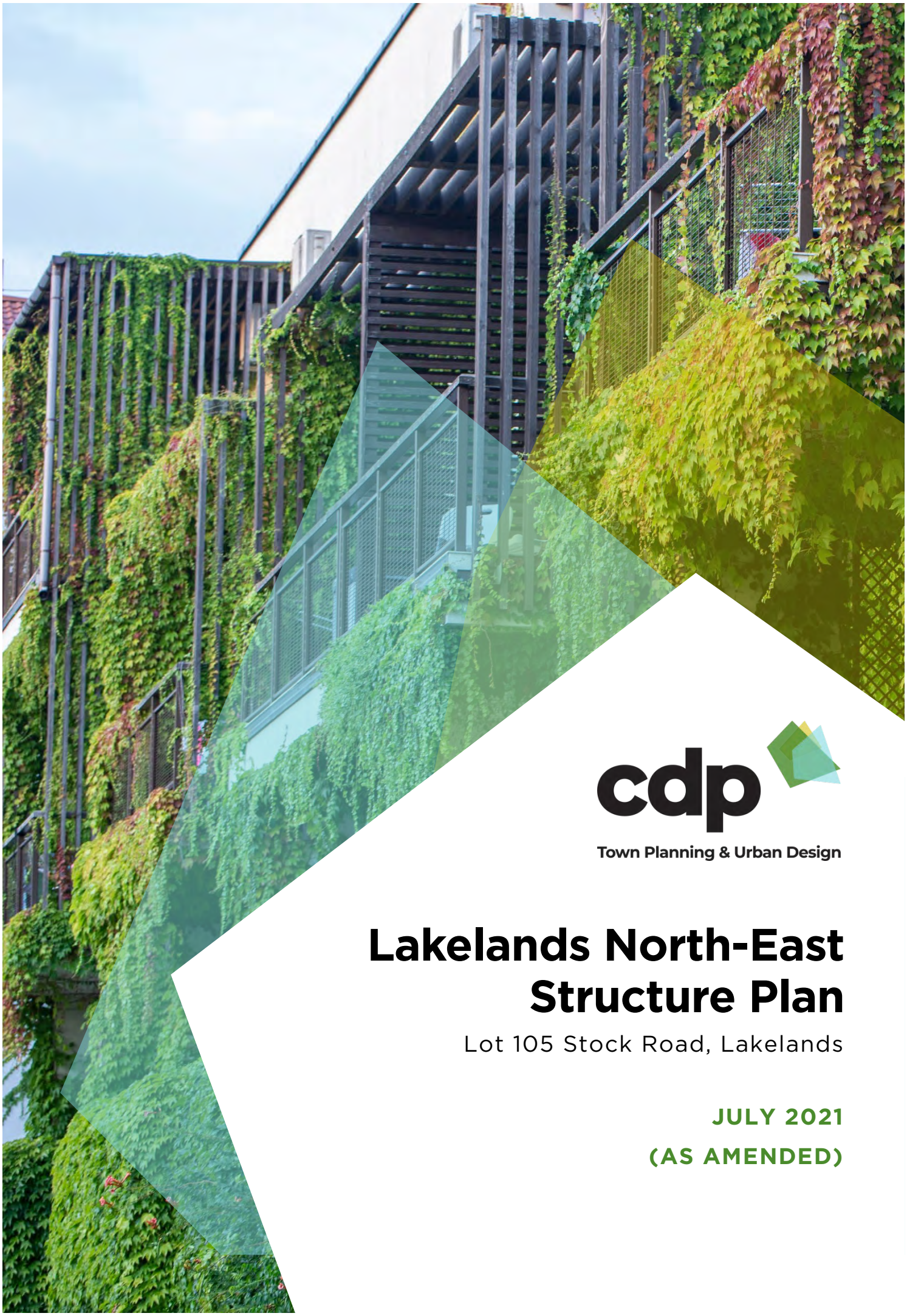

cdp

Town Planning & Urban Design

Lakelands North-East Structure Plan

Lot 105 Stock Road, Lakelands

JULY 2021

(AS AMENDED)

Lakelands North-East Structure Plan.

Lot 105 Stock Road, Lakelands

JULY 2021 (AS AMENDED)

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In Collaboration with.
JDSi Consulting Engineers
Emerge Associates
Bushfire Safety Consulting
Lloyd George Acoustics
GTA Consultants
McMullen Nolan Group

DOCUMENT STATUS

Version	Comment	Prepared	Reviewed	Issued
2	WAPC Schedule of Modifications	TV	JH	19/03/2018
3	LSP Amendment No. 1 (2021) Submission	TV	JH	02/06/2020
4	LSP Amendment No. 1 (2021) WAPC Schedule of Modifications	TV	JH	20/07/2021

ENDORSEMENT OF STRUCTURE PLAN

This Structure Plan is prepared under the provision of the City of Mandurah Town Planning Scheme No.3.

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

11 April 2018 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

11 April 2018 Date

11 April 2038 Date of Expiry

Table of Amendments.

Modification	Description	Amendment Type	Endorsed by WAPC
1	▪ Reconfiguration of Public Open Space areas and adjoining residential cells and road network - pursuant to EPBC Act approval, December 2019. ▪ Amendment of the density range from R25 - R40 to R25 - R60.	Standard	01 November 2021

Table of Density Plans.

Density Plan No.	Area of Density Plan Application	Date Endorsed by WAPC
1	WAPC 157010 for The Gardens Lakelands Estate - Stage 1	April 2019
2	WAPC 159279 for portion of The Gardens Lakelands Estate - Stage 1 *NB. Supersedes portion of Density Plan No. 1*	November 2019

Executive Summary.

The *Lakelands North-East Structure Plan* (**Structure Plan**) has been prepared to guide the subdivision and development of approximately 136.46ha of land, comprising Lot 105 Stock Road, Lakelands, within the City of Mandurah municipality. The developable area relates to the 'Urban' portion of Lot 105, being ~38.1ha. The remaining portion of Lot 105 is reserved under the Peel Region Scheme (PRS) as 'Regional Open Space'.

The Structure Plan has been prepared on behalf of Lot 105 Lakelands Pty Ltd by the following specialist consultant team:

- CDP Town Planning & Urban Design – urban design & town planning;
- JDSi Consulting Engineers – engineering;
- Emerge Associates – environment, landscaping, hydrology;
- Bushfire Safety Consulting – bushfire management;
- Lloyd George Acoustics – noise management;
- GTA Consultants – traffic & transport analysis;
- McMullan Nolan Group (MNG) – surveying

Purpose

This Structure Plan provides an overarching planning framework to guide and facilitate the development of the site for urban purposes and has been prepared in accordance with the provisions under Schedule 2 Part 4 of the *Planning and Development (Local Planning Scheme) Regulations 2015*.

The plan provides for an integrated and coordinated approach to an appropriate mix of residential land uses and infrastructure, necessary to create a new, vibrant residential community in the Mandurah municipality.

The Structure Plan has been submitted for approval by the Western Australian Planning Commission (**WAPC**).

Design Approach

The design approach has been a rigorous multidisciplinary process with continuous reflection upon the purpose of the Structure Plan and improving project outcomes. Design principles and considerations which have informed the design approach include:

- Urban structure and place making
- Movement systems and connectivity
- Public Open Space allocation, including community creation and interface to the Paganoni Swamp (Conservation Category) and associated buffers and
- Landform and environment

Project Overview

The Structure Plan will create a framework for the future urban subdivision development of an anticipated 488 dwellings, which will ultimately house a new community in the vicinity of 1,350+ people within a variety of lot product and dwelling types.

Executive Summary Table.

Item	Data	LSP Reference
Total area covered by the Structure Plan	137.32 ha	
Area of each land use proposed (approx.): • Urban • Regional Open Space • Stock Road Reservation	 38.11 ha 94.35 ha 4.85 ha	Part 2 - Section 3.3 *Land Composition*
Area of each 'Urban' land use proposed (approx.): • Residential • Primary School (portion) • Public Open Space • CCW Wetland Buffer • Roads (internal) • Sewer Pump Station	 18.48 ha 2.0 ha 4.26 ha 2.59 ha 10.63 ha 0.14 ha	
Estimated Lot Yield	488 lots	Part 2 - Section 3.4 *Dwelling Forecasts*
Estimated Dwelling Yield	488 dwellings	
Estimated Residential Density	~12 dwellings/*gross urban zone* [1] ~25+ dwellings/*site hectare* [2]	
Estimated Population	1,360+ persons	
Number of High Schools	N/A	Part 2 - Section 3.9 *Education Facilities*
Number of Primary Schools	1 (part contribution)	
Estimated Number and percentage of Public Open Space given over to: • Regional Open Space • District Open Space • Neighbourhood Parks (>3,000m^2) • Local Parks (<3,000m^2)	 94.35 ha 0 ha 4 parks @ 3.97 ha (93%) 2 parks @ 0.28 ha (7%)	Part 2 - Section 3.7 *Public Open Space*
Estimated percentage of natural area	94.35 ha *(NB. Outside of Urban zoning)*	

Footnotes:

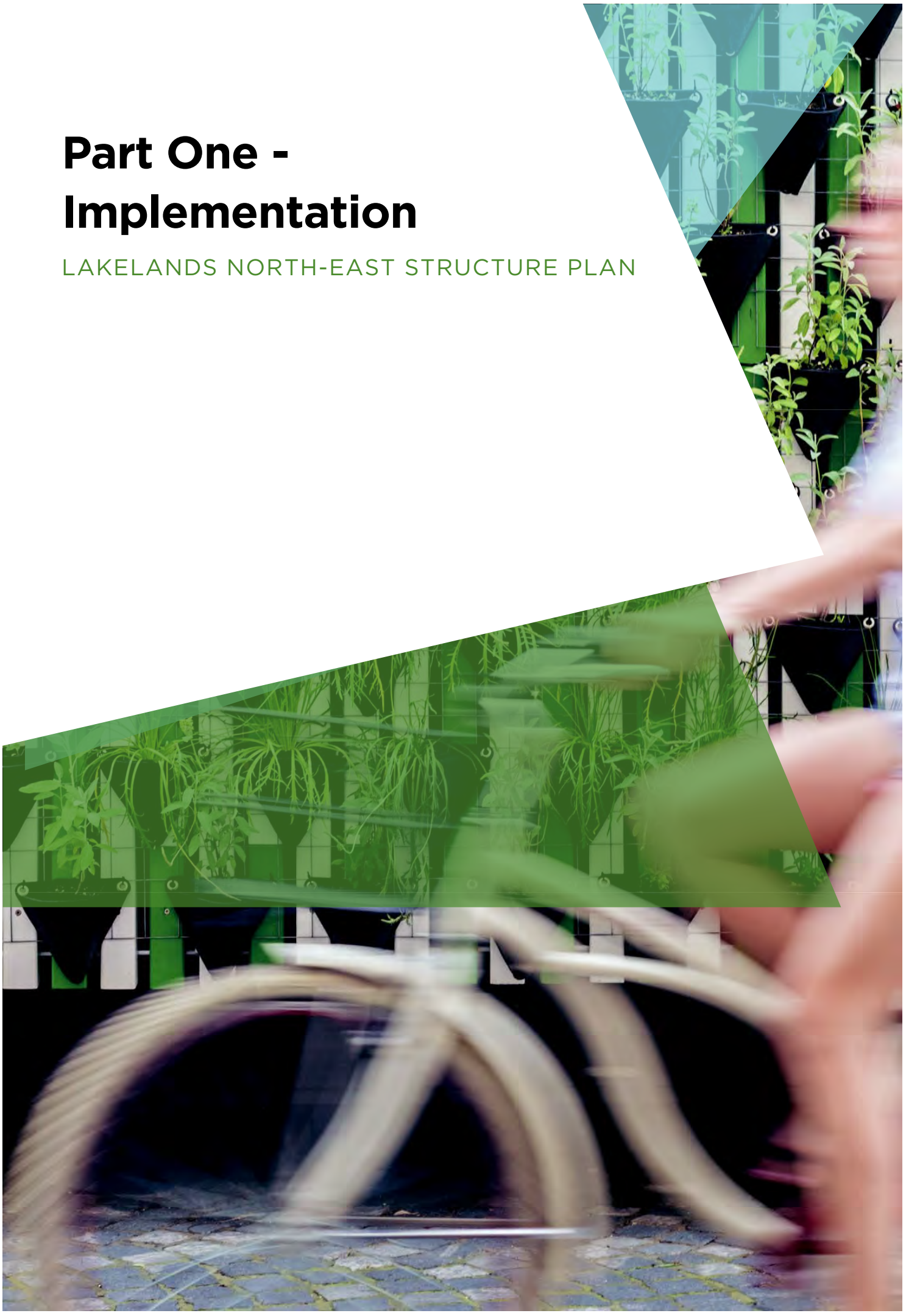
[1] *Gross urban zone refers to the definition under WAPC's Directions 2031 and supporting documents.*

[2] *Site hectare refers to the definition under Element 1 of WAPC's Liveable Neighbourhoods.*

Contents.

Part One - Implementation

LAKELANDS NORTH-EAST STRUCTURE PLAN



Part One - Implementation

LAKELANDS NORTH-EAST STRUCTURE PLAN

1. Structure Plan Area

This Structure Plan applies to Lot 105 Stock Road, Lakelands, 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 *Lakelands North-East Structure Plan* (**Structure Plan**).

2. Operation

This Structure Plan comes into effect on the date it is approved by the Western Australian Planning Commission (**WAPC**).

The Structure Plan is to be given due regard when determining an application to subdivide or develop land within the structure plan area.

3. Staging

The development of the site will be implemented in multiple stages. The staging plan is indicative as timing, location and composition of the future stages will be dependent on market demand.

The staging will commence in the southern portion of the site, with secure and sufficient vehicular access to be provided. The staging will generally move northwards.

The provision of engineering infrastructure and primary internal road network will also need to be staged to suit development demand. A detailed programme for this will be prepared as part of ongoing detailed planning and design of service infrastructure.

4. Subdivision & Development Requirements

4.1 Land Use Permissibility

a) Land use permissibility within the Structure Plan area is to be in accordance with the corresponding zone or reserve under the City of Mandurah *Town Planning Scheme No. 3* (the **'Scheme'**).

4.2 Hazards & Separation Distances

a) A detailed Noise Management Plan is to be prepared and implemented in accordance with *State Planning Policy 5.4 Road and Rail Noise* and the associated implementation guidelines for lots identified as affected by noise under Figure B1 of Appendix B in the Acoustic Assessment prepared by Lloyd George Acoustics (**Appendix 4.2**).

b) Where necessary, each application for approval of a new stage of subdivision should be supported by technical documentation (preferably prepared by a suitably qualified bushfire practitioner) which demonstrates how the requirements of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* and the associated guidelines are being met through the implementation of the Bushfire Management Plan (**Appendix 1**).

4.3 Major Infrastructure

a) Primary access to the site is proposed via three road connections to the south, approved as *Neighbourhood Connectors* in the *Lakelands East Structure Plan* (January 2015, as amended).

b) Traffic modelling shows the intersection between Mandjoogoordap Drive and Lilydale Drive will need to be modified to accommodate residential development within the broader urban precinct. The WAPC is likely to require, as a condition of subdivision approval, that the landowner/applicant make arrangements for pro-rata contribution to be made towards the modification of this intersection, on the advice of Main Roads Western Australia (**MRWA**).

4.4 Public Open Space

a) The Structure Plan (**Plan 1**) nominates an area of 4.25 hectares as creditable Public Open Space (**POS**). The proposed POS meets the minimum 10% requirements, as outlined in Part Two of this Structure Plan.

b) An updated POS Schedule is to be provided at the time of subdivision for determination by the WAPC, upon advice of the City of Mandurah.

4.5 Residential Density Code Plan

a) A residential density code plan is to be submitted to the WAPC at the time of subdivision, unless exempt from this requirement by clause 4.5(d) of this Structure Plan. This plan is to identify the residential density code applicable to each proposed lot, in accordance with the locational criteria set out below.

b) The residential density code plan is to include a summary of the proposed dwelling yield and demonstrate how the density target, as specified in section 4.6, is progressively being achieved.

c) The WAPC is to determine the residential density code plan together with the related subdivision application. If approved, the residential density code plan will then form part of the Structure Plan and shall be used to assess and determine any future application for development approval.

d) A residential density code plan is not required if the purpose of the subdivision application is to:

   i. amalgamate lots;

   ii. create a lot or lots for the purposes of facilitating the provision of access, services or infrastructure;

   iii. create a lot or lots which cannot be developed for residential purposes; or

   iv. create residential lots in accordance with a previously approved residential density code plan.

e) As each stage of subdivision is finalised and the deposited plan depicting the lots is submitted to the WAPC for its endorsement, a consolidated residential density code plan is to be prepared and forwarded to the local government and WAPC, and this shall supersede each previous residential density code plan(s).

4.6 Residential Density Targets

a) The subdivision of land zoned Urban in the Peel Region Scheme (**PRS**) should aim to achieve a density of 15 dwellings per hectare.

4.7 Locational Criteria

a) The allocation of specific residential density code to a lot shall be consistent with the residential density range identified on the Structure Plan (**Plan 1**) and the following locational criteria:

Density Code	Locational Criteria
R25	The base residential density code shall be R25, unless an R40 or R60 residential density code is applied in accordance with the locational criteria set out below.
R40	An R40 residential density code may only be applied where a lot is: i. at the end of a street block and with rear laneway access; **and/or** ii. located within 100 metres (walking distance) of public open space and key distributor roads.
R60	An R60 residential density code may only be applied where a lot is: i. located at the end of a street block and with rear laneway access; **and** ii. located abutting or adjacent to (that is, separated by no more than a constructed and dedicated public road) public open space; **or** iii. located abutting a key public transport node or route.

5. Local Development Plans

a) The WAPC may require, as a condition of subdivision approval, that a local development plan(s) be prepared in accordance with Part 6 of Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, prior to the creation or development of lots:

   i. of irregular shape or less than 260m^2;

   ii. affected by road or rail noise exceeding the targets set out in *State Planning Policy 5.4 Road and Rail Noise* and the associated implementation guidelines;

   iii. where vehicular access is obtained from a rear laneway or right of way or is otherwise constrained;

   iv. abutting areas of public open space; and/or

   v. intended to accommodate grouped or multiple dwellings.

b) Local development plans are to address the following matters, as required:

   i. street and boundary setbacks;

   ii. dwelling orientation;

   iii. uniform fencing requirements;

   iv. open space requirements;

   v. garage setbacks and widths;

   vi. vehicular and pedestrian access;

   vii. parking requirements;

   viii. overshadowing;

   ix. visual privacy;

   x. quiet house design and/or construction requirements; and

   xi. any variations to the residential design codes which may be required.

6. Other Requirements

6.1 Notifications on Title

a) Notifications are to be placed on titles of all affected lots to advise:

i. that the lot is located near a transport corridor and higher construction standards may be required to reduce transport noise to acceptable levels in accordance with *State Planning Policy 5.4 Road and Rail Noise*;

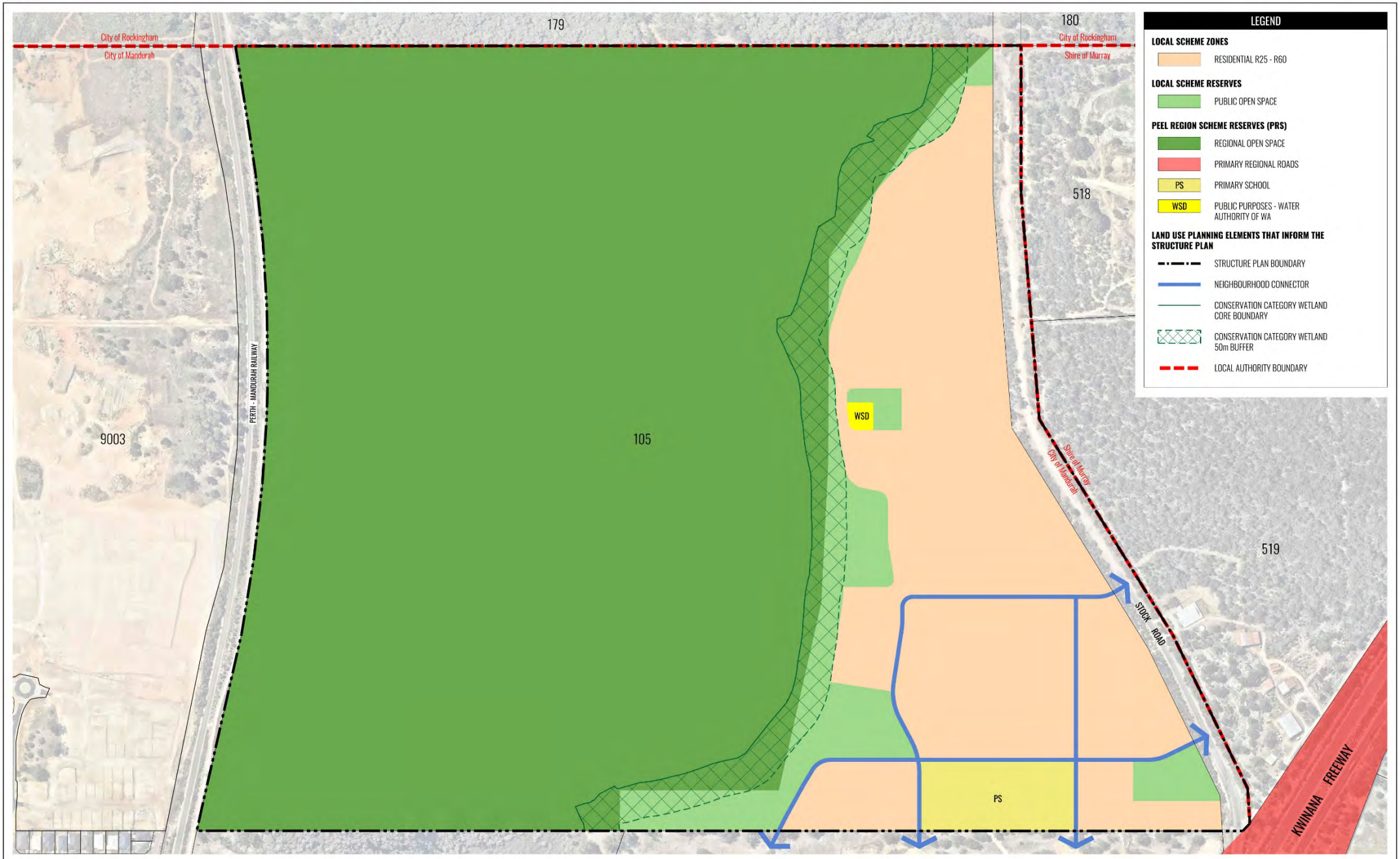
ii. that the lot is located within an area which has been declared bushfire prone and may be subject to a bushfire management plan and additional construction requirements may apply in accordance with *Australian Standards AS3959 Construction of Buildings in Bushfire Prone Areas* (as amended).

6.2 Developer Contributions

a) The proposed development is not encompassed by a Development Contribution Plan.

7. Additional Information

Additional Information	Approval Stage	Approval / Consultation Required
Density Plans	Subdivision Application	WAPC; City of Mandurah
Public Open Space	Subdivision Application	WAPC; City of Mandurah
Bushfire Attack Level Assessment	Subdivision application/condition of subdivision for identified lots; or Development application for identified lots	City of Mandurah; Dept. of Fire and Emergency Services
Bushfire Management Plan	Subdivision Application	Dept. of Fire and Emergency Services
Wetland Management Plan	Condition of subdivision approval	City of Mandurah
Fauna Management Plan	Condition of subdivision approval	City of Mandurah
Detailed Noise Management Plan	Subdivision application/condition of subdivision for identified lots; or Development application for identified lots	City of Mandurah; Main Roads Western Australia; Dept. of Water and Environmental Regulation
Traffic Impact Assessment – Mandjoogoordap – Lilydale Intersection	Subdivision Application	Main Roads Western Australia
Stock Road verge landscaping plan	Subdivision Application (as required)	City of Mandurah, in consultation with Western Power
Plan demonstrating passive surveillance opportunities over Stock Road	Subdivision Application (where proposed stage of subdivision abuts Stock Road)	City of Mandurah



LAKELANDS NORTH-EAST STRUCTURE PLAN

Plan 1

NORTH

Scale: 1:5000 @ A3

0 50 100 150m

PLAN: URBM2-5-004C REVISION: C
DATE: 24/01/2020 DRAWN: JP
PROJECTION: PCG 94 PLANNER: JH
DATUM: AHD CHECK: JH

cdp
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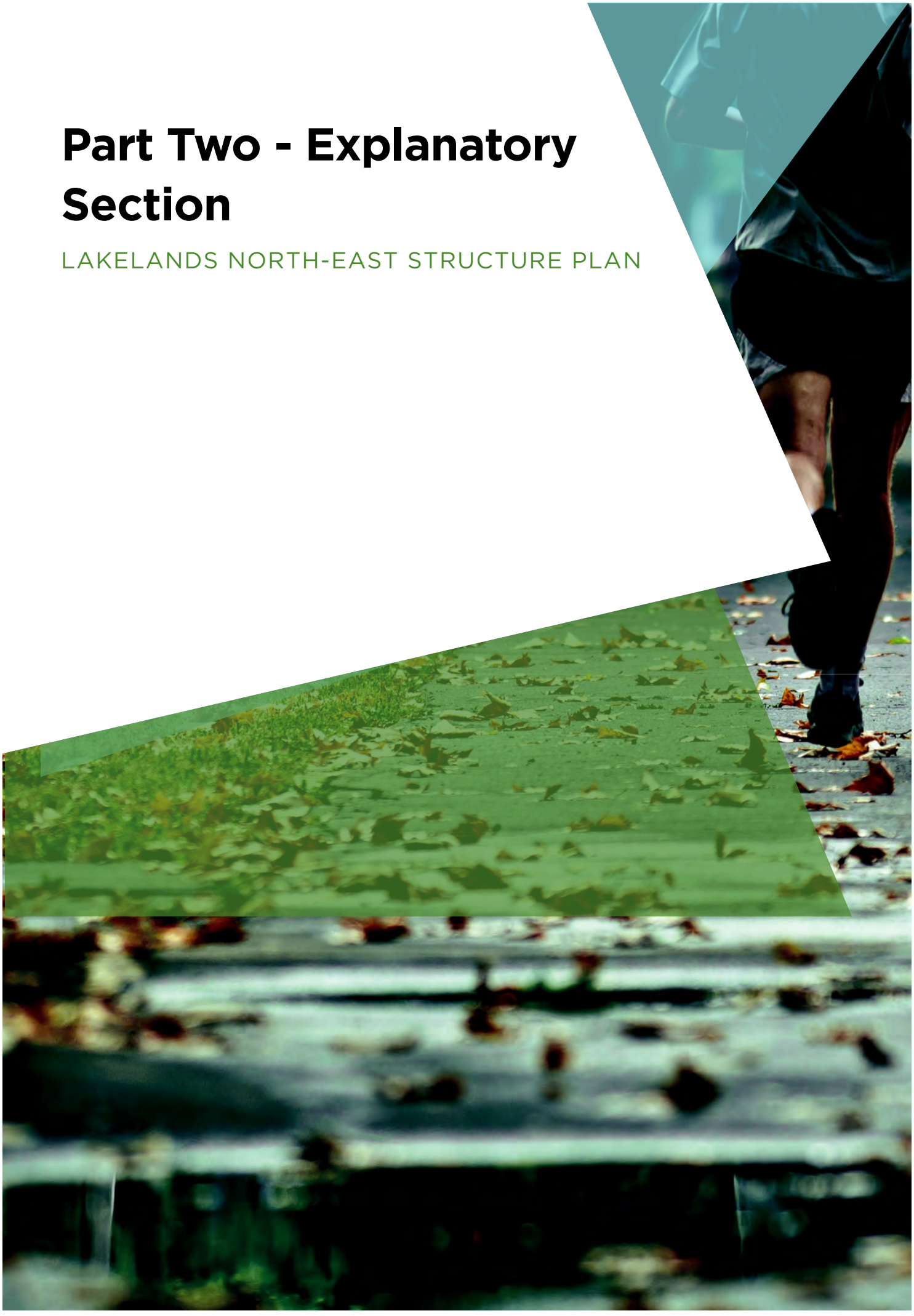
Part Two - Explanatory Section

LAKELANDS NORTH-EAST STRUCTURE PLAN



Part Two – Explanatory Section.

LAKELANDS NORTH EAST STRUCTURE PLAN

1. Planning Background

1.1 Purpose

The purpose of the Lakelands North-East Structure Plan report is to provide for the orderly and proper subdivision and development of portion of the site for 'Urban' purposes. The information contained in this section provides justification and support for the comprehensive and co-ordinated design response provided for the Structure Plan.

1.2 Land Description

1.2.1 Location

The site is located to west of the Kwinana Freeway and Stock Road, approximately 4 km east of the Indian Ocean, 9km north of the Mandurah Strategic Metropolitan Centre and 55km south of the Perth CBD (**Figure 1** refers).

1.2.2 Area, Land Use & Ownership

The total land area is 132.4617ha comprising 'Urban' portion of 38.1065ha and Peel Region Scheme 'Regional Open Space' portion of 94.3663ha. The site identified as Lot 105 on Deposited Plan 37823, Volume 2616, Folio 592 (**Appendix 1** refers). The registered owner is Lot 105 Lakelands Pty Ltd.

The 'Urban' portion of the site, historically comprised of bushland, has been subject to small occurrences of intermittent and minor clearing since 1965, with natural regrowth typically occurring in these areas.

Around 1995, more formal clearing was undertaken in the central-southern portion of the site to allow for the commencement of sand and/or limestone extraction activities. Further clearing was progressively undertaken to expand the extraction footprint until it reached its ultimate footprint around 2003, which extended across approximately half of the site. Extraction operations appear to have ceased by 2004, with some limited regrowth of vegetation occurring within the historical extraction footprint since this time.

1.3 Planning Framework

1.3.1 Zoning & Reservations

Peel Region Scheme

The eastern portion of site is zoned 'Urban' and western portion reserved as 'Regional Open Space" under the Peel Region Scheme (PRS) (**Figure 2** refers).

The site abuts the Kwinana Freeway to the south-east, classified as 'Primary Regional Roads' under the PRS.

City of Mandurah Town Planning Scheme No.3

Pursuant to the City of Mandurah *Town Planning Scheme No. 3* (TPS3), the site is zoned 'Urban Development' (**Figure 3** refers); with the western portion commensurate to the PRS reservation.

1.3.2 Regional & Sub Regional Structure Plans and Strategies

Directions 2031 and Beyond

Directions 2031 and Beyond, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, is a high level strategic plan that establishes a vision for the 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.

Draft Outer Metropolitan Perth & Peel Sub-Regional Strategy

The draft *Outer Metropolitan Perth and Peel, Sub-Regional Strategy* (OMSRS) provides a framework for delivering the objectives of *Directions 2031*. The document provides detailed analysis towards strategic plans of action, stakeholder responsibilities and

timeframes for delivery of development within the metropolitan corridors.

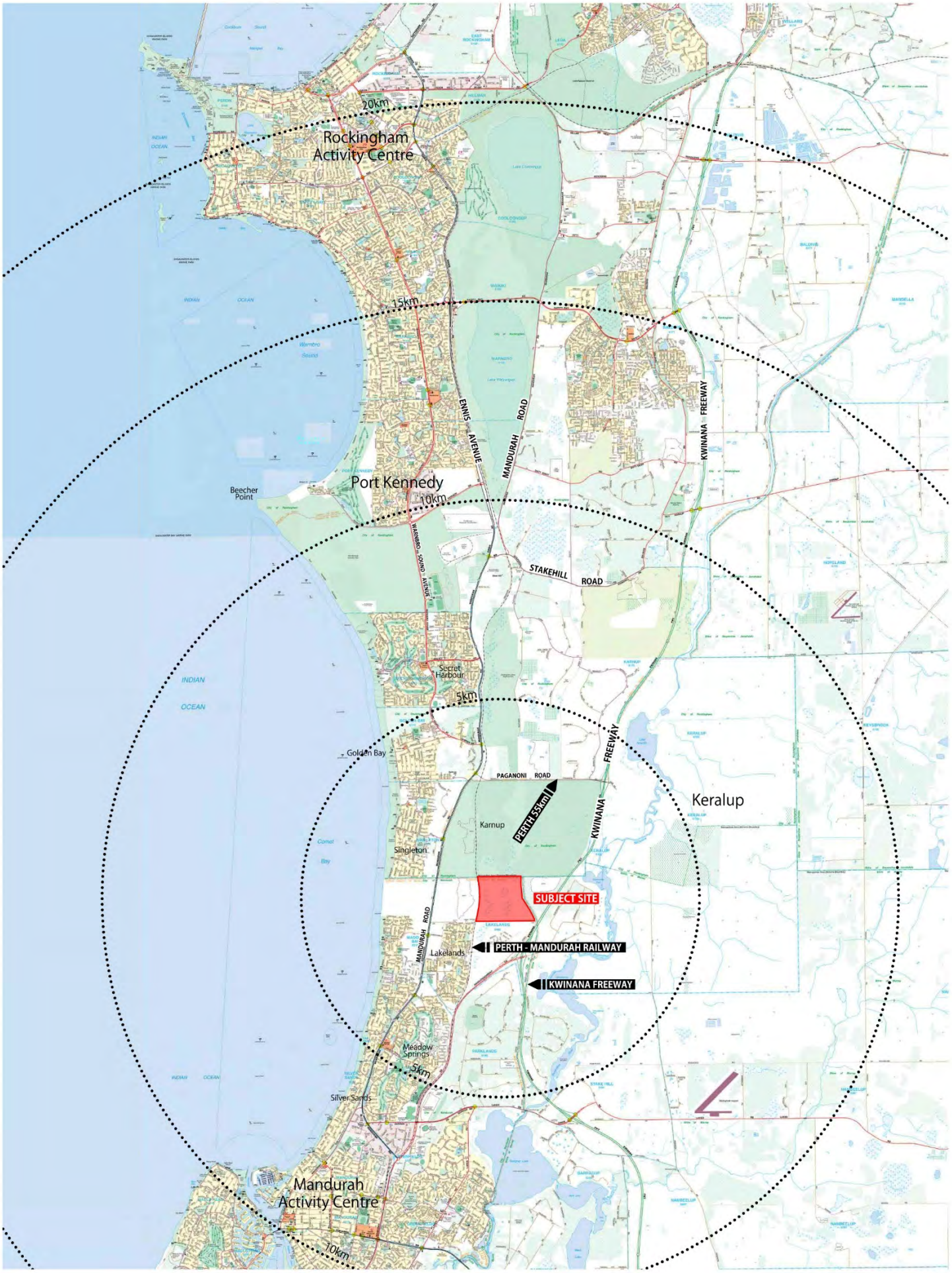
Situated within the 'Peel Sub-region', the site is identified as 'Urban Zoned Undeveloped' and together with land to the south is forecast to provide approximately 3,400+ dwellings (**Figure 4** refers).

Draft Perth and Peel @3.5 Million

The draft *Perth and Peel@3.5million* 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 site identified as 'Urban', under the draft *South Metropolitan Sub-Regional Planning Framework*.

Planning Bulletin 112/2015 – Medium Density Single House Development Standards

This Planning Bulletin, current version released in 2016, provides the medium-density single house standards which can vary the 'Deemed to Comply' R-Codes provisions of the Residential Design Codes. Said provisions now adopted under the City's *Local Planning Policy 1 (LPP1) – Residential Design Codes Policy*.



LOCATION PLAN

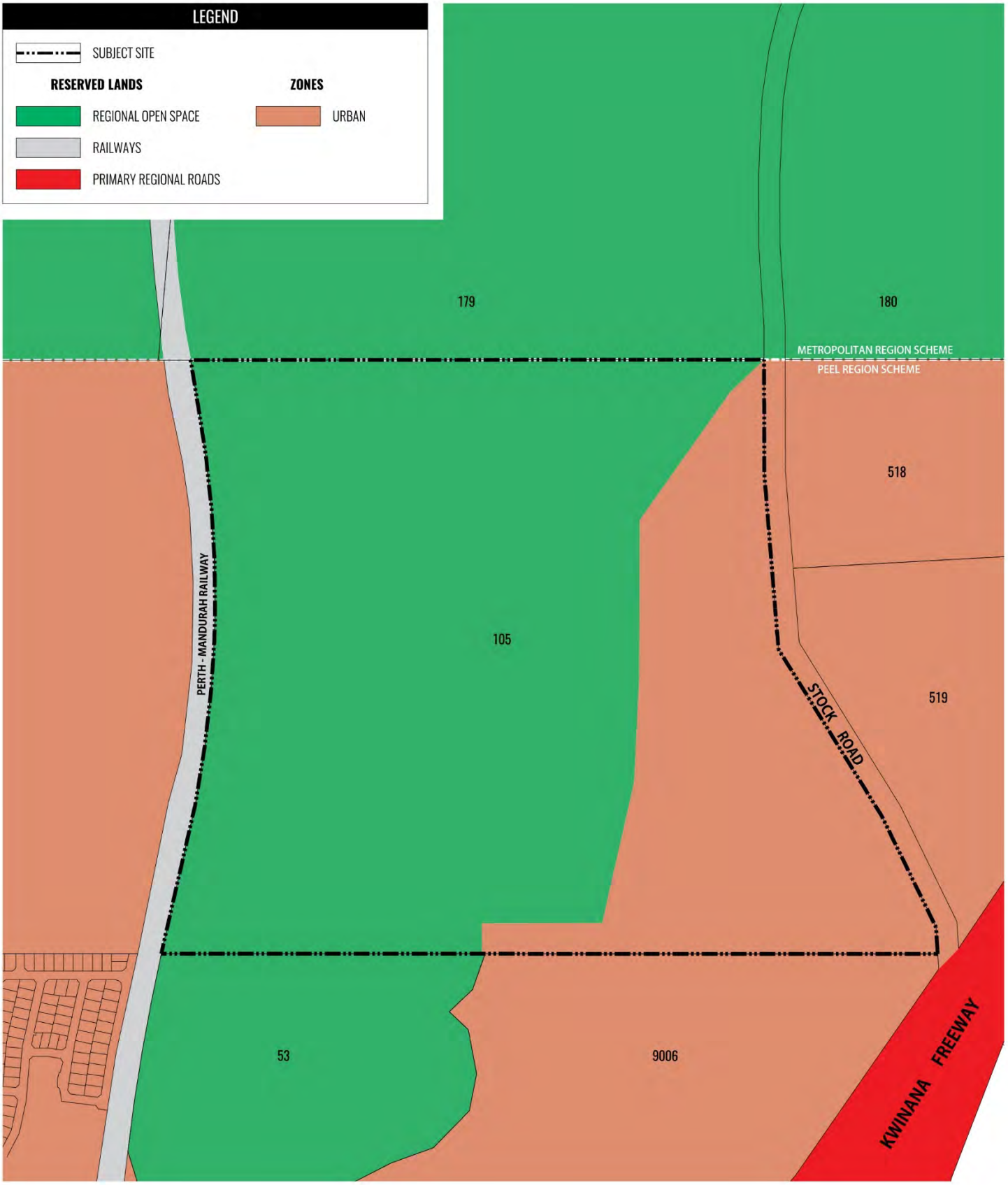
Figure 1

NORTH

Scale: NTS @ A4

0 1.25 2.5 3.75km

Date: 04/02/2020 **Plan:** URBM2-5-005B



PEEL REGION SCHEME ZONING MAP

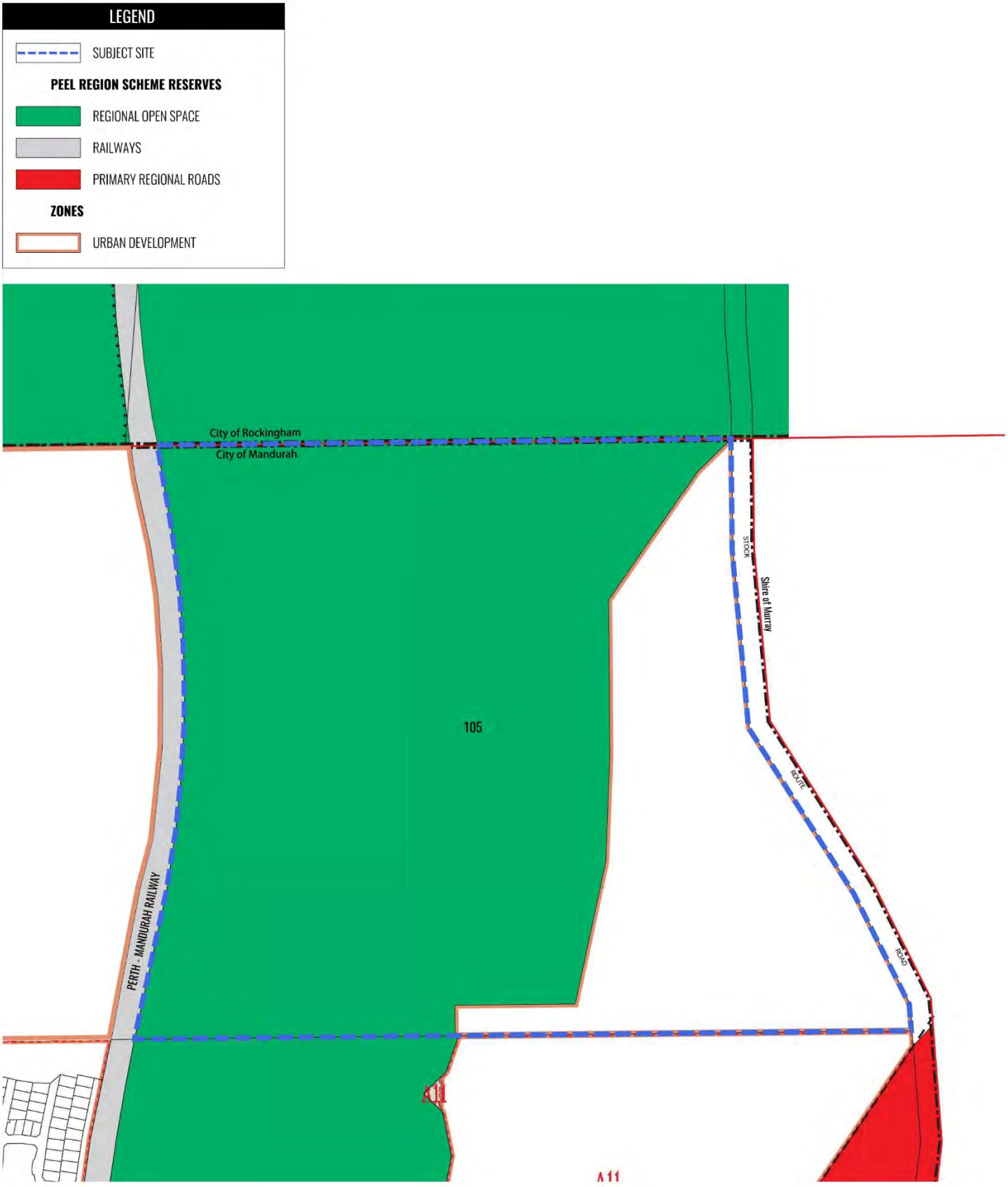
Figure 2

NORTH

Scale: 1:10,000 @ A4

0 100 200 300m

Date: 04/02/2020 Plan: URBM2-5-006B



CITY OF MANDURAH

Town Planning Scheme No.3 Zoning Map

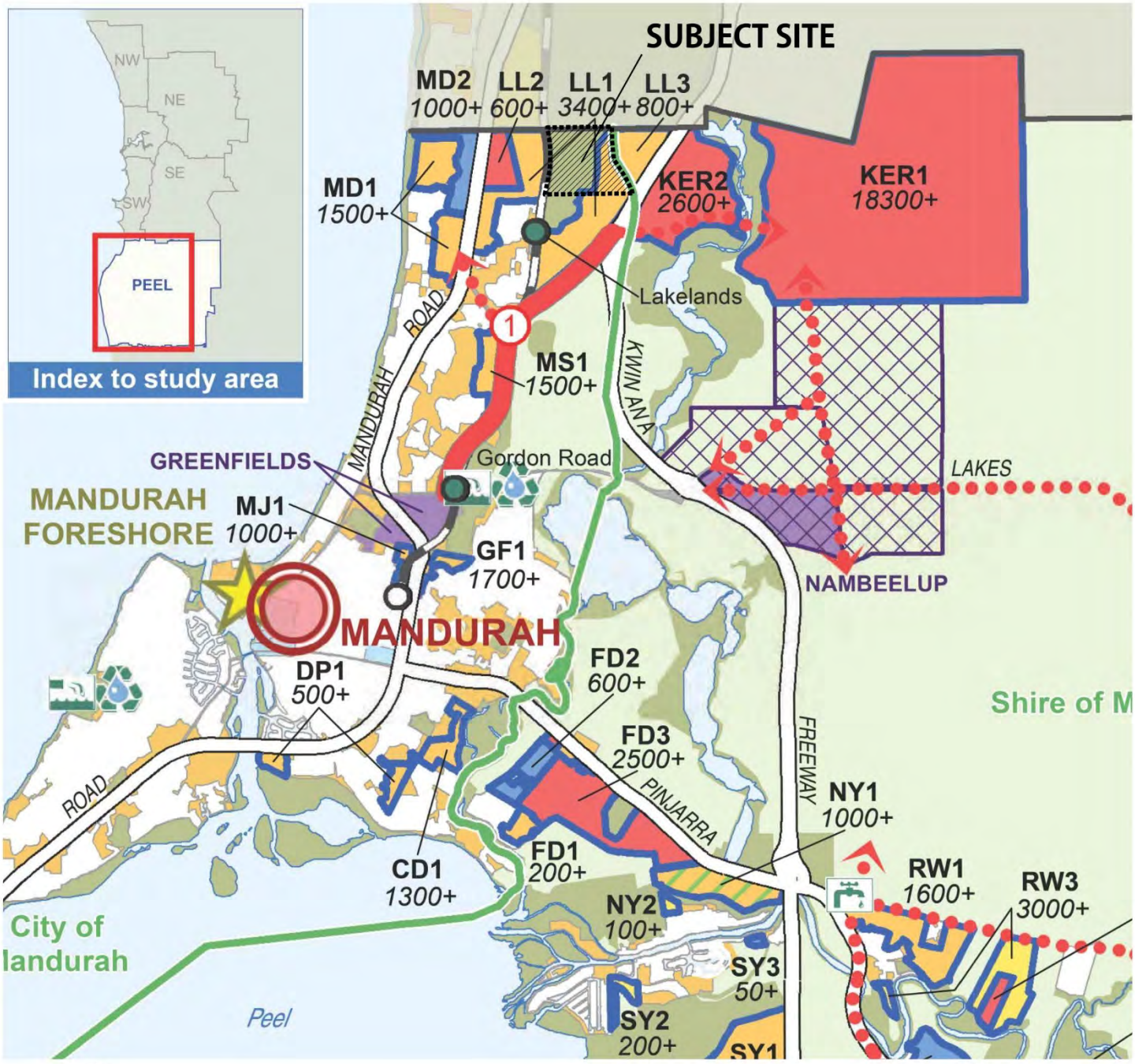
Figure 3

NORTH

Scale: 1:10,000 @ A4

0 100 200 300m

Date: 04/02/2020 **Plan:** URBM2-5-008B



OUTER METROPOLITON PERTH & PEEL SUB-REGIONAL STRATEGY

Figure 4

NORTH

Scale: 1:100,000 @ A4

0 1 2 3km

Date: 04/02/2020 **Plan:** URBM2-5-011B

Draft Perth & Peel Green Growth Plan for 3.5 Million

The *Draft Perth and Peel Green Growth Plan for 3.5 Million* provides for the growth of the population to 3.5 million people while protecting the unique biodiversity and other environmental values of the regions. It sets out a framework which delivers improvements to the protection and management of state and national biodiversity and environment matters.

The site is identified as 'Urban Class of Action' under the Strategic Conservation Plan. This Class of Action provides for existing, new and proposed urban development. Portion of the site is mapped as 'Broad Commitments and Values'.

Mandurah North District Structure Plan

The *Mandurah North District Structure Plan* (DSP) was adopted by the Council in June 2006 (**Figure 5** refers). It was prepared to assist the assessment of landowner/developer proposals over the City's northern-western development cell by ensuring that an overall design framework was established.

The DSP identifies the site as 'New Urban Development (Subject to Design and Approvals)'. The DSP also includes a notation for the site "*Future Urban Development with final road, lot and land use layouts subject to further design, assessment and relevant Outline Development Plan and Rezonings*".

1.3.3 Planning Strategies

Draft Mandurah Planning Strategy

In September 2013, the Council resolved to adopt the draft Mandurah Planning Strategy for the purposes of forwarding to the Western Australian Planning Commission for certification and consent to advertise. This Strategy is intended to provide an overarching planning framework and strategic basis for the Local Planning Scheme, which Council resolved to prepare in July 2013.

As an overarching summary of the Strategy, the Mandurah Structure Plan was prepared to provide an overview of the key outcomes arising from the structural elements addressed; being urban form and activity centres, transport and movement, environment and landscapes and social infrastructure.

Pursuant to the Mandurah Structure Plan the site is identified as 'Suburban (Future)' (Figure 6 refers).

The City's Biodiversity Strategy and Urban Form and Housing Strategy both form a sub-component of the Strategy.

1.3.4 Biodiversity Strategy

In November 2013, a *Biodiversity Strategy* was adopted by Council and forwarded to the WAPC for endorsement. The Biodiversity Strategy will be incorporated into the local planning framework and includes the following information relevant to the site:

Precinct N4: Lakelands North-East

Sub-section 5.1.3 of the Biodiversity Strategy identifies the biodiversity protection requirements for each precinct. A summary of the recommendations for this Precinct is provided below:

- a 'Biodiversity Protection Target' of 8.3ha has been identified, and is subject to an on-site ecological survey and analysis;
- the priority for conservation is to:
  - protect native vegetation adjacent to Paganoni swamp to protect feeding habitat for Carnaby's Black Cockatoo. This could be achieved by providing an average width of 75m along the 1100m extent of the Regional Open Space; and
  - ensure the on-site cockatoo feeding resource is maintained, or any loss mitigated, as part of the proposed development.
- future Structure Plans for the Precinct are to be prepared consistent with this 'Biodiversity Protection Target', subject to ecological assessment and confirmation of

the necessary wetland buffer to Paganoni Swamp.

Urban Form and Housing Strategy

In June 2014, the Council adopted the *Urban Form and Housing Strategy*, and has since been referred to the WAPC for endorsement. The *Urban Form and Housing Strategy* outlines the approach to the future housing, density and scale of development across Mandurah with the aim to inform and maintain TPS3 to ensure that it remains up to date and relevant to planning decision making within Mandurah.

The site is within the Mandurah North Precinct and is identified as 'Suburban (Future)'; projecting a dwelling yield of 5,560. The site will significantly contribute to this projection.

Urban Design Policy

The Urban Design Policy sets out the urban design parameters that the City, in liaison with developers and the public to utilise when land is developed in Mandurah. The policy should be used in the preparation of urban design requirements for draft Structure Plans.

Local Planning Policy (LPP1) – Residential Design Codes Policy

This policy provides further interpretation of the R-Code provisions for residential development within the City of Mandurah. It provides for consistent assessment and decision making by the City. The proposed Structure Plan design has been formulated to facilitate the creation of lots that will be able to achieve the criteria required by the policy, inclusive of RMD Codes provisions pursuant to WAPC's *Planning Bulletin 112/2015 – Medium Density Single House Development Standards.*

KEY PRINCIPLES

1. CREATION OF A VIBRANT RETAIL AND COMMUNITY BASED TOWN CENTRE
2. PROVISION OF ACTIVITY NODE BASED ON REGIONAL BEACH FACILITIES
3. TRANSIT ORIENTATED DEVELOPMENT AROUND LAKELANDS RAIL STATION
4. ACCESS POINTS TO MANDURAH ROAD TO BE BASED ON INTRA-REGIONAL TRAFFIC MOVEMENTS TO ENSURE SUITABLE EAST-WEST ACCESS
5. DEVELOPMENT TO FRONT / ADDRESS REGIONAL ROADS WITH FRONTAGE VIA SERVICE ROADS (WITH SUITABLE ACCESS). NO DEVELOPMENT TO BACK ONTO THESE ROADS (REFER ELEMENT 2 'R4' & ELEMENT 3 'R32 & 'R34' OF LIVEABLE NEIGHBOURHOODS 3

STRUCTURE PLAN NOTES

1. MADORA BAY REGIONAL BEACH

   REGIONAL BEACH FACILITIES (CLUB, CAR PARKING, KIOSK ETC) COMBINED WITH MIXED USE COMMERCIAL, DESIGNED TO FOCUS ON COAST WITH MAIN-STREET PRINCIPLES.

   OPPORTUNITIES FOR MULTI-STOREY DEVELOPMENT TO REINFORCE NODAL DEVELOPMENT AND TOURISM POTENTIAL TO BE MAXIMISED.

2. ENVIRONMENTAL / LANDSCAPE ASSESSMENT AREA

   LAND CURRENTLY ZONED RURAL IN TOWN PLANNING SCHEME NO 3 AND PEEL REGION SCHEME.

   PRIOR TO ANY CONSIDERATION TO MODIFY THIS ZONING, ASSESSMENT ON ENVIRONMENTAL AND LANDSCAPE QUALITY TO BE UNDERTAKEN TO DETERMINE APPROPRAITE DEVELOPMENT (IF ANY) BASED ON TOPOGRAPHY AND PROXMITY TO REGIONAL BOUNDARIES.

3. NORTHERN ACCESS POINTS AND INTERSECTIONS TO MANDURAH ROAD

   EAST-WEST LINKAGE REQUIRED BETWEEN MADORA NORTH AND EASTERN SIDE OF MANDURAH ROAD REQUIRED, WITH LONG TERM PLANNING TO PROVIDE FOR FOUR-WAY SIGNALISED INTERSECTION. STAGGERED 'T' INTERSECTIONS TO BE PROVIDED FOR INITIALLY.

4. ACTIVE RECREATIONAL FACILITIY TO BE PROVIDED WITHIN LAND CURRENTLY ZONED RURAL IN PEEL REGION SCHEME AND TO BE A MINIMUM OF 10 HECTARES AND LOCATED ADJACENT TO PUBLIC HIGH SCHOOL TO MAXIMISE JOINT-USE OF FACILITIES (REFER PEELWOOD RESERVE / HALLS HEAD RECREATION CENTRE MODEL)

   PREVIOUS STRATEGIC RECREATION PLANNING TO BE CONFIRED AND / OR FURTHER STUDIES TO BE UNDERTAKEN BY DEPARTMENT FOR SPORT AND RECREATION / CITY OF MANDURAH TO DETERMINE REGIONAL OR DISTRICT NATURE OF FACILITY AND TO BE UNDERTAKEN PRIOR TO ANY CHANGE TO EXISTING ZONING. FINAL LAND REQUIRED TO BE RESERVED UNDER PEEL REGION SCHEME.

5. THE LAND IS LARGELY ZONED RURAL IN TPS NO 3 AND URBAN DEFERRED IN THE PEEL REGION SCHEME. SUBJECT TO THE WAPC AGREEING TO LIFT THE URBAN DEFERRED ZONING ON MADORA BAY EAST, ANY FUTURE DEVELOPMENT SHALL BE DESIGNED AND DEVELOPED IBASED ON AN APPROPRIATE ASSESSMENT OF THE ENVIRONMENT AND LANDSCAPE QUALITY, RECOGNISING THE LAND'S INHERENT CHARACTER AND REGIONAL SIGNIFICANCE OF THE LAND, HAVING PARTICULAR REGARD TO THE LANDSCAPE, VEGETATION AND TOPOGRAPHY.

6. LAKELANDS TOWN CENTRE

   A COMMUNITY FOCUSED TOWN-CENTRE, BASED ON MAIN STREET RETAIL (ACTIVE STREETS AND EDGES, SHARED SPACES, ON STREET PARKING), WITH MANDURAH ROAD BEING AN INTEGRAL PART OF THE CENTRE, COMBINED WITH COMMUNITY FACILITIES, MIXED USE RESIDENTIAL AND TOWN SQUARE / PUBLIC OPEN SPACE.

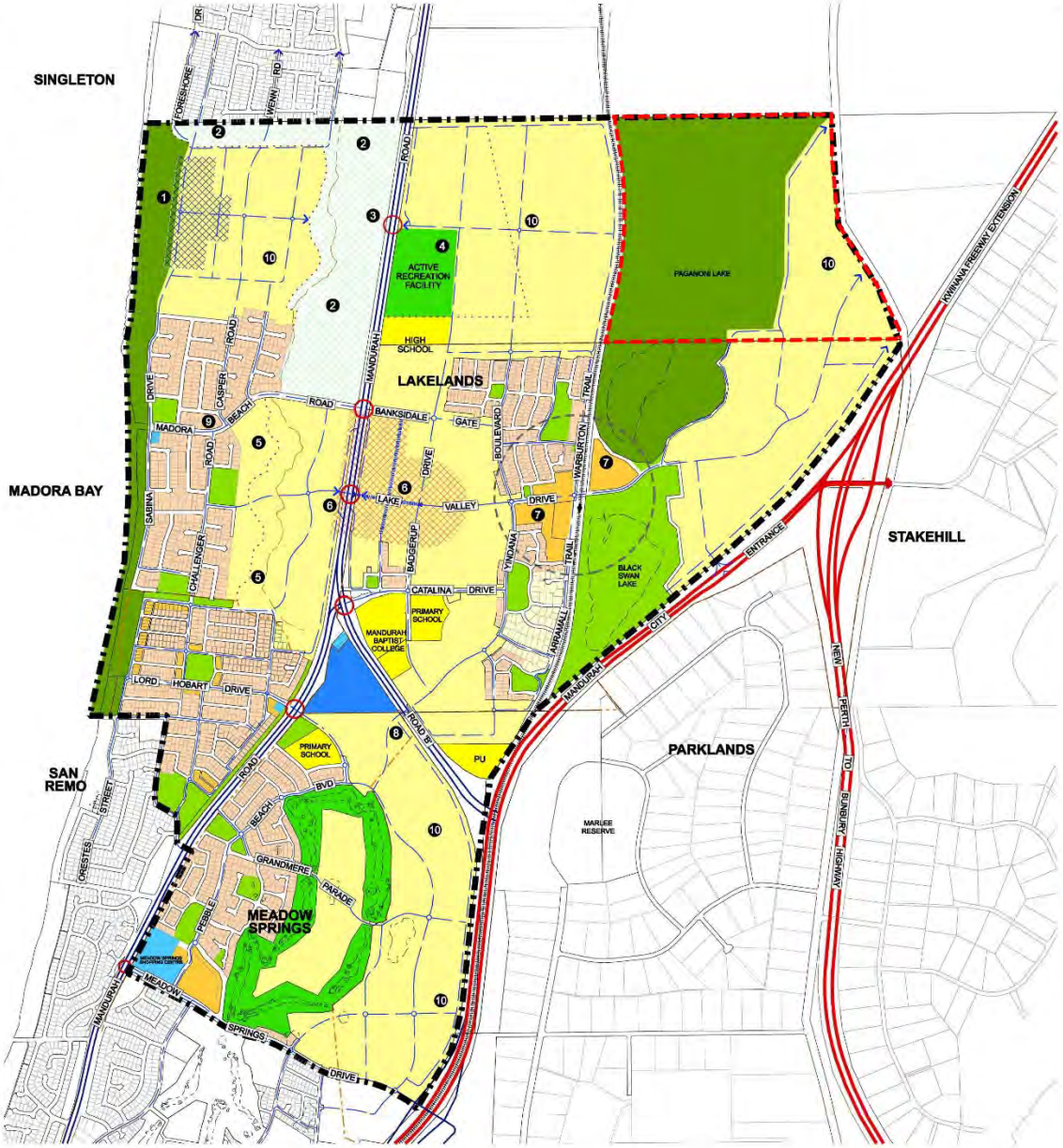
   A DETAILED PRECINCT PLAN TO BE PREPARED IN ACCORDANCE WITH THESE PRINCIPLES AND TO BE REFLECTED IN LAKELANDS ODP.

7. TRANSIT ORIENTATED DEVELOPMENT TO BE APPLIED AROUND FUTURE LAKELANDS RAILWAY STATION, WITH RESIDENTIAL DENSITIES TO BE MAXIMISED, WHILST MAINTAINING SITE'S AMENITY AND NATURAL FEATURES.

8. IMPORTANT LOCAL CONNECTION CONSTRUCTED AS AN UNDERPASS UNDER ROAD 'B'

9. POTENTIAL CONNECTION OF CHALLENGER ROAD AND CASPER ROAD, MADORA BAY (SUBJECT TO FURTHER REVIEW AND DESIGN)

10. FUTURE URBAN DEVELOPMENT WITH FINAL ROAD, LOT AND LAND USE LAYOUTS SUBJECT TO FURTHER DESIGN, ASSESSMENT AND RELEVANT OUTLINE DEVELOPMENT PLAN AND REZONINGS



ZONING LEGEND

- LAKELANDS TOWN CENTRE
- MADORA BAY REGIONAL BEACH
- RETAIL - COMMERCIAL (EXISTING)
- MIXED BUSINESS - SERVICE COMMERCIAL
- MEDIUM DENSITY RESDIENTIAL (R30 / R40)
- EXISTING RESIDENTIAL (R20)
- LOW DENSITY RESIDENTIAL (R10)
- NEW URBAN DEVELOPMENT (SUBJECT TO DESIGN AND APPROVALS)
- ENVIRONMENTAL / LANDSCAPE ASSESSMENT AREA
- REGIONAL OPEN SPACE
- DISTRICT OPEN SPACE / ACTIVE RECREATION
- LOCAL OPEN SPACE
- PUBLIC / COMMUNITY PURPOSE
- PRIMARY REGIONAL ROADS
- IMPORTANT REGIONAL ROADS
- KEY LOCAL ROAD CONNECTIONS
- TOWN CENTRE - MAIN STREETS
- PERTH - MANDURAH RAILWAY
- TRAFFIC SIGNALS
- 400m WALKABLE CATCHMENT TO RAIL STATION
- EXISTING RURAL ZONE BOUNDARY
- RIDGE LINE (APPROXIMATE)
- APPROVED ODP BOUNDARY
- STRUCTURE PLAN BOUNDARY
- SUBJECT SITE

City of MANDURAH

SUSTAINABLE DEVELOPMENT DIRECTORATE

NORTH

Scale: 1:25,000 @ A3

0 250 500 750m

Date: 04/02/2020 Plan: URBM2-5-013A

MANDURAH NORTH DISTRICT STRUCTURE PLAN

ADOPTED BY COUNCIL (20 JUNE 2006) AS A LOCAL STRUCTURE PLAN IN ACCORDANCE WITH CLAUSE 9.6 OF TOWN PLANNING SCHEME NO.3

Figure 5

MANDURAH STRUCTURE PLAN

Figure 6

2. Site Conditions & Constraints

An Environmental Assessment and Management Strategy has been prepared by Emerge Associates (**Appendix 4.4** refers) and a summary of the key findings are in the sections below.

2.1 Biodiversity & Natural Area Assets

2.1.1 Flora

Significant survey effort has been applied to gain a comprehensive understanding of the flora and vegetation values of the site, including the identification of all mature endemic trees over 300mm diameter at breast height (DBH).

Overall, flora and vegetation values within the site have been subject to significant historical disturbance as a result of sand extraction, grazing and unauthorised access. This has resulted in 96% of the site comprising vegetation in 'degraded' or 'completely degraded' condition.

Only one intact plant community (EmBKg) was identified within the site, which was observed to have been subject to disturbance. Approximately half of this community was observed to be in 'good' condition, with the remainder in 'degraded' condition.

Notwithstanding this, plant community EmBKg does meet the criteria of the Banksia Woodlands TEC and as such represents an albeit disturbed 3.16 ha patch of this TEC. No other TECs or PECs occur within the site.

A comprehensive tree survey of the site identified 468 native endemic trees with a DBH of at least 300mm, primarily comprising tuart, marri and jarrah species. A range of environmental attributes were recorded during the survey providing a comprehensive catalogue of tree values within the site.

One P2 species, *Acacia benthamii*, was observed in the south-east corner of the site. No other threatened or priority flora species were recorded or are considered likely to occur.

2.1.2 Bush Forever

No Bush Forever sites occur within the site, given its location outside of the PRS Regional Open Space Reserve. However, remnant bushland immediately north of the site is include within Bush Forever site no. 395 (BF 395) *Paganoni Swamp and adjacent bushland, Karnup*. BF 395 forms part of the Rockingham Lakes Regional Park.

Remnant vegetation immediately west of the site, associated with the southern portion of Paganoni Swamp, is contiguous with vegetation within BF 395 and as such forms a natural extension of this area.

2.1.3 Fauna

Historical disturbance and associated clearing of understorey vegetation has significantly reduced the fauna habitat values of the site, particularly regarding terrestrial species.

Notwithstanding this, a significant amount of large endemic trees remain across the site which provide useful habitat to a variety of species, particularly avifauna.

The site also contains potential black cockatoo habitat, primarily represented by endemic tuart, marri and jarrah trees. Evidence of foraging activity and (on one occasion) opportunistic roosting activity was observed within the site.

263 potential black cockatoo habitat trees occur across the site. These trees are defined as potential habitat only, as intensive survey effort applied across the site to inspect potentially suitable hollows did not identify any confirmed occurrences of black cockatoo nesting activity.

2.2 Landforms & Soils

2.2.1 Topography

The elevation of the site ranges between approximately 2m Australian Height Datum (m AHD) and 21m AHD. The lowest points of the site occur along the western boundary, associated with the interface to the adjacent wetland (Paganoni Swamp), and in the central areas, associated with historical quarrying footprints. The highest points of the site

occur along the eastern and southern boundaries.

2.2.2 *Regional Geomorphology*

The site is located in the western portion of the Swan Coastal Plain, which is approximately 20 to 30km wide and consists of a series of geomorphic entities aligned parallel to the coastline. The youngest and western-most geomorphic entity is the Quindalup Dunes, followed by the Spearwood Dunes and the Bassendean Dunes, all of which are of aeolian origin. The alluvial Pinjarra Plain then lies east of the dunal entities, followed by the Ridge Hill Shelf at the eastern most edge of the Swan Coastal Plain near the Darling escarpment (Seddon 2004).

The site is located within the Spearwood Dune system (Gozzard 2011), which consists of yellowbrown siliceous sands over limestone, with hilly to gently undulating terrain (Seddon 2004).

2.2.3 *Landform, Soils & Geology*

Landform and soil mapping undertaken by Churchward and McArthur (1980) indicates that the majority of the site is within the Yoongarillup soil association, described as plains with low ridges and swales, with shallow and brown sands over marine limestone. The western portion of the site is within the Karrakatta soil association, described as an undulating landscape with deep yellow sandsover limestone.

The *Perth Metropolitan Region 1: 50,000 Environmental Geology Series, Rockingham (Part of sheets 2033 II and 2033 III)* (Gozzard 1983) indicates the site to be comprised of 'sand' (map unit S7) derived from Tamala Limestone. Areas immediately west of the site, associated with a north-south chain of wetlands, is mapped as comprising 'clayey sand' (map unit Scp). Areas east of the site are also mapped as comprising 'sand' (map unit S8).

2.2.4 *Acid Sulfate Soils*

The mapping indicates that the site has no known risk of ASS occurring. However, the mapping also indicates that areas in proximity to the site having varying levels of risk of ASS occurrence, generally consistent with regional soil types.

2.3 Groundwater & Surface Water

A Local Water Management Strategy has been prepared by Emerge Associates (**Appendix 4.3** refers) and a summary of the key aspects are below.

2.3.1 *Groundwater*

Groundwater beneath the site is a multi-layered system comprised of the following (DoW 2017):

- Perth - Superficial (unconfined) aquifer;
- Perth - Leederville (confined) aquifer; and
- Perth - Cattamarra Coal Measures (confined) aquifer.

Groundwater monitoring has been carried out by Emerge in six bores from July to November 2016 including levels and water quality. Based on the results of this monitoring, it has been calculated the maximum groundwater level (MGL) for the site ranges between 1.85m AHD and 1.89m AHD. Groundwater flows from east to west where it interacts with the adjacent Paganoni Swamp. Depth to groundwater therefore ranges between 0.11m in the northern quarried area and 19.11m, to the south of the wetland boundary.

2.3.2 *Surface Water*

Surface water infiltrates freely across the majority of the site due to the high permeability of the underlying sandy soils. The site consists of nine surface water catchments. The western and northern catchments are graded towards the adjacent Paganoni Swamp with surface runoff discharging as sheet flow into the wetland following significant rainfall events. The remaining catchments will retain all surface runoff within localised low-points where it will infiltrate through the sandy soils prior to reaching groundwater.

A hydrological model has been prepared to determine the surface water peak flow rates

and volumes entering the wetland, with details provided in the LWMS.

No surface water quality data is available given the site does not contain any defined surface water bodies or channels. Water quality monitoring within the adjacent wetland has not been carried out due to restricted access from dense vegetation and low water levels in the wetland.

2.3.3 Wetlands & Waterways

No geomorphic wetlands are identified as occurring within the site, however, Paganoni Swamp is situated within the greater Lot 105 is identified as a Conservation Category Wetland (UFI #13887) and reserved under the PRS.

Paganoni Swamp is a sumpland and covers a large area of approximately 197ha in total, extending to areas south and north of the Lot 105. The western portion of the site is within the surface water catchment for the wetland, with discharges from the site entering the wetland following rainfall events.

A wetland boundary assessment was undertaken by Strategen in 2014 to confirm and delineate the actual extent of the Paganoni Swamp wetland. The assessment was based on the definition of a wetland provided in Schedule 5 of the EP Act, which states '*wetland means an area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary*'.

The assessment concluded that the most appropriate boundary of Paganoni Swamp is delineated by the 2m contour. This refined boundary is considered to supersede that shown in *Geomorphic Wetlands of Swan Coastal Plain* spatial dataset.

Department of Water (DoW) surface water and ground monitoring records for the Paganoni Swamp indicate that the wetland is highly influenced by local groundwater conditions. Calculations carried out by Emerge for the wetland indicate an existing 100 year ARI event top water level (TWL) in the wetland of approximately 2.22m AHD (full details of the calculation are provided in the LWMS).

2.3.4 Monitoring

It will be necessary to confirm that the management measures that are implemented are able to fulfil their intended management purpose and are in a satisfactory condition at a point of management hand over to the City of Mandurah.

A post-development monitoring program will be developed to provide this confirmation, and it will include details of objectives of monitoring, relevant issues and information, proposed methodology, monitoring frequency and reporting obligations.

These monitoring programs are discussed in the LWMS and will be further detailed at the UWMP stage.

2.4 Heritage

In accordance with the *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013), a search of the AHIS online database (DAA 2017) was undertaken.

Site DAA 17307 Paganoni Swamp (Berong), is mapped by the DAA within Lot 105, however is completely contained within the Regional Open Space Reserve boundary, under the PRS.

An Aboriginal Heritage Risk Assessment (AHRA) (Horizon Heritage Management 2017) for Lot 105 was conducted by Horizon Heritage Management in 2017, provided as Appendix D of **Appendix 4.4**. The AHRA involved a desktop review and a site-specific landscape assessment to understand the risk of Aboriginal heritage values (both ethnographic and archaeological) potentially occurring within the Lot 105.

Based on a review of the original site file and heritage survey report (K. MacIntyre and B. Dobson 1993), which were requested from and provided by the DAA, DAA 17307 is an ethnographic Aboriginal heritage site of mythological importance. Aboriginal community representatives consulted during

the heritage survey which identified DAA 17307 outlined that Paganoni Swamp was known to be a reliable food and drinking water source, camping location and of spiritual significance given it formed part of the Wagyl dreaming track.

The original mapping of DAA 17307, as published by the DAA, extended over the south-west portion of the site . The AHRA concluded that this mapping was incorrect, as it did not align with the description of the site provided by the originally consulted Aboriginal community representatives.

A request was lodged with the DAA to re-map the boundary for DAA 17307, consistent with the description provided in the original heritage survey report. This was completed by the DAA on 23 March 2017 and the AHIS now shows the correct, updated boundary of DAA 17307, as shown in Figure 9 of **Appendix 4.4**. The boundary of DAA 17307 now aligns with the wetland boundary of Paganoni Swamp.

Based on the outcomes of the AHRA, Horizon Heritage Management concluded that there is a negligible to low risk to Aboriginal heritage if DAA 17307 is avoided from any future development impacts.

2.5 Context & Other Land Use Constraints & Opportunities

A Context Plan is included as **Figure 7** providing an illustration of the following section, and **Figure 8** is the orthophoto for the site.

2.5.1 Local Context

The surrounding land uses adjacent the site include:

- The future extension of the Peet's Lakelands Estate (Lakelands East ODP) is located to the south of the site (**Figure 9** refers).
- The Perth-Mandurah Rail Line and the Ocean Hill Estate (Lakelands North Structure Plan) residential development is located to the west of the site.
- To the north is 'Bush Forever site 395 identified as 'Parks and Recreation' under the MRS.

2.5.2 Activity & Employment Centres

The site is located approximately 9km north of the Mandurah Strategic Metropolitan Centre and 20km south of the Rockingham Strategic Metropolitan Centre.

A number of District, Neighbourhood and Local Centres exist or are imminent in the surrounding areas which will conveniently service the residents of the development.

The site is well located for local employment opportunities, including good access to the following employment nodes:

- Mandurah Strategic Metropolitan Centre;
- Rockingham Strategic Metropolitan Centre;
- Gordon Road Industrial Area;
- Rockingham/Kwinana Industrial Area;
- Peel Health Campus;
- Rockingham General Hospital;
- Murdoch University, Rockingham and Peel Campuses; and
- Challenger Tafe, Rockingham and Peel Campuses.

In addition to the above, 'on-site' employment opportunities will be provided through the proposed Primary School and development and building industries, as the Estate develops.

2.5.3 Education

Several education facilities exist in close proximity to the site. Nearby existing (or under construction) Public Primary Schools include those in Lakelands.

Several options for private education exist in the locality including Mandurah Baptist College, Frederick Irwin Anglican School, Assumption Catholic Primary School, Foundation Christian College, Mandurah Catholic College and Living Waters Lutheran College.

Murdoch University (Peel Campus) and Challenger TAFE (Peel Campus) are also situated approximately 6km south of the site offering tertiary education facilities in the local context.

2.5.4 District & Regional Open Space

To the west and north of the site is a large area of bushland protected by its Bush Forever designation, therefore providing a passive recreation option for future residents.

The site is located approximately 8km south of the Larkhill Regional Sporting complex and approximately 12km north-east of the district playfields located at Halls Head.

Within Ocean Hill Private Estate and Lakelands Estate, District Playing Fields are under construction and co-located with the High School and future Primary School.

2.6 Movement Network

A Transport Assessment has been prepared by GTA Consultants; **Appendix 4.5** refers. The key findings of the existing movement network include as follows.

2.6.1 Stock Road

Lot 105 has frontage and is accessible via Stock Road. Stock Road south of the site is within the Kwinana Freeway reserve and is therefore under the care and control of Main Roads WA. Stock Road provides access to the south to Mandjoogoordap Drive with forward access to Mandurah and to Perth/Fremantle via the Kwinana Freeway. Stock Road was recently upgraded at its southern connection with Lilydale Drive in proximity to the intersection of Mandjoogoordap Drive.

Stock Road currently forms a single carriageway and runs to the east of Lot 105 in a north-south direction with a speed limit of 80km/hr along its full length. It is currently classified as an Access Road under the Main Roads WA Functional Road Hierarchy. Stock Road is carrying minimal existing traffic adjacent Lot 105, as there are no surrounding urban developments.

During the development planning of the neighbouring Lakelands East Revised ODP (January 2015, as amended), that plan noted:

'Stock Road provides a temporary access only and is not designed to accommodate urban traffic. The proposed design of the temporary connection between Stock Road and the ODP area is indicative and shall be determined at the subdivision stage.'

Further discussions with the City of Mandurah as part of this project has confirmed that Stock Road is to be 'temporary' only until Lots 105, 518 and 519 have access through the Lakelands East Structure Plan area.

2.6.2 Mandjoogoordap Drive

Mandjoogoordap Drive runs east-west to the south of the site and has a posted speed limit of 90km/hr. It is classified as a *Primary Distributor* per the Main Roads WA Functional Road Hierarchy, and it is configured as a four-lane dual-carriageway carrying around 11,800vpd (50m east of Lilydale Drive), referencing 2012 traffic data provided by MRWA online traffic data.

Mandjoogoordap Drive intersects with Lilydale Drive (1.6km south of the site) via a three-way priority controlled staged crossing with formalised right and left turn pockets and a median storage.

2.6.3 Lilydale Drive

Lilydale Drive runs generally in a north-south direction, ~1.3km south of the site and is currently classified as a *Local Distributor* according to the Main Roads WA Functional Road Hierarchy and intends to "Carry traffic within a cell and link District Distributors at the boundary to access roads."

It is currently configured as a two-lane two-way divided road with a ~ 13m wide carriageway set within a 25m wide road reserve. It forms a three-way priority-controlled T-intersection with Lake Valley Drive, and a three-way priority-controlled intersection with Mandjoogoordap Drive.

Lilydale Drive was constructed as part of the Lakelands East development and the City of

Mandurah has advised that at the time of reporting that there are no traffic counts available yet.

2.6.4 Lake Valley Drive

Lake Valley Drive runs generally in an east-west direction and is classified as an *Access Road* providing local area access to abutting properties. Currently, Lake Valley Drive forms a priority-controlled T-intersection with Lilydale Drive and further east will extend to provide access to Lots 105, 518, and 519 Stock Road. Lake Valley Drive also extends over the Mandurah-Perth Railway line to connect to the Lakelands Estate and ultimately intersects with Mandurah Road via a signalised intersection.

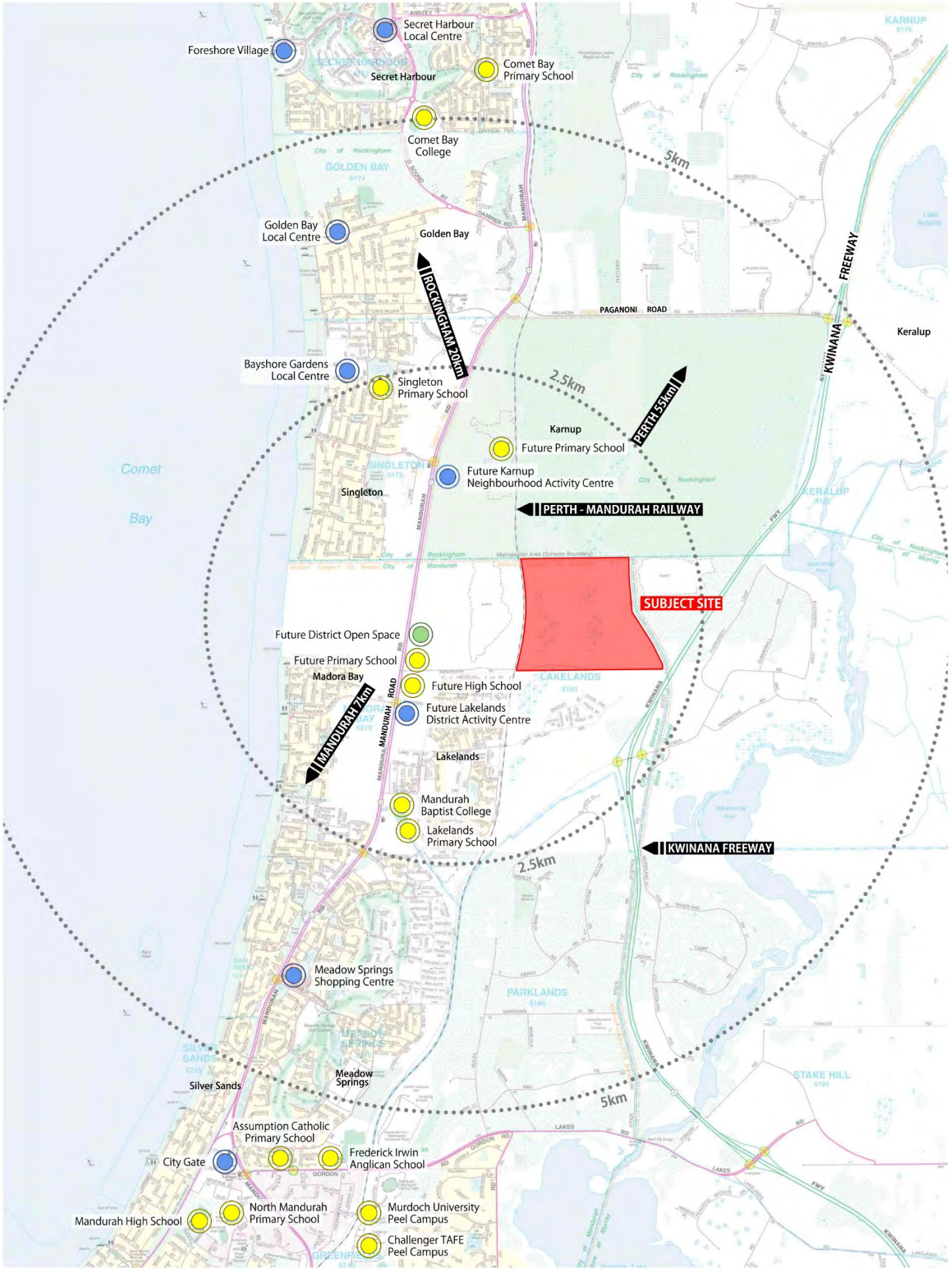
2.6.5 Existing Pedestrian & Cyclist Networks

There are currently no formal walking and cycling provisions within the site. There is a Principal Shared Path (PSP) which extends along the Kwinana Freeway and Mandjoogoordap Drive, which is near the site. Also, there is some existing walking and cycling infrastructure within Lakelands East area to the south of the site.

2.6.6 Existing Public Transport

The 587 service is the closest bus service currently operating in the vicinity of the site ~ 2km from the centre of Lot 105); this meanders the Meadow Springs locality enroute to the Mandurah train station to the south.

It is also noted that the Mandurah-Perth Railway Line lies to the west of the site, although at present the nearest stations on this line are located at Warnbro to the north, and Mandurah to the south.



DISTRICT CONTEXT PLAN

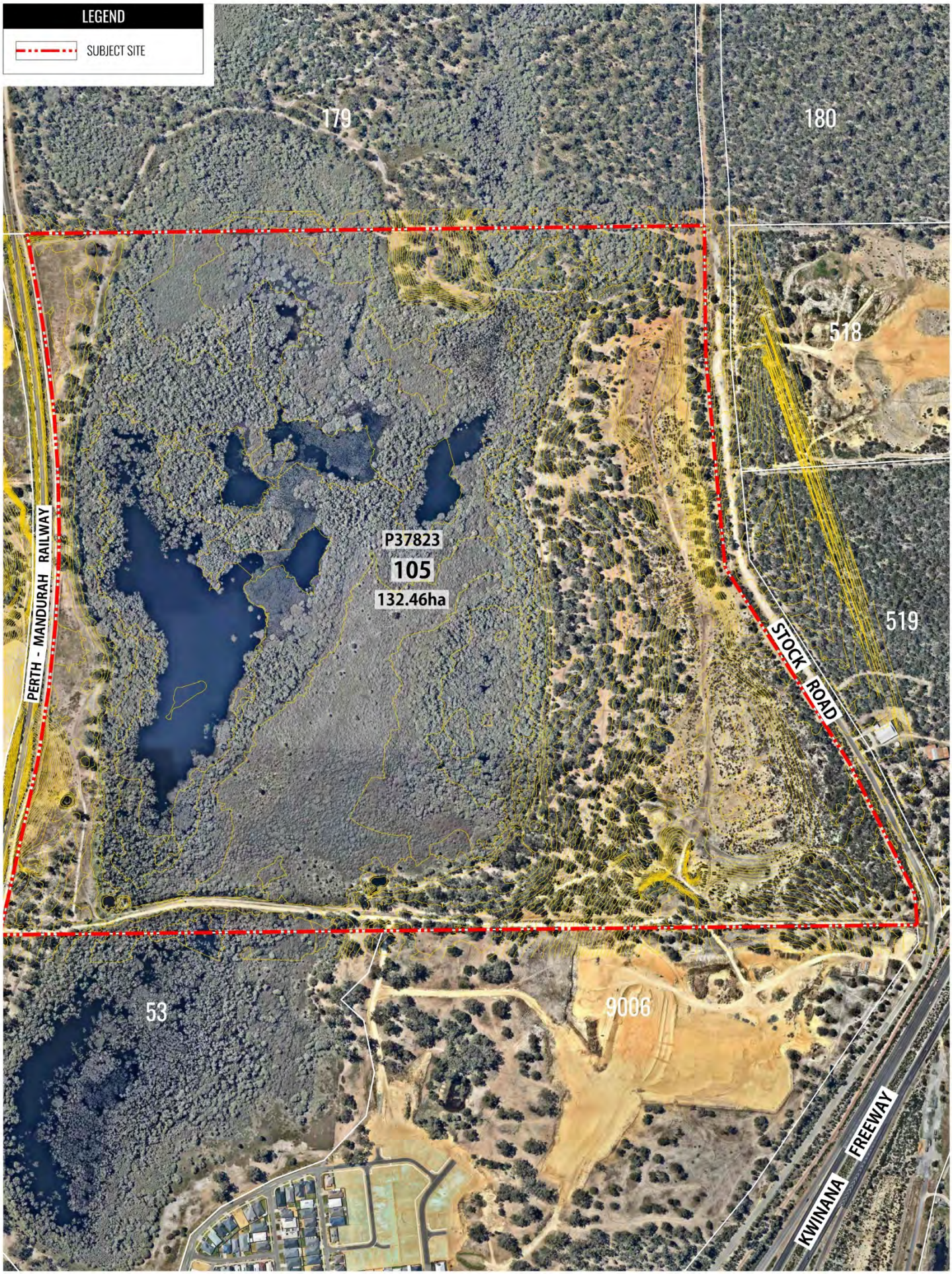
Figure 7

NORTH

Scale: 1:50,000 @ A4

0 0.5 1 1.5km

Date: 04/02/2020 Plan: URBM2-5-016A



ORTHOPHOTO

Figure 8

NORTH

Scale: NTS @ A4

0 80 160 240m

Date: 04/02/2020 Plan: URBM2-5-015B

LEGEND

- COMMERCIAL (R30-R60)
- MEDIUM DENSITY RESIDENTIAL (R30-R60)
- LOW DENSITY RESIDENTIAL (R15-R25)
- LAKE
- PRIMARY SCHOOL (50%)
- COMMUNITY PURPOSE
- PUBLIC OPEN SPACE
- TRAFFIC SIGNALS
- PEDESTRIAN/CYCLE LINKS (Arborways)
- SEWER PUMP STATION
- FUTURE RAIL STATION/800m WALKABLE CATCHMENT
- NEIGHBOURHOOD CONNECTOR 'A' ROADS
- VEHICLE ACCESS CONTROL REQUIRED
- OUTLINE DEVELOPMENT PLAN AREA

NOTES

1. The proponent shall upgrade the Mandjoogoordap Drive intersection to a full movement T-intersection with provision for future signalisation, to the specifications of Main Roads WA. This upgrade is required prior to the Mandjoogoordap Drive intersection being accessible by subdivisional roads with the ODP area.
2. Stock Road provides temporary access only and is not designed to accommodate urban traffic. The proposed design of the temporary connection between Stock Road and the ODP area is indicative and shall be determined at the subdivision stage.
3. Arborways provide vegetation and open space connectivity between larger pockets of public open space. Retention and rehabilitation of locally endemic native vegetation and retention of trees shall be managed and protected via subdivision design.
4. At the time of subdivision, a Residential Density Code Plan is to be submitted as a minor modification to the ODP and be approved by the City of Mandurah and the Western Australian Planning Commission, prior to the subdivision application being determined. The Residential Density Code Plan shall be consistent with the residential density range shown on the Outline Development Plan.
5. As part of future subdivision applications within Lakelands East the applicant shall provide updated traffic analysis, to the satisfaction of Main Roads WA, to determine whether the intersection with Mandjoogoordap Drive requires signalisation as result of that subdivision.
6. Traffic calming measures required along Lake Valley Drive west of and adjacent to the Neighbourhood Centre/Community Purpose Site.
7. Land use permissibility for the Commercial site shall be in accordance with the Commercial zone under the Town Planning Scheme with the exception of the following land uses and their designated use classes:

Auction Mart - SA	Laundromat - AA
Amusement Parlour - SA	Liquor Store - AA
Car Park - SA	Marina - X
Car Wash - SA	Motel - SA
Dwelling (single) - P	Night Club - X
Funeral Parlour - X	Place of Amusement - SA
Hotel - X	Tavern - X

8. The proponent is required to submit a POS schedule for the ODP area as part of subdivision applications.

LAKELANDS (EAST) OUTLINE DEVELOPMENT PLAN

Figure 9

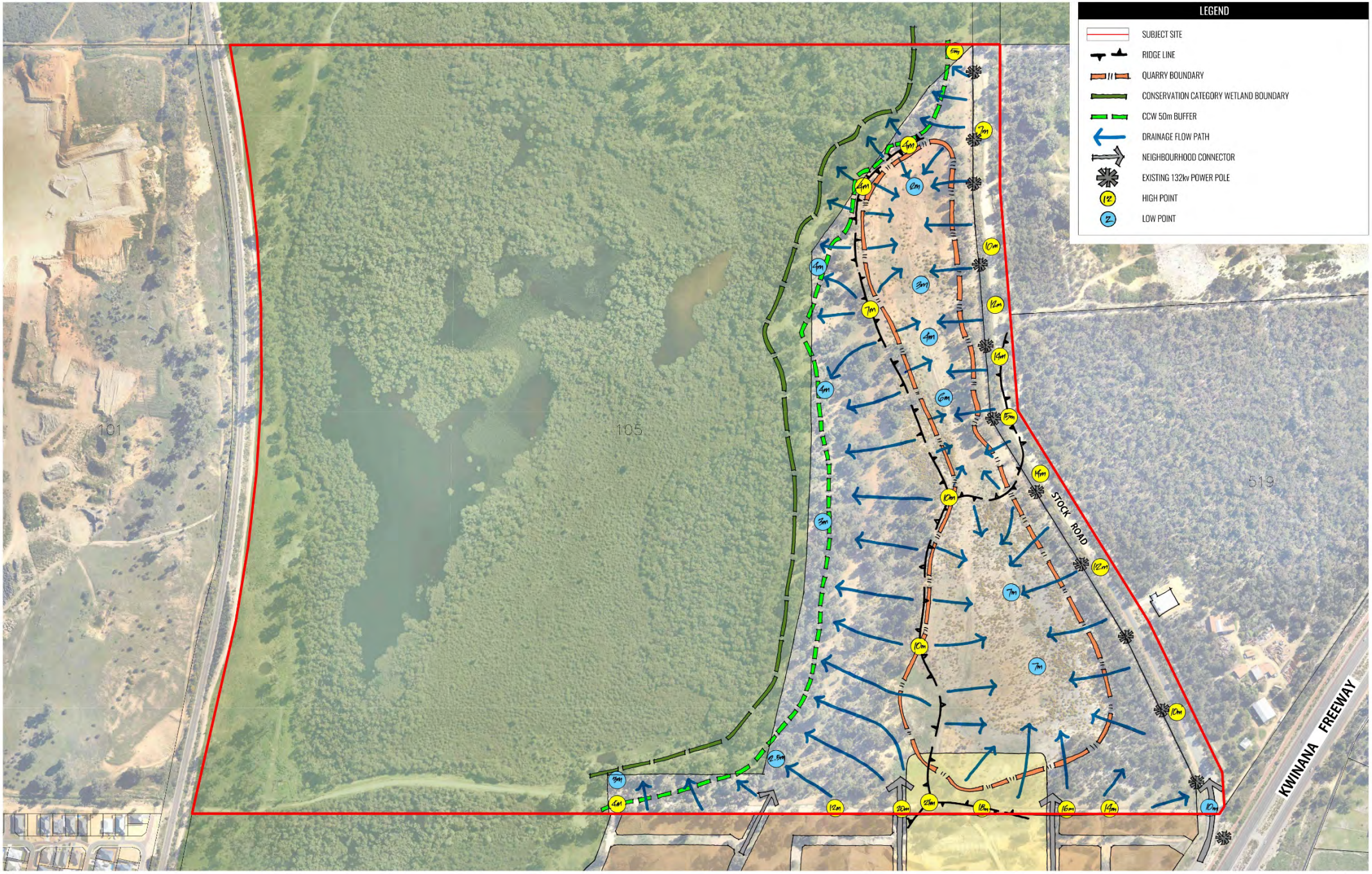
Source: City of Mandurah

NORTH

Scale: 1:1000 @ A3

0 10 20 30m

Date: 04/02/2020 Plan: URBM2-5-014A



SITE ANALYSIS

Figure 10

CONCEPT MASTER PLAN

Figure 11

3. Land Use & Subdivision Requirements

3.1 Design Philosophy

The Structure Plan design has taken into consideration the environmental and physical attributes within and external to the site, as well as acknowledging abutting land uses and how these can best be addressed regarding interfacing with future residential land uses (**Figure 10** refers).

The design philosophy has been predicated upon the following objectives:

- to provide a range of lot products to encourage diversity of lot product, built form and affordability measures;
- to provide suitable interface to external boundaries with remnant vegetated areas where the threat of fire requires mitigation;
- provide suitable location and amenity within public open space areas to ensure accessibility, visual aesthetics and view corridors to foster a local sense of identity;
- to deliver a safe pedestrian and cyclist environment with pathways linking residential precincts and associated local parks as well as providing for external connectivity to strategic community nodes; and
- to implement sound engineering and drainage solutions for the site.

3.2 External Design Influences

3.2.1 Bush Fire Management

The site has been identified as a "Bushfire Prone Area" under the state-wide *Map of Bush Fire Prone Areas* (2016) released by the Office of Bushfire Risk Management (OBRM). The identification of Bushfire Prone Areas within any portion of the site requires further assessment of the bushfire hazard implications on proposed development to be undertaken in accordance with the *Guidelines for Planning in Bushfire Prone Areas* (WAPC et al. 2017).

The Bushfire Management Plan (BMP) has been prepared by Emerge Associates (**Appendix 4.1** refers) to support the Structure Plan and future development of the site, by assessing any potential bushfire risks that are likely to apply, and to demonstrate that any bushfire risk is appropriately managed for the proposed development.

It is important that the measures and procedures outlined in this BMP are adopted across future subdivision and dwelling construction approvals processes. All areas within 100m of the urban boundary have been assessed to determine the presence of bushfire prone vegetation and, where this occurs, associated vegetation classification and bushfire hazard rating levels. Permanent long term bushfire hazard considerations are posed by remnant vegetation associated with Paganoni Swamp and the CCW buffer to the west of the site, and vegetation contained within private landholdings on the opposing side of Stock Road to the east of the site.

The preliminary BAL contours applicable to the site, are based on the post-development scenario, refer to Figure 7 under **Appendix 4.1**. Based on this preliminary BAL assessment, BAL-29 will not be exceeded for any proposed residential lots.

3.2.2 Noise Management

A Transportation Noise Assessment has been prepared by Lloyd George Acoustics (**Appendix 4.2** refers). A summary of the assessment is below.

With no noise control, road traffic noise levels at some future dwellings will be above the target with potentially one lot being above the *limit* (south-¬-eastern most lot, adjacent Kwinana Freeway Reservation). To control noise impacts, the following is to be implemented, subject to further detailed design:

- Construct 1.8m high wall to east boundary of south-eastern most proposed residence (refer to Figure 4.3 within **Appendix 4.2**) as being above the limit without the wall). The wall is to be solid, free of gaps, of a

material having minimum surface mass of 10kg/m2 and height is relative to finished lot level. This is calculated to reduce noise levels to below the limit.

- Any dwellings where noise levels are above the target are to incorporate 'Package A' architectural treatments and notifications on lot titles.
- Should the dwelling in the southeast corner of the site be double storey, the upper floor will be required to implement 'Package B' construction standards.

The above requirements are to be confirmed as the subdivision plan develops including final lot layout and finished lot levels.

3.3 Land Composition

The site will be predominantly developed for 'Residential' purposes. A Concept Master Plan (Figure 11) has been prepared to support the overall Structure Plan (**Plan 1**).

Excluding the existing 94.35ha PRS 'Regional Open Space' Reservation, the land use composition for the remaining 'Urban' area includes as follows:

Table 1: Land Composition

Land Use	Area (ha)	Percentage
Residential	18.47	43.02
Public Open Space	4.25	9.92
CCW Buffer	2.59	6.03
Primary School	2.0	4.66
Public Purpose (Sewer)	0.14	0.33
Road Reserve		
Internal Roads	10.62	24.74
Stock Road	4.85	11.31
Total	42.96	100

3.4 Dwelling Forecasts

3.4.1 Directions 2031 Forecasts

Situated within the Peel sub-region, the Structure Plan is identified as part '*Urban Zoned Undeveloped*'.

The *Directions 2031* and accompanying OMSRS sets the following dwelling target rates for the nominated Lakelands (LL1) area:

Table 2: Directions 2031 Targets (Lakelands Area)

Directions 2031 Scenarios	Projected Dwellings
'Connected City' @ **15 dwellings** per *gross urban zone*	3,400+ dwellings
'Business as Usual' @ **10 dwellings** per *gross urban zone*	2,200+ dwellings

Lot 105 is 132.46ha in total, however the 'Urban' portion equates to a gross urban zone of 37.97ha (excluding the Sewer Pump Station site).

Based on the dwelling projections of Directions 2031 and accompanying OMSRS, the Structure Plan is projected to generate the following dwelling yields:

Table 3: Directions 2031 Targets (Structure Plan)

Directions 2031 Scenarios	Projected Dwellings
'Connected City' @ **15 dwellings** per *gross urban zone*	569 dwellings
'Business as Usual' @ **10 dwellings** per *gross urban zone*	379 dwellings

The indicative concept plan for the Structure Plan area suggests that **~488 lots/dwellings** will be provided, this based on the project team's lot mix and yield projections.

This proposed dwelling yield is lower than the targets set by *Directions 2031* by virtue of the proponent retaining significant stands of quality remnant vegetation on site, namely interfacing with the CCW and associated buffers to the west of the site. In this regard, the Structure Plan proposes up to 6.83ha (15.94%) of 'green space' inclusive of CCW buffers and Public Open Space.

The creditable POS is ~12.09% of the Structure Plan area; this being ~0.69ha surplus to *Liveable Neighbourhoods* 10% POS requirements.

Should the Structure Plan area have complied with the minimum 10% POS provision, and CCW buffer within the 'Urban' area been available to develop, this would have

contributed ~3.26ha to the developable area; this equivalent of up to 72 additional dwellings based on a 450m^2 average (or 93 dwellings at 350m^2 average).

Additional measures to retain further vegetation within the eastern POS area and road reserves throughout will also be considered as part of detailed subdivision and engineering design. These measures will in turn influence the design 'efficiencies' of the planned road network, and residential cells and dwelling yields.

3.4.2 Liveable Neighbourhoods Forecasts

Based on the *Liveable Neighbourhoods 'Site Hectare'* definition, the Structure Plan's 'developable area' equates to 38.11ha, of which ~18.47ha relates to nett residential cells. As such the overall LN density for the Structure Plan will be in the order of:

488 dwellings = 26 dwellings per site hectare.

The projected densities fulfil the *Liveable Neighbourhoods* targets of average 22 dwellings per site hectare for the overall development.

The Structure Plan has been assigned a base coding of 'R25' (RMD-25); with opportunity for 'R40' (RMD-40) and 'R60' (RMD-60) development subject to relevant locational criteria including laneway product and other strategic 'walkable catchment' development areas (i.e. POS frontage, bus routes) nominated at the time of subdivision.

3.5 Local Development Plans

3.5.1 RMD Codes

The provisions under WAPC *Planning Bulletin 112/2016 Medium-density single house development standards – Structure Plan areas* ('RMD Codes') are proposed to be implemented within the site. It is recognised that these provisions have been adopted under City of Mandurah's *Local Planning Policy LPP1 – Residential Design Codes Policy*, thus 'Estate wide' Local Development Plans (LDPs) will not be required.

3.5.2 Circumstances Where LDPs May Apply

Notwithstanding the above RMD Codes variations, there will be instances where LDPs will be required; this generally relating to development comprising the following attribute(s):

Lots affected by excessive noise in relation to Kwinana Freeway

Buildings requiring upgrades to façade construction (i.e. quiet house principles) shall be in accordance with State Planning Policy 5.4 *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*.

The height and location of noise barriers required to achieve the noise limit criteria is also outlined in State Planning **Policy** 5.4 *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*. Affected lots may be identified spatially in Figure 4-3 of the accompanying *Noise Impact Assessment*, under Part Four – **Appendix 4.2** of the Structure Plan; this to be updated subject to finished ground levels adjacent or type of built form design being developed.

Other Built Form & Streetscape Provisions

To ensure consistency in the built form, fencing and general streetscape throughout the various subdivision stages, the developer will seek to prepare LDPs or Estate covenants with respect to:

- Lots with rear-loaded (laneway) vehicle access; and
- Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space.

3.6 Movement Networks

The Transport Assessment, prepared by GTA Consultants, identifies projected traffic volumes and suggested road hierarchies in and adjacent to the site (**Appendix 4.5** refers). Key findings from the report are summarised in the following section.

Based on GTA's report recommendations, broad cross-sections and concepts have been prepared to establish a general road hierarchy, pedestrian network and preferred streetscape character, and in acknowledgement of the development of landholdings to the east of the Structure Plan area.

3.6.1 *Site Access*

Vehicle access into the site will be restricted to the eastern and southern boundaries, noting the Paganoni Swamp boundary extends to the north/west of the site. There are six primary access points proposed in the Structure Plan, these include:

Table 4: Site Access (Structure Plan)

Access	Notes
Access 1 – 3	North-south through-connections to Lakelands East Estate to the south.
Access 4	Stock Road access to serve as an interim connection for Lots 105, 518 and 519 until the Lakelands East Structure Plan area and subdivision stages have progressed.
Access 5	An indicative east-west link through-connection to future urban development of Lot 519.
Access 6	An indicative east-west link through-connection to future urban development of Lot 518.

The existing Stock Road reservation (Access 4) in the south-east portion of the site has been confirmed by the City of Mandurah, Main Roads WA and WAPC as a 'temporary' access only which will be closed once the site and Lots 518 and 519 have access through the *Lakelands East Structure Plan* area.

The Stock Road closure will require all traffic from the site, Lots 518 and 519 to distribute through Lakelands East's three north-south aligned *Neighbourhood Connector A* roads. Consistent with the internal road network recommendations of the *Lakelands East Structure Plan*, the proposed internal network design will ensure an equitable distribution of Lot 105, 518 and 519 traffic movements via the three available *NCA* roads. This design outcome will avoid the majority of traffic focusing on one *NCA* (i.e. Lake Valley Drive) and avoiding unnecessary traffic stress on this road.

3.6.2 *Proposed Internal Road Network*

The proposed road hierarchy for the Structure Plan is illustrated in **Figure 12**, this prepared under guidance of the Structure Plan's Transport Assessment (**Appendix 4.5**) and WAPC's *Liveable Neighbourhoods*.

Neighbourhood Connectors

Neighbourhood Connector roads are proposed to accommodate traffic forecasts of ~3,000 – 5,000vpd. The road design is based on 18 - 22m road reserves; this consistent with the constructed portion of Lake Valley Drive (*NCA*) within the *Lakelands East Structure Plan* area. The design generally comprises (**Figure 13** refers):

- 7.4 - 10m wide carriageway to accommodate a future public bus route – the wider carriageway in for sections where inclusive of dedicated 1.5m wide on-road cycle lanes;
- Verges of 4.5 – 6.0m incorporating a combination of shared path, landscaping, intermittent embayment parking and service infrastructure alignments.

Boulevard designs with medians generally 4.5m wide is proposed in locations to incorporate minor drainage swales, or for Estate aesthetics (i.e. entry roads). In this instance, the width of the NCA may increase to a 22 ~ 24m (max) wide boulevard treatment with 3.5 - 4.0m carriageways and 4.5 – 6.0m verges based on shared path, landscaping, intermittent embayment parking and service infrastructure alignments (**Figure 18** refers).

Access Streets

The typical *Access Streets* proposed include 6.0m wide carriageways generally set within a 15m road reserve as per the design guidance for *Access Street D* under *Liveable Neighbourhoods*.

Where daily traffic volumes are expected to exceed 1,000vpd or a road contributes to the general hierarchy and function of the Structure Plan area, these carriageways may be widened to 7.2m and set within 16.2m wide road reserves, as per the Access Street C requirements (**Figure 14** refers).

Where abutting POS, verges may be reduced by 2m for all the above road scenarios.

Laneways

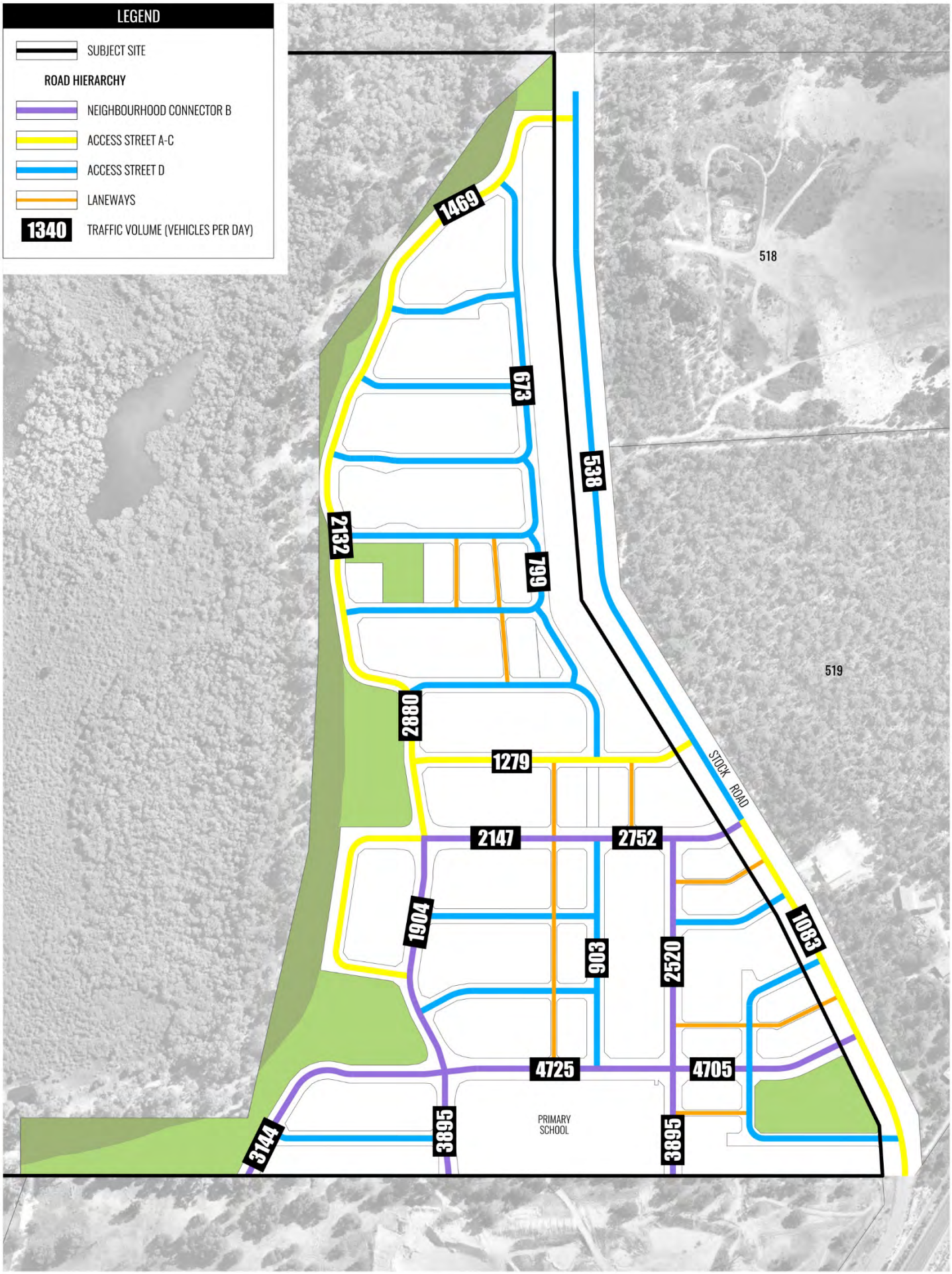
Laneways are to be 6.01m wide, thus are of sufficient width to accommodate two-way vehicle movement, refuse collection and vehicle access into garages located at the rear of lots. Visitor parking for adjacent lots will be provided within the primary or secondary street verges.

3.6.3 Public Transport

It is recommended that new (or extended) bus services be developed to service the site in consultation with the Public Transport Authority to determine potential preferred routing and supporting infrastructure requirements. All **NCA** and **NCB** roads have been designed to accommodate buses.

3.6.4 Pedestrian & Cycle Infrastructure

In accordance with the requirements of *Liveable Neighbourhoods*, shared paths are to be provided on *Neighbourhood Connector* roads, with a footpath to also be provided in the opposite verge. All *Access Streets* are to have a shared path or footpath on at least one side of the carriageway subject to locational demand (**Figure 15** refers).



ROAD HIERARCHY

Figure 12

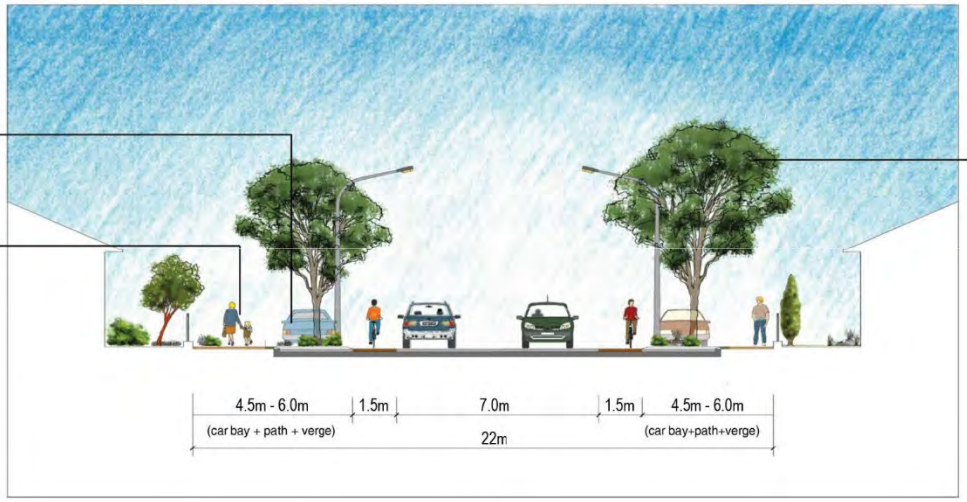
NORTH

Scale 1:5000 @ A4

0 50 100 150m

Date: 27/05/2020 **Plan:** URBM2-5-010A

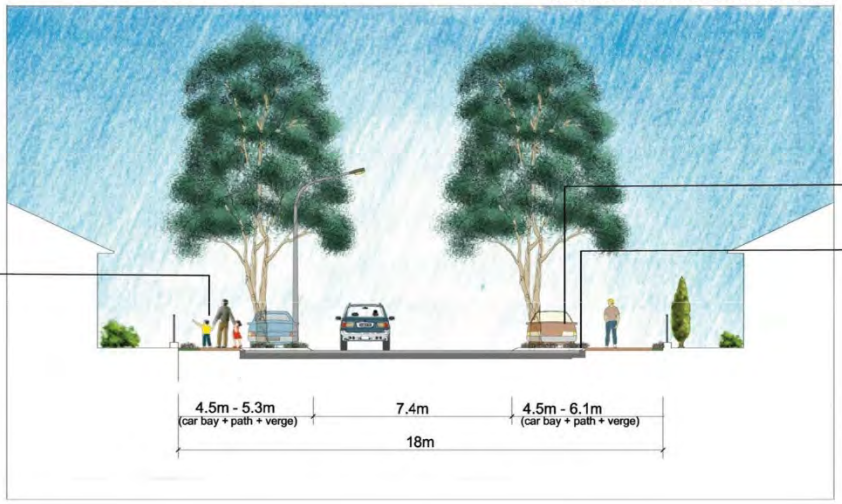
NEIGHBOURHOOD CONNECTOR A



Notes:

- Reduction of verge permitted where abutting open space
- 2.1m - 2.5m shared path meander within verge
- 1.5m for footpaths

NEIGHBOURHOOD CONNECTOR B



Notes:

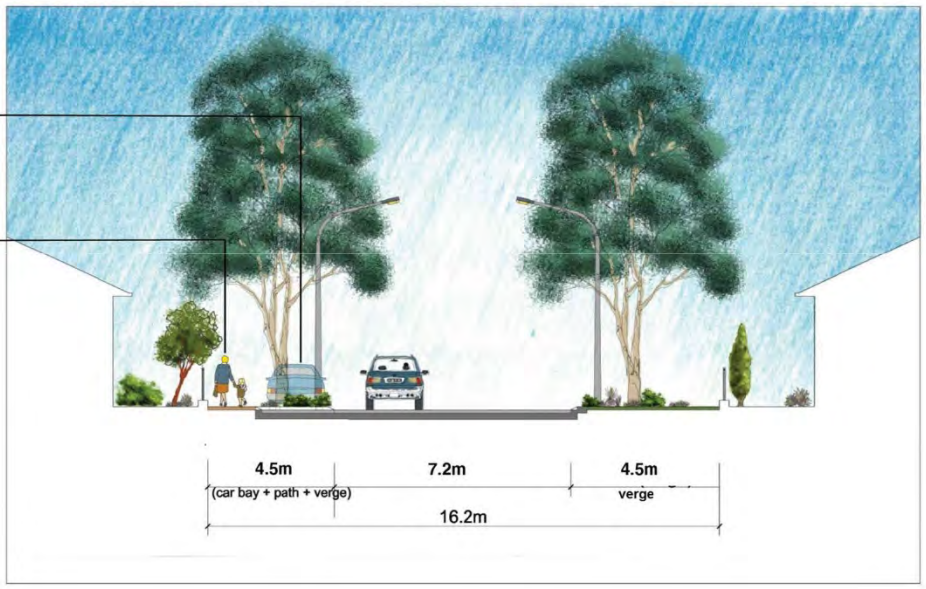
- Reduction of verge permitted where abutting open space
- 2.1m - 2.5m shared path meander within verge
- 1.5m for footpaths

ROAD CROSS SECTIONS

Figure 13

Scale: NTS@A4 Date:19/04/2017 Plan:UCGM2

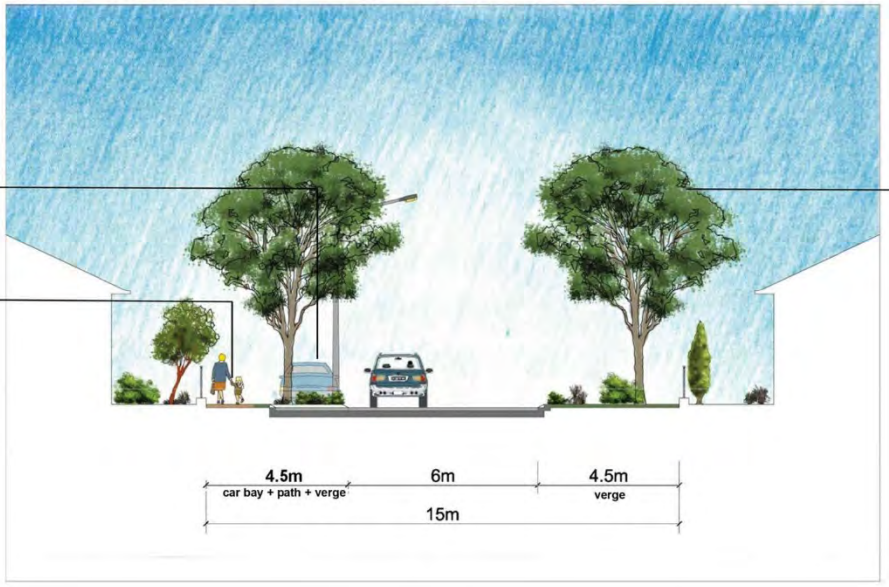
ACCESS STREET C – 16.2m ROAD RESERVE



Notes:

- Reduction of verge permitted where abutting open space
- 2.1m - 2.5m shared path meander within verge
- 1.5m for footpaths

ACCESS STREET D – 15.0m ROAD RESERVE



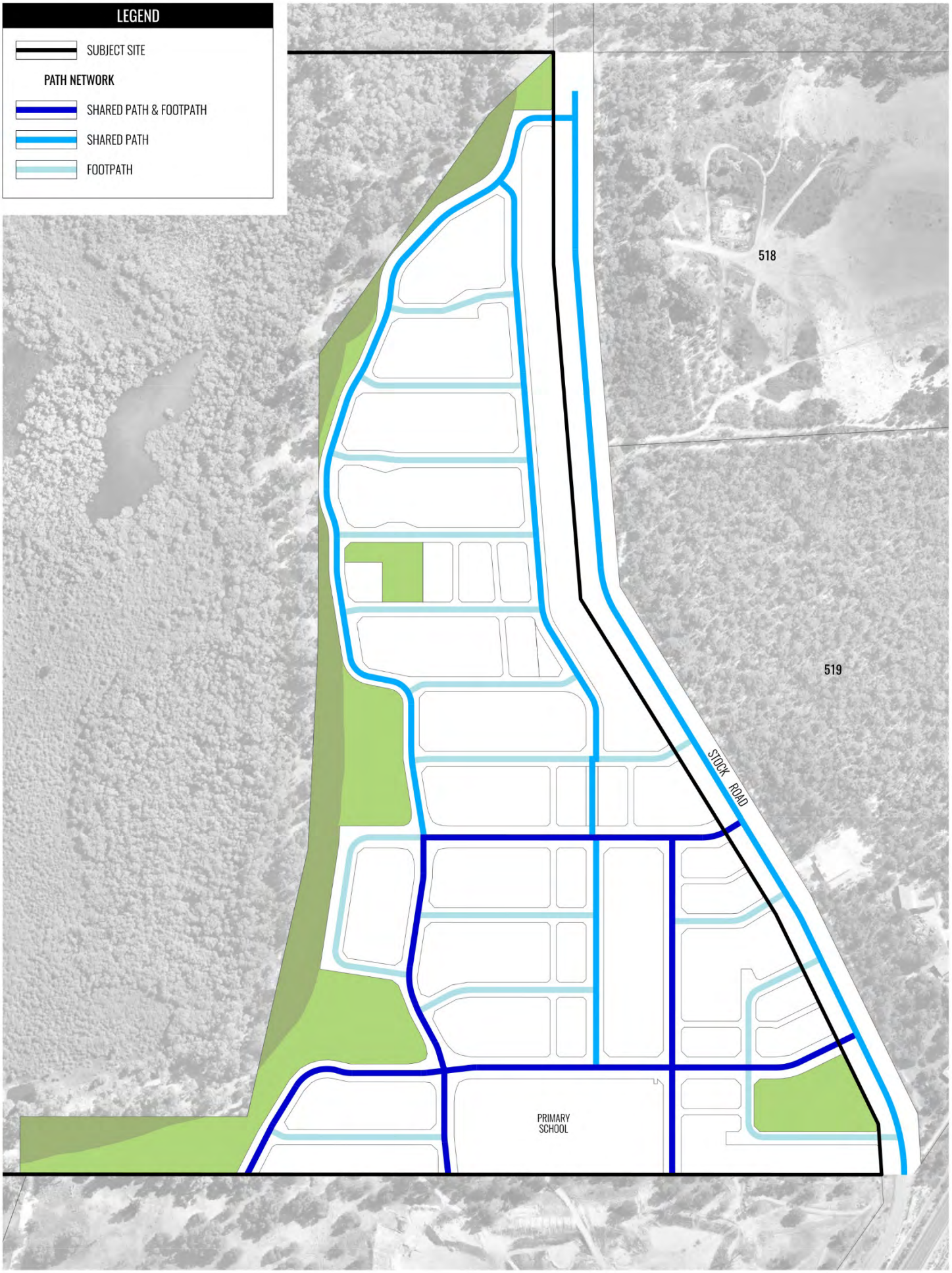
Notes:

- Reduction of verge permitted where abutting open space
- 2.1m - 2.5m shared path meander within verge
- 1.5m for footpaths

ROAD CROSS SECTIONS

Figure 14

Scale: NTS@A4 Date: 19/04/2017 Plan: UCGM2



PATH NETWORK

Figure 15

NORTH

Scale 1:5000 @ A4

0 50 100 150m

Date: 27/05/2020 **Plan:** URBM2-5-017A

3.7 Public Open Space

The Structure Plan proposes five credited Public Open Space (POS) areas. A POS contribution provision has been prepared for the Structure Plan area (**Figure 16** refers) and illustrates compliance with the 10% creditable POS requirements in accordance with *Liveable Neighbourhoods* guidance and WAPC's Development Control (DC) Policy 2.3 *Public Open Space in Residential Areas*.

The Structure Plan design (**Plan 1**) offers a creditable POS contribution of 12.09%; or 0.69ha 'surplus' to the minimum area prescribed.

Through the environmental assessment of the site, significant survey effort has been undertaken to understand the fauna habitat values. The proposed Structure Plan design has responded to the outcomes of these investigations through the strategic location of POS to minimise impacts to areas of fauna habitat identified as having the highest retention priority, namely mature marri, tuart and jarrah trees.

Notably, POS 2, 3 and 5 provide direct interface to Paganoni Swamp and associated CCW buffer areas, and POS 1 provides an entry statement into the Structure Plan area. All POS areas are strategically positioned to maximise retention of significant remnant vegetation on-site.

Further opportunities for the retention of habitat provided by mature endemic trees within road reserves, verges and lots will be considered as part of future detailed subdivision and engineering design.

A Landscape Master Plan has been prepared to demonstrate the proposed intent of the areas of POS (**Figures 17** and **18** refer).

This POS contribution will be continually reviewed under the more detailed subdivision and engineering design stages, as drainage provision, earthworks and nett residential development cells are further adjusted.

3.8 Water Management

A Local Water Management Strategy (LWMS) has been prepared for the site developed in accordance with Better Urban Water Management (WAPC 2008), State Planning Policy 2.9 *Water Resources* (WAPC 2006) and *Planning Bulletin 92 Urban Water Management* (WAPC 2008) (**Appendix 4.3** refers).

The overall objective for integrated water cycle management for the development is to mimic the existing hydrological regime of the site. The design objectives seek to deliver best practice outcomes using a water sensitive urban design (WSUD) approach, including management approaches for:

- Water conservation
- Stormwater quality management
- Flood mitigation
- Groundwater management

The criteria proposed within this LWMS are based on the characteristics of the existing environment and a contemporary best-practice approach to integrated water cycle management.

The overall approach to water conservation is to reduce the amount of scheme water required within the development at both a lot and estate scale. Within lot, potable water consumption will be reduced by promoting water efficient fixtures and appliances (WEFA) and water wise gardening (WWG) principles within lot gardens. On an estate scale, groundwater will be utilised for irrigation of landscaped areas within POS which will also utilise WWG principles.

Surface water management focuses on treating small event runoff (15mm) on-site and maximising discharges of clean water to the adjacent wetland. Erosion control structures will be utilised to ensure surrounding vegetation is protected.

Surface water quality will be addressed using a treatment train approach, which incorporates lot scale retention (via soak wells), vegetated median swales in road

reserve and vegetated bioretention areas (BRAs) within POS. Further non-structural measures will also be adopted and will be detailed in future urban water management plans (UWMP).

Groundwater level management focusses on protecting properties from flooding due to inundation by groundwater. The substantial clearance to groundwater across the majority of the site and high permeability of the underlying soils indicates that flooding from groundwater inundation is unlikely. The lower lying areas of the site will utilise fill as necessary to provide adequate clearance to groundwater.

The main objective of the management of groundwater quality is to maintain or improve the existing groundwater quality. This will be achieved by reducing total nutrient loads originating from the development and treating surface water runoff as close to source as possible and using high nutrient uptake soils and vegetation within drainage infrastructure. Measures to address groundwater quality are consistent with those proposed for surface water quality.

3.9 Education Facilities

A portion of a Primary School is located in the southern portion of the site. The Primary School site is to be shared with the *Lakelands East Structure Plan*.

The Structure Plan area is expected to be included in the Lakelands Secondary School catchment, this school opened in 2019.

3.10 Activity Centres & Employment

The Structure Plan does not provide for any Activity Centre or employment facilities in its boundary. Nearby major employment centres are identified under Section 2.6.

PUBLIC OPEN SPACE SCHEDULE Lakelands North-East Structure Plan		
Gross Site Area		**137.316**
Minus Deductions		
1:1yr Drainage	0.252	
Primary School	2.001	
Sewer Pump Station Site	0.143	
CCW Buffer (0.4727ha; 0.7299ha; 0.7016ha; 0.2890ha; 0.3761ha)	2.569	
PRS Parks and Recreation Reserve	94.350	
Stock Road	4.854	
Total Deductions		**104.169**
Gross Subdivisable Area		**33.147**

Maximum 2% Restricted POS Permitted	0.6629	
Minimum 8% Unrestricted POS Required	2.6517	
10% POS Requirement		**3.3147**

Proposed POS Provision - *Liveable Neighbourhoods* Summary		
Restricted POS Provision		
>1:1 - 1:5yr Drainage	0.0000	
Unrestricted POS Provision		
Credited POS	4.0072	
TOTAL POS PROVISION	**12.09%**	**4.0072**

OVER PROVISION OF 10% POS REQUIREMENT	**0.6925**

DRAINAGE + CREDITABLE OPEN SPACE (DETAILED BREAKDOWN)					
POS Area (Ref)	Gross Land Area (ha)	Uncredited Green Space (Deduction)	Credited 'Restricted' Public Open Space	Credited 'Unrestricted' Public Open Space	Total Credited Public Open Space
		1:1yr Drainage	>1:1 - 1:5yr Drainage		
All figures in hectares (ha)					
APPROVED POS - Stage 1 (WAPC 157010)					
1	0.6947	0.0000	0.0000	0.6947	0.6947
2	2.0704	0.0678	0.0000	2.0026	2.0026
		Subtotal:	**0.0000**	**2.6973**	**2.6973**
REMAINING POS - Stage 2+ (TBA)					
3	0.8908	0.1500	0.0000	0.7408	0.7408
4	0.3184	0.0000	0.0000	0.3184	0.3184
5	0.1349	0.0210	0.0000	0.1139	0.1139
6	0.1503	0.0135	0.0000	0.1368	0.1368
		Subtotal:	**0.0000**	**1.3099**	**1.3099**
TOTAL CREDITABLE POS:			**0.0000**	**4.0072**	**4.0072**

PUBLIC OPEN SPACE PROVISION

Figure 16

LEGEND

NOTE: EXISTING TREES TO BE RETAINED WHERE POSSIBLE

EXTENT OF WORKS BOUNDARY

50M CCW BUFFER EDGE WITH LIMESTONE MAINTENANCE TRACK ON EAST SIDE

PRIMARY SCHOOL

SEWER PUMP STATION

PROPOSED FACILITIES KEY

- SHADE STRUCTURE
- PICNIC FACILITIES
- BENCH SEATING
- BBQ
- DRINK FOUNTAIN
- BIN
- BIKE RACKS
- PLAY SPACE
- FITNESS EQUIPMENT
- DRAINAGE BASIN
- RETAINED VEGETATION
- PEDESTRIAN PATH NETWORK

PUBLIC OPEN SPACE SUMMARY

Public open space will be designed using the following principles:

- Consideration and enhancement of natural features
- Retention of identified existing mature endemic trees where possible, with consideration of tree health, public safety and earthworking requirements.
- Identifying open and existing cleared areas
- Understanding of bushfire management requirements (low fuel zones)
- Understanding of wetland management objectives
- Maintenance of biodiversity and ecological linkages
- Management of landscaped areas
  - Containment of turf
  - Use of hard edges
  - Native planting

INDICATIVE FEATURE PARK FACILITIES

Easily accessible to the entire community
Large gathering spaces with picnic/BBQ facilities
Large all ages play space
Pedestrian/Cycle Path Network
Active recreation space
Existing trees retained where possible
Vegetated bioretention basins

INDICATIVE LOCAL PARKS FACILITIES

Predominantly native planted areas with pockets of turf
Small gathering nodes and basic picnic/BBQ facilities
Pedestrian/Cycle Path Network
Primary focus on passive recreation
Existing trees retained where possible
Vegetated bioretention basins

INDICATIVE ENTRY PARK FACILITIES

Entry focal point into development
Existing trees retained where possible
Native planted areas with small pockets of turf
Minor path network

NORTH

Scale: 1:4000 @ A3

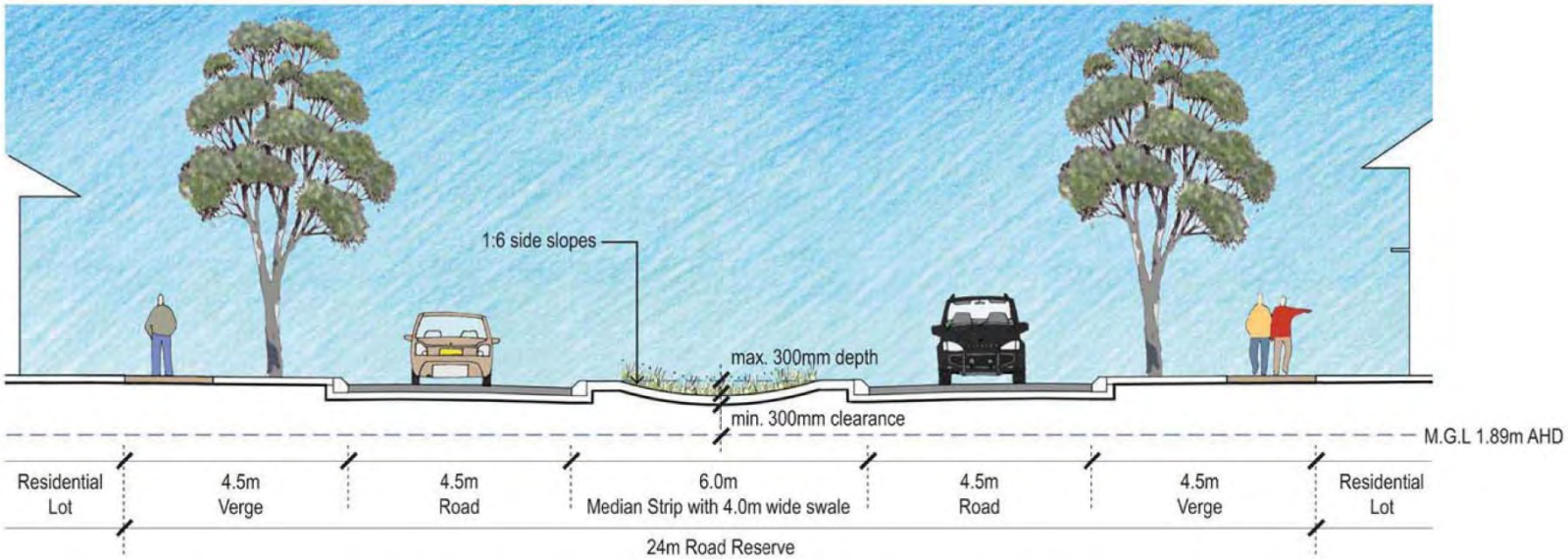
0 40 80 120m

Date: 25/05/2020 Plan: URBM2-5-027

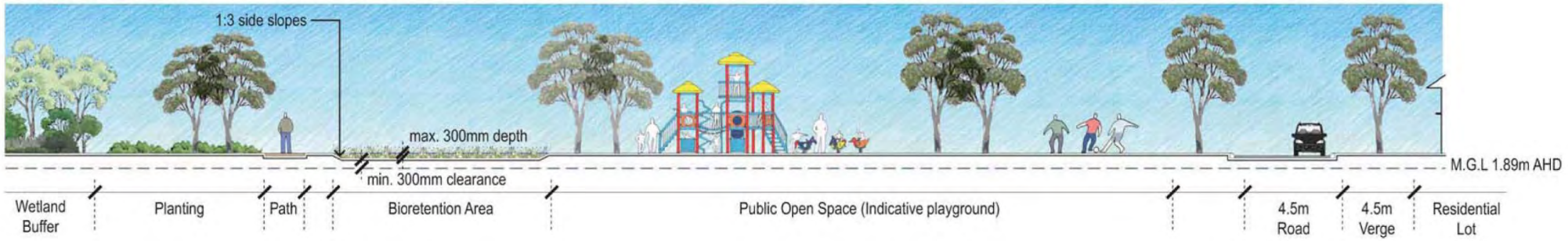
LANDSCAPE CONCEPT PLAN

Figure 17

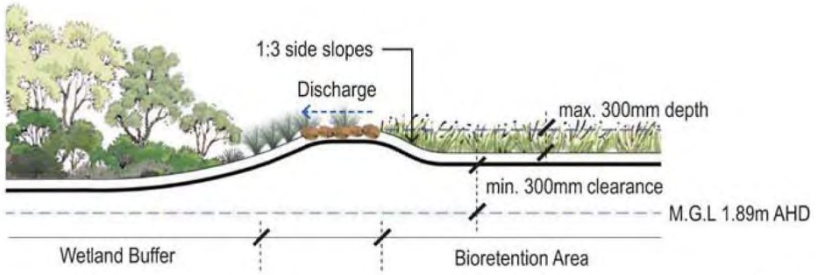
SECTION AA 1:100 @ A3



SECTION BB 1:250 @ A3



DETAILED SECTION - INDICATIVE EROSION CONTROL MEASURES



LOT 105 STOCK ROAD
LANDSCAPE SECTIONS

FIGURE 18

REV A
DATE 03.04.17

emerge ASSOCIATES

3.11 Infrastructure Coordination, Servicing & Staging

An Engineering Servicing Report has been prepared by JDSi (**Appendix 7** refers), and a summary is contained within the sections below.

3.11.1 Earthworks

Based on the preliminary geotechnical investigation for the site, the earthworks are expected to comprise large cut to fill of existing undulating materials (mounds) assuming they are suitable for clean fill. This is subject to further assessment.

The earthworks levels will also be constrained by the following:

- Comprehensive Geotechnical recommendations.
- Drainage outfall levels for the stormwater and subsoil drainage systems.

This is subject to further advice provided by the hydrologist and will be verified during preliminary design.

The invert level of the existing sewer gravity mains that the site will discharge into. Based on this invert and development layout, the lower portion of the site will be opposing the design grade of the site, which could provide restrictions on the fill levels to ensure the lots can gravitate at minimum sewer grades. This will be verified during preliminary design.

The bulk earthworks will need to be undertaken in accordance with recommendations from a detailed geotechnical investigation and Australian Standard AS3978-1996 'Earthworks for Residential and Commercial Developments'.

3.11.2 Demolition & Clearing

All scattered vegetation, with the exception of those marked for retention, will need to be removed prior to undertaking earthworks on the site.

No contaminated materials have been identified on the site, however, should any materials be found they will require removal in accordance with applicable standards and disposed at licensed facilities.

3.11.3 Sewage

There is currently no existing sewer infrastructure in the vicinity of the site. However, based on information obtained from Water Corporation's Spatial system (Esinet, accessed 16/03/17), there are recently constructed gravity reticulation approximately 500m to the south-west of the proposed development.

Information provided by the Water Corporation indicates the site is within the future Type 40 Wastewater Pump Station 'A' (WWPS 'A') which ultimately connects into the recently constructed *Lake Valley Drive Wastewater Pump Station* (WWPS B') located within Peet's Lakelands Estate. Water Corporation has advised that the WWPS 'A' is currently outside the 5 year CIP (nominally around 2024). However, once the Local Structure Plan is in place, Water Corporation advised negotiations can take place to possibly bring these works forward.

Should the initial stages be delivered prior to the completion of the WWPS 'A', it would be likely that interim measures for sewer reticulation such as Tankering be required whilst the WWPS 'A' is under construction.

Based on the ultimate MSWA planning for Peet's Lakelands Estate development, there will be a DN300 gravity main which the site will ultimately connect into.

3.11.4 Water Supply

There is currently no existing water infrastructure in the vicinity of the site. However, based on information obtained from Water Corporation's Spatial system (Esinet, accessed 16/03/17), there are recently constructed water reticulation approximately 500m to the south-west of the proposed development. Water Corporation advised in June 2016 that the site is located outside the North Mandurah gravity water supply zone. A recent greater Mandurah water planning review (2014/15) determined that a high-level zone would need to be established for any

new services above 10mAHD in the 'North Lakelands east' development area.

The planning identified the need for a small High Level tank of approximately 0.7ML capacity and a booster pump station within the site from around 2024 onwards. Water Corporation would also need to secure a suitable location for the tank and the booster.

Based on the ultimate MSWA planning for Peet's Lakelands Estate development, there will be a DN375 Distribution Main, DN200 and DN150 reticulation main which the site will ultimately connect into.

3.11.5 Power Supply

The site requires a total power supply of 2.5MVA (2466.7kVA).

Based on Western Power Load Breakdown for development, it is estimated that a minimum of four 630 KVA transformers (4 x 630kVA = 2.520MVA) be required within the development. Furthermore, the site requires approximately four high voltage switchgear kiosks to bring the network into the subdivision.

Based on Western Power Forecast Capacity for 2018, any additional electricity load would potentially trigger the requirement for a new 22,000 volt feeder cable to the site. Therefore, a Western Power feasibility study is highly recommended to confirm the power supply to the development.

All future development's electricity load requirements will be required to be approved by Western Power.

3.11.6 Telecommunications

The site is earmarked for NBN infrastructure, with the implication that the existing developments in the area have also been approved for NBN reticulation.

General communication services for the development will consist of the installation of a standard pit and pipe network in accordance with NBN Co guidelines and standards. The current design practice for road reserves, pavement and verge provisions will make adequate allowance for services including broadband in accordance with the agreed Utilities Service Providers handbook. There will be some local land requirements for equipment sites, similar to current provisions which will be accommodated at detailed subdivision stage.

Developers will be required to cover the costs of trenching and ducting for the infrastructure, however NBN Co will cover the other costs of installing fibre infrastructure, including backhaul.

Post construction and due to the possible NBN Co delays in rollout programming, negotiations with Telstra may be required for an interim mobile service, and access to the internet will only be available through wireless broadband services.

All communication assets within the development will remain in the ownership of the provider and easements will need to be granted in favour of the service provider.

3.11.7 Gas

Reticulated gas is not considered to be an essential service and as such is not required as a condition of subdivision.

It is usual practice to install gas reticulation network for the subdivision within a common civil trench at no cost to the developer. If there is an extension required to connect to the nearest high pressure gas main the developer will be required to pay for the trenching to the gas main as a headworks cost.

Based on Dial Before You Dig (DBYD) information requested in March 2017, there are currently no gas reticulation in the vicinity of the site. However, it would be likely that any future gas connections would be connected from Peet's Lakelands Estate development.

3.11.8 Roads

Existing roads adjacent the site are owned and maintained by the City of Mandurah and will be required to be designed in accordance with the City of Mandurah guidelines. As part of any development and required under

WAPC subdivision approval the portion of roads fronting the development typically require upgrading to provide suitable access into the site. As such, Stock Road in the interim will need to be upgraded to a suitable urban standard with kerbed treatment as a minimum.

The internal roads are proposed to be to the City of Mandurah's subdivisional standards which require a minimum 5.5m pavement in a 15m road reserve for urban access roads, increasing to a 6m pavement within a 22m+ road reserve for local distributors. Intersections, sweeps/corners, and roundabouts will be designed for vehicle turning movements defined in AUSTROADS design guidelines. All internal roads are owned and maintained by the City of Mandurah.

Internal roads within the development are also subject to City of Mandurah and Liveable Neighbourhoods. These are indicated as Access Roads, and Laneways.

Further detailed traffic analysis and studies will be required during the planning studies for the site.

3.11.9 Stormwater Management & Drainage

Stormwater Management

The maximisation of stormwater recharge to the shallow aquifer through the adoption of 'Best Management Practices', promotes the dispersion and infiltration of runoff.

These include the use of porous paving for roads and carparks, the diversion of runoff into road medians and road-side swales, drainage soakwells or linear soakage units to infiltrate runoff from road reserves or building roofs 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', promotes the disposal of runoff via water pollution control facilities. This includes vegetated swales and basins, detention storages and gross pollutant traps and the implementation of non-structural source controls including urban design, community education, low fertiliser landscaping regimes, etc).

Stormwater Collection, Treatment & Disposal

Drainage from public roads will be collected via side entry pits, combination gullies or open swales depending on the nature of the adjacent land uses, the extent of traffic and pedestrian activity, etc. At source infiltration will be promoted for short recurrence interval events.

The drainage collection and conveyance system will be designed to cater for the runoff from storms with up to a 1 in 5 year recurrence interval. Infiltration basins would be designed to store runoff from up to 1 in 10 year storms. In all cases roads and POS would be designed to cater for the surface overflow for more severe storms with building pad levels set at least 500mm above the 1 in 100 year flood or storage level at any location.

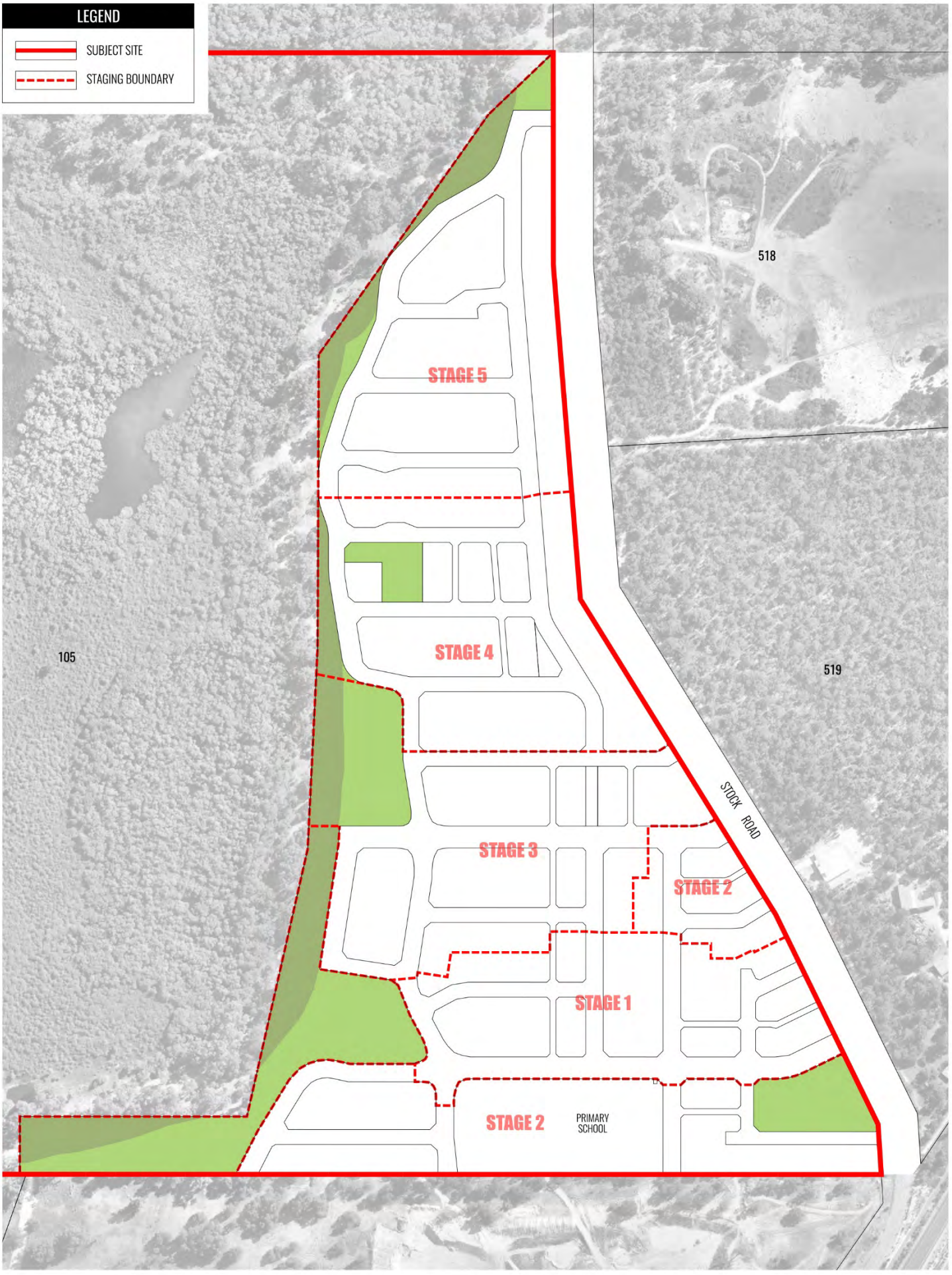
In areas where infiltration is not possible the attenuation of runoff in basins will minimise flooding and quantity issues in the final receiving basins. The basins will also assist nutrient removal along with other measures such as suitable vegetation planting and the use of modified soils with high phosphorous retention capacity.

3.12 Other Requirements

3.12.1 Staging

It is recommended that the initial stage of the development be constructed from the south where services will tie into Peet's Lakelands Estate. Development staging will then extend progressively north.

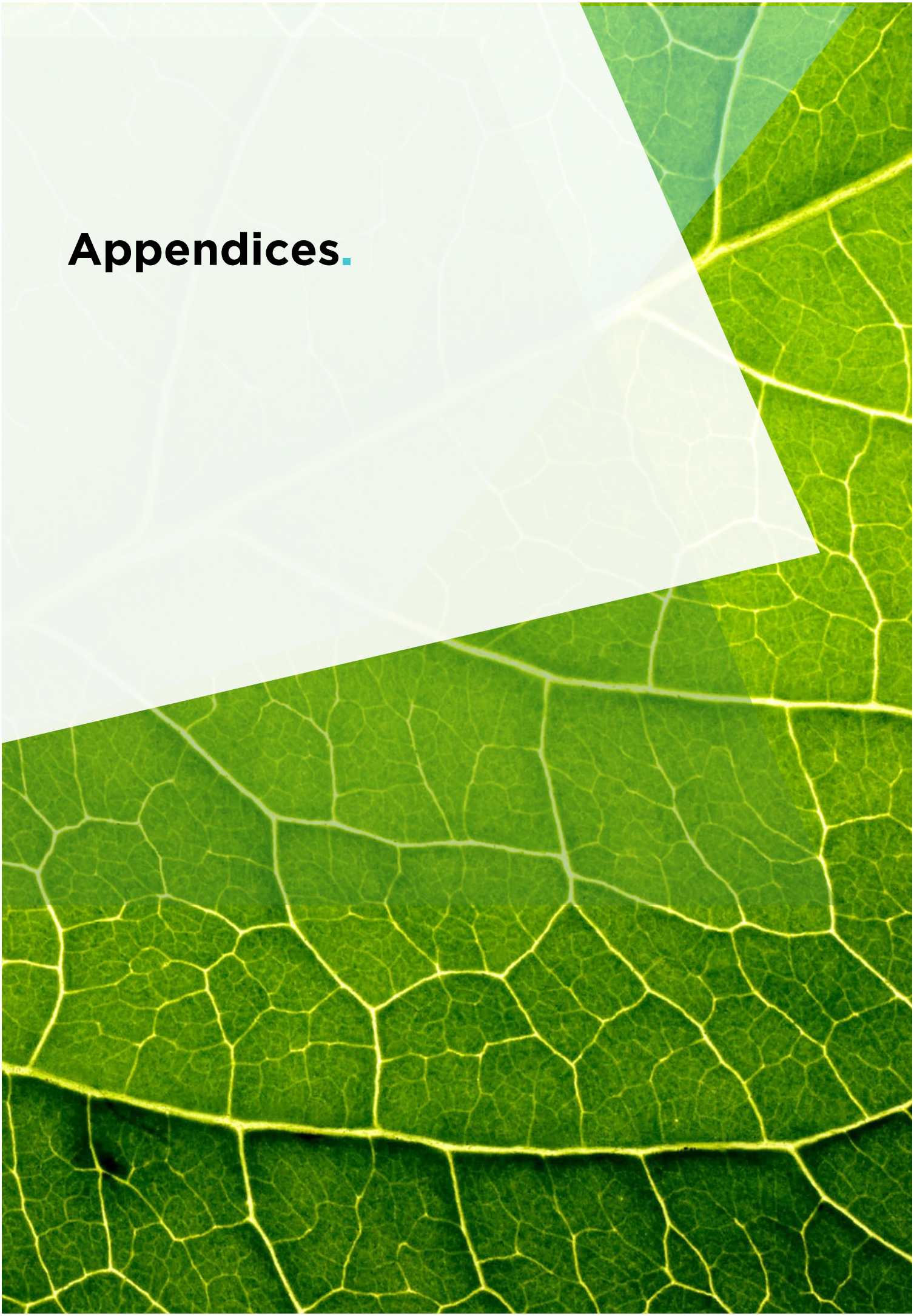
Due to the natural terrain of the site, the proposed wastewater pump station will need to be constructed in the initial stages to sufficiently service the development with minimal temporary measures such as sewer tankering in the interim (**Figure 19** refers).



STAGING PLAN

Figure 19

Appendices.



Appendix 1
Bushfire Management Plan
(LSP Amdt 1 Update)

Appendix 2
Transportation Noise Assessment

Appendix 3
Local Water Management Strategy
(+ LSP Amdt 1 Addendum)

Appendix 4
Environmental Assessment & Management Strategy (LSP Amdt 1 Update)

Appendix 5
Transport Assessment
(+ LSP Amdt 1 Addendum)

Appendix 6
Engineering Servicing Report

Appendix 7
Certificate of Title (Parent Lot)

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