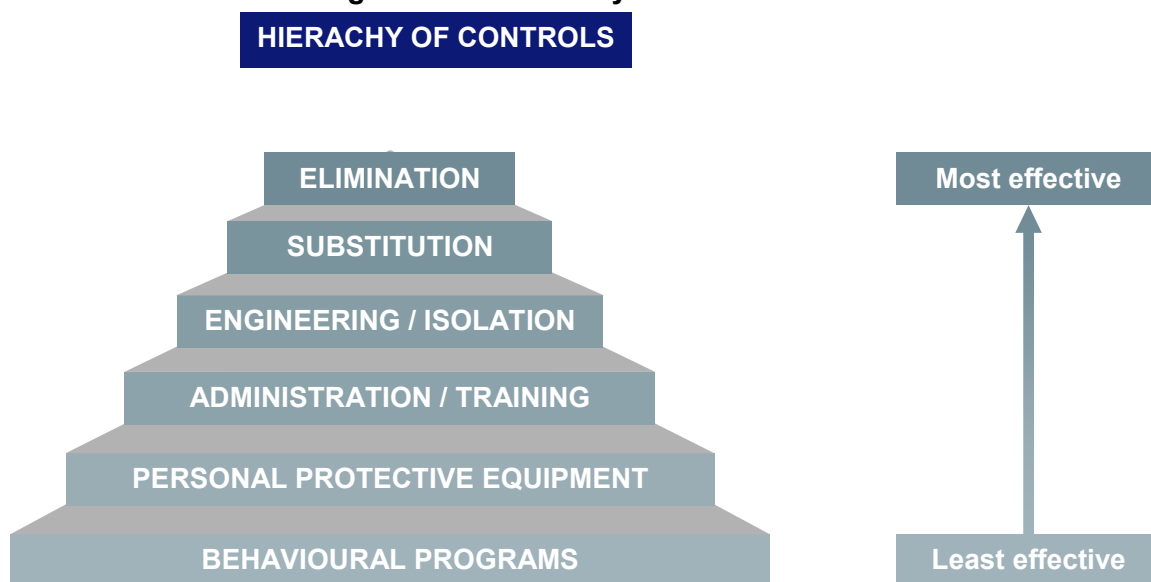
This aspect of the risk assessment process involves identifying the mitigation measures which are required to reduce the risk from the threats (if credible) to As Low As Reasonably Practicable (ALARP). The requirements under AS2285 call for a number of mitigation measures that should be introduced for external interference protection and procedural /



design prevention measures. Also within the AS2885 standard are a number of design requirements for corrosion, electrical protection and natural events.

It should be also noted that judgement by the team was used to determine the effectiveness of controls as to whether they would be in place at the time of the project or likelihood of the threat consequence occurring. For example, a concrete slab over the pipeline at the road crossings was deemed to be in place (and effective) as the road crossings would not be constructed without it, even though it was not physically in place at the time of this assessment. However, a procedural control such as APA supervision has the potential not to be in place at the time of the project if the risk management process fails. Consequently, this latter type of control was deemed to be less effective. This aligns with the well known Hierarchy of Controls methodology shown in Figure 4.1.

Figure 4.1 – Hierarchy of Controls



4.1.5. Risk Evaluation and Risk Management

The effectiveness of the design measures and procedures were assessed during the workshop. If the initially identified design and procedural controls are unable to reduce the risks to an acceptable level, further risk evaluation and risk management control measures are required to reduce the risks to ALARP. AS2885 contains risk ranking frequency and consequence tables to assist with assessment of the risk and guidance on the acceptability of the risk, refer to section 4.2 below.

4.2. Risk Ranking

A risk ranking was assigned to the identified hazards based on the AS2885.1 risk assessment matrix that is shown in Table 4.1. The frequency and consequence classification tables from AS2885 are presented in Tables 4.2 and 4.3 respectively. The risk ranking was performed by using the safety and environmental related consequences of an event.



Table 4.1– AS2885 Risk Assessment Matrix

	Catastrophic	Major	Severe	Minor	Trivial
Frequent	Extreme	Extreme	High	Intermediate	Low
Occasional	Extreme	High	Intermediate	Low	Low
Unlikely	High	High	Intermediate	Low	Negligible
Remote	High	Intermediate	Low	Negligible	Negligible
Hypothetical	Intermediate	Low	Negligible	Negligible	Negligible

Table 4.2 – Frequency Classification Table

Frequency Class	Frequency Description
Frequent	Expected to occur typically once per year or more.
Occasional	Expected to occur several times in the life of the pipeline.
Unlikely	Not likely to occur within the life of the pipeline, but possible.
Remote	Not likely or anticipated to occur for this pipeline at this location.
Hypothetical	Theoretically possible, but has never occurred on a similar pipeline.

Table 4.3– Consequence Classification Table

	Severity Class				
	Catastrophic	Major	Severe	Minor	Trivial
Dimension	Measures of Severity				
People	Multiple fatalities	Few fatalities with several people with life threatening injuries	Injury or illness requiring hospital treatment	Injuries requiring first aid treatment	Minimal impact on health and Safety
Supply	Long term Interruption to supply	Prolonged interruption, long term restriction of supply	Short term interruption; prolonged restriction of supply	Short term interruption; restriction of supply but shortfall met from other sources	No impact; no restriction of pipeline supply
Environment	Effects widespread; viability of ecosystems or species affected; permanent major changes	Major off-site impact; long term sever effects; rectification difficult	Localised (<1ha) and short term effects (< 2yr) easily rectified	Effect localised (<0.1ha) and very short term (weeks), minimal rectification	No effect, minor on-site effects rectified rapidly with negligible residual effect.

4.3. Location class

The PGP risk assessment was undertaken in accordance with the AS2885 location class requirements. The classification of the proposed project has three types as per section 4.3.4 of AS2885.1 namely:

- Residential (T1) as the type at the southern part of the easement will have domestic single dwelling houses adjacent to it;



- Residential (T1, I) as the type east of the northern part of the easement will have commercial properties within the hazard zones (the swale basin is between the easement and the commercial area); and
- Residential (T1) as higher density R60 zoning residences south of the Swale Basin and adjacent to the easement. Although higher density it is not considered enough to rate a T2 classification.

4.4. Safeguards / Control Measures

The AS2885.1 standard (section 5.5.4 a) and b)) specifies that external interference threats in areas assigned a T1 and T2 (Residential) location class should have a minimum of two physical and two procedural mitigation measures to achieve a minimum compliance. By comparison, a R1 (Rural) or R2 (Rural Residential) zoned location requires a minimum of one physical and two procedural measures.

For this study, the design and procedural measures were identified and assessed in the workshop to determine whether they were considered adequate or if further measures were required for mitigation against the pipeline threat. If the existing (or likely to be present) controls were not deemed adequate, a risk rating was noted that would then be reviewed when additional actions had been completed. Additionally, if two physical and two procedural measures were noted then APA personnel present at the work shop indicated that no further risk assessment was required.

4.5. Risk Assessment Activities

At the start of the risk assessment workshop, an overview of the project and work activities was given by Mr. Paul Ellenbroek of Planning Solutions.

The workshop was conducted by reviewing the proposed project using a set of standard industry accepted guidewords consistent with AS 2885.1 to prompt discussion on the development and assist the progressing the hazards.

The relevant columns were then completed on the spreadsheet attached as Appendix B.



5. RISK ASSESSMENT KEY FINDINGS

This section summarises the key findings of the risk assessment. The results from this study are used as a basis for the Pipeline Protection (Risk Management) Plan to be incorporated in the existing APA pipeline protection systems for the PGP and used by the contractors during the proposed development. The worksheet and recorded data for the risk assessment is presented in Appendix B.

The risk assessment study identified and reviewed 11 threats for all location and non-location specific threats. However, several of the threats are duplicated at more than one location. These have been identified in the workshop data table at Appendix B. For example there are two road crossings proposed over the pipeline easement. The threat list for each crossing is essentially identical with only the location class being different.

Four of the identified threats were discussed but nominated as not credible due to the controls that are or will be in place. The other seven identified threats deemed credible were assessed as ALARP and have an intermediate risk ranking.

The intermediate ranked items are deemed ALARP as although the catastrophic consequence is theoretically possible it is not deemed foreseeable and the likelihood is hypothetical for these circumstances providing the nominated controls are in place and effective. Should these controls not be in place or ensured to be effective then the risk from the threats would be higher.

All other items in the data sheet were considered to have no credible threats.

5.1. Recommendations/ Actions Close-out

As the project is at an early planning approval stage the nomination of individuals responsible for completing actions was not possible. However either a representative of Planning Solutions (Paul Ellenbroek) or APA Group (Paul Revell) will be responsible in due course. The allocation is noted in Appendix B.

As a minimum (some may be subdivided) 13 individual actions will require implementation at the relevant time by the nominated party (or delegate) prior to commencement of / or during the works as relevant. In particular additional job specific risk assessments with the relevant sub contractors prior to commencement of work are required.

5.2. Risk Summary

Overall the project hazards are well understood and this proposal does not present any unusual or difficult to manage threats with only the construction of the swale drainage basin and two straightforward road crossing directly affecting the easement.

As is typical with this type of development, the threats will require a high degree of supervision / coordination between APA, Galati Nominees and their subcontractors to ensure that the controls nominated in the risk assessment table are followed and the work progresses in the required order to protect the pipeline.



6. CONTROLS

Physical and procedural controls will be applied to all credible external interference threats by application of multiple independent protective measures in accordance with AS2885.1. These physical and procedural controls were identified during the Risk Assessment Workshop (Appendix B).

The following hierarchy of controls is applied to the credible threats:

- Elimination;
- Physical controls;
- Procedural controls;
- Reduction; and
- Mitigation.

Controls will be incorporated into the safety management systems of the selected contractors during the development activities that are associated with pipeline.

The following physical and procedural controls (other than the design conditions of the pipeline as noted in Appendix D) are proposed to manage the credible threats, ensure safety at site and provide compliance with AS2885:1. The controls are presented in two groups:

- Section 6.1 lists both physical and procedural controls that are aimed at managing the specifically identified (Ref. 2) direct threats; and
- Section 6.2 lists the generic procedural controls that are aimed at managing risks across many or all of the direct threats.

6.1. Direct Threat - Physical and Procedural Controls

These controls are grouped by the main threats as follows:

- Pipeline Condition;
- Excavation,
- Backfill / Spreading;
- Horizontal Boring (if required);
- Movement of Machinery / Vehicles; and
- Landscaping.

Details of these controls are given below.

6.1.1. Pipeline Condition

Prior to the commencement of the site works adjacent to the pipeline easement, APA will examine the length of the pipeline associated with the proposed development. This will involve examining the weld joints and replacing the protective wrapping in accordance with the pipeline operator's requirements and procedures.



6.1.2. Excavation

Prior to carrying out any excavation an approved Permit to Dig must be obtained which requires that all known services in the work area have been identified and located. The completed Permit to Dig application will include all specific details, such as those provided by APA relating to work within the vicinity of a particular service (Ref. 4).

The purpose of locating the services is to confirm they are located more than 5m away from any part of the planned excavation. If it is not possible to confirm that they are more than 5m away then excavation will be by hand digging only (Ref. 4).

APA's requirements are that:

- All mechanical equipment shall be approved by APA prior to use on the easement or in the vicinity of the pipeline. No tiger teeth devices are allowed;
- The maximum size of mechanical excavators is 15 tonnes;
- Excavation machinery within 1m on either side of the pipeline will not be used. Trenching or excavation within these limits will be done by hand;
- Protective wrapping will be applied if the pipeline is to be exposed for more than a few hours;
- The pipeline will be located by authorised personnel and soil probes will not be used;
- If rock breakers are used (for limestone areas) vibration monitoring to ensure no exceedances of peak particle velocity of 10mm/s must be implemented;
- Barriers, signs and lights will be erected as necessary if excavation is not immediately backfilled; and
- A concrete slab, to APA specification, will be installed 300mm above the pipeline for the length of the Lots adjacent to the development prior to the release by APA of any subdivided lots within the setback distance. This is being done as a requirement of the WAPC Planning Bulletin 87 Table 6 (Ref. 5) to permit development up to the boundary of the easement.

6.1.3. Backfill / Spreading

In order to ensure that the pipeline will not be subject to excessive additional loads due to backfilling or spreading of materials during the construction activities, special attention / supervision will be required and approved / supplied by APA. This will be particularly relevant for the two road crossings construction.

All mechanical equipment shall be approved by APA prior to use on the easement or in the vicinity of the pipeline. No tiger teeth devices are allowed.

The maximum sized vibratory roller used in standard construction practice is 12 tonne. Additionally, APA requires that vibrating compaction equipment is not permitted to be used within 10m of the pipeline. (Note small 500mm plate compactors can be approved for some circumstances).

Prior to work commencing adjacent to the easement, a concrete slab, to APA specification, will be installed 300mm above the pipeline for the length of the Lots adjacent to the development prior to the release by APA of any subdivided lots within the setback distance.

6.1.4. Horizontal Boring

Horizontal boring may be required when connecting services from the proposed development to any future development on the western side of the easement. This activity



presents a significant hazard to the pipeline. As nothing is known about the development details in the area of the road crossings now a separate risk assessment would be required with the APA and Galati Nominees' subcontractors prior to any work involving horizontal boring commencing at any time during the development or at a future date.

As an example, a typical physical control to manage this type of hazard is the placement of vertical or side concrete slabs / barriers to protect the pipeline where the horizontal boring is likely to occur. This will be confirmed during the specific risk assessment should side slabbing be required.

Additionally APA have a work instruction "Easement Crossing Construction" that requires the pipeline to be uncovered at the horizontal boring location up to 300mm below the pipeline (Ref. 6). This enables visual confirmation that the horizontal drill can be physically seen to miss the pipeline.

6.1.5. Movement of Machinery / Vehicles

For this project vehicles will cross the pipeline easement only for the construction of the two road crossings. The remainder of the easement will be fenced off during the development to prevent access at all times. For the road crossings the following control measures will be adhered to during movement of construction machinery and vehicles:

- All mechanical equipment shall be approved by APA prior to use on the easement or in the vicinity of the pipeline. No tiger teeth devices are allowed.
- The use of any vibratory equipment will not be permitted within 10m of the pipeline;
- The construction zone will be marked and the pipeline easement will be temporarily fenced which will be maintained until the construction works, including dwellings, is completed;
- The Galati Nominees (and subcontractors) will ensure that construction traffic does not cross the Parmelia pipeline easement, outside the designated crossing points in the construction zone(s). Any crossing within the construction zone will be in accordance with the details in the pipeline stress analysis;
- No machinery of any kind will be stationed / parked within 1.5m of the buried pipeline or facilities;
- Vehicular crossings will have a minimum cover of 1.2m above the top of pipeline crossing, for heavy equipment the depth of cover may be greater. The current site conditions have a ground cover of between 1.7 and 2.2m depending upon the location; and
- Prior to work commencing adjacent to the easement, a concrete slab, to APA specification, will be installed 300mm above the pipeline for the length of the Lots adjacent to the development prior to the release by APA of any subdivided lots within the setback distance.

6.1.6. Landscaping

- Landscaping details associated with the easement and adjacent public open space are not known at this time. However, the landscape architect and installers should be made aware of the following requirements.
- Installation of irrigation lines will require a separate risk assessment once the design is known. Typically the design should minimise or eliminate crossings over the easement;



- There is to be no mechanical digging within 1m of the pipeline;
- For path construction the depth of cover is to be a minimum of 750mm. There can be no dumping of materials within five metres of the pipeline;
- The maximum sized vibratory roller used in standard construction practice is 12 tonne. Additionally, APA requires that vibrating compaction equipment is not permitted to be used within 10m of the pipeline. (Note small 500mm plate compactors can be approved for some circumstances eg path base material compaction);
- Prior to work commencing adjacent to the easement, a concrete slab, to APA specification, will be installed 300mm above the pipeline for the length of the Lots adjacent to the development prior to the release by APA of any subdivided lots within the setback distance.
- Holes for planting trees and shrubs on the easement to be no deeper than 300mm. Tree planting requiring deeper holes needs to be done under the supervision of an APA Permit to Work officer; and
- Trees and shrubs with a height greater than 3m with a root depth greater than 300mm are not permitted within the easement.

6.2. Generic Procedural Controls

The following procedural controls are proposed:

- Site Inductions;
- Review of easement access;
- Review of existing drainage location;
- Review of maintenance procedures;
- Dial before you dig;
- Permitting procedures;
- Signage;
- Marker Tape;
- Patrols; and
- Landowner, Occupier and other Authority Liaison.

6.2.1. Site Inductions

All personnel new to the Lots 14, 15 and 299 Kerosene Lane, Baldivis development, including Contractors and Visitors will be required to attend a site induction briefing upon arrival and prior to commencing work. The induction details aspects of the development, site safety requirements (including pipeline protection measures) and procedures, which apply when working on site.

Details are provided to attendees of emergency responsibilities and actions including (but not limited to) the following:

- Health, Safety Requirements;
- Safety Responsibilities and Safety Management;



- Communications;
- Emergency Response Plan;
- Site Familiarisation; and
- Hazard / Risk Awareness.

6.2.2. Review of Easement Access

A review of the type of vehicles that will be permitted to operate within the pipeline easement (for the road crossings) will be conducted by APA. The findings from this review will restrict access into the easement to the permitted site vehicles.

6.2.3. Review of Maintenance Procedures

APA will perform regular review of their maintenance procedures to ensure regulatory compliance of their safety management systems.

6.2.4. Dial Before You Dig

Galati Nominees / APA will obtain information, such as pipeline location and third party service routes from the Dial before you Dig service prior to any work activities conducted on site. This will be particularly relevant for the road crossing construction. However a concrete slab will be installed above the pipeline prior to the road construction commencing. This will only prevent hand tools and small equipment damaging the pipeline.

6.2.5. Permitting Procedures

Galati Nominees and all subcontractors shall communicate their proposed activities in advance to allow APA to organise and provide direct supervision of required activities. Additionally a permit to dig procedure shall be used as part of the site safety management system. This will take into account the proposed work and the location of the services (pipeline or others) in the vicinity.

6.2.6. Signage

Signage on the Parmelia Gas Pipeline shall be visible in both directions along the section of pipeline adjacent to the Lots 14, 15 and 299 Kerosene Lane, Baldivis development with spacing not exceeding 50m. An emergency contact number will be shown on the sign to alert emergency services in the event of an incident.

6.2.7. Marker Tape

In locations where additional protection is deemed necessary, marker tape shall be installed above the pipe to warn third parties of the presence of the buried Parmelia Gas Pipeline.

6.2.8. Patrols

Routine patrols of the pipeline easement will be performed by the pipeline operator (APA), which shall not exceed the six monthly intervals.

6.2.9. Landowner, Occupier and other Authority Liaison

The Pipeline Operator (APA) will inform all landholders, occupiers and other utility providers within Lots 14, 15 and 299 Kerosene Lane, Baldivis area of any proposed maintenance activities that may arise at least on an annual basis. This is part of APA's public awareness procedures.



7. REFERENCES

1. Australia standard AS2885.1 2007, "Pipelines – Gas and Liquid Petroleum, Part 1: Design and Construction", Standards Australia.
2. Parmelia Gas Pipeline, Lots 14, 15 and 299 Kerosene Lane, Baldivis development - AS 2885.1 -2007 Pipeline Risk Assessment, Appendix B and C Vanguard Solutions.
3. Penetration Resistance, Fatigue & Radiations Contour Calculations Parmelia Gas Pipeline, APA document PAM-DC-624, APA Group
4. Instructions for Work Near Gas Pipelines, APA Group-Parmelia Operations.
5. Western Australian Planning Commission, Planning Bulletin 87, High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region; October 2007.
6. APA Work Instruction document, WI-4.9.43 "Easement Crossing Construction".



APPENDIX A- AS2885.1 Compliance Table



Table A.1 - Compliance Table

Compliance Table for Pt Lot 26, Lots 1 and 11, South Baldivis development				
Ref.	AS2885.1 2007 Standard Requirement	AS2885.1 2007 Standard Section	Documentation	Notes for Client Use
SR-01	Implementation - All actions arising from the safety management study shall be implemented and the implementation documented. Where ongoing action is required, a reporting mechanism to demonstrate action shall be established, implemented and audited.	2.2.3	All actions from the Risk Assessment Workshop (RA), have been documented in the RA worksheet (Appendix B) Actions requiring on-going reporting have been recommended in the RA worksheet and PPP report which are to be included in APA's Safety Management System to ensure ongoing management of this item.	
SR-02	Safety Management Study Validation - Each detailed safety management study shall be validated by a properly constituted workshop which shall critically review each aspect of the safety management study.	2.2.4	The safety management study has been conducted as a result of new threats associated with the construction activities on Lots 14, 15 and 299 Kerosene Lane, Baldivis development. The scope of the study has been restricted to only the area that is changed. An assessment of the existing and agreed recommended controls has been undertaken during the Risk Assessment workshop.	
SR-03	Operational Review - An assessment of the implementation and effectiveness of all threat controls shall be made at each operational review.	2.2.5	The operational reviews are conducted by APA on a regular basis. However they are not part of the scope of this development work.	



Compliance Table for Pt Lot 26, Lots 1 and 11, South Baldvis development				
Ref.	AS2885.1 2007 Standard Requirement	AS2885.1 2007 Standard Section	Documentation	Notes for Client Use
SR-04	Safety Management Process – The pipeline safety management process consists of the following: - Threat identification; - Application of physical, procedural and design measures to identified threats; - Review and control of failure threats; and - Assessment of residual risk from failure threat. An assessment of the implementation and effectiveness of all threat controls shall be made at each operational review.	2.3.1	The Risk Assessment Workshop was performed in accordance with the Safety management Process as stated in Section 2.3 of AS2885:1 – 2007.	
SR-05	External Interference Protection-The pipeline shall be protected from external interference by a combination of physical and procedural controls at the location of each identified threat. All reasonably practicable controls should be applied.	2.3.3.2	All external interference threats identified in the Risk Assessment have been protected by a combination of physical and procedural controls to ensure that the risks of impact to the pipeline are ALARP (Appendix B), except where a further risk assessment is noted as being required.	
SR-06	Control by Design and/or Procedures - Design and/or procedures shall be applied to threats other than external interference threats in accordance with Standard	2.3.3.3	Failure analysis is addressed in the Risk Assessment Data (Appendix B), which covered all identified pipeline threats associated with the Lots 14, 15 and 299 Kerosene Lane, Baldvis development.	
SR-07	Failure Analysis – where controls may not prevent failure for a particular threat, the threat shall be analysed to determine the damage that it may cause to the pipeline.	2.3.4.1	Failure analysis is addressed in the Risk Assessment Data (Appendix B), which covers all identified pipeline threats and foreseeable maximum consequences.	



Compliance Table for Pt Lot 26, Lots 1 and 11, South Baldivis development				
Ref.	AS2885.1 2007 Standard Requirement	AS2885.1 2007 Standard Section	Documentation	Notes for Client Use
SR-08	Treatment of Failure Threats – where a failure event is identified additional controls to prevent failure shall be investigated and applied where applicable.	2.3.4.2	Refer to comment SR-07. Additional controls, where necessary have been addressed in the Risk Assessment Data (Appendix B) and recommendations noted as actions were made where insufficient existing controls were identified.	
SR-09	Documentation –The failure analysis for the specific threat shall be documented.	2.3.4.3	Refer to comment SR-07. However items f) and g) in AS 2885.1 section 2.3.4.3 have not been specifically documented as it is obvious that the fluid is natural gas and further QRA to that referred to in Western Australian Planning Commission Planning Bulletin 87 (Ref. 5) would provide no benefit in determining setback distances etc. for this development.	
SR-10	Demonstration of Fault Tolerance – To demonstrate the fault tolerance of the pipeline design, a situation where failure of threat control measures leads to pipe damage or loss of containment shall be considered as a threat.	2.3.6	Residual risks have been assessed during the Risk Assessment Workshop for threats taking into account the potential effectiveness of the nominated controls as per the hierarchy of controls Fig. 4.1, refer to the Risk Assessment Data (Appendix B).	
SR-11	Environmental Management – The threats to the environment from each part of the life cycle of the pipeline to be identified and control measures shall be given to ensuring environmental threats are managed by avoidance.	2.5	No potential threats to the environment were identified during the workshop.	



Compliance Table for Pt Lot 26, Lots 1 and 11, South Baldvis development				
Ref.	AS2885.1 2007 Standard Requirement	AS2885.1 2007 Standard Section	Documentation	Notes for Client Use
SR-12	Environmental Management – An environmental impact assessment shall be conducted in accordance with the standard along the length of pipeline route. The environmental impact assessment report shall form the basis of the environmental management plan.	2.5	The environmental impact assessment for the operating aspects Parmelia Gas pipeline is outside the scope of this study as the pipeline is in place. The development by Galati Nominees does not generate additional environmental impact from the pipeline.	
SR-13	Environmental Management –Threat of damage to the environment from operational maintenance and abandonment activities shall be identified and control measures developed.	2.5	Refer to comment SR-11.	
SR-14	Electrical – A pipeline in the vicinity of electricity supply powerlines or facilities shall be analysed to determine if controls are required to provide for electrical safety.	2.6	The impact from third party service providers was addressed within the Risk Assessment Data (Appendix B). Galati Nominees and subcontractor prior to construction activities requests Dial before you Dig documentation. This information will be communicated to all third party contractors (Appendix B, and Ref. 4).	
SR-15	Construction Safety – A construction safety plan shall be prepared, reviewed by appropriate personnel, and approved. This review shall take the form of a construction safety plan workshop.	2.7.1	There will be no pipeline construction activities taking place during the development of Lots 14, 15 and 299 Kerosene Lane, Baldvis. Therefore, this requirement is not applicable.	
SR-16	Testing Safety – The construction safety plan shall address safety through all phases of testing of the pipeline during construction.	2.7.2	Refer to comment SR-15.	



Compliance Table for Pt Lot 26, Lots 1 and 11, South Baldvis development				
Ref.	AS2885.1 2007 Standard Requirement	AS2885.1 2007 Standard Section	Documentation	Notes for Client Use
SR-17	Commissioning Plan – The commissioning plan shall consider the safety of the activities undertaken through all phases of commissioning and, where required, develop specific procedures to manage the safety during commissioning of the pipeline.	2.7.3	Refer to comment SR-15.	



APPENDIX B – Pipeline Risk Assessment Minutes / Data.



AS 2885 Risk Assessment

Project: **A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA**

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,I; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
L1	Location Specific		Swale drainage basin													
		T1,I														
	Drainage															
HAZ 1		T1,I		Inundation of pipeline from storm water collection.	A 1 in 10 year fill of swale basin may affect pipeline easement causing erosion or flotation of pipeline.	N	Existing depth of cover is 1.7-2.2m. A concrete slab (150mm thick) will be placed over the pipeline.	Pipe coating - No. 1 Yellow Polyethylene Jacket. (0.031" thickness) Cathodic protection for pipeline.	Y							The pipeline is under the water table in similar locations for part of year so swale is not considered significant additional threat. Due to existing cover flotation is not possible. Proposed contours (minor changes from existing) mean that significant erosion is not considered possible.
	Road Crossings															
		T1,I		No credible threats at this location												
	Services															
		T1,I		No credible threats at this location												
	Excavations															
HAZ 2		T1,I		Regrading of swale contours	Heavy machinery could impact pipeline via vibration or direct contact.	N	Signage Existing depth of cover is 1.7-2.2m. No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Easement delineation with star picket fence and designated crossing locations Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Fencing and exclusion of all vehicles from easement during earthworks. No work is to be performed on or that could affect the easement Vehicles to cross the easement at designated points only. If rock breakers are used (for limestone areas) vibration monitoring to ensure no exceedances of peak particle velocity of 10mm/s must be implemented.	Galati Nominees, (Planning solutions - PE)	At subdivision approval stage				Threat is not considered to be credible. However this does depend upon the fences being in place prior to work commencing and no large vibrating equipment being used during swale contouring.



AS 2885 Risk Assessment

Project: A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,I; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
	Filling / Back Filling															
		T1,I		As per HAZ 2												
	Spreading															
		T1,I		As per HAZ 2												
	Access to / across Easement															
HAZ 3		T1,I		Construction activity heavy vehicles	Heavy machinery could impact pipeline via vibration or stressing from mass of vehicle.	N	Signage Existing depth of cover is 1.7-2.2m. No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Easement delineation with star picket fence and designated crossing locations Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.		As per HAZ 2						Threat is not considered to be credible. However this does depend upon the fences being in place prior to work commencing and no large vibrating equipment being used during swale contouring.
	Future Services															
		T1,I		No credible threats at this location												
	Lighting															
		T1,I		No credible threats at this location												
L2	Location Specific		R60 grouped housing (zone 3)													
		T1														
	Drainage															
		T1		No credible threats at this location												Drainage is either soak wells or will be directed to the swale basin
	Road Crossings															
		T1		No credible threats at this location												
	Services															
		T1		No credible threats at this location												
	Excavations															



AS 2885 Risk Assessment

Project: A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,I; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
		T1		No credible threats at this location												
	Filling / Back Filling															
		T1		No credible threats at this location												
	Spreading															
		T1		No credible threats at this location												
	Access to / across Easement															
HAZ 4		T1		Construction activity heavy vehicles. (As per HAZ 3)	Heavy machinery could impact pipeline via vibration or stressing from mass of vehicle.	N	Signage Existing depth of cover is 1.7-2.2m. No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Easement delineation with star picket fence and designated crossing locations Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Fencing and exclusion of all vehicles from easement during earthworks. No work is to be performed on or that could affect the easement Vehicles to cross the easement at designated points only. If rock breakers used vibration monitoring to ensure no exceedances of peak particle velocity of 10mm/s	Galati Nominees, (Planning solutions - PE)	At subdivision approval stage				The north / south road running parallel to the easement is approximately 13m from pipeline to the edge of the road reserve and 20m to the edge of the road from the pipeline. Providing heavy vehicles are excluded from the easement and use designated crossings the threat is not credible.
	Future Services															
		T1		No credible threats at this location												
	Lighting															
		T1		No credible threats at this location												
L3	Location Specific		Road crossing North with roundabout													
		T1														



AS 2885 Risk Assessment

Project: A10526 - Lots 14, 15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,i; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
	Drainage															
HAZ 5		T1		Road drainage services	Installation of road drainage services could damage the pipeline (As per HAZ 8 excavation activities)	Y	Existing depth of cover is 1.7-2.2m. A concrete slab (150mm thick) will be placed over the pipeline. No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices.	Easement delineation with star picket fence and designated crossing locations Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Construction risk assessment with selected contractors to be performed prior to commencement of work	Galati Nominees, (Planning solutions - PE), APA, Contractor's). APA Group	At subdivision approval stage	Catastrophic	Hypothetical	Intermediate	
	Road Crossings															
HAZ 6		T1		Construction activity heavy vehicles.	Heavy machinery could impact pipeline via vibration or stressing from mass of vehicle.	Y	Signage Depth of existing 1.7-2.2m cover No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Easement delineation with star picket fence and designated crossing locations Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Fencing and exclusion of all vehicles from easement during earthworks. No work is to be performed on or that could affect the easement Vehicles to cross the easement at designated points only. If rock breakers used vibration monitoring to ensure no exceedances of peak particle velocity of 10mm/s. A list of vehicles to be used for road construction to be submitted to APA for approval prior to work commencing.	Galati Nominees, (Planning solutions - PE)	At subdivision approval stage	Catastrophic	Hypothetical	Intermediate	



AS 2885 Risk Assessment

Project: A10526 - Lots 14, 15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,i; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
Services																
HAZ 7		T1		Construction of services conduits / corridors.	Heavy machinery could impact pipeline via vibration or direct contact during excavation for trenches etc. Depending upon the final design sewerage lines may be below the pipeline.	Y	Signage Depth of existing 1.7-2.2m cover No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline. General exclusion of electrical transformers within recommended distances to prevent interference with pipeline cathodic protection	Dial before you dig Contractors to communicate details of work to allow APA to provide supervision. Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved. APA procedure for sighting of boring devices at depth prior to crossing pipeline.	Y	Contractor work specific risk assessment with APA prior to work commencing APA procedures for these types of crossings to be used and communicated to contractors. Electrical services to be assessed when final design is known.	Galati Nominees, (Planning solutions - PE), APA, Contractor's). APA Group	At subdivision approval stage	Catastrophic	Hypothetical	Intermediate	
Excavations																
HAZ 8		T1		Excavations for construction of road crossing	Excavation equipment could damage pipeline	Y	Depth of existing 1.7-2.2m cover No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Dial before you dig Contractors to communicate details of work to allow APA to provide supervision. Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Additional risk assessment required for construction of road crossings. Provide list of construction vehicles and vibratory equipment etc	Galati Nominees, (Planning solutions - PE), APA, Contractor's).	At subdivision approval stage	Catastrophic	Hypothetical	Intermediate	
Filling / Back Filling																
		T1		As per HAZ 8												
Spreading																
		T1		As per HAZ 8												



AS 2885 Risk Assessment

Project: A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,i; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
	Access to / across Easement															
		T1		As per HAZ 3												
	Future Services															
HAZ 9		T1		Future development west of easement may require services from east of the easement	Side drilling for services links under the easement / pipeline from west to east side roads could damage pipeline depending upon distance the side drilling has to surface from easement. Sewerage services may have to go under the pipeline.	Y	Signage Depth of existing 1.7-2.2m cover No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline. General exclusion of electrical transformers within recommended distances to prevent interference with pipeline cathodic protection. Concrete pipeline sidewall protection.	Dial before you dig Contractors to communicate details of work to allow APA to provide supervision. Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved. APA procedure for sighting of boring devices at depth prior to crossing pipeline.	Y	Concrete sidewalls will be required as additional protection at the road crossings or points where services may cross easement for future western development. Sidewalls should be put in place at the time of construction of the road crossing.	Galati Nominees, (Planning solutions - PE)	When road crossings are developed or when western developments required services from the eastern development.	Catastrophic	Hypothetical	Intermediate	Hypothetical rating given due to side walls being present. Sidewalls will only need to go in if development takes place on the west that requires horizontal boring or similar from east.
	Lighting															
		T1		No credible threats at this location												
L4	Location Specific		Road crossing South													
		T1		The threats for the south crossing are the same as that for the north (the south crossing is less complex). However the location class changes here so potential consequences are lower due to lower people density.												
	Drainage															
		T1		As per HAZ 5												



AS 2885 Risk Assessment

Project: A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,I; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
	Road Crossings															
		T1		As per HAZ 6												
	Services															
		T1		As per HAZ 7												
	Excavations															
		T1		As per HAZ 8												
	Filling / Back Filling															
		T1		As per HAZ 8												
	Spreading															
		T1		As per HAZ 8												
	Access to / across Easement															
		T1		As per HAZ 3												
	Future Services															
		T1		As per HAZ 9												
	Lighting															
		T1														
NL1	Non location specific															
HAZ 10		Overall														
	External Interference															
		Overall		As per HAZ 3 and Irrigation and landscaping of the public open space and easement areas.	Installation of irrigation and planting of large trees may allow impact on the pipeline of tree root causing stress damage to pipeline and damage to protective coatings.	Y	Signage Depth of existing 1.7-2.2m cover No mechanical digging within 1m of pipeline. Limit the size of the excavator to 15 tonne. No tiger teeth devices. A concrete slab (150mm thick) will be placed over the pipeline.	Dial before you dig. Holes to be a maximum of a spade depth eg 300mm without APA supervision. Contractors to communicate details of work to allow APA to provide supervision. Pipeline design details in table header. 55 tonne penetration resistance for general purpose teeth (10 tonne for tiger teeth) APA document PAMDC624 penetration resistance calculations APA representative on site during construction. No large vibratory compaction to be used within 10m of pipeline. Small 500mm plate compactors are generally approved.	Y	Confirmation of irrigation and landscaping design will require further risk assessment and APA approval. Landscaping requirements eg no trees greater than 2m in height to be planted on the pipeline easement	Galati Nominees, (Planning solutions - PE) APA Group	At subdivision approval stage	Catastrophic	Hypothetical	Intermediate	As there is known to be limestone in the area more hazardous excavation equipment present a greater threat if uncontrolled when trying to work in the limestone. Hypothetical rating is given as landscaping will not take place without APA approval.
	Corrosion															
		Overall		No credible threats relevant to this proposal												



AS 2885 Risk Assessment

Project: A10526 - Lots14,15 & 299 Kerosene Lane, Baldivis, WA

			Pipeline Type:	Gas	Pipe Internal Diameter:	355.6mm (14")		Facilitator	Tony Davies							
			Location Class:	T1; T1,I; T2	Wall Thickness:	5.5 - 6mm		Note	If 2 physical and 2 procedural controls are / will be present no further risk assessment is required by APA Group.							
			Land Use:	Residential / Light Commercial	Pressure:	5.6MPa										
HAZ ID #	Location	Location Class	Location Description	Threat	Threat Analysis	Is the threat credible? (y/n)	Safeguards - External Interference Protection	Safeguards - Procedural/ Design - Safeguards	Reduced to ALARP	Actions	Action By	Action due date	Consequence	Frequency	Risk Ranking	Comment
	Natural Events															
		Overall		No credible threats relevant to this proposal												
	Electrical Effects															
		Overall		As per HAZ 9												
	Operations and Maintenance Activities															
		Overall		No credible threats relevant to this proposal												
	Construction Defects															
		Overall		No credible threats relevant to this proposal												
	Design Defects															
		Overall		No credible threats relevant to this proposal												
	Material Defects															
HAZ 11		Overall		Pipeline may have deteriorated since construction	As the land use is changing any deterioration in the conditions of the pipeline since construction may now have larger consequences	Y	N/A	Cathodic corrosion protection The pipeline will be uncovered and all joins / welds will be visually inspected, any action required taken and the pipeline re-wrapped prior to concrete top slab placement. APA group maintenance system and checks	Y	Prior to development pipeline inspection (joins / welds) to be completed.	APA group	Prior to concrete top slab placement prior to the start of the site works	Catastrophic	Hypothetical	Intermediate	
	Intentional/ Malicious Damage															
		Overall		No credible threats relevant to this proposal												As the pipeline is buried (1.7 - 2.2m) and will be covered in concrete slab. There are no surface features so this threat is not considered credible.



APPENDIX C – Workshop Risk Assessment Team



Name	Company	Position
Paul Ellenbroek	Planning Solutions	Senior Planner
Clayton Wylie	APA Group	Mechanical Engineer
Paul Revell	APA Group	Land Coordinator
Gerry Connell	APA Group	Lands Officer
Warren Guthrie	APA Group	Operations Team Leader
Tony Davies	Vanguard Solutions	Facilitator / Scribe Lead Risk & Safety Engineer

Name	Company	Position
Tony Davies	Vanguard Solutions Pty Ltd	Facilitator / Risk and Safety Engineer
Paul Ellenbroek	Planning Solutions	Senior Planner
CLAYTON WYLIE	APA ✓	MECHANICAL ENGINEER
PAUL REVELL	APA	LAND CO-ORDINATOR
GERRY CONNELL	APA	LANDS OFFICER
Warren Guthrie.	APA.	Operations Team Leader.



APPENDIX D - Parmelia Pipeline Material Specification and other properties.



Pipeline Property	Pipeline Name: Parmelia
Pipe Material	API 5L x52, Butt welded along trunk line
Pipe outside diameter	356mm (14")
Pipe Maximum allowable operating pressure (MAOP)	5.61 MPa
Depth of Cover	1300mm
Pipe Coating	No. 1 Yellow Polyethylene Jacket. (0.031" thickness)
Pipe length affected by the project	Approx. 600m
Design Factor	50%
AS2885 Design Location Classification	T1, I (refer section 2.3)
AS2885.1 Resistance to Penetration Calculations. <i>(Reference - Penetration Resistance, Fatigue & Radiations Contour Calculations Parmelia Gas Pipeline, AGY-007-TR-003, APA Group)</i>	The largest excavator that the pipeline can resist is a 15 tonne 'tiger' tooth excavator. Other excavators with "standard" teeth could be larger. However, any contact by any machinery of any type will likely cause damage to the pipe coating which is inherent to corrosion mitigation



DOCUMENT TRANSMITTAL

To : Paul Ellenbroek
Company : Planning Solutions
Copy : Paul Revell – APA Group
Email : pellenbroek@planningsolutions.com.au; Paul.Revell@apa.com.au
From : Tony Davies
Date : 2/7/2010
Subject : PGP Risk Assessment and Pipeline Protection Plan Report Rev 0
Ref. : A10526-TRANS-001

Issued for/as:	Final	✓	Review		Information	-
Comments due by		NA				

We hereby transmit the following:

Quantity	Description
1	Revision 0 of Kerosene Lane development, PGP Risk Assessment and Pipeline Protection Plan Report A10526-PSO-RX-001

RECEIPT

Please acknowledge receipt of the above by signing and returning an e-copy of this notification by email to the following address(es), subject Header as per Ref. above:

To: tony.davies@vanguardsolutions.com.au;

DOCUMENT DISTRIBUTION

- N/A

NOTES OR REVIEW INSTRUCTIONS/REQUESTS:

- N/A

Signed for
Vanguard Solutions Pty Ltd

Name (please print): Tony Davies

Date: 02/07/2010

Acknowledgment of receipt

Name (please print) _____

Date: _____

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Level 18, 191 St Georges Tce, Perth WA 6000
T. (08) 9289 8300 – E. hello@elementwa.com.au
elementwa.com.au