COCK/2015/3/1
LOT 95 WATSON ROAD
STRUCTURE PLAN

Lot 95 Watson Road, Beeliar

March 2016

Urban Capital Group

Creative DESIGN+PLANNING

DOCUMENT STATUS

VERSION	COMMENT	PREPARED BY	REVIEWED BY	REVIEW DATE	APPROVED BY	ISSUE DATE
1	Lodgement	TV	SD	20.07.2015	FA	28.07.2015
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COCK/2015/3/1
LOT 95 WATSON ROAD
STRUCTURE PLAN

MARCH 2016

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Our Ref: W:\CD+P 2016\UrbBe\Watson Road\Structure Plan\160302 Structure Plan Report.docx

ENDORSEMENT OF STRUCTURE PLAN

This structure plan is prepared under the provisions of the City of Cockburn Town Planning Scheme No.3.

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

15 MARCH 2016 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 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

 Witness

16 March 2016 Date

15 MARCH 2026 Date of Expiry

Table of Amendments

AMENDMENT NO.	SUMMARY OF AMENDMENT	AMENDMENT TYPE	DATE APPROVED BY WAPC

Table of Density Plans

DENSITY PLAN NO.	AREA OF DENSITY PLAN APPLICTION	DATE ENDORSED BY WAPC

EXECUTIVE SUMMARY

This Structure Plan has been prepared to guide the zoning, subdivision and development of Lot 95 Watson Road, Beeliar, within the City of Cockburn municipality.

The SP has been prepared on behalf of Urban Capital Group by the following specialist consultant team:

- Creative Design + Planning – urban design, town planning
- JDSi Consulting Engineers – engineering
- Emerge Associates – environment, hydrology
- Transcore - traffic

The Structure Plan has been submitted for approval by the Western Australian Planning Commission.

The design approach for this SP has focused on achieving appropriate integration with the surrounding land and to implement contemporary planning principles relating to urban density, public open space (POS) and drainage.

ITEM	DATA
Total area covered by the Structure Plan	4,047m^2
Area of each zoned or reserved land use proposed: • Residential • Roads • Public Open Space	 2,739m^2 913m^2 395m^2
Estimated lot yield	7 lots
Estimated number of dwellings	7 dwellings
Estimated residential site density	~ 17 dwellings/*gross urban zone* [1] ~ 25 dwellings/*site hectare* [2]
Estimated population	18+ people @2.7 persons per dwelling
Estimated area and number: • Local Parks	 1 park @ 395m^2

FOOTNOTES:

[1] *Gross Urban Zone' refers to the definition under WAPC's Directions 2031 and supporting documents.*
[2] *'Residential Site Hectare' refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods.*

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ABBREVIATIONS

AHD	Australian Height Datum
ASS	Acid Sulfate Soils
ARI	Average Recurrence Interval
BGL	Below Ground Level
CoC	City of Cockburn
CBD	Central Business District
DA	Development Area
DCA	Development Contribution Area
DPaW	Department of Parks and Wildlife
DoW	Department of Water
Ha	Hectare
LWMS	Local Water Management Strategy
MRS	Metropolitan Region Scheme
OMSRS	Draft Outer Metropolitan Perth & Peel Sub Regional Structure Plan
POS	Public Open Space
TPS3	City of Cockburn Town Planning Scheme No.3
UWMP	Urban Water Management Plan
WAPC	Western Australian Planning Commission

PART ONE

Implementation

LOT 95 WATSON ROAD STRUCTURE PLAN

1. Structure Plan Area
2. Operation
3. Staging
4. Subdivision and development requirements
5. Local Development Plans
6. Other requirements

PART ONE – IMPLEMENTATION

1 Structure Plan Area

This Structure Plan shall apply to Lot 95 Watson Road, Beeliar being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan (**Plan 1**). The Structure Plan is identified as the *Lot 95 Watson Road Structure Plan*.

2 Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the WAPC.

3 Staging

The development of the Structure Plan area will be in one stage.

4 Subdivision and Development Requirements

The Structure Plan (**Plan 1**) and **Table A** below form part of the implementation provisions of this Structure Plan outlining the requirements for the proposed residential land use zone (R40) and reserve, public open space.

Table A: Subdivision and Development Requirements

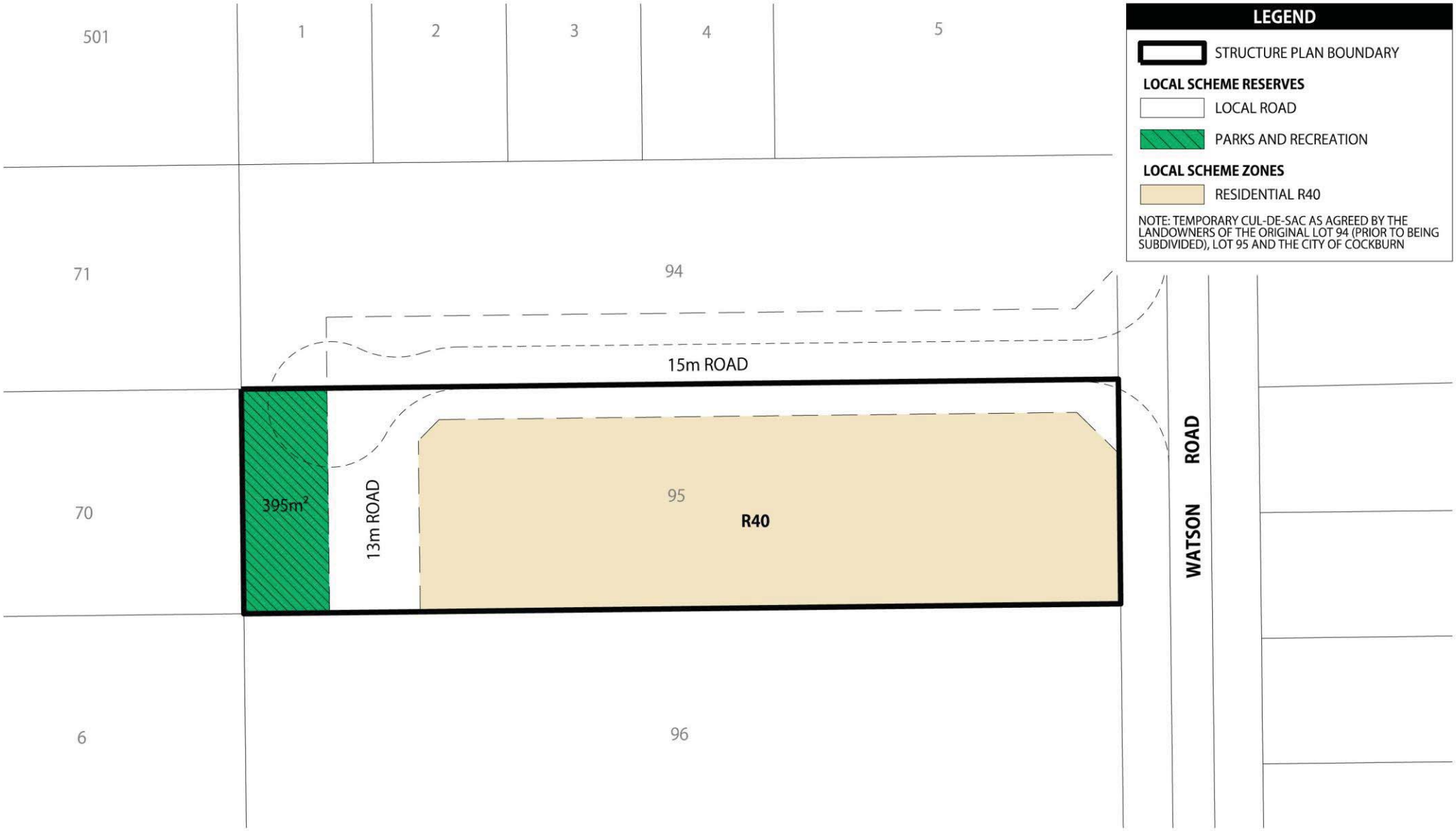
1. Land Use Zones and Reserves	a) The proposed land use zone and reserves are shown on **Plan 1**. b) Land use permissibility within the Structure Plan area shall be in accordance with Clause 4.3.2 of the Scheme. c) Subdivision and development within the Structure Plan area shall correspond to the nominated R40 density coding on the Structure Plan (**Plan 1**) and a recommendation by the City of Cockburn on whether the Structure Plan should be approved by the Western Australian Planning Commission (WAPC).
2. Public Open Space	a) **Plan 1** nominates an area of 395m^2 as Public Open Space. b) The final design of the Public Open Space will be subject to detailed engineering, drainage and landscape design. c) Subject to the agreement of the WAPC and the City of Cockburn, the provision of any Public Open Space not provided by way of land shall be provided by a payment of cash-in-lieu of land in accordance with the relevant provision of the *Planning and Development Act 2005*.
3. Residential Density	a) As per *Directions 2031*, the estimated residential density for the Structure Plan is approximately 16 dwellings/*gross urban zone* [1]. b) As per *Liveable Neighbourhoods* the estimated residential density for the Structure Plan is approximately 28 dwellings/*site hectare* [2].

5 Local Development Plans

A Local Development Plan will be prepared for the Structure Plan area pursuant to the WAPC's *Local Development Plan Framework* and the Schedule 2, 'Deemed Provisions for Local Planning Schemes' of the *Planning and Development (Local Planning Schemes) Regulations 2015*. The Local Development Plan will encompass all lots within the Structure Plan area.

6 Other Requirements

The Structure Plan area is subject to a City of Cockburn Development Contribution Plan for community infrastructure (DCP13); this is to apply to all land within the Structure Plan area to be subdivided and/or developed for residential purposes.



COCK/2015/138 - PLAN 1 - STRUCTURE PLAN

Lot 95 Watson Road, BEELIAR

NORTH

0 10 20 30m

Scale: 1:750@A4
Date: 02/03/2016
Plan: URBBE-2-003b

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PART TWO

Explanatory Section

LOT 95 WATSON ROAD

STRUCTURE PLAN

1. Planning Background
2. Site Analysis
3. Context Analysis
4. Structure Plan
5. Infrastructure Co-ordination and Servicing
6. Implementation

PART TWO – EXPLANATORY SECTION

1 Planning Background

1.1 Purpose

The purpose of the Lot 95 Watson Road Structure Plan is to provide for the orderly and proper subdivision and development of the Structure Plan area for 'Urban' purposes.

The information contained in this section provides justification and support for the design response provided for the Structure Plan.

1.2 Land Description

1.2.1 Location

The Structure Plan area is located on the western side of Watson Road, 500m south of Beeliar Drive and 250m east of Stock Road, within the municipality of the City of Cockburn. It is situated approximately 6km west of the Cockburn Secondary Centre and 20km south of the Perth CBD (**Figure 1** refers).

1.2.2 Area & Land Use

The Structure Plan area comprises 0.4047 ha and has been used historically for residential purposes.

1.2.3 Legal Description & Ownership

The Structure Plan area is identified as Lot 95 (No.95) Watson Road, Beeliar on Deposited Plan 3562, Volume 1734 and Folio 487. The registered owners are Juan Luis Da Luz and Diana Da Luz.

The Certificate of Title is enclosed as **Appendix 1**.

1.3 Planning Framework

1.3.1 Zoning & Reservations

1.3.1.1 METROPOLITAN REGION SCHEME

Pursuant to the Metropolitan Region Scheme (MRS) the Structure Plan area is zoned 'Urban'.

1.3.1.2 CITY OF COCKBURN TOWN PLANNING SCHEME NO.3

Under the provisions of the Scheme, the Structure Plan area is zoned 'Development' and lies within 'DA 4', 'DCA 4' and 'DCA 13' (**Figure 2** refers).

All land within the 'Development' zone requires a structure plan to guide future subdivision and development.

Subdividers within 'DCA 4' are required to make a contribution towards the construction of Beeliar Drive.

Subdividers within 'DCA 13' are required to make a contribution towards planned community infrastructure relevant to that area.

1.3.1.3 STRUCTURE PLAN

Lot 94 Watson Road, Beeliar adjoins the Structure Plan area to the north and has an approved Structure Plan (July 2014) prescribing Residential R40 and public open space (POS) development.

This approved Structure Plan nominates a 15m road reserve adjacent to the northern boundary of the subject land (**Figure 3** refers).

1.3.2 Regional & Sub Regional Structure Plans and Strategies

1.3.2.1 DIRECTIONS 2031

Directions 2031, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, is a high level strategic plan that establishes a vision for future growth of the Perth and Peel region. It provides a framework to guide the detailed planning and delivery of housing, infrastructure and services necessary to accommodate that growth.

Broadly defined, the Structure Plan area is located within the 'South-West Sub-Region' of *Directions 2031*, which encompasses the Cockburn, Rockingham and Kwinana municipalities. By 2031, the population of this sub-region is expected to grow by approximately 70,000 to a total population of 278,000 people. This will result in approximately 41,000 additional dwellings being required.

1.3.2.2 DRAFT OUTER METROPOLITAN PERTH & PEEL SUB-REGIONAL STRATEGY

The Draft Outer Metropolitan Perth & Peel Sub-Regional Strategy *(OMSRS)* provides a framework for delivering the objectives of *Directions 2031*. The document provides a more detailed analysis in terms of strategic plans of action, stakeholder responsibilities and timeframes for delivery of development within the metropolitan corridors.

Situated within the South-West sub-region, the Structure Plan area is identified as 'Urban Zoned Undeveloped'.

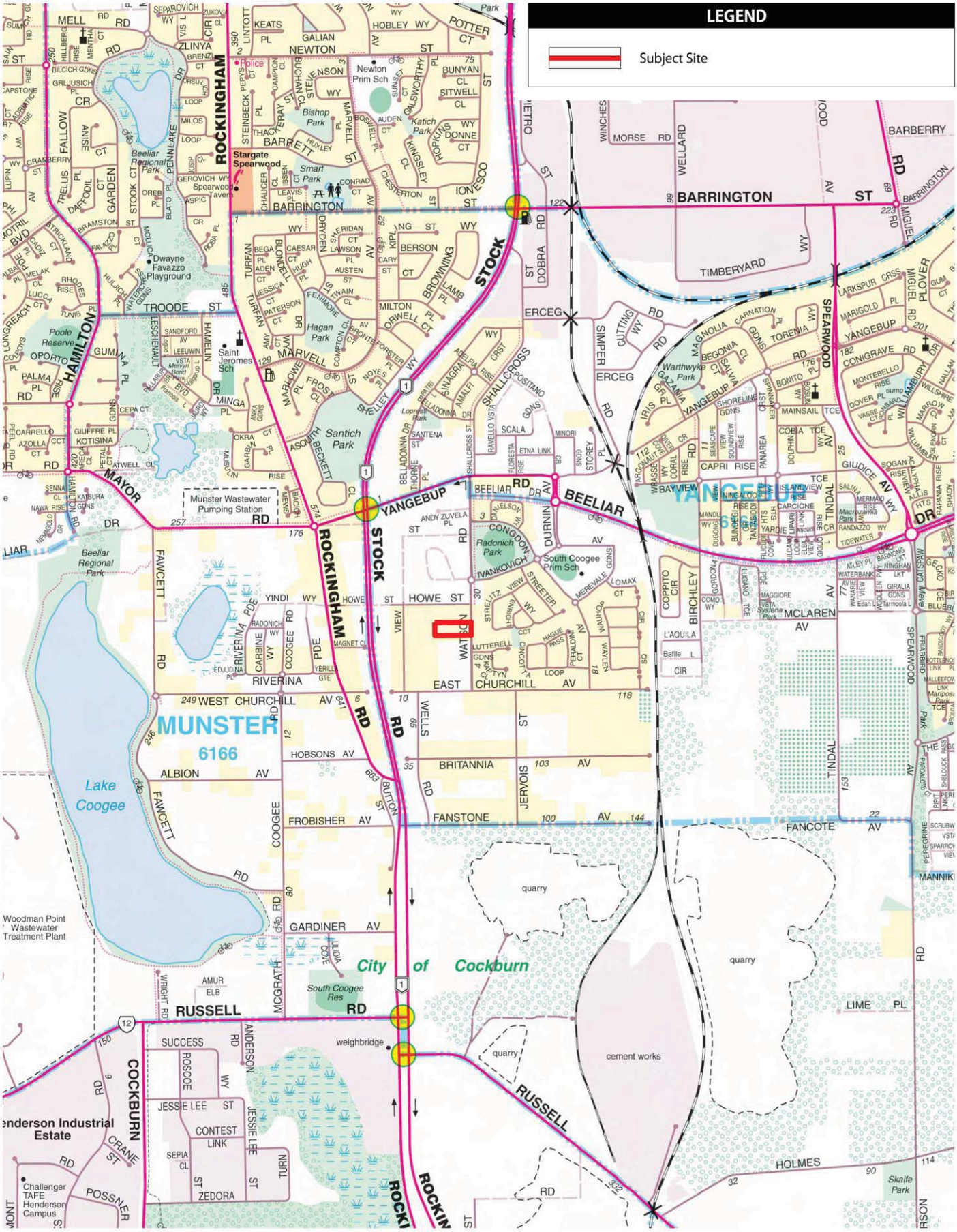
1.3.2.3 DRAFT PERTH@3.5 MILLION

The draft *Perth and Peel@3.5 million* report sets the context for the four draft sub-regional planning frameworks. The frameworks build upon the principles of *Directions 2031* and once finalised the frameworks will become sub-regional structure plans to provide guidance for future urban development and supporting infrastructure.

The Structure Plan area is identified as 'Urban' within the *South Metropolitan Peel Sub-regional Planning Framework*.

1.3.3 Policies

The Structure Plan has been informed by, and is consistent with, relevant State Planning Policies, *Liveable Neighbourhoods*, WAPC Development Control Policies and Council Local Planning Policies. These polices will also be considered as part of future subdivision and development.



LOCATION PLAN

Lot 95 Watson Road, BEELIAR

for: Urban Capital Group

NORTH

0 200 400 600m

Scale: 1:20,000@A4
Date: 13/05/2015
Plan: URBBE-5-021

Figure 1

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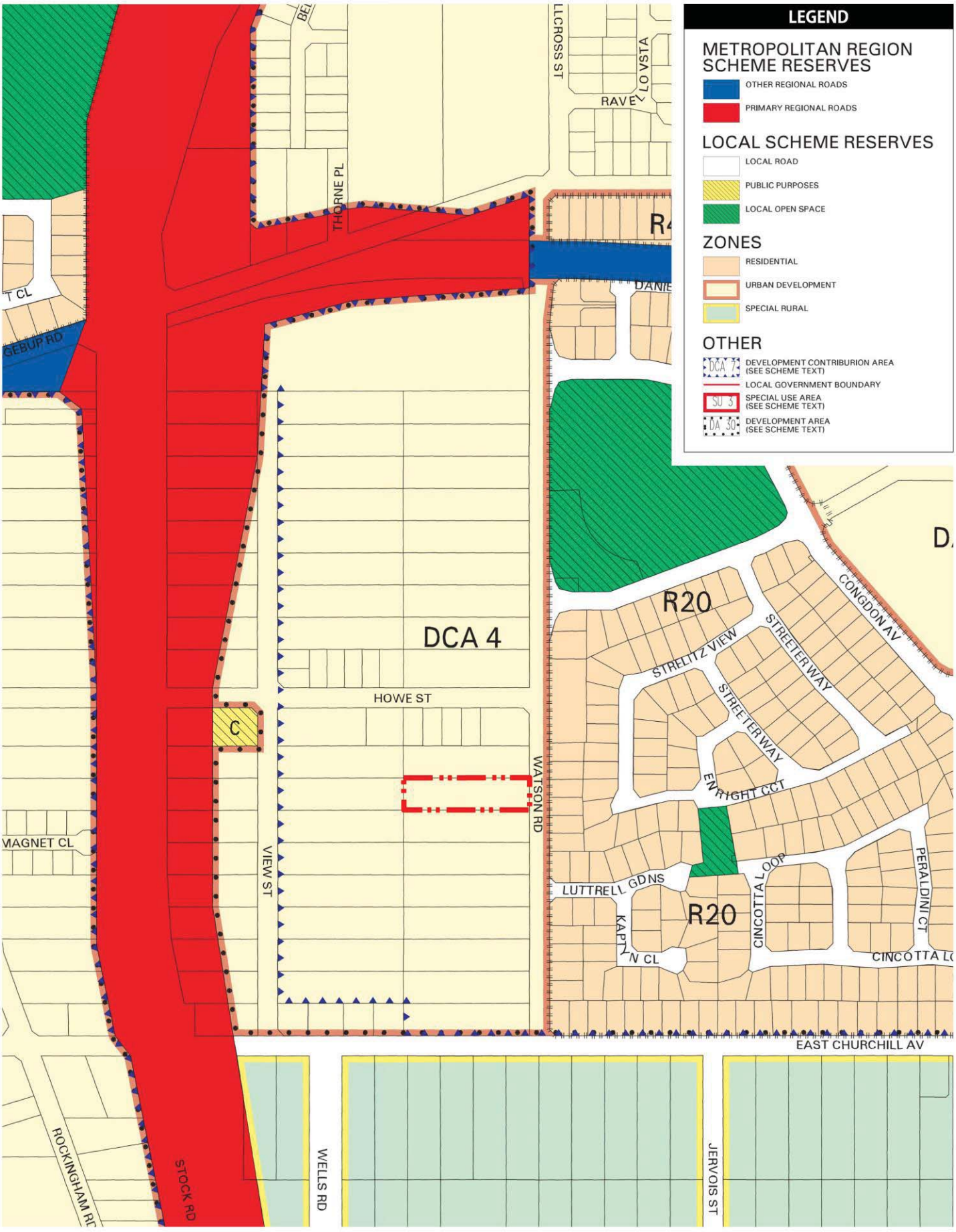


TPS No. 3

Lot 95 Watson Road,
BEELIAR

for: Urban Capital Group

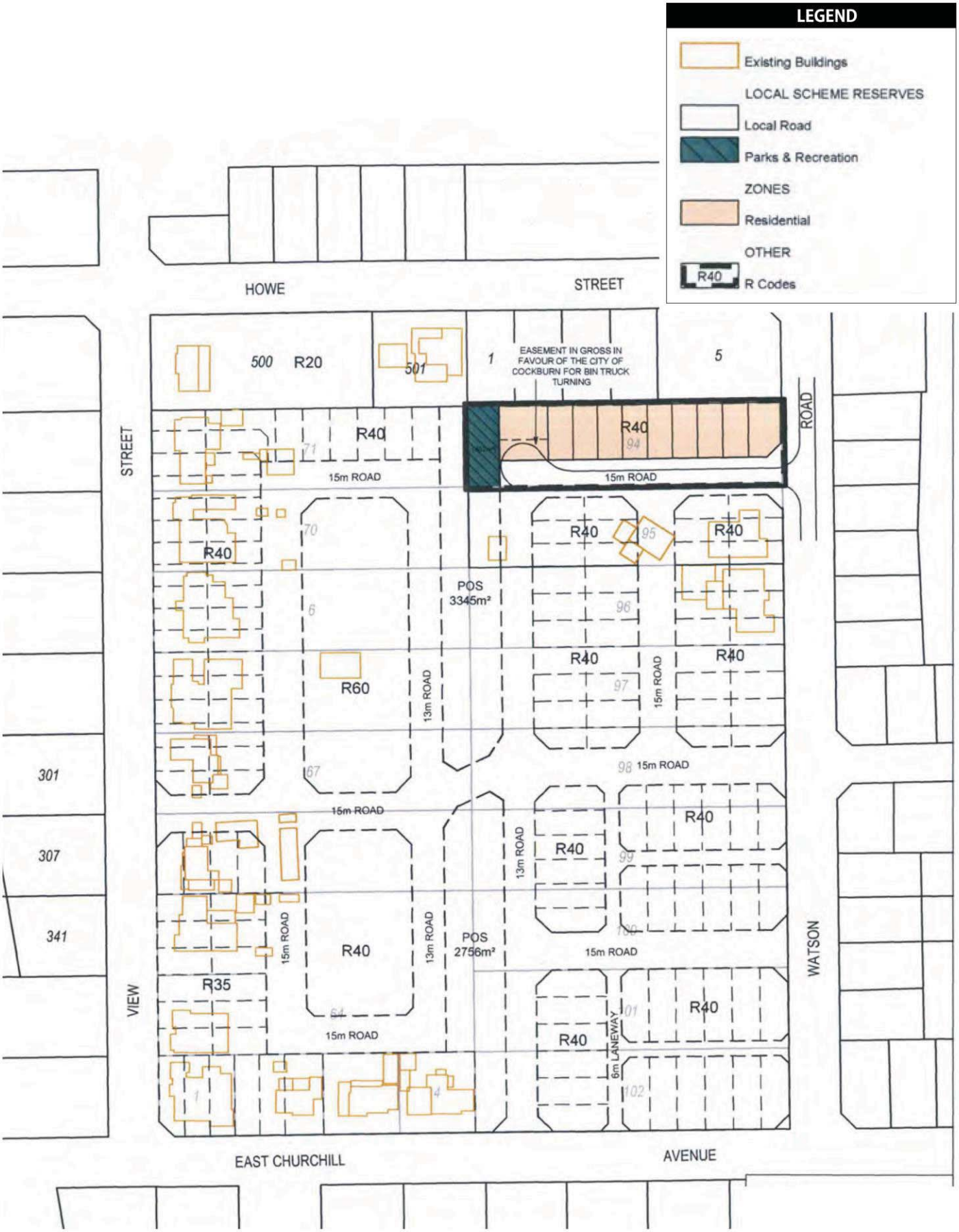
NORTH

0 50 100 150m

Scale: 1:5,000@A4
Date: 13/05/2015
Plan: URBBE-5-022

Figure 2

Creative DESIGN+PLANNING



ENDORSED STRUCTURE PLAN

Lot 94 Watson Road, BEELIAR

for: Urban Capital Group

NORTH

0 20 40 60m

Scale: 1:2000@A4
Date: 25/08/2015
Plan: URBBE-5-025

Figure 3

Creative DESIGN+PLANNING

2 Site Analysis

An Environmental Assessment Report (EAR) has been prepared by Emerge Associates which identifies that there are no significant environmental values or attributes within the Structure Plan area that require consideration. The EAR is enclosed as **Appendix 2** and a summary is provided below.

2.1 Landforms and Soils

2.1.1 Topography

The Structure Plan area is generally flat, with elevation ranging from 15.5m AHD in the north east to 22m AHD in the south west.

2.1.2 Regional Geomorphology

The Structure Plan area is situated within the Spearwood Dune system, which largely consists of yellow-brown siliceous sand over limestone and ranges from hilly to gently undulating.

2.1.3 Landforms and Soils

The Structure Plan area is comprised of Limestone, which consists of Tamala Limestone and Safety Bay Sands.

2.1.4 Acid Sulfate Soils

According to the Perth Groundwater Atlas the Structure Plan area has no known risk of encountering Acid Sulphate Soils within 3m of natural surface.

2.2 Groundwater and Surface Water

2.2.1 Groundwater

The Structure Plan area is located between the 1.0m Australian height datum (AHD) and 2.0m AHD maximum groundwater contour (DoW 2015). Groundwater is therefore assumed to be more than 13.5m below ground level (BGL) across the Structure Plan area.

2.3 Environmental Assets and Constraints

2.3.1 Flora

A Level 1 Flora and Vegetation Survey was undertaken across the Structure Plan area and adjoining Lot 94. The survey found the Structure Plan area to be largely cleared with remnant vegetation identified as 'Degraded' condition (refer **Figure 4**). Two vegetation communities were mapped within the Structure Plan area, including:

- W1: *Eucalyptus gomphocephala* open woodland over *Grevillea vestita* subsp. *vestita*, *Xanthorrhoea preissii*, *Macrozamia iedlei* and *Hakea prostrata* over *Hibbertia hypericoides* and *Hardenbergia comptoniana* over dense mixed annual weeds.
- R1: Remnant/isolated tree species.

No Threatened/Priority Flora species or Threatened/Priority Ecological Communities were found within the Structure Plan area.

Overall, the biodiversity values of the Structure Plan area are limited due to the degraded nature of the land, and do not inhibit development of the Structure Plan area.

ORTHOPHOTO

Lot 95 Watson Road,
BEELIAR

for: Urban Capital Group

NORTH

0 10 20 30m

Scale: 1:1000@A4
Date: 20/07/2015
Plan: URBBE-5-023

Figure 4

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3 Context Analysis

3.1 Local Context

The Structure Plan area is immediately surrounded by the following land uses:

- Existing residential development of South Coogee to the east;
- Semi-rural residential land uses to the south and west;
- Residential development of Lot 94 to the north.

Figure 5 shows the location and context of the Structure Plan area.

3.2 Movement Network

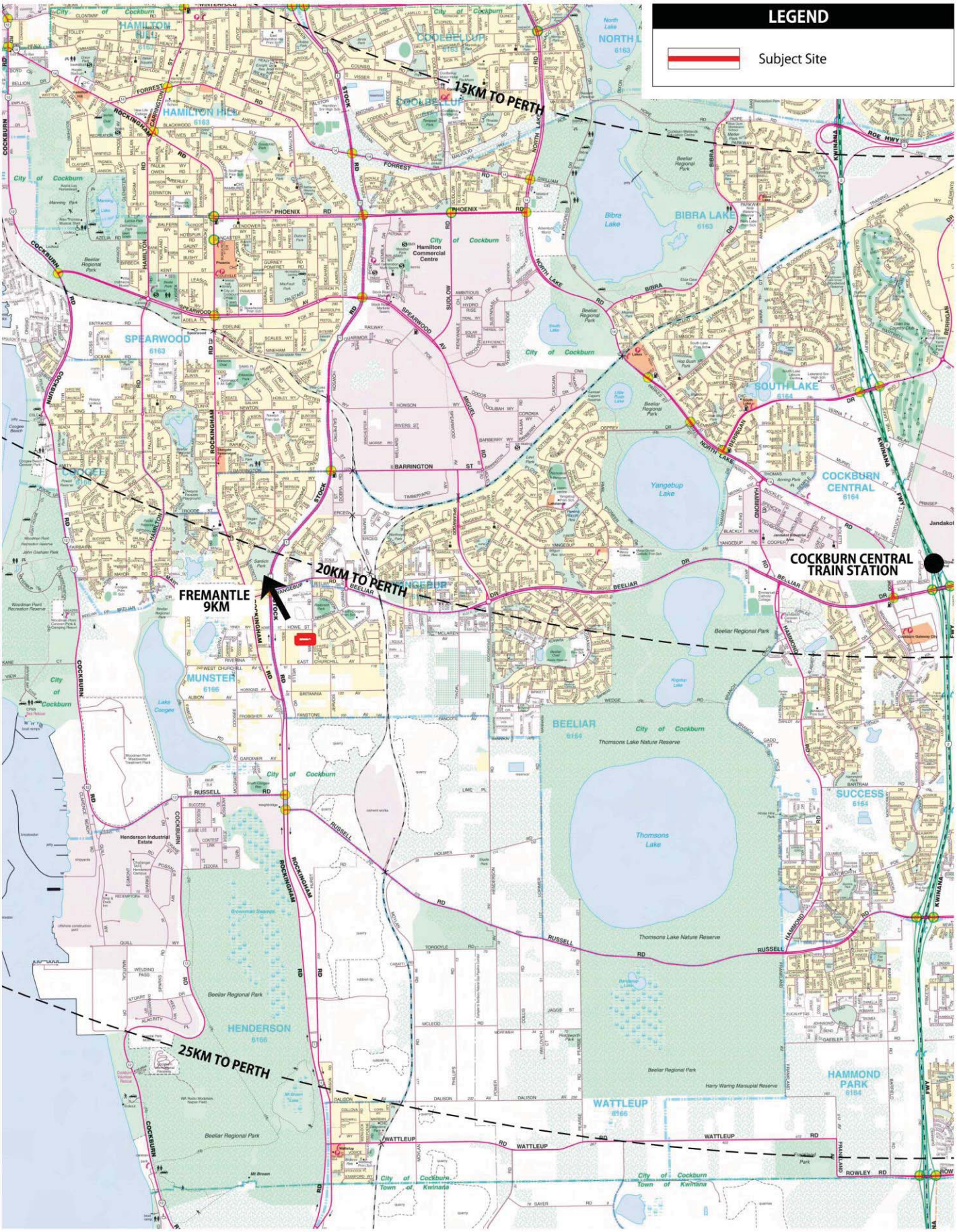
A Traffic Report has been prepared by Transcore Consultants, **Appendix 3** refers. The key findings of the existing movement network include as follows:

3.2.1 Existing Road Network

Corella Close borders the Structure Plan area to the north and was approved under the Lot 94 Watson Road Structure Plan. It comprises a 6.0m wide carriageway with a pedestrian path along its northern side. This road is contained within a reduced reserve of 13m, with the remaining verge (south) to be provided as part of this Structure Plan.

Watson Road is a single-carriageway, two-way road with a 7.2m wide carriageway. It entails a pedestrian path along its eastern verge and operates under a default built-up area speed limit of 50km/h.

Howe Street, View Street and East Churchill Avenue are all typical single carriageway, two-way residential roads approximately 6-7m wide with pedestrian paths.



CONTEXT PLAN

Lot 95 Watson Road, BEELIAR

for: Urban Capital Group

NORTH

0 500 1000 1500m

Scale: 1:50,000@A4
Date: 13/05/2015
Plan: URBBE-5-024

Figure 5

Creative DESIGN+PLANNING

4 Structure Plan

4.1 Design Philosophy

This Structure Plan has been designed to provide an appropriate interface with the approved Structure Plan for Lot 94 to the north, and to integrate with the future development area to the south and west.

The design provides an appropriate residential density and a legible movement network within the Structure Plan area.

Figure 6 shows the indicative development layout for the surrounding land, which is a revision to that proposed in the approved Lot 94 Watson Road Structure Plan.

4.2 Land Composition

The Structure Plan area will predominantly be developed for 'Residential' purposes, with a portion of the site being Public Open Space (POS).

The land use composition, including POS provision is outlined in **Table 2** below:

Table 1: Land Composition

Land Uses	Area M²	Percentage
Residential	2,739	67.68%
Public Open Space	395	9.76%
Road Reserve	913	22.56%
Total	4,047	100%

4.3 Dwelling Yield

Based on the R40 density the Structure Plan area could yield a maximum of 12 dwellings (including grouped and multiple options), thus exceeding the 15 dwellings per *gross urban zone* targets of *Directions 2031,* and may potentially accommodate 32+ people, at a rate of 2.7 persons per household.

Based on the *Liveable Neighbourhoods* '*Site Hectare*' definition, the 'developable area' for the Structure Plan equates to 2,739m². As the Structure Plan area could yield a maximum of 12 dwellings which equates to 43 dwellings per *site hectare* thus meeting the requirements of LN.

4.4 Variation to Residential Design Codes

This Structure Plan adopts the standards for RMD40 of the Residential Medium Density Design Codes outlined in the WAPC's Planning Bulletin 112/2015.

Table 3 outlines the development standards within areas coded R40. These standards 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 for R40 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).

Refer to **Table 2** for all the development standards.

4.5 Movement Networks

A Traffic Report has been prepared by Transcore Consultants, refer **Appendix 3**. A summary of this report is provided below:

4.5.1 Proposed Internal Transport Network

The Structure Plan area will be accessed via the existing east-west *Access Street D* (Corella Close) approved under the Lot 94 Watson Road Structure Plan. This access street integrates with the comprehensive internal road system for the area as shown in the Indicative Development Plan (**Figure 6**).

It is currently constructed as a cul-de-sac, however is proposed to link to the internal road network in the Structure Plan area.

The Corella Close road reserve is currently 13m in width. It is proposed to provide an additional 2m within this Structure Plan area, resulting in a total road reserve width of 15m.

The proposed road reserve is 15m, comprising of a 6m carriageway and 4.5m verges. Where abutting POS the verge width may be reduced by 2.0m.

4.5.1 Public Transport

The Structure Plan area can be serviced by the existing public transport services available in the immediate vicinity or within comfortable walking distance of the subject site, no modifications are required as a result of this Structure Plan.

4.5.2 Pedestrian and Cycle Infrastructure

The pedestrian path along the new east-west road provides direct access to the existing pedestrian and cyclist path network within the Structure Plan area.

4.6 Public Open Space

This Structure Plan proposes one (1) area of POS comprising approximately 395m^2.

Table 2: POS

Land Budget Summary	
Subject Area:	4,047m^2
Deductions:	0m^2
Gross Subdivisible Area:	4,047m^2
POS Requirement 10%:	404.7m^2
POS Contribution:	
Restricted Open Space:	0m^2
Unrestricted Open Space:	395m^2

The proposed area of POS corresponds with the Scheme 'Parks and Recreation' zone and forms part of a broader area of POS as shown on the Indicative Development Plan (**Figure 6**).

No drainage is proposed to be contained within the proposed POS.

The Structure Plan area falls marginally short of the required 10% POS contribution, however it is noted this land forms part of the broader 'DA 4' area which, once developed will accommodate an appropriate area of POS. Under *Liveable Neighbourhoods* Element 4 – Public Parkland the preference is to create linear areas of POS, so in this regard rather than modifying the shape of the proposed POS to meet the minimum 10% requirement, the POS has been designed to be consistent with the land already subdivided to the north.

The shortfall in POS equates to 9.7m^2, subject to the agreement of the WAPC and the City of Cockburn, the provision of POS not provided by way of land shall be provided by a payment of cash-in-lieu of land in accordance with the relevant provision of the *Planning and Development Act 2005*.

4.7 Urban Water Management

A Local Water Management Strategy (LWMS) has been prepared for the Structure Plan area (refer **Appendix 4**).

The development drainage system for the Structure Plan area has been designed to retain up to the 100 year ARI event runoff as close to source as practicable in order to maintain pre-development hydrology.

The stormwater management strategy for the Structure Plan area includes the following components:

- **Lot Drainage** – the majority of the 100 year ARI event will be retained on each lot. In large rainfall events excess runoff will be allowed to infiltrate in back gardens with runoff from front driveways retained and infiltrated within permeable areas on site. The ultimate configuration of lot retention designs will be confirmed within the future Urban Water Management Strategy.
- **Development Drainage** – the run off from driveway crossovers located within the road reserve will be captured and infiltrated within the road reserve. Subsurface storage areas will be provided within Corella Close road reserve within the subject land and will be sized to retain up to the 100 year ARI event runoff from the road network. Runoff will be treated via adsorption and filtration by sand particles as water passes through the underlying soil column to ground water. The ultimate design of retention/treatment infrastructure will be detailed at subdivision stage.

Further detail on how water management objectives for the Structure Plan area will be achieved will be provided in the UWMP to support future subdivision.

The Structure Plan area is located within the Cockburn groundwater management area for Kogalup groundwater subarea to which allocation is available from the superficial aquifer. The future UWMP will demonstrate that adequate allocation of water has been obtained to irrigate POS and road reserves within the subdivision area, or that an appropriate contingency plan has been established in the event that reduced water allocation is obtained.

Table 3: Residential Medium Density Design Codes

1. Street Setback and Front Fences	a) 2m minimum, no average. b) 1.5m to porch/veranda, no maximum length. c) 1m minimum to secondary street. d) Front fences within the primary street setback area being a maximum height of 900mm above natural ground level, measured from the primary street side of the front fence.
2. Lot Boundary Setbacks	a) 1.2m for wall height 3.5m or less with major openings. b) 1m for wall height 3.5 or less without major openings.
3. Boundary Walls	a) Permitted to both side boundaries subject to: i. No maximum length to one side boundary; and ii. 2/3 max length to second side boundary, for wall heights 3.5m or less.
4. Open Space	a) An outdoor living area (OLA) with an area of 10% of the lot size or 20m^2, whichever is greater, directly accessible from a habitable room of the dwelling and located behind the street setback area. b) At least 70% of the OLA must be uncovered and includes areas under eaves which adjoin uncovered areas. c) The OLA has a minimum 3m length or width dimension. d) No other R-Codes site cover standards apply.
5. Garage Setbacks and Width and Vehicular Access	a) 4.5m garage setback from the primary street and 1.5m from a secondary street. b) The garage setback from the primary street may be reduced to 4m where an existing or planned footpath or shared path is located more than 0.5m from the street boundary. c) For front loaded lots with street frontages between 10.5m and 12m, a double garage is permitted to a maximum width of 6m as viewed from the street, subject to: i. garage setback a minimum of 0.5m behind the building alignment; ii. a major opening to a habitable room directly facing the primary street; iii. an entry feature consisting of a porch or veranda with a minimum depth of 1.2m; and, iv. no vehicular crossover wider than 4.5m where it meets the street. d) Lots with a frontage less than 10.5m or not compliant with the above require single or tandem garaging.
6. Overshadowing	a) No maximum overshadowing for wall height 3.5m or less. b) 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 does not exceed 35%.
7. Privacy	R-Codes Clause 5.4.1 C1.1 applies to RMD40, however: a) The setback distance is 3m to bedrooms and studies, 4.5m to major openings to habitable rooms other than bedrooms and studies and 6m to unenclosed outdoor active habitable spaces.

FIGURE 6 - INDICATIVE DEVELOPMENT PLAN

Lot 95 Watson Road, BEELIAR

A Creative Design & Planning Project

NORTH

0 12.5 25 37.5m

Scale: 1:1250@A3
Date: 26/08/2015
Plan: URBBE-2-003

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5 Infrastructure Co-ordination and Servicing

An Engineering Servicing Assessment has been prepared by engineering consultants, JDSi, **Appendix 5** refers. A summary of the assessment is provided below.

5.1 Roads

Lot 94 Watson Road to the north of the Structure Plan area has already commenced subdivisional land construction in which road and servicing has been installed. The existing cul-de-sac is temporary the purposes of a temporary turnaround for access from Corella Close. Following development of Lot 96 the temporary cul-de-sac and restrictive covenant will be developed for two residential lots.

5.2 Sewerage and Water Reticulation

Water and sewer assets are located on the northern side of the existing internal road and thus any connections to the Structure Plan area will require individual works orders requests from Water Corporation.

5.3 Groundwater

Groundwater is at approximately RL2.0m and thus the Structure Plan area has sufficient depth to groundwater for on-site infiltration for housing.

5.4 Power

The Structure Plan area can be serviced by existing Western Power infrastructure.

6 Implementation

6.1 Site Works

The site grades from RL 23.0m in the south west corner to RL16.0m in the north east corner.

Due to the slope of the site it is envisaged that a retaining wall will be required between Lot 95 and 96 (Lot 95 being higher). It is also envisaged that retaining walls will be located alongside boundaries in the same manner as Lot 94.

APPENDICES

Appendix 1
Certificate of Title

WESTERN AUSTRALIA

REGISTER NUMBER	
95/P3562	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
3	29/5/2007

RECORD OF CERTIFICATE OF TITLE

VOLUME 1734 FOLIO 487

UNDER THE TRANSFER OF LAND ACT 1893

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

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 95 ON PLAN 3562

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

JUAN LUIS DA LUZ
IN 4/5 SHARE
DIANE DA LUZ
IN 1/5 SHARE
BOTH OF 15 TANSON STREET, ATTADALE
AS TENANTS IN COMMON

(AN M418286) REGISTERED 2 OCTOBER 2013

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

1. *M418287 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA REGISTERED 2.10.2013.

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: 1734-487 (95/P3562).
PREVIOUS TITLE: 580-69.
PROPERTY STREET ADDRESS: LOT 95 WATSON RD, BEELIAR.
LOCAL GOVERNMENT AREA: CITY OF COCKBURN.

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING M418287

Appendix 2
Environmental Assessment Report

emerge ASSOCIATES
Integrated Science & Design
PERTH
Suite 4, 26 Railway Road
Subiaco. Perth
Western Australia 6008
P +61 8 9380 4988
F +61 8 9380 9636
www.emergeassociates.com.au
Blue Tang (WA) Pty Ltd as trustee for The Reef Unit Trust ABN 44656153170 and Emerge Environmental Services Pty Ltd ABN 57144772510 trading as Emerge Associates

Document Reference: EP15-023(01)[illegible]001 [illegible]

Emerge contact: Jason Hick

[illegible] July 2015

Attention: [illegible]
C/- Urban Capital Group
14 Kearns Crescent
APPLECROSS WA 6153

Delivered by email to: tom@urbancapitalgroup.com.au

Dear John,

ENVIRONMENTAL ASSESSMENT REPORT – LOT 95 WATSON ROAD, BEELIAR

Introduction

Creative Design + Planning has prepared a Local Structure Plan (LSP) for the proposed residential development of Lot 95 Watson Road, Beeliar. This area is herein referred to as 'the site' and its location is shown in **Figure 1**. The site is approximately 0.4 hectares (ha) in size and located approximately 20 km south of the Perth Central Business District (CBD), within the City of Cockburn.

Emerge Associates has been engaged to undertake an environmental assessment to support future residential development within the site. This has included numerous site investigations to identify and assess the environmental attributes and values present within the site utilising a range of information sources including local and regional reports, databases and mapping.

Due to the size and nature of the proposed development, it was not considered necessary to prepare an Environmental Assessment and Management Strategy report to support the LSP, and instead this letter will serve to outline the environmental values and attributes of the site for consideration within the LSP.

To date, our LSP support includes:

- Desktop environmental investigation.
- Preparation of *Local Water Management Strategy* (LWMS) advice (Emerge Associates 2015).

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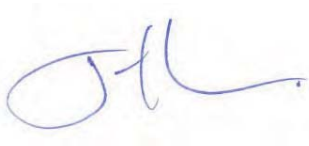

Jason Hick

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Figure 1: Site Plan

Project: Environmental Assessment Report
Lot 95 Watson Road, Beeliar

Client: John Da Luz

Legend
- Site boundary
- Existing cadastral boundaries

Plan Number: EP15-023(01)--F01	
Drawn: KNM	Date: 16/06/2015
Approved: JDH	Date: 03/07/2015
Checked: VMK	Scale: 1:1,000@A4

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emerge ASSOCIATES Integrated Science & Design

Figure 2: Proposed Local Structure Plan

Project:	Environmental Assessment Report Lot 95 Watson Road, Beeliar
Client:	John Da Luz

Plan Number: EP15-023(01)--F02

Drawn:	KNM	Date:	16/06/2015
Approved:	JDH	Date:	03/07/2015
Checked:	VMK	Scale:	1:600@A4

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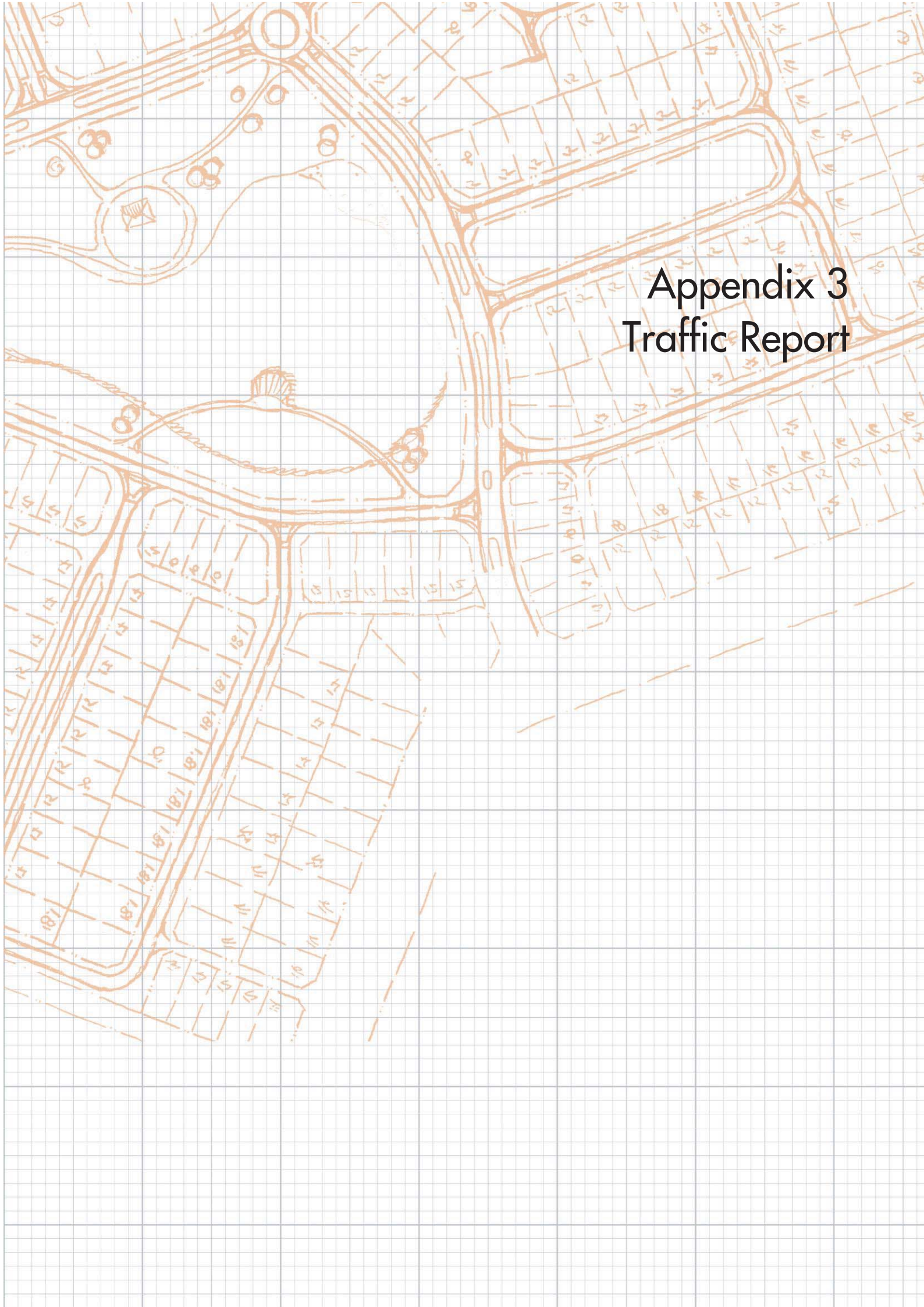
emerge ASSOCIATES Integrated Science & Design



Appendix 3
Traffic Report

Proposed Local Structure Plan
Lot 95 Watson Road, Beeliar

Traffic Report

PREPARED FOR:
Urban Capital Group

June 2015

Document history and status

Author	Revision	Approved by	Date approved	Revision type
Vladimir Baltic	r01	B Bordbar	12/06/2015	Final

File name: t15.122.vb.r01.docx

Author: Vladimir Baltic

Project manager: Behnam Bordbar

Client: Urban Capital Group

Project: Lot 95 Watson Road, Beeliar

Document revision: r01

Project number: t15.122

TABLE OF CONTENTS

REPORT FIGURES

REPORT TABLES

1.0 Summary

This traffic report has been prepared for the Lot 95 Watson Road Local Structure Plan (hereafter LSP) in Beeliar, City of Cockburn. The LSP area forms part of the wider Draft Structure Plan for the area bound by Howe Street to the north, Watson Road to the east, East Churchill Avenue to the south and View Street to the west.

In October 2013 Transcore prepared a Transport Assessment report for the then proposed LSP over Lots 94 and 95 Watson Road. The current Lot 95 LSP proposal takes into account the existing situation and proposes minor modifications to the 2013 LSP proposal.

The proposed LSP takes access from a new east-west cul-de-sac road off Watson Road and integrates with the existing residential areas at this locality. Transport characteristics and assessment of the proposed LSP access system form part of this report.

2.0 Introduction and Background

This traffic report is prepared by Transcore on behalf of Urban Capital Group with regard to the proposed LSP for Lot 95 Watson Road in Beeliar, City of Cockburn (subject site). Refer **Figure 1** for more details.

Figure 1: Aerial photo of the subject site

The proposed LSP area is bound by Watson Road to the east and new East-West cul-de-sac road and Lot 94 to the north. The LSP is anticipated to accommodate a total of 8 dwellings and a small P.O.S. over approximately 0.4ha area (R40 density).

The LSP occupies an area located near the northeast corner of the wider Draft Structure Plan area (hereafter SP) bound by Howe Street (to the north), Watson Street (to the east), East Churchill Avenue (to the south) and View Street (to the west). According to the SP, the recently constructed East-West road which is cul-de-saced at the western side will ultimately be extended further west and connect to the future North-South LSP road. This newly constructed East-West road intersects with Watson Street approximately 45m south of Howe Street.

Two single-storey residential dwellings and a small ancillary building are presently located at the subject site.

3.0 Local Structure Plan Proposal

The location of the proposed LSP area in its regional context within the Metropolitan Region Scheme (MRS) is illustrated in **Figure 2** ,. The site is zoned "Urban" in the MRS.

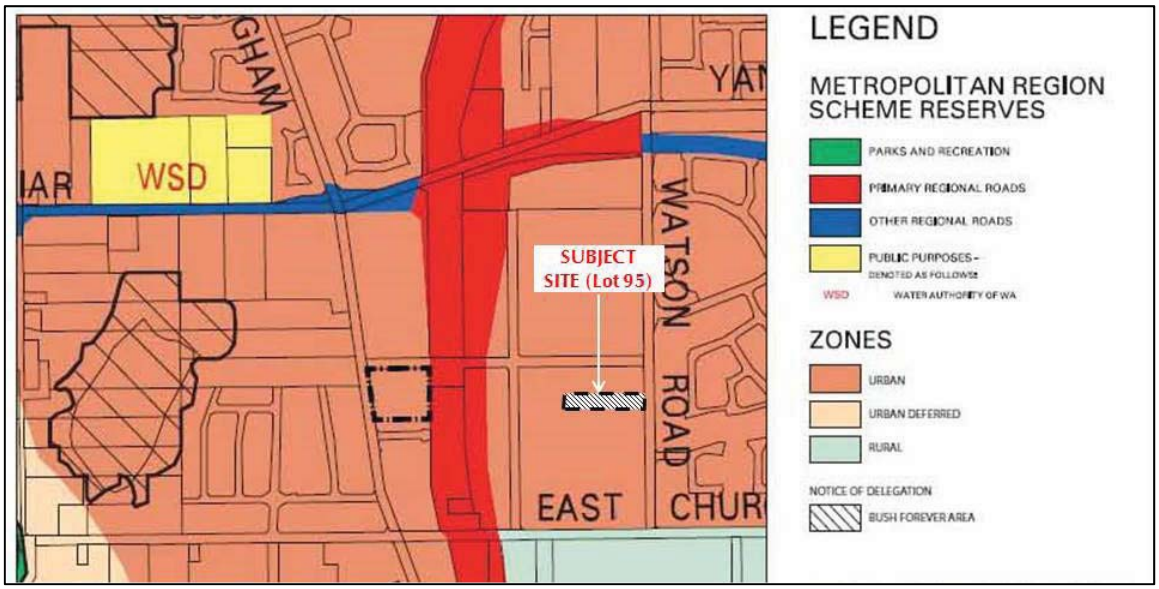


Figure 2: Subject site within Metropolitan Region Scheme

The LSP (refer **Appendix A**) is bound by Watson Road to the east and the recently constructed East-West LSP road to the immediate north. It is broadly located within the SP area bound by Howe Street, Watson Road, View Street and East Churchill Avenue (refer **Appendix B**)[1].

According to the LSP plan the existing East-West road which is currently cul-de-saced at the western end is proposed to be extended southbound into the SP area.

As part of the development proposal the existing easternmost residential dwelling will be retained while the other two structures at the site will be demolished and the land subdivided to yield additional seven R40 lots.

The existing easternmost residential development takes access from Watson Road while the future residential lots are proposed to take access from the East-West road. The proposed LSP provides for a total of eight residential dwellings. The proposed LSP also comprises one P.O.S. area at the westernmost end.

[1] *Lots 94 and 95 Watson Road are featuring in the Structure Plan area*

4.0 Existing Situation

The LSP area is located approximately 20km southwest of the Perth CBD. Existing residential subdivisions are surrounding the LSP area. The Market Garden Swamp and Coogee Lake are located to the west. A new shopping centre is presently being constructed approximately 600m to the northeast on Beeliar Drive/Burnin Avenue corner. The Kwinana Freeway and Cockburn Central train station are located approximately 7km to the east.

4.1 Existing Road Network

Watson Road is a single-carriageway, two-way road with a 7.2m wide carriageway (refer **Figure 3** and **Figure 4**). It entails a pedestrian path along its eastern verge and operates under a default built-up area speed limit of 50km/h.

According to the latest available data soured from the City, Watson Road (in the immediate vicinity of the subject site) carried approximately 1,460vpd in May 2014. Watson Road is classified as *Local Distributor* in the Main Roads WA *Perth Metropolitan Area Functional Road Hierarchy* document.

Figure 3: Southbound view along Watson Road in the vicinity of the East-West road intersection

Figure 4: Northbound view along Watson Road in the vicinity of the East-West road intersection

East-West road is presently constructed about 115m from Watson Road and cul-de-saced at the western end. It entails approximately 6.0m wide single carriageway profile with a pedestrian path along its northern side. Refer **Figure 5** for more details. This road presently carries no traffic as no dwellings are yet constructed on the northern side of the road (Lot 94).

Figure 5: Westbound view along East-West road from the Watson Road intersection

Howe Street, View Street and **East Churchill Avenue** are all typical single-carriageway, two-way residential roads which are about 6-7m wide with pedestrian paths on or the other sides of the roads (refer **Figure 6**).

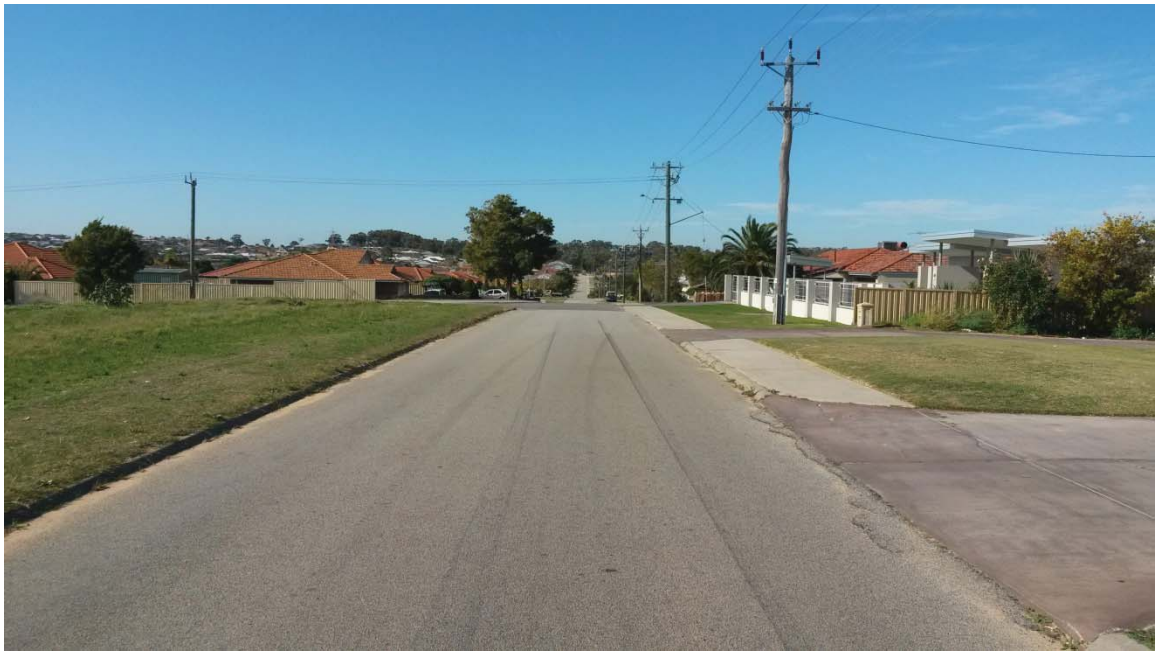


Figure 6: Eastbound view along East Churchill Road towards the Watson Road intersection

All three roads operate under a default built-up area speed limit of 50km/h. Limited traffic count information is available only for East Churchill Avenue. According to the traffic count data sourced from the City, East Churchill Road (west of Jervois Street) carried approximately 350vpd in October 2005.

In the Main Roads WA *Perth Metropolitan Area Functional Road Hierarchy* document Howe Street, View Street and East Churchill Avenue are classified as Access Streets.

The East-West road forms a priority-controlled T-intersection with Watson Road terminating on its eastbound approach to the intersection.

4.2 Existing Public Transport

There is one bus service (route no. 531) operating along Watson Road with bus stops in immediate vicinity of the subject site. Another two bus services (routes no. 530 and 532) are operating along Beeliar Drive (north of Beeliar Drive) with bus stops within a 5-10min walking distance from the LSP area.

The Perth to Mandurah rail line and the Cockburn Central Train Station are located approximately 7km to the east of the subject site, near the Beeliar Drive/Kwinana Freeway interchange. The majority of the local bus services link the train station with important local and regional destinations.

Bus and train services and route details are illustrated in **Figure 7** and **Table 1**.

Table 1: Bus services operating in the vicinity of the LSP

Bus service No.	Route
530	Cockburn Central Train Station/Fremantle Train Station
531	Cockburn Central Train Station/Fremantle Train Station
532	Cockburn Central Train Station/Carrington Street

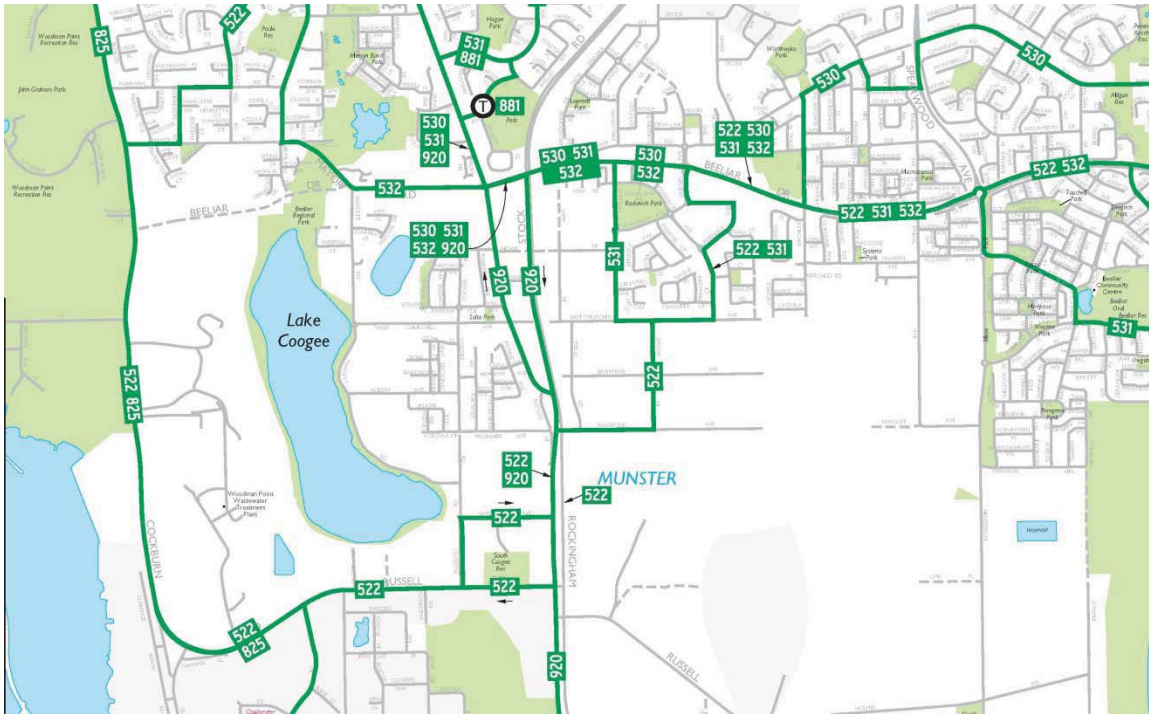


Figure 7: Local bus services map

4.3 Existing Pedestrian & Cyclist Facilities

The Perth Bike Map series published by the Department of Transport shows limited cycling facilities in immediate vicinity of the LSP.

A shared path is in place along Mayor Road and Beeliar Drive connecting to the Principal Shared Path along Kwinana Freeway further to the east. Another (recreational) shared path is in place around Radonich Park to the northeast of LSP connecting to Beeliar Drive path to the north.

Watson Road, East Churchill Avenue and Congdon Road are classified as good road riding environments. Stock Road however is classified as a poor road riding environment. A number of other local roads in relative vicinity such as Churchill Avenue West, Mayor Road and Fawcett Road are also classified as good road riding

environment providing links to a number of local attractions including Lake Coogee recreational path.

Extract from the Perth Bike Map illustrating bicycle facilities at this locality is shown in **Figure 8**.

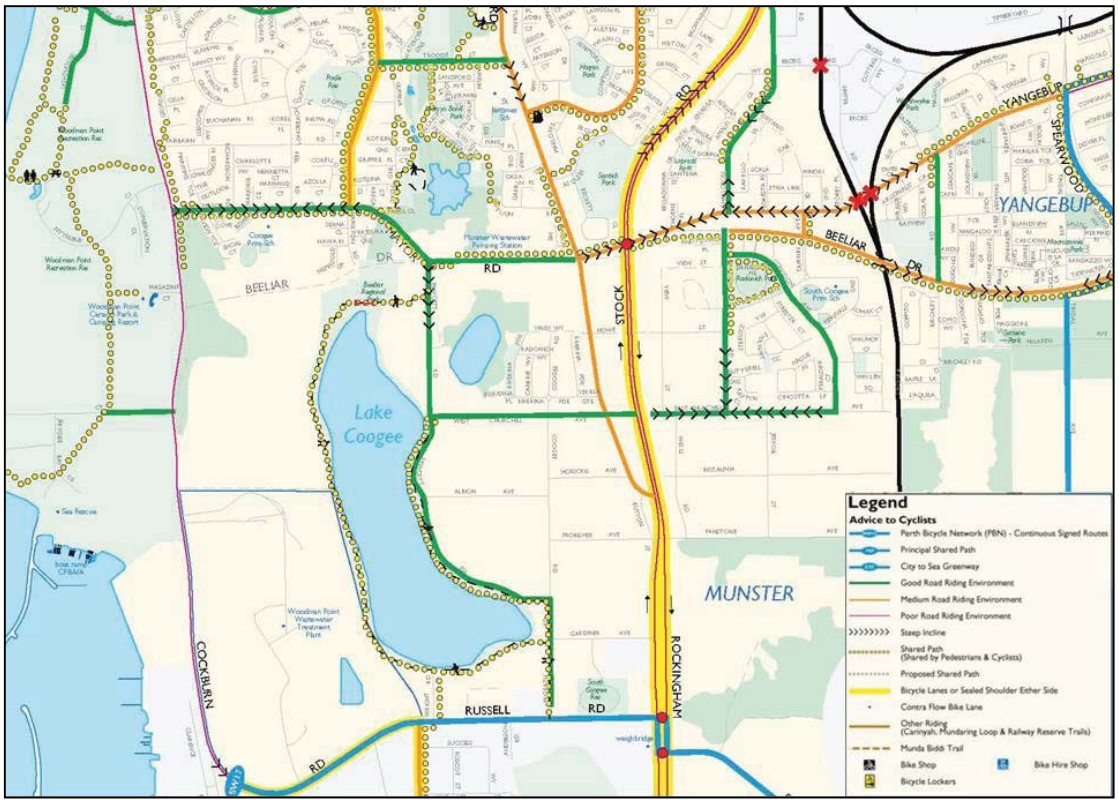


Figure 8: Existing cycling facilities within the locality

5.0 Proposed Internal Transport Network

The existing East-West road bordering the LSP along its northern side forms part of a future comprehensive internal road system for the Draft Structure Plan area.

In the October 2013, the TA report for the Lots 94 and 95 Watson Road LSP shows that the East-West road was proposed to be constructed as a typical residential *Access Street D*, in accordance with the *WAPC "Liveable Neighbourhoods"* document. Accordingly the existing East-West road provides sufficient capacity to service the proposed LSP and accommodate the future anticipated traffic volumes once the SP is fully developed.

The typical road reserve for *Access Street D* entails a 6m wide trafficable carriageway pavement with 4.1m wide verges on both sides. Maximum desirable traffic volume for this type of road is 1,000vpd. The typical cross-section of the *Access Street D* is illustrated in **Figure 9**.

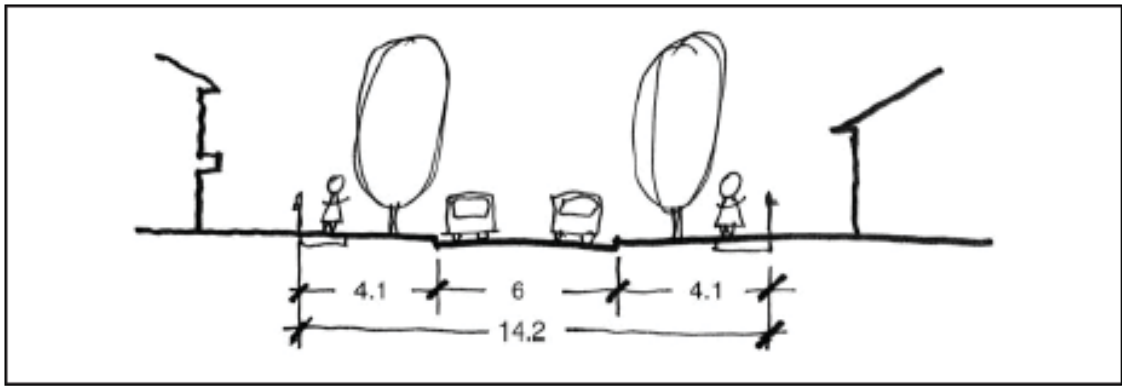


Figure 9: Access Street D – narrow yield (give way) street with target speed of 30 km/h (<1,000vpd)

5.1 Public Transport

The existing bus services at this locality are described in section 4.2 of this report. The proposed LSP can be serviced by the existing public transport services available in the immediate vicinity or within comfortable walking distance of the subject site.

5.2 Pedestrian and Cyclist Facilities

The existing pedestrian and cyclist facilities available at this locality are discussed in section 4.3 of this report.

The pedestrian path along the new East-West road provides direct access to the existing pedestrian and cyclist path network within the LSP area.

Considering the anticipated daily traffic on internal LSP and Structure Plan roads no specific cyclist facilities are deemed necessary as these activities can take place on internal access roads.

6.0 Changes to the External Road Network

No changes to the external road network are proposed as part of the LSP proposal.

7.0 Integration with Surrounding Area

The proposed LSP is in tune with the existing surrounding land uses consisting primarily of residential uses. As such, the LSP integration into the wider area is assured.

8.0 Analysis of Internal Transport Network

8.1 LSP Trip Generation and Distribution

The traffic generation rates for the LSP were sourced from the Roads and Traffic Authority, NSW, *"Guide to Traffic Generating Developments"* document. The residential traffic generation rates range from 9 vehicles per day (vpd) per dwelling for the lower residential densities, 7 vpd for medium density dwellings and 5 vpd for high-density units close to transit. For the purpose of this report a conservative trip rate of 9 trips per dwelling was applied to establish the total traffic generation from the proposed LSP.

Accordingly, the LSP area is estimated to generate approximately **72** total daily vehicular trips for a typical weekday. The total daily vehicular traffic includes both inbound and outbound trips. Similarly, trip generation during the AM and PM peak periods for the LSP is estimated to be in order of **7** trips per hour.

The distribution and assignment of the LSP traffic was based on the location of the development, the existing road network and the location of various local and district attraction nodes.

Accordingly, forecast traffic volume plan for the LSP is illustrated in **Figure 10**.

Figure 10: AM/PM peak/Total Daily traffic flow forecast for the LSP

8.2 LSP Intersection Assessment

Table 2.4 from AUSTROADS *"Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings"* document illustrates the traffic volume thresholds above which a detailed intersection capacity assessment is required.

Assuming that typical peak hour traffic represents approximately 10% of the total daily traffic volume, it is confirmed that uninterrupted traffic flow conditions can be expected at the intersection of East-West Road/Watson Road.

As hourly traffic volumes through the intersection are significantly below the indicative thresholds indicated in **Table 2,** sufficient capacity would be available and detailed assessment or capacity analysis is not warranted (refer **Figure 10** for LSP daily traffic projections).

Table 2: Traffic volume threshold for detailed intersection analysis

Major Road type	Major Road Flow (vph[2])	Minor Road Flow (vph)
Two-lane	400 500 650	250 200 100
Four-lane	1,000 1,500 2,000	100 50 25

The site observations confirmed good and unobstructed sightlines are available at the East-West Road/Watson Road.

8.3 LSP Roads Assessment

The anticipated post-development total daily traffic on East-West road is well within the desirable daily traffic volume thresholds for typical *Access Streets* of 1,000vpd.

8.4 Pedestrian/Cyclist Network

Due to anticipated low pedestrian and cyclist traffic expected to be generated by the proposed LSP no specific pedestrian or cyclists facilities other than existing ones are deemed necessary.

[2] *vph – vehicles per hour, typically represent 10% of total daily traffic volume*

9.0 Analysis of External Transport Network

9.1 Traffic Volumes on External Road Network

The existing and post development daily (weekday) traffic volumes on the road abutting the LSP area is shown in **Table 3**. The existing traffic volume on Watson Road (adjacent to the subject site) was based on traffic data sourced from City of Cockburn dating from May 2014. The estimated post-development traffic volume on Watson Road including the level of impact is present in **Table 3**.

Table 3: Estimated daily traffic impacts on surrounding road network

Road Sections	Total Daily Traffic (vpd)			Impact (%)
	Existing	New	Total	
Watson Road (in the vicinity of subject site)	1,460	72	1,532	4.9%

The WAPC *Transport Assessment Guidelines for Developments* (2006) suggests that traffic impact should be assessed on those parts of the surrounding road network where an increase of 100 vehicles per hour is generated on any traffic lane. As estimated daily traffic volume increase on Watson Road, as a result of the proposed LSP, is nowhere this level, it is concluded that a detailed capacity assessment is not warranted.

10.0 Conclusions

This traffic report has been prepared for the proposed LSP for Lot 95 Watson Road in Beeliar, City of Cockburn. The subject site is located at the south west corner of the recently constructed East-West/Watson Road intersection approximately 65m south of Howe Street.

The proposed LSP yields a total of 8 residential dwellings (R40 density). Internal road system consisting of existing East-West road classified as *Access Streets D* is sufficient to facilitate LSP's vehicular, cyclist and pedestrian movements and seamlessly integrate with the surrounding road network and land uses at this locality.

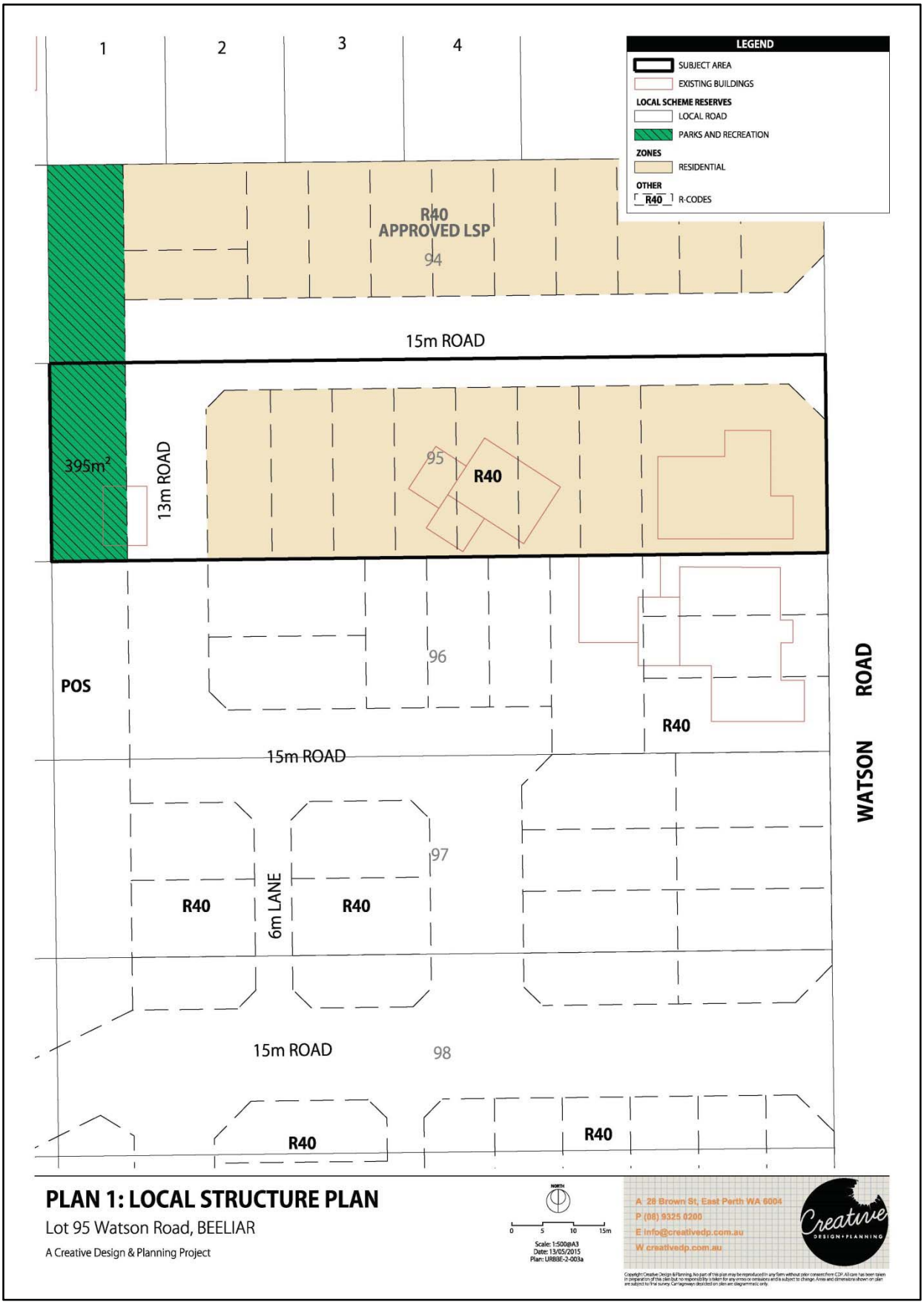
The LSP is estimated to generate approximately 72 total daily inbound and outbound vehicular trips with approximately 7 trips during AM and PM peak weekday periods.

The capacity assessments of the East-Wes road/Watson Road intersection indicates more than sufficient capacity remains available at this intersection in the post-development stage of the LSP.

The subject site has good public transport coverage and pedestrian /cyclist path system within the locality is deemed satisfactorily.

Appendix A

PROPOSED LOT 95 WATSON ROAD LSP PLAN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2
3
4
LEGEND
SUBJECT AREA
EXISTING BUILDINGS
LOCAL SCHEME RESERVES
LOCAL ROAD
PARKS AND RECREATION
ZONES
RESIDENTIAL
OTHER
R40 R-CODES
R40
APPROVED LSP
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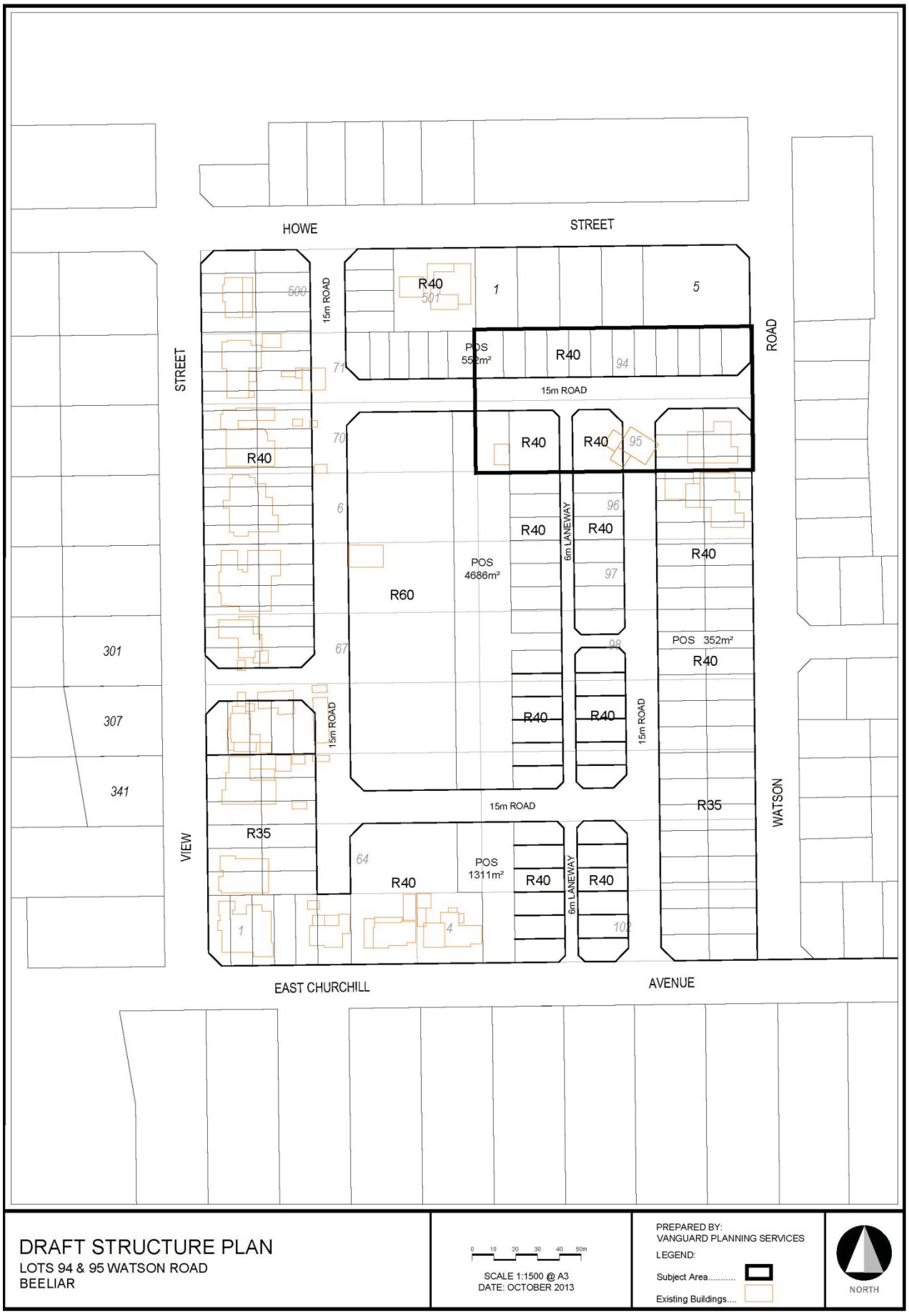
15m ROAD
395m²
13m ROAD
95
R40
POS
96
R40
WATSON ROAD
15m ROAD
97
R40
6m LANE
R40
15m ROAD
98
R40
R40
PLAN 1: LOCAL STRUCTURE PLAN
Lot 95 Watson Road, BEELIAR
A Creative Design & Planning Project
NORTH
0 5 10 15m
Scale: 1:500@A3
Date: 13/05/2015
Plan: URB8E-2-003a
A 26 Brown St, East Perth WA 6004
P (08) 9325 0200
E info@creativedp.com.au
W creativedp.com.au
Creative DESIGN+PLANNING

Appendix B

DRAFT STRUCTURE PLAN



DRAFT STRUCTURE PLAN
LOTS 94 & 95 WATSON ROAD
BEELIAR

0 10 20 30 40 50m
SCALE 1:1500 @ A3
DATE: OCTOBER 2013

PREPARED BY:
VANGUARD PLANNING SERVICES
LEGEND:
Subject Area.....
Existing Buildings....

NORTH

Appendix 4
Local Water Management Strategy

Document Reference: EP15-023(02)--002 SMF

Emerge Associates contact: David Coremans

10 September 2015

Attention: John Da Luz
C/- Urban Capital Group
14 Kearns Crescent
APPLECROSS WA 6153

Delivered by email to: tom@urbancapitalgroup.com.au

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Blue Tang (WA) Pty Ltd as trustee for The Reef Unit Trust ABN 44656153170 and Emerge Environmental Services Pty Ltd ABN 57144772510 trading as Emerge Associates

Dear John,

LOCAL WATER MANAGEMENT STRATEGY – LOT 95 WATSON ROAD, BEELIAR

Creative Design & Planning (CDP), on behalf of Urban Capital, have prepared a Local Structure Plan (LSP) for residential development within Lot 95 Watson Road (referred to herein as 'the site'), in the locality of Beeliar. This letter is intended to support future water management design within the LSP area.

The site is zoned "Urban" under the Metropolitan Region Scheme (MRS) and "Development" under CoC Town Planning Scheme (TPS) No. 3. The site is approximately 0.4 hectares (ha) in size and located approximately 20 km south of the Perth Central Business District (CBD), within the City of Cockburn (CoC). The site is bound by Watson Road to the east, and residential dwellings and/or development areas to the north, south, and west. The location of the site is shown in **Figure 1**.

The proposed development comprises eight R40 lots, associated road reserves and 395 m^2 of public open space (POS). The water management strategy detailed below has been developed in consideration of the existing environmental context and the objectives and principles detailed in *Better Urban Water Management* (WAPC 2008).

Existing Environment

The existing environmental attributes relevant to water management at the site are summarised as:

- The area receives an average of 753 mm of rainfall annually (BOM 2015). The majority of rainfall is received between June and August.
- Topographical contours indicate that the site ranges from 22.0 m Australian height datum (AHD) in the south west and 15.5 m AHD in the north east with an average slope of 4.3%.
- Regional geological mapping indicates the site is underlain with sand derived from limestone (LS1) (Gozzard 1983).
- Available information indicates that the site has been classified as having "no known risk" of acid sulfate soils (ASS) occurring within three metres of the natural soil surface (Landgate 2015).
- The maximum groundwater level (MGL) for the site is between 1 m AHD and 2 m AHD (DoW 2015). Groundwater is therefore inferred to be ~13.5 m below ground level (BGL) across the site.
- No groundwater quality data exist for the site.

- There are no surface water features within the site due the high permeability of underlying soils.
- There are no geomorphic wetlands within the site (DPaW 2013).
- The site contains two residences and a shed.

Design criteria and objectives

There are no overarching water management documents available for the site. Water management design criteria and objectives for the site have been generated under guidance from a number of National and State policies and guidelines including:

- *State Water Strategy* (Government of WA 2003)
- *State Water Plan* (Government of WA 2007)
- *Guidance Statement No. 33: Environmental* Guidance for Planning and Development (EPA 2008)
- *State Planning Policy 2.9: Water Resources* (WAPC 2006a)
- *Statement of Planning Policy No. 3: Urban Growth and Settlement* (WAPC 2006b)
- *Liveable Neighbourhoods* (4th Edition) (WAPC 2007)
- *Better Urban Water* Management (WAPC 2008)
- *Decision Process for Stormwater Management in Western Australia* (DoW 2009)
- *Stormwater Management Manual for Western Australia* (DoW 2007).

Stormwater management

The principle behind stormwater management at the site is to mimic the pre-development hydrological conditions. Stormwater design criteria include:

- **Criteria SW1** Lots will retain the 20 year 5 minute ARI rainfall event within soakwells.
- **Criteria SW2** The 100 year ARI event shall be contained onsite.
- **Criteria SW3** Provide stormwater flow pathways for the 100 year ARI event runoff.
- **Criteria SW4** Finished floor levels will have a minimum 500 mm clearance to 100 year ARI levels.
- **Criteria SW5** Apply appropriate non-structural measures to reduce nutrient loads.

Groundwater management

The principle behind the groundwater management strategy is to maintain the existing groundwater hydrology. The design criteria proposed for groundwater management include:

- **Criteria GW1** Treat stormwater runoff before discharging to groundwater.

Stormwater management strategy

The development drainage system has been designed to achieve the objectives and criteria stated above. Specifically, the site will retain up to the 100 year ARI event runoff as close to source as practicable in order to maintain pre-development hydrology.

Lot drainage

Lots will retain the majority of the 100 year ARI event on lot. Rainfall on the front and backyards of lots (garden areas) will infiltrate directly at-source. Runoff from roof areas may be directed to rainwater tanks with excess runoff to soakwells, or entirely to soakwells (up to the 20 year 5 minute ARI event) which will infiltrate into the sandy soil and ultimately the groundwater.

In large rainfall events (i.e. the 100 year ARI event), excess runoff will be allowed to infiltrate in back gardens with runoff from front driveways retained and infiltrated within permeable areas on site. The ultimate configuration of lot retention designs (i.e. linear grated drainage pits and/or soakwells) will be confirmed within the future UWMP.

Development drainage

As discussed above, runoff from driveway crossovers located within road reserve will be captured and infiltrated within the road reserve. This may be either within individual soakage at the lot boundary or a single consolidated storage volume at the downstream end of the road reserve.

Corella Close (constructed as part of subdivision of Lot 94 Watson Road to the north of the site) grades to the east and currently retains up to the 100 year ARI event from within Lot 94 in subsurface storage infrastructure (A. Khosravi 2015, pers. comm., 26 June). Corella Close is proposed to be extended as shown in **Figure 2**. Subsurface storage will be provided within Corella Close road reserve within Lot 95 Watson Road and will be sized to retain up to the 100 year ARI event runoff from the road network (which will include runoff from the extension of the Corella Close road reserve). An indicative location for subsurface storage is shown in **Figure 2**.

There are a number of formats that the subsurface storage could take. At this stage the brand of product has not been selected. The important thing will be that the 100 year ARI event subsurface storage volume will be provided for in some form. Runoff will be treated via adsorption and filtration by sand particles as water passes through the underlying soil column to groundwater. The installation of subsurface storage infrastructure will be conducted such that a clearance to MGL of 500 mm is maintained. The ultimate design of retention/treatment infrastructure will be detailed at subdivision at which stage compliance with the above criteria will be demonstrated within a supportive UWMP.

Subdivision and urban water management plans

The requirement to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. The development of the future UWMP should follow the guidance provided in *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008).

It is expected that the civil drainage designs will be progressed to a level that provides detailed cross-sections, sizes of storage areas, pipe sizes, inverts, etc. The exact location and shape of the drainage infrastructure will be specified and presented within the future UWMP. Specifically, the future UWMP will address:

- Compliance with design objectives listed above.
- Detailed stormwater management design (including subsurface infrastructure design).
- Detailed drainage calculations and sub-surface storage details.
- Details of proposed roles and responsibilities for the above measures.

The site is located within the Cockburn groundwater management area within the Kogalup groundwater subarea to which allocation is available from within the superficial aquifer. The future UWMP will demonstrate that adequate allocation of water has been obtained to irrigate POS and road verges within the subdivision area, or that an appropriate contingency plan has been established in the event that a reduced water allocation is obtained.

Due to the significant (~13.5 m) depth to groundwater across the site, groundwater quality is unlikely to be representative of the management practices of the site above and therefore ongoing monitoring of groundwater quality is not proposed.

Summary and closing

The stormwater management strategy detailed above provides an appropriate guidance to the future design of the site in a manner which is based upon site-specific investigation and is consistent with relevant State and Local Government policies. The responsibility for working within the framework established rests with the proponent, although it is anticipated that future UWMP will be developed in consultation with the CoC and DoW and in consideration of other relevant policies and documents.

We trust the above adequately details the proposed method to manage stormwater within the site.

Yours sincerely
Emerge Associates

David Coremans
PRINCIPAL ENVIRONMENTAL CONSULTANT, TEAM LEADER - HYDROLOGY

cc: Urban Capital Group
Creative Design & Planning

Encl: Figure 1: Site Plan and Locality Diagram
Figure 2: Stormwater Management Strategy

General References

Department of Water (DoW) 2007, *Stormwater Management Manual for Western Australia*, Perth.

Department of Water (DoW) 2009, *Decision Process for Stormwater Management in Western Australia*.

Environmental Protection Authority (EPA) 2008, *Guidance Statement No. 33: Environmental Guidance for Planning and Development*, Environmental Protection Authority, Perth.

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Western Australian Planning Commission (WAPC) 2008, *Better Urban Water Management*, Western Australian Planning Commission, Perth.

Online References

Bureau of Meteorology (BOM) 2015, *Climate and weather statistics*, http://www.bom.gov.au/climate/averages/tables/cw_009194.shtml [viewed: 15/06/15]

Department of Water (DoW) 2015, *Perth Groundwater Atlas*, http://www.water.wa.gov.au/idelve/gwa/ [viewed: 16/06/15]

Landgate 2015, WA Atlas, viewed 29 April 2015, <https://www2.landgate.wa.gov.au/bmvf/app/waatlas/>. [viewed: 16/06/15]

Figure 1:	**Site Plan and Locality Diagram**
Project:	Local Water Management Strategy Lot 95 Watson Road, Beeliar
Client:	John Da Luz

Legend

- Site boundary
- Existing cadastral boundaries

Plan Number: EP15-023(02)--F03			
Drawn:	SMF	Date:	22/06/15
Approved:	DPC	Date:	30/06/15
Checked:	SMF	Scale:	1:1,087@A4

0 10 20 30 Metres

emerge ASSOCIATES
Integrated Science & Design

Sources: The following datasets were used in the production of this map: Layer - CUSTODIAN (date)

Figure 2: Stormwater Management Strategy

Project: Local Water Management Strategy
Lot 95 Watson Road, Beeliar

Client: John Da Luz

Legend

- Site boundary
- Existing cadastral boundaries
- Subsurface storage (indicative)
- POS
- Residential
- Road

Plan Number: EP15-023(02)--F04	
Drawn: SMF	Date: 22/06/15
Approved: DPC	Date: 30/06/15
Checked: SMF	Scale: 1:600@A4

0 7.5 15 22.5 Metres

emerge ASSOCIATES
Integrated Science & Design

Sources: The following datasets were used in the production of this map: Layer - CUSTODIAN (date)

Appendix 5
Engineering Servicing Advice

JDSi
CONSULTING ENGINEERS

Certified System
Quality
ISO 9001
SAI GLOBAL

P: 08 9227 0595
F: 08 9227 8617

Workzone,
Level 6, 1 Nash Street,
Perth WA 6000

PO Box 8523
Perth BC WA 6849

ABN 67 138 876 203
jdsi.com.au

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6 ǂ terKand sŎ@ŎrKassŎts arŎlocǂ ed on t.ŎKnorth side ĜK.ŎKŎA wig intŎrnǂ l rĜǂdKand thusK nyK connecwionsKĜLot 95 @wŎH irŎKwdwwdual @or- s ordersKŎH estsKĜmK6 ǂ terKĜrporǂ ion. DuŎKĜK.ŎK locǂǐ wn ĜK.ŎKŎAstinǐ KĜĜ3ǂ.8 therŎK@ll be rŎnsǐǂŎ ment costs assĜcwated @wK c t ins<K
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ᵞAistinǐ K6 estern Po@erKĜwned and operated elŎcǐ rwcwyKdistrw2wĜn assŎtsK.ǂ kŎK2een idenwǐwŎdKwithŎK arŎǂKĜK.ŎKprĜ3osed dekŎlopment at Lot 95K6 ǂ son Road, ; ŎŎwar<KK=se assŎts arŎKĜer. ead andK are s 33lied fromK.ŎK6 Ŏs ern PĜ@ŎrKĜĜ- 2 rn CemŎnKĜnŎS bsǂ wnKKwǂKŎK22,000 (Ĝ lt RussŎll Road 6 ŎsK&ĜC501.0 OC; 'KEeeder<K Ŏs ern Po@ŎrKnet@Ĝr- capacwyKĜrŎcǂ sK"or 2015-20 c rrŎnǐ lyK indwǂ tesK.ŎK3Ĝ@erK kǂ w2 le for ne@KdŎkŎlopment isKV25M(A<K
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ErŒm an engineerẇg pers3ecẇǨ. e sẇǑcan be sǑṙẇed and is s ẇᵲ2le for resẇentiᵲ l deṙǑlopment.K
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Phone:K(08) 9227 0595
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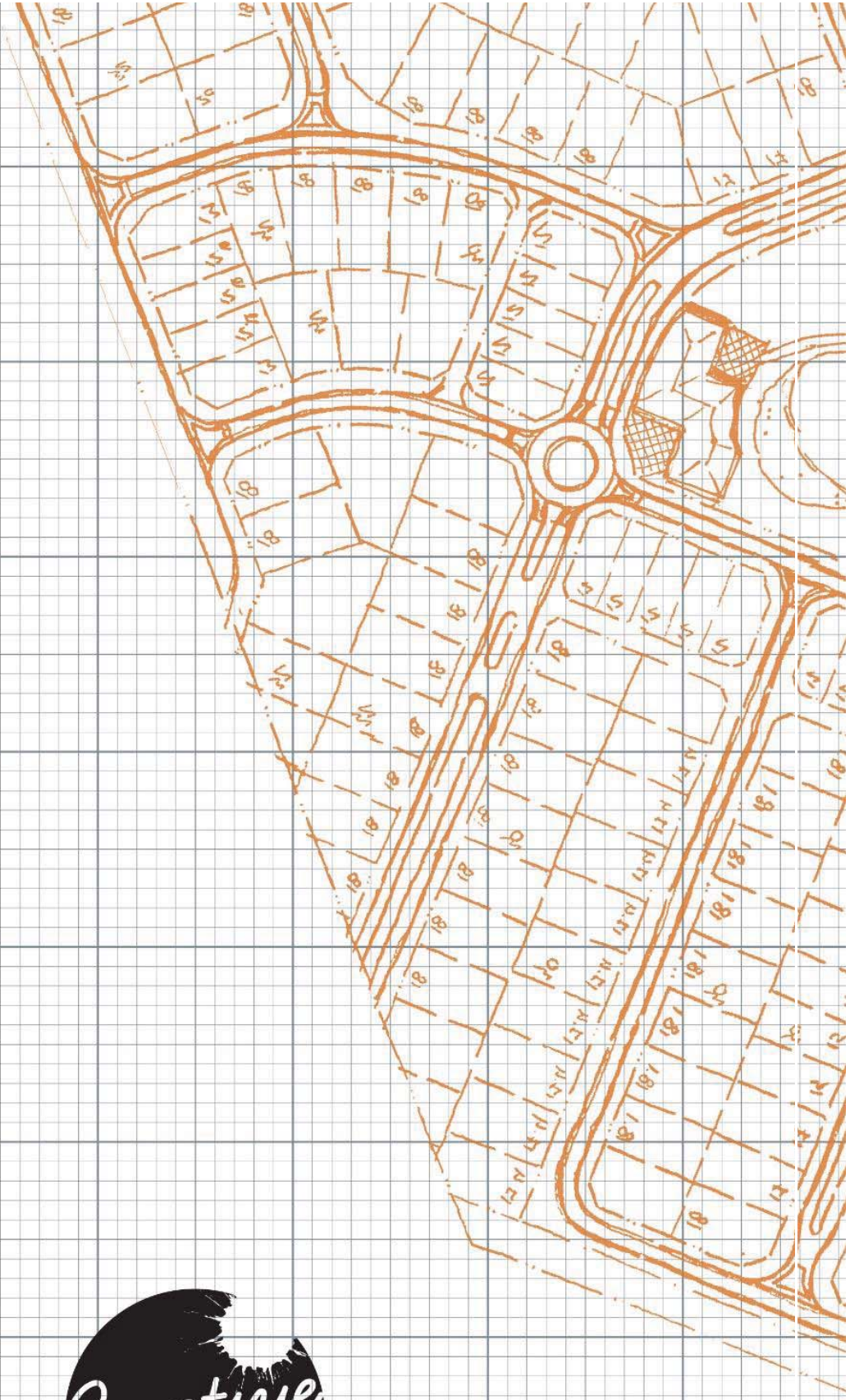

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