

ONSLOW TOWNSITE EXPANSION

STRUCTURE PLAN

711-010
APRIL 2016



TOWN PLANNING
URBAN DESIGN AND HERITAGE

DOCUMENT CONTROL

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“This plan provides the building blocks for a vibrant, sustainable and prosperous future for Onslow, and considers the significant opportunities that are currently presented to the Town.”



EXECUTIVE SUMMARY

The burgeoning resources industry, including the imminent development of the Ashburton North Strategic Industrial Area (ANSIA) is likely to place significant pressures on the town of Onslow and create significant demand for housing in Onslow. The Onslow Townsite Strategy, which was prepared in 2011 by the Shire of Ashburton and Department of Planning, identifies a potential population of 3,500 people by 2021, fuelled by the growth of the resources sector in the north-west of WA. This places significant demand on the current infrastructure, services and housing in Onslow, which currently caters for approximately 700 permanent residents.

Due diligence was undertaken in 2010 and 2011 initially to assess the options to enable expansion to occur within the Onslow townsite, but also to provide a key focus on its delivery. The due diligence signaled the development readiness of identified land parcels in the town, which began the first stage of the development process of delivering infill residential lots through the rationalisation of existing Unallocated Crown Land and Reserves within the existing residential development areas of the town.

In July 2011, a five-day public and stakeholder consultation workshop was undertaken. This process produced, amongst other information, a Vision Plan for the ultimate townsite expansion, which has formed the basis of this Structure Plan.

The expansion of Onslow is to be undertaken in a staged manner, to ensure that lots are developed and released as soon as possible to meet demand, as well as meet the State's commitment to provide an urban village to cater for Chevron's operational workforce associated with the ANSIA. The expansion of Onslow creates an opportunity to demonstrate where good planning and expeditious infrastructure delivery can work to mitigate the impacts that arise when you mix land shortages with significant housing demand.

The Structure Plan is consistent with the long-term strategic goal to ultimately provide accommodation for an additional 3,500 people whilst remaining cognisant of strategic opportunities and development principles to optimise future benefit for the Onslow townsite.

There is a range of planning processes operating concurrently to facilitate the delivery of land in Onslow, including numerous scheme amendments, development plans and subdivisions.

REFER TO TABLE 1 AND FIGURE 1 - CONCURRENT PLANNING PROCESSES.

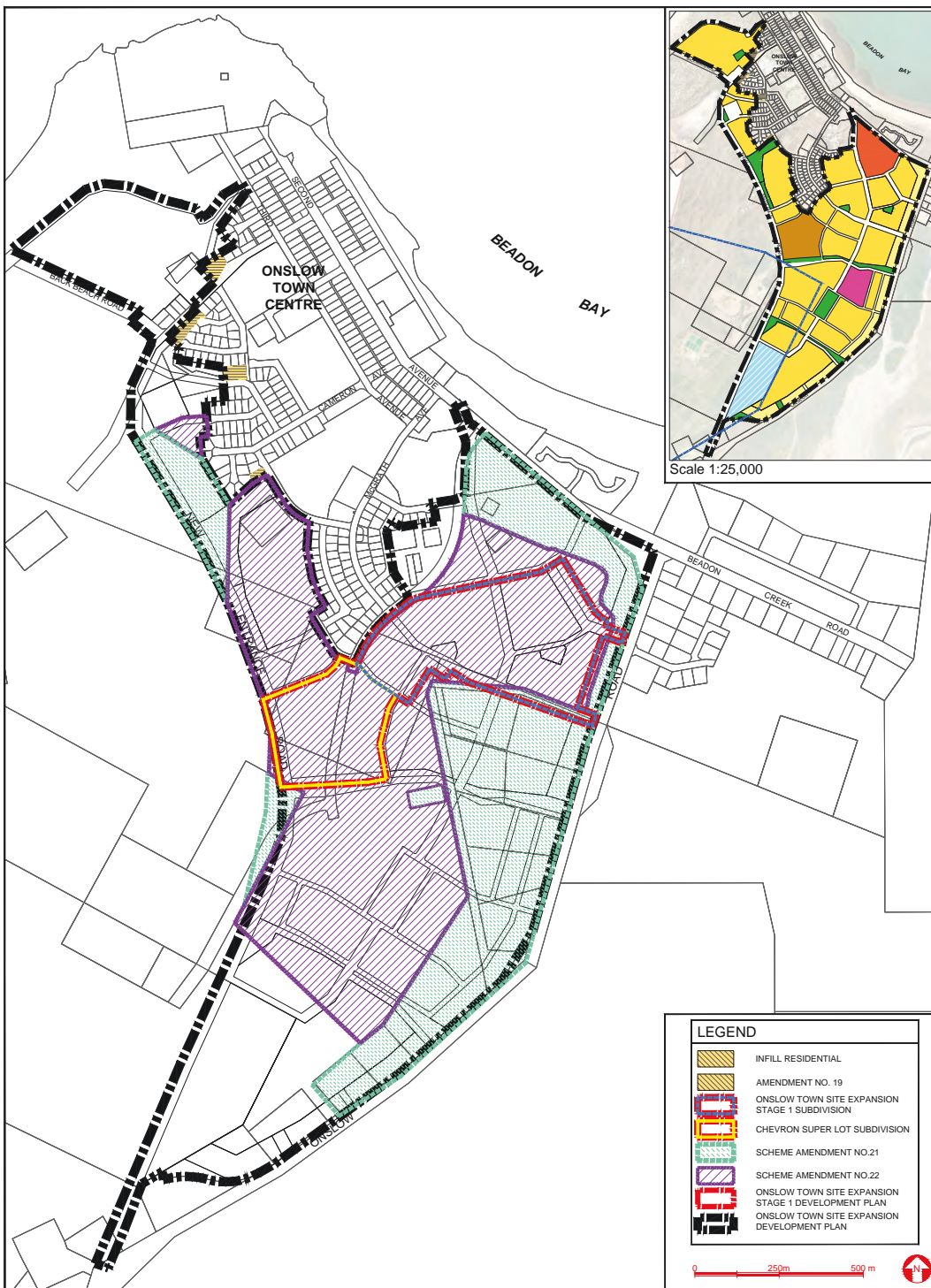
1.1 RELATED PLANNING PROCESSES

There is a range of planning processes operating concurrently to facilitate the delivery of land in Onslow, including numerous scheme amendments, development plans and subdivisions. The table below outlines each of these processes.

TABLE 1 - CONCURRENT PLANNING PROCESSES

Name	Purpose	Status
Scheme Amendment No. 19.	Rezone portions of UCL to facilitate in-fill development.	Gazetted 11 September 2012.
In-fill Subdivision Applications	Create a number additional lots within the existing townsite.	Various subdivision applications approved throughout 2012/2013.
Scheme Amendment No. 21	Rezone remaining portions of the Onslow expansion area to 'Urban Development'.	Initiated by the Council on 14 December 2011. Adopted by Council on 11 December 2013. Soon to be Gazetted.
Scheme Amendment No. 22	Remove the density coding from land zoned 'Urban Development' to allow greater flexibility in the Structure Plans.	Initiated by the Council on 14 December 2011. Adopted by Council on 11 December 2013.
Onslow Townsite Expansion Development Plan	Provide a comprehensive planning tool to guide the expansion of Onslow to meet demand.	Subject of this application.
Onslow Townsite Expansion Stage 1 Development Plan	Guide the development of the Stage 1 area and allow the Shire to approve the Stage 1 Subdivision.	Endorsed by WAPC in March 2013.
Stage 1 Subdivision Application	Deliver 223 residential lots and 2 POS reserves as the first stage of the Onslow townsite expansion.	Approved by WAPC in March 2013.
Chevron Superlot Subdivision Application	Create a 9ha site to accommodate Chevron's operations village.	Approved by WAPC in March 2013.

FIGURE 1 - CONCURRENT PLANNING PROCESSES





CERTIFICATION OF STRUCTURE PLAN

This structure plan is prepared under the provisions of the Shire of Ashburton Town Planning Scheme No.7.

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

..... 10.6.16

Signed for and on behalf of the Western Australian Planning Commission:

.....
[Signature]

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:

.....
[Signature].....Witness

..... 10/6/16 Date

DATE OF EXPIRY: 10 June 2026

“This zone is intended for future urban land, encompassing residential, community, commercial or industrial uses, open space and other reserves. Development is to proceed in accordance with a Development Plan.”



PART A

IMPLEMENTATION PROVISIONS

1 SUBJECT AREA

The Structure Plan area comprises approximately 190 hectares of Unallocated Crown Land and forms a southward extension of the current Onslow town site. The subject site will provide a connection to the proposed airport expansion and light industrial area. The site also extends to the west to meet the proposed new entrance road.

REFER FIGURE 1 - LOCATION PLAN

2 THE SCHEME

The land is zoned 'Urban Development' in the Shire of Ashburton Town Planning Scheme No. 7 (TPS7). Section 6.8 - Urban Development Zone, in conjunction with Part 4 - Zones, and Appendix 7 of TPS7 sets out the requirements for planning, subdivision and development within the Urban Development zone.

The Planning and Development (Local Planning Schemes) Regulations 2015 at Clause 15 of Schedule 2 Deemed Provisions for Local Planning Schemes states as follows:

A structure plan is respect of an area of land in the Scheme area may be prepared if -

(a) the area is -

- (i) all or part of a zone identified in this scheme as an area suitable for urban or industrial development; and*
- (ii) identified in this Scheme as an area requiring a structure plan to be prepared before any future subdivision or development is undertaken; or*

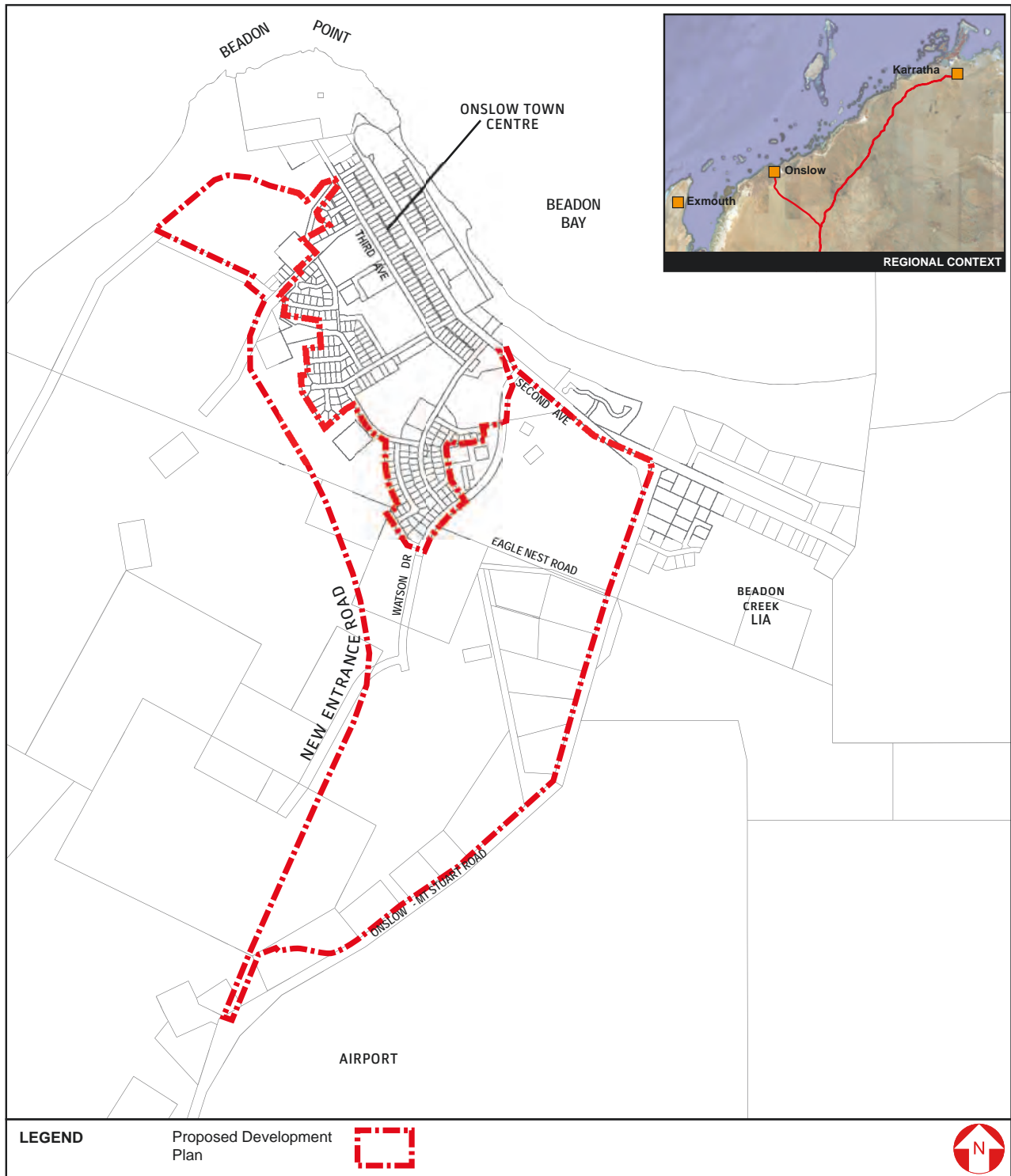
- (b) a State planning policy requires a structure plan to be prepared for the area; or*
- (c) the Commission considers that a structure plan for the area is required for the purposes of orderly and proper planning.*

Clause 16 of the Deemed Provisions then goes on to state:

(1) A structure plan must -

- (a) be prepared in a manner and form approved by the Commission; and*
- (b) include any maps, information or other material required by the Commission; and*
- (c) unless the Commission otherwise agrees, set out the following information -*
 - (i) the key attributes and constraints of the area covered by the plan including the natural environment, landform and the topography of the area;*
 - (ii) the planning context for the area covered by the plan and the neighbourhood and region within which the area is located;*
 - (iii) any major land uses, zoning or reserves proposed by the plan;*
 - (iv) estimates of the future number of lots in the area covered by the plan and the extent to which the plan provides for dwellings, retail floor space or other land uses;*

FIGURE 1 - LOCATION PLAN



- (v) the population impacts that are expected to result from the implementation of the plan;*
- (vi) the extent to which the plan provides for the coordination of key transport and other infrastructure;*
- (vii) the proposed staging of the subdivision or development covered by the plan.*

- (2) The local government may prepare a structure plan in the circumstances set out in clause 15.*
- (3) A person may make an application to the local government for a structure plan prepared by the person in the circumstances set out in clause 15 to be assessed and advertised if the person is -*
 - (a) a person who is the owner of any or all of the land in the area to which the plan relates; or*
 - (b) an agent of a person referred to in paragraph (a).*

A Structure Plan is defined in the Deemed Provisions as

“means a plan for the coordination of future subdivision and zoning of an area of land.”

A Development Plan is defined under TPS7 as:

“Plans which are required to be prepared prior to the consideration of planning or subdivision applications which address the schematic layout of proposed development and lot boundaries in addition to various other matters as may be required by the Scheme and includes local structure plans, outline or comprehensive development plans.”

The Deemed Provisions override the provisions of the Shire’s TPS7, and this document is therefore referred to as a ‘Structure Plan’ throughout.

The proposed Structure Plan shall apply to the entire Townsite Expansion Area, as identified on the Structure Plan in Appendix 1, and shall supersede the ‘Onslow Townsite Expansion Stage 1 Structure Plan’. This will ensure that the approach to any new development is consistent.

3 STRUCTURE PLAN

This document shall have the formal title of ‘Onslow Townsite Expansion Structure Plan’ and hereafter referred to as the ‘Structure Plan’.

The proposed Structure Plan is depicted in Appendix 1 – Onslow Townsite Expansion Structure Plan.

The objectives of the Structure Plan are to:

- Provide a comprehensive master plan to facilitate the orderly and proper subdivision and development of the land to meet the anticipated growth demand in the town of Onslow.
- Create a sustainable and affordable urban area with a range of lot sizes and diversity of housing types and land for a second school site, public open space and drainage purposes.
- Recognise the logistical requirement of the Watson Drive Precinct and through good design, promote the integration of the village with the surrounding development.

4 STRUCTURE PLAN REQUIREMENTS

4.1 LAND USE PRECINCTS AND STANDARDS

The Structure Plan identifies several land use precincts that are generally characterised by a predominant use although it is intended that the Structure Plan be treated in a flexible manner to allow other compatible uses. The proposed land use precincts include Residential, Large Live-Work Lots, School, Public Open Space and Drainage and Area Subject to Detailed Design, as well as the Watson Drive Precinct.

4.1.1 RESIDENTIAL PRECINCT

4.1.1.1 Statement of Intent

The intent of the Residential Precinct is to provide a high quality, environmentally sustainable, residential environment providing a range of living options to cater for a diverse population and encourage a sense of community.

Development within the Precinct will provide for pedestrian friendly streetscapes with passive surveillance of the public domain. The Structure Plan encourages a range of housing types, including the introduction of ancillary dwellings.

4.1.1.2 Development Standards

Development standards to be satisfied for the Residential Precinct include:

- a) The provisions of the Residential Design Codes of Western Australia (R-Codes) shall apply to residential development in this Precinct unless otherwise specified under a Local Planning Policy or Residential Design Guidelines.

- b) Development is to be in accordance with the density coding identified on the expansion Structure Plan.
- c) Sites identified as grouped housing sites as part of any subsequent subdivision applications may be developed to a maximum density of R40 and the Shire may require the preparation of a Local Development Plan (LDP) to be prepared prior to the development of that site.
- d) No development or subdivision shall occur within the Waste Water Treatment Plant buffer until the buffer is removed or reduced.
- e) All use, subdivision and development shall be in accordance with relevant development plan.
- f) In accordance with the EPA Guidance Statement No. 3, for any subdivisions within 500m of the Onslow Salt operations, notifications are to be placed on the certificate of title of each new subdivided lot to notify prospective purchasers of the potential noise impacts.
- g) In accordance with the EPA Guidance Statement No. 3, for any new dwellings within 1km of the Onslow Salt operations, the facades of buildings fronting or perpendicular to the Onslow Salt operations are to incorporate architectural treatments to minimise noise impacts.

4.1.2 SPECIAL USE (WATSON DRIVE PRECINCT)

The intent of the Watson Drive Precinct (the Precinct) is to provide a specific area that allows medium-density accommodation for operational workers associated with the Wheatstone Project that provides for the needs of the occupants, recognising the opportunities for integration of the Precinct with the surrounding residential areas. Built form within this precinct will respect and build upon Onslow's vernacular high quality, architecturally designed, resort style accommodation that positively contributes and adds

to the vibrancy of the planned future community. The Village must ultimately be developed as a modern facility with high amenity both physically and visually to meet the needs of future residents.

Development within the Precinct will provide for pedestrian friendly streetscapes with passive surveillance of the public domain and promote integration with the surrounding community.

4.1.2.1 Development Standards

The following development standards apply to the development of land in the Watson Drive Precinct:

- a) Design of the precinct shall facilitate good connectivity, within the precinct and to other external recreational and community facilities.
- b) The Precinct shall be structured to facilitate accommodation that allows seamless future transition and integration into the surrounding urban area.
- c) The provision of high quality development reflecting a motel/resort style development with appropriate landscaping, recreation areas/facilities, quality design and materials for the benefit of the occupants and the wider Onslow community.
- d) The internal movement network shall be designed to maximise connectivity and pedestrian access. This may be achieved by the use of shade trees and a footpath network that is interconnected with the surrounding residential areas.
- e) The provision of services and facilities associated with development in the Precinct shall not undermine the viability of existing or proposed services and facilities within the Onslow community.
- f) The external frontages of the Precinct shall be developed to a standard consistent with adjacent residential areas with regards to bulk and scale, streetscape, setbacks and landscaping, in order to maximise integration with the surrounding townsite.
- g) Any incidental non-residential land uses with the potential for external access by the wider Onslow community shall be located toward the street where services can be shared, where appropriate.
- h) Any vehicular traffic movements, including deliveries, access/ egress and parking for all vehicles shall be located with access to the proposed new access road.
- i) An Local Development Plan (LDP) for this Precinct must be approved and be adopted by the Shire, prior to the commencement of any development.
- j) Any LDP approved for this Precinct shall be in accordance with the objectives of this Structure Plan.
- k) If any prohibited land uses are proposed within this precinct, an amendment to TPS7 would be required prior to the adoption of any LDP.

4.1.3 SPECIAL USE (LARGE LIVE WORK LOT PRECINCT)

4.1.3.1 Statement of Intent

The intent of the Large Live-Work Lot Precinct is to:

- Provide a large lot typology that includes both a residential and home-based business/work uses that are not suited within the town centre or light industrial areas.
- Ensure that residential uses fronting the adjoining residential area are protected from flooding and storm surge and that the home-based business/work uses are located towards Onslow Road.

Development of the residential component of each

lot will be as per the R-Codes applicable and will provide a complimentary interface with adjoining residential areas with regards to pedestrian friendly streetscapes, landscaping, setbacks and passive surveillance of the public domain.

Development of the non-residential component of each lot will be similar to that allowed for a home business under the Shire of Ashburton Scheme without the floor space limits, however, will provide landscaped and screened setbacks where appropriate and the opportunity for large sheds for the use of a business, which will provide the interface to the adjacent light industrial area (LIA).

4.1.3.2 Development Standards

The following development standards apply to the development of land in the Large Live-Work Lot Precinct:

- a) The development of the residential portion of the lot that faces a residential area in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Residential Design Codes of Western Australia (R-Codes) unless otherwise specified in this section.
- b) The development of the non-residential portion of the lot that faces non-residential areas in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Home Business Standards under the Shire of Ashburton Scheme in regards to employment, amenity, vehicles and car parking and servicing needs.
- c) Non-residential development in the Large Live-Work Lot Precinct shall be adequately landscaped and screened to maintain a lifestyle land use appearance as opposed to a commercial or industrial land use appearance.
- d) An Local Development Plan (LDP) shall be prepared identifying basic design requirements within this precinct, including building envelopes,

floor space limits, types of land uses etc.

4.1.4 EDUCATION

4.1.4.1 Statement of Intent

The intent of the Education Precinct is to provide a connected site for the use and benefit of the community that has a flexible intended purpose for school/ education purposes to meet demand in Onslow. The site can be used for any education related land uses that are required in Onslow from pre-primary to adult education facilities.

The built form, landscaping, setbacks and streetscape of the Education Precinct will be cohesive, complementary and consistent over the site, although the site may cater for a number of different educational uses.

The development in the Education Precinct will be complementary and will not detract from the surrounding areas residential amenity and will encourage the co-location of community uses.

4.1.4.2 Development Standards

The following development standards apply to the development of land in the Education Precinct:

- a) The development of the Education Precinct shall be in accordance with the meaning of an Education Establishment as defined under the Shire of Ashburton Local Planning Scheme.
- b) The external frontages of the Education Precinct shall be developed to a standard consistent with adjacent residential areas with regards to bulk and scale, streetscape, setbacks and landscaping.
- c) The architectural style of any proposed buildings within this precinct are to be reflective of the Onslow Vernacular.

4.1.5 RESERVE (PARKS, RECREATION, SPACE AND DRAINAGE)

4.1.5.1 Statement of Intent

The intent of the Reserves (Parks, Recreation, Space and Drainage) areas are to provide high quality, public open spaces that offer residents and visitors passive and active recreation opportunities whilst facilitating stormwater disposal particularly in cyclonic events.

Areas of public open space also have the dual role to protect, maintain and enhance areas of indigenous heritage significance.

4.1.5.2 Development Standards

Development standards to be satisfied for the Reserves (Parks, Recreation, Space and Drainage) areas include:

- a) The size and location of public open space shall be in accordance with the Structure Plan.
- b) The design of public open space areas shall assist in the protection and enhancement of indigenous and european heritage sites (where applicable).
- c) The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
- d) The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- e) The design of these areas shall maximise the provision of shading to enhance amenity and promote social capital and walkability.

4.1.6 AREA 'SUBJECT TO FURTHER INVESTIGATION'

4.1.6.1 Statement of Intent

The intent of the area noted 'Subject to Further Investigation' is to allow for further investigations and detailed design of these areas prior to any development occurring to determine what portions of the site are suitable for further development and what portions of the site should be protected due to significant heritage values.

If detailed investigations can establish areas of the Precinct that are suitable for further development the provisions of the Residential Precinct shall apply to these areas. If detailed investigations can establish areas of the Precinct that are not suitable for further development and should be protected in perpetuity the provisions of the Public Open Space Drainage Precinct shall apply to these areas.

Any interpretation and investigation works shall be in accordance with the heritage investigation in town. Input from local indigenous groups is encouraged in the future design of these areas.

The results of detailed investigations shall be subject to the approval of the Shire of Ashburton and the WAPC.

Furthermore, the area subject to further investigation within the WaterCorp WWTP buffer will not be developed for residential purposes, given the impacts associated with the areas proximity to the WaterCorp WWTP.

4.1.6.2 Development Standards

The following development standards apply to the development of land in the Area Subject to Detailed Design Precinct after detailed investigations have established development areas and non-development areas in the Precinct to the satisfaction of the Shire of Ashburton and the WAPC:

- a) The provisions of the Residential Design Codes of Western Australia (R-Codes) and Clause 4.1.1 of this report shall apply to areas suitable for residential development in this Precinct subject to approval of the Shire of Ashburton and WAPC.
- b) For areas not suitable for development in this Precinct the provisions of the Public Open Space and Drainage Precinct shall apply including:
 - i) The design of public open space areas shall ensure the protection and enhancement of indigenous heritage sites.
 - ii) The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
 - iii) The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- c) The area within the WWTP buffer shall be subject to an LDP being prepared to the satisfaction of the Shire prior to any development.

4.2 LAND USE PERMISSIBILITY

Land use permissibility shall generally be in accordance with the following Land Use Permissibility Table.

Precinct Land Uses	Residential	Large Live-Work Lots	Education	Area Subject to Further Investigation	Reserve (Parks Recreation and Drainage)	Watson Drive Precinct
RESIDENTIAL						
Aged or Dependent Persons Dwelling	D	D	X	D	X	D
Caretaker's Dwelling	D	A	I	D	X	D
Grouped Dwelling	D	X	I	D	X	D
Holiday Accommodation	X	X	X	D	X	X
Hotel	X	X	X	D	X	X
Motel	X	X	X	D	X	X
Moveable Dwelling	D	D	D	D	X	I
Multiple Dwelling	A	X	I	D	X	A
Residential Building	A	A	I	D	X	D
Rural Settlement	X	X	X	D	X	X
Single House	D	P	I	D	X	D
Transient Workforce Accommodation	X	X	X	D	X	D
INDUSTRY						
Abattoir	X	X	X	X	X	X
Agriculture	X	X	X	X	A	X
Arts and Crafts Centre	A	A	I	D	X	D
Harbour and Marina Facilities	X	X	X	A	X	X
Hire Services (Industrial)	X	X	X	X	X	X
Home Business	A	D	X	A	X	D
Home Occupation	D	D	X	A	X	D
Industry - Extractive	X	X	X	X	X	D
Industry - General	X	X	X	X	X	X
Industry - Light	X	X	X	X	X	x
Industry - Noxious	X	X	X	X	X	X
Industry - Resource Processing	X	X	X	X	X	X
Industry - Rural	X	X	X	X	X	X
Industry Service	X	X	X	X	X	X
Infrastructure	D	D	D	D	D	D
Intensive Agriculture	X	X	I	X	A	X
Research Laboratory	X	A	I	A	X	X
Stockyard	X	A	X	X	X	X
Storage Facility/depot/laydown area	X	D	X	A	X	X

Precinct Land Uses	Residential	Large Live-Work Lots	Education	Area Subject to Further Investigation	Reserve (Parks Recreation and Drainage)	Watson Drive Precinct
COMMERCE						
Aerodrome	X	X	X	X	X	X
Display Home Centre	D	D	X	D	X	D
Exhibition, Display and Outdoor Sales Facilities	X	A	I	A	A	D
Market	X	A	I	A	A	X
Motor Vehicle and/or Marine Repair	X	X	X	X	X	X
Motor Vehicle and/or Marine Sales & Hire	X	X	X	X	X	X
Motor Vehicle and/or Marine Service Station	X	X	X	X	X	A
Motor Vehicle and/or Marine Wrecking	X	X	X	X	X	X
Motor Vehicle Wash	X	X	X	X	X	X
Office	A	D	I	A	X	D
Outdoor Display	X	A	I	A	A	X
Restaurant	X	X	I	A	X	D
Shop	A	A	I	X	X	A
Showroom	X	A	X	A	X	X
Take-away Food outlet	X	X	I	A	X	D
Warehouse	X	X	X	X	X	X
HEALTH, WELFARE AND COMMUNITY SERVICES						
Carpark	X	A	I	A	X	D
Childcare Services	A	A	I	A	X	A
Community Use	A	A	P	D	A	D
Consulting Rooms	A	A	I	A	X	D
Education Establishment	A	A	P	A	X	D
Emergency Services	X	X	X	D	X	D
Funeral Parlour	X	X	X	X	X	D
Hospital	X	X	X	X	X	X
Detention Centre	X	X	X	X	X	X
Medical Centre	X	X	X	A	X	A
Nursing Home	A	A	X	A	X	D
Place of Animal Care	X	X	I	X	X	D
Place of Public Meeting, Assembly or Worship	A	A	I	A	X	D
Public Utility	D	D	D	D	D	D
ENTERTAINMENT, RECREATION AND CULTURE						
Clubrooms	X	X	I	A	X	X
Equestrian Centre	X	X	X	X	X	X
Entertainment Venue	X	X	I	A	X	X
Private Recreation	X	X	I	A	X	D
Public Recreation	D	X	I	A	A	D
Reception Centre	X	A	X	X	X	X

4.4 RESIDENTIAL DENSITY CODING

The Structure Plan indicates the Residential Density Coding that applies to land within the 'Residential' and 'Large Live-Work lots' precincts, pursuant to Clause 6.5 of the Scheme and includes the following:

- R5;
- R30; and
- R40.

Residential development shall be in accordance with the Residential Design Codes of Western Australia (R-Codes) as given effect by Clause 6.5 of the Scheme, unless otherwise stated in this Part.

The built form provisions of the R-Codes may be varied by a local policy applied through the preparation of Local Planning Policy or LDPs, adopted at subdivision stage.

4.5 LOCAL DEVELOPMENT PLANS

The Structure Plan identifies several land parcels for which a Local Development Plan (LDP) is required to be prepared.

LDPs may be required (by the developer, an owner of the land or the Shire) to be adopted by Council prior to any subdivision and/or substantial development and used as the basis for the determination of all development applications to the Shire of Ashburton.

LDPs will enhance, elaborate and expand the details and provisions contained in this Part as well as supplement the provisions of the Scheme and the R-Codes. LDP's are required to address the following:

- a) building envelopes;
- b) setbacks;
- c) interfaces with public open space and drainage areas;

- d) distribution of land uses within a lot (Large Residential Lifestyle lots);
- e) vehicular access and parking;
- f) loading and unloading areas, storage yards and rubbish collection closures;
- g) the location, orientation and design of buildings and the space between buildings; and
- h) such other information considered relevant by the Shire of Ashburton.

Variations to the provisions of the R-Codes other than density shall be allowed.

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APPENDIX 1

ONSLOW EXPANSION STRUCTURE PLAN

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STRUCTURE PLAN REQUIREMENTS

Residential Precinct

- a) The provisions of the Residential Design Codes of Western Australia (R-Codes) shall apply to residential development in this Precinct unless otherwise specified under a Local Planning Policy or Residential Design Guidelines.
- b) Development is to be in accordance with the density coding identified on the Structure Plan.
- c) Sites identified as grouped housing sites as part of any subsequent subdivision applications may be developed to a maximum density of R40 and the Shire may require the preparation of a Local Development Plan (LDP) to be prepared prior to the development of that site.
- d) No development or subdivision shall occur within the Waste Water Treatment Plant buffer until the buffer is removed or reduced.
- e) All use, subdivision and development shall be in accordance with relevant Structure Plan.
- f) In accordance with the EPA Guidance Statement No.3, for any subdivisions within the 500m of the Onslow Salt operations, notifications are to be placed on the certificate of title of each new subdivided lot to notify prospective purchasers of the potential noise impacts.
- g) In accordance with the EPA Guidance Statement No.3, for any new dwellings within 1km of the Onslow Salt operations, the facades of the buildings fronting or perpendicular to the Onslow Salt operations are to incorporate architectural treatments to minimise noise impacts.

Watson Drive Precinct

- a) For the Watson Drive Precinct development standards are defined in Part A, section 4.1.2.1 of the Structure Plan report.

Large Live Work Lot Precinct

- a) The development of the residential portion of the lot that faces a residential area in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Residential Design Codes of Western Australia (R-Codes) unless otherwise specified in this section.
- b) The development of the non-residential portion of the lot that faces non-residential areas in the Large Live-Work Lot Precinct shall be in accordance with the provisions of the Home Business Standards under the Shire of Ashburton Scheme in regards to employment, amenity, vehicles and car parking and servicing needs.
- c) Non-residential development in the Large Live-Work Lot Precinct shall be adequately landscaped and screened to maintain a lifestyle land use appearance as opposed to a commercial or industrial land use appearance.
- d) A Local Development Plan (LDP) shall be prepared identifying basic design requirements within this precinct, including building envelopes, types of land uses etc.

Public Open Space and Drainage

- a) The size and location of public open space shall be in accordance with the Structure Plan.
- b) The design of public open space areas shall assist in the protection and enhancement of indigenous and european heritage sites (where applicable).
- c) The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
- d) The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- e) The design of these areas shall maximise the provision of shading to enhance amenity and promote social capital and walkability.

Education

- a) The development of the Education Precinct shall be in accordance with the meaning of an Education Establishment as defined under the Shire of Ashburton Local Planning Scheme.
- b) The external frontages of the Education Precinct shall be developed to a standard consistent with adjacent residential areas with regards to bulk and scale, streetscape, setbacks and landscaping.
- c) The architectural style of any proposed buildings within this precinct are to be reflective of the Onslow Vernacular.

Area Subject to Further Investigation

- a) The provisions of the Residential Design Codes of WA (R-Codes) and Clause 4.1.1 of this report shall apply to areas suitable for residential development in this Precinct subject to approval of the Shire of Ashburton and WAPC
- b) For areas not suitable for development in this Precinct the provisions of the Public Open Space and Drainage Precinct shall apply including:
 - i. The design of public open space areas shall ensure the protection and enhancement of indigenous heritage sites.
 - ii. The design of public open space areas shall ensure appropriate provision for stormwater drainage management.
 - iii. The landscaping of public open space areas shall be suitable for an arid climate having regard to minimising maintenance and water use whilst providing areas of highly aesthetic and functional amenity.
- c) The area within the WWTP Buffer shall be subject to a Local Development Plan (LDP) being prepared to the satisfaction of the Shire, prior to any development

Land Use Permissibility

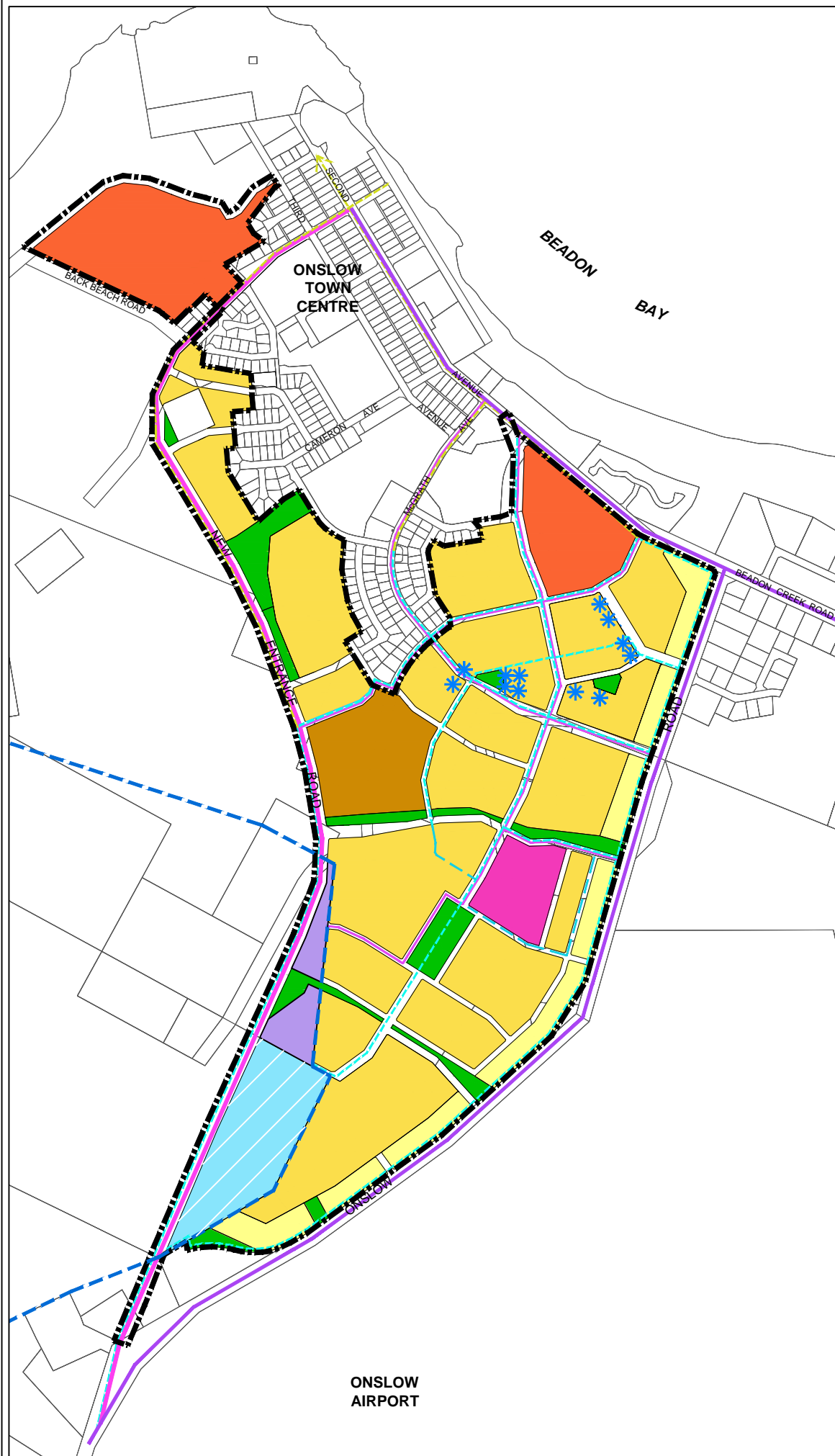
Land use permissibility shall generally be in accordance with the Land Use Permissibility Table, as shown in Part A of the Onslow Townsite Expansion Structure Plan report.

Local Development Plans

A LDP may be required (by the developer, an owner of the land or the Shire) by Council prior to any subdivision and/or substantial development and used as the basis for the determination of all development applications to the Shire of Ashburton.

The LDP will enhance, elaborate and expand the details and provisions contained in this Part as well as supplement the provisions of the Scheme and the R-Codes. LDPs are required to address the following

- a) building envelopes;
- b) setbacks;
- c) interfaces with public open space and drainage areas;
- d) distribution of land uses within a lot (Large Residential Lifestyle lots);
- e) vehicular access and parking;
- f) loading and unloading areas, storage yards and rubbish collection closures;
- g) the location, orientation and design of buildings and the space between buildings; and
- h) such other information considered relevant by the Shire of Ashburton. Variations to the provisions of the R-Codes other than density shall be allowed.



CERTIFICATION OF STRUCTURE PLAN

This Structure Plan is prepared under the provisions of the Shire of Ashburton Town Planning Scheme No. 7

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

Date.....

Signed for and on behalf of the Western Australian Planning Commission:

an Officer of the Commission duly authorised by the Commission pursuant to Section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

Witness.....

Date.....

Date of Expiry.....

LEGEND		OVERALL YIELDS	
	STRUCTURE PLAN AREA	199.1363ha	100%
	RESERVE (PARKS, RECREATION & DRAINAGE)	10.1354ha	5.0%
	EDUCATION	4.7324ha	2.4%
	SPECIAL USE (WATSON DRIVE PRECINCT)	9.0000ha	4.5%
	SPECIAL USE (LARGE LIVE WORK LOTS)	14.0680ha	7.1%
	RESIDENTIAL R30	91.9028ha	46.1%
	AREA SUBJECT TO FURTHER INVESTIGATION	21.8990ha	11.0%
	AREA SUBJECT TO FURTHER INVESTIGATION - NON RESIDENTIAL	3.4960ha	1.8%
	RESERVE (INFRASTRUCTURE) - WATER CORP UTILITIES SITE COMPATIBLE LAND USES ONLY	10.7086ha	5.4%
	ROADS	33.1941ha	16.7%
	BUFFER FROM TOWN WWTP	N/A	N/A
	EXISTING CADASTRE	N/A	N/A
TOTAL		199.1363ha	100%
ROAD HIERARCHY			
	ARTERIAL/ PRIMARY		
	NEIGHBOURHOOD CONNECTOR		
	ACCESS STREET (HIGHER ORDER)		
	GROUP HOUSING SITES		
PEDESTRIAN AND CYCLE PATHS			
	SHARED PATH NETWORK AND FOOTPATH		
	FOOTPATH BOTH SIDES		
	SHARED PATH NETWORK BY OTHERS		

ONSLOW TOWNSITE EXPANSION STRUCTURE PLAN

This concept has been prepared for the purpose of meeting client specifications. The drawing does not constitute an invitation, agreement or contract (or any part thereof) of any kind whatsoever.

Although care has been taken in the compilation of this drawing by The Planning Group WA Pty Ltd, all parties associated with the proposed property development disclaim all responsibility for any errors or omissions. The right is reserved to change the plan at any time.

Liability is expressly disclaimed by The Planning Group WA Pty Ltd for any loss or damage which may be sustained by any person acting on any visual impression gained from this drawing.

“The growing resources industry, specifically the planned development of the ANSIA and associated major hydrocarbons processing facilities, has resulted in the potential for significant population growth in Onslow.”



PART B

1. EXPLANATORY SECTION

1.1 INTRODUCTION

This report has been prepared on behalf of LandCorp, in support of a Structure Plan to facilitate the urban expansion of the town of Onslow.

The report has been prepared in consideration of the Scheme and the State and local planning framework applicable to the site, presents details of the site, the proposed design layout and addresses design, planning, and environmental issues relevant to the site.

This report has been prepared with input from the following team:

- LandCorp – Project Manager;
- TPG Town Planning Urban Design and Heritage (TPG) – Urban Design and Statutory Planning;
- Whelans – Surveying;
- ENV Australia (ENV) – Environmental;
- AECOM – Environmental and Engineering;
- ERM – Contamination;
- Emerge Associates – Landscape Design;
- Josh Byrne & Associates (JBA) – Sustainability;
- Lloyd George – Acoustics;
- Riley Consulting – Traffic and Transport;
- Wood and Grieve Engineers – Engineering;
- Hyd2o – Hydrology; and
- MP Rogers – Coastal Vulnerability.

This Structure Plan was designed having due regard to the objectives of a number of planning documents, including the State Planning Strategy, Onslow Townsite Strategy, Pilbara Planning and Infrastructure Framework and the Onslow Regional Hot Spots and Land Supply Update, and therefore is consistent with the orderly and proper planning and essential for the future growth and prosperity of Onslow and the north-west.

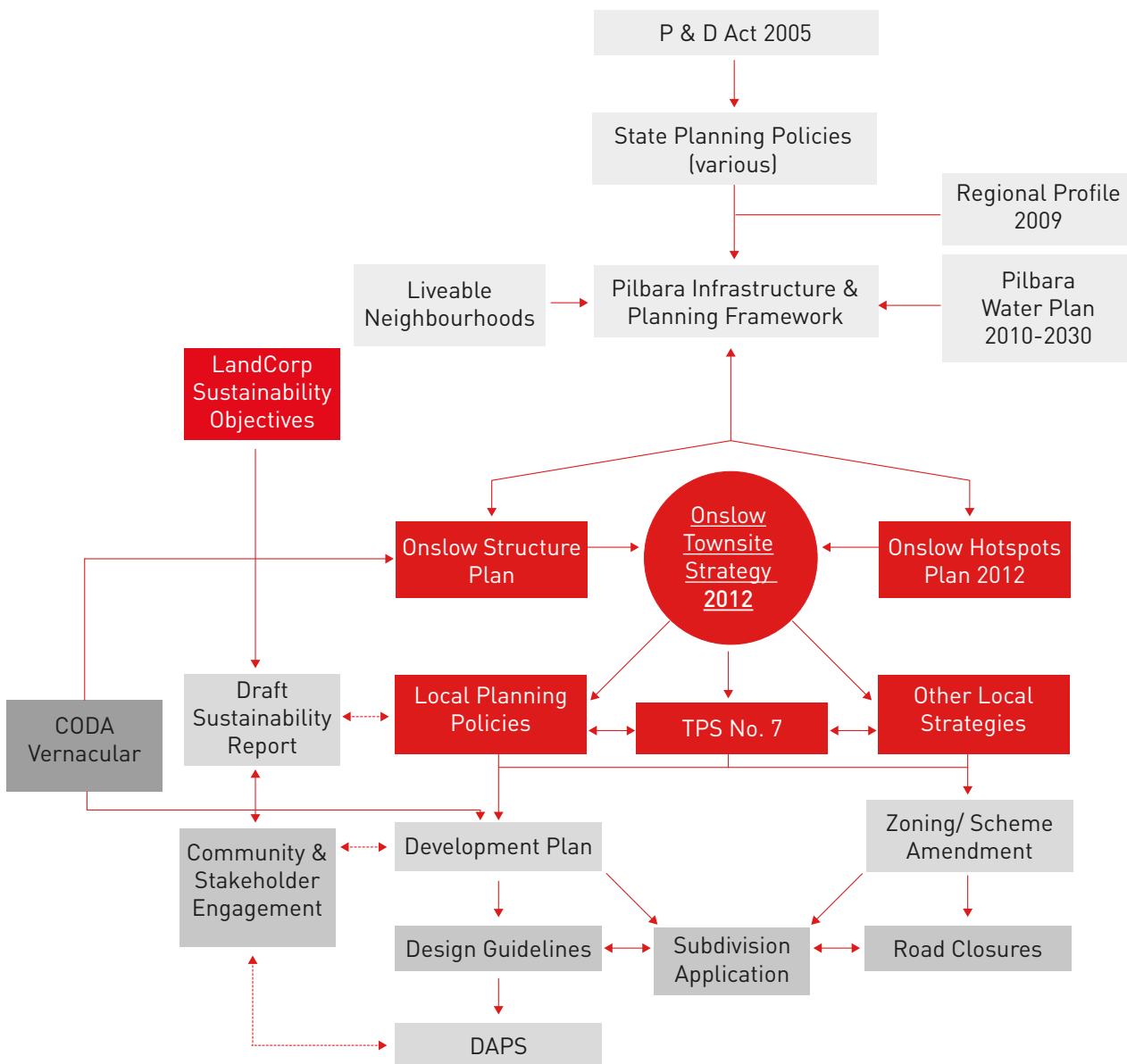
Figure 1 illustrates how each of the relevant documents are inextricably linked and have assisted in the preparation of the Structure Plan.

1.2 PREAMBLE

The growing resources industry, specifically the planned development of the ANSIA and associated major hydrocarbons processing facilities, has resulted in the potential for significant population growth in Onslow. Whilst currently home to a population of approximately 700 people, recent estimates indicate an increase of up to 1,500 residents by 2016 and a further 1,800 into the future.

This presents a considerable challenge, on one hand to meet its future potential, whilst building upon and protecting the unique relaxed and inclusive community and holiday atmosphere of the Onslow Township.

FIGURE 1 - PLANNING FRAMEWORK



Previous townsite planning has been undertaken and comprised the draft Onslow Structure Plan (2003). This Plan was reviewed in 2008, and abandoned in favour of a higher level Onslow Townsite Strategy (OTS), which was adopted by the WAPC in March 2011.

Due diligence was undertaken by LandCorp towards the end of 2010 in order to progress expansion options identified in the OTS, including infill and greenfield development possibilities.

The release of land in the short term and the deconstraining of land to address the medium to long term is paramount. This will help meet demand generated not only by the oil and gas industry, but also to accommodate local industries and the values of existing residents. Onslow represents a microcosm of many of the challenges experienced for growth and development in our resource-rich Pilbara region. However, addressed in the early stages of the growth cycle, there is the opportunity for Onslow to demonstrate where long term land and infrastructure planning can work to mitigate the adverse impacts of short term issues. Alleviation of current land shortages and identifying critical infrastructure essential to the release of land is crucial to the successful growth and revitalisation of Onslow.

A scheme amendment to remove the density coding on existing land zoned Urban Development in the Greenfields site and to rezone the majority of land within the site to Urban Development was lodged with the Shire for initiation in December 2011.

The preparation of this Structure Plan is the third stage of development by LandCorp and is consistent with the long term strategic goal to ultimately provide accommodation for an additional 3,500 people (Onslow Townsite Strategy), whilst

remaining cognisant of strategic opportunities and development principles to optimise future benefit for the Onslow townsite.

1.3 PURPOSE AND CONTENT

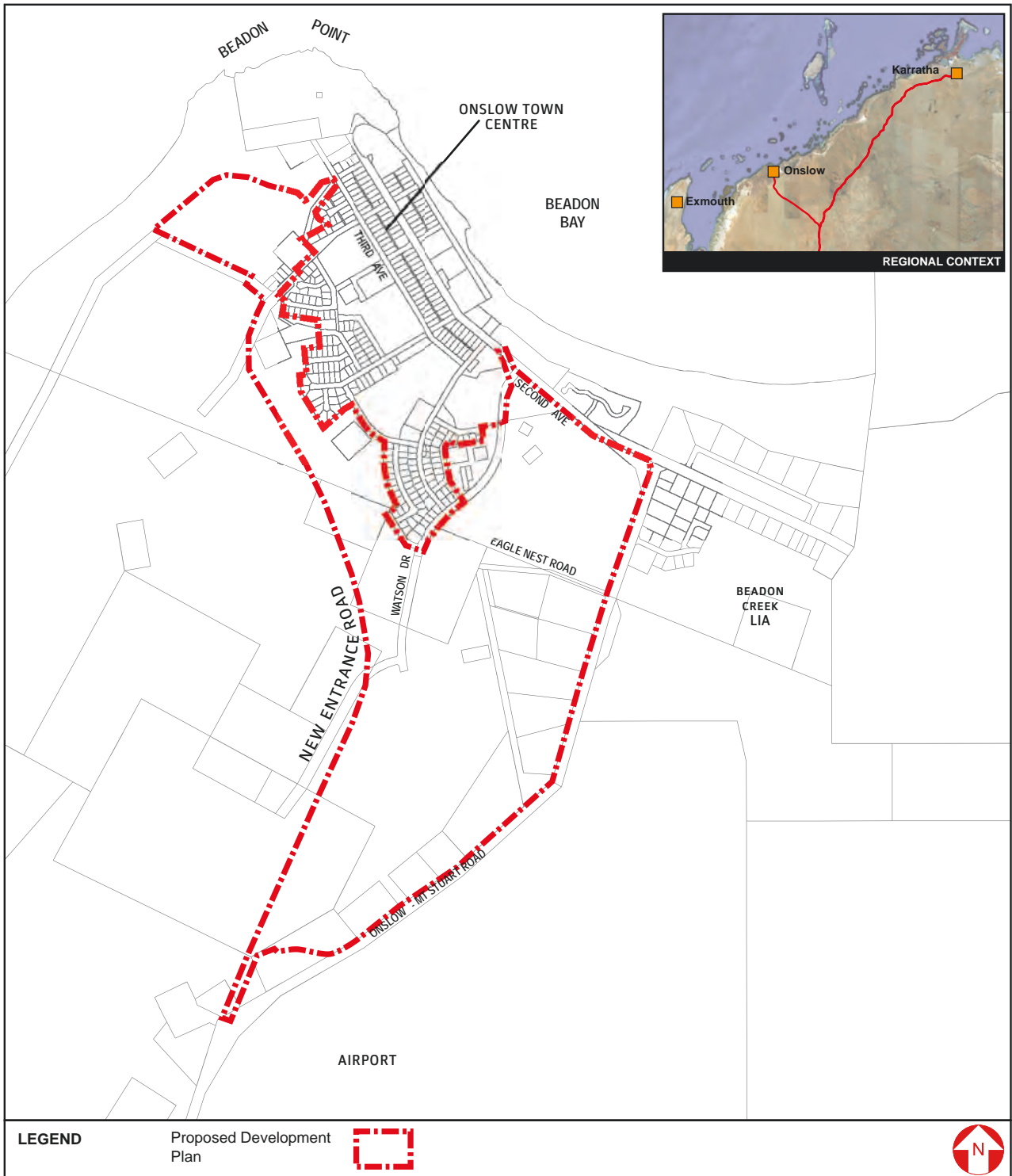
This Structure Plan has been prepared on behalf of LandCorp and is associated with the development of Unallocated Crown Land (UCL) in the town of Onslow. The Structure Plan encompasses the 'Greenfields' portion of the development of the town and is a major redevelopment of predominantly vacant land on the fringes of the existing townsite. This development is intended to provide much needed freehold land to Onslow.

REFER TO FIGURE 2 - LOCATION PLAN

The preparation of this Structure Plan has involved the input of many stakeholders and the community. The project team has been part of ongoing consultation throughout the process between LandCorp, the Shire of Ashburton, the Department of Planning and other State Government agencies in the Pilbara. In July 2011 a five-day community design workshop was also undertaken in Onslow with key stakeholders and the community.

Under the Shire of Ashburton Town Planning Scheme No. 7 (the Scheme) the local government may require the preparation of a Development Plan prior to considering subdivision or development proposals in the Urban Development zone. This report provides an assessment of the proposed development against the development plan provisions located in Appendix 7 of the Scheme and the Department of Planning structure plan and subdivision guidelines.

FIGURE 2 - LOCATION PLAN



1.4 LAND OWNERSHIP AND ENCUMBRANCES

The majority of the lots in the subject site are either Unallocated Crown Land (UCL) or Reserves. The UCL sites have a survey but there is no title so the land is unencumbered. The Reserves have titles that detail management orders and interests but otherwise are also generally unencumbered.

The site is spread over a number of existing lots and includes portions of larger parcels. Table 1 summarises the title details of the site. Table 1 also includes existing zoning details of each lot and proposed zoning as per Scheme Amendments 21 and 22, which are currently underway to rezone the entire site to 'Urban Development'. Current interest and lease details are also included in Table 1.

REFER TABLE 1 –LAND OWNERSHIP DETAILS

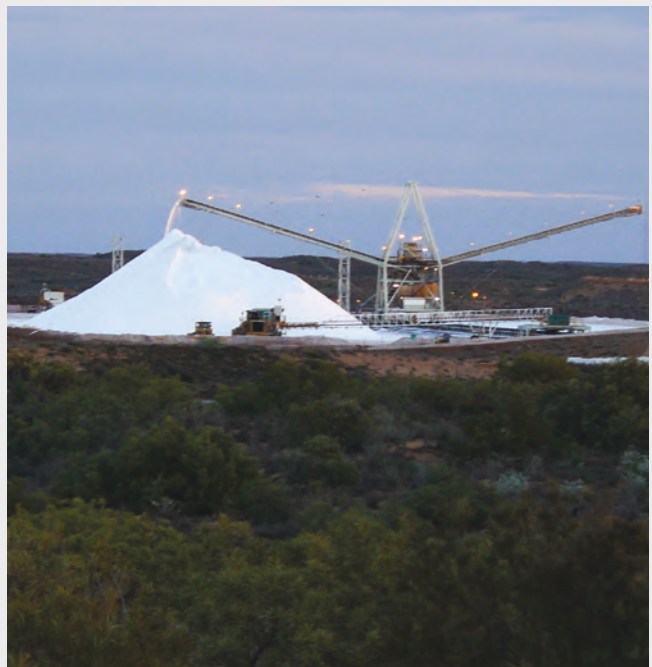


TABLE 1 - LAND OWNERSHIP DETAILS

Lot No.	DP No.	Volume/Folio	Primary Interest Holder/Interest Holder
Pt Lot 41	ASHBU LOC	-	-
Lot 69	214441	LR3054/880	State of WA / RS & VL Harris
Lot 70	214441	LR3054/881	State of WA
Lot 71	214441	LR3054/884	State of WA
Lot 72	214441	LR3054/771	State of WA
Lot 73	214441	LR3119/177	State of WA
Lot 74	214441	LR3054/890	State of WA / Stanley Holdings Pty Ltd
Lot 75	214441	LR3055/78	State of WA
Lot 76	214441	LR3054/892	State of WA / B Hayes
Lot 77	214441	LR3055/79	State of WA
Lot 78	214441	LR3054/895	State of WA / GA & JC Whitmore
Lot 80	214441	LR3119/993	State of WA / N McQuade & LJ Rasmussen
Lot 85	215492	LR3138/673	Shire of Ashburton
Pt Lot 86?	215492	LR3138/674	State of WA / Shire of West Pilbara
Lot 105	215492	LR3138/672	Shire of Ashburton
Lot 129	186891	LR3054/947	State of WA / BindiBindi Community Aboriginal Corporation (Waste Water Treatment Plant)
Pt Lot 185			Water Corporation
Lot 214	194560	LR3116/616	State of WA
Lot 215	P194560	LR3116/617	State of WA

Lot No.	DP No.	Volume/Folio	Primary Interest Holder/Interest Holder
Lot 216	194560	LR3116/618	State of WA
Pt Lot 300	67927	-	State of WA
Pt Lot 301	67928	LR3017/139	State of WA
Pt Lot 302	45791	LR3135/814	State of WA / Shire of Ashburton
Pt Lot 303	49430	LR3152/106	State of WA / Shire of Ashburton
Lot 383	205462	LR3150/955	State of WA / Minister for Works
Lot 385	205642	1723/928	R C McDonald
Lot 448	169922	LR3003/61	State of WA
Pt Lot 571	65685	LR3160/88	State of WA
Lot 590	182847	LR3042/272	State of WA / PD Stewart
Lot 591	183434	LR3001/659	State of WA
Lot 647	215185	LR3147/483	Minister for Water Resources
Lot 974	194493	LR3033/614	State of WA
Lot 975	194493	LR3033/614	State of WA
Road Reserve	-	-	Watson Drive Road Reserve
Road Reserve	-	-	Eagle Nest Road Reserve
Road Reserve	-	-	Macedon Road Reserve

“Onslow is considered a strategic location given its proximity to gas reserves, and a number of oil and gas projects are currently operating in the area.”



2. SITE CONTEXT

2.1 REGIONAL CONTEXT

From a regional perspective the site is located in the Town of Onslow, which is located in the Shire of Ashburton and is approximately 1,386 kilometres north of Perth; 400 kilometres from Exmouth by road (105 kilometres direct line); and 311 kilometres from Karratha by road (210 kilometres direct line).

Onslow townsite has a total area of 514 hectares with 73% of this area occupied by urban land uses (Pilbara Framework: Regional Profile Aug 2009; DPI Mapping and Spatial Data 2008). The land uses in the urban area comprise residential, commercial, community and industrial facilities.

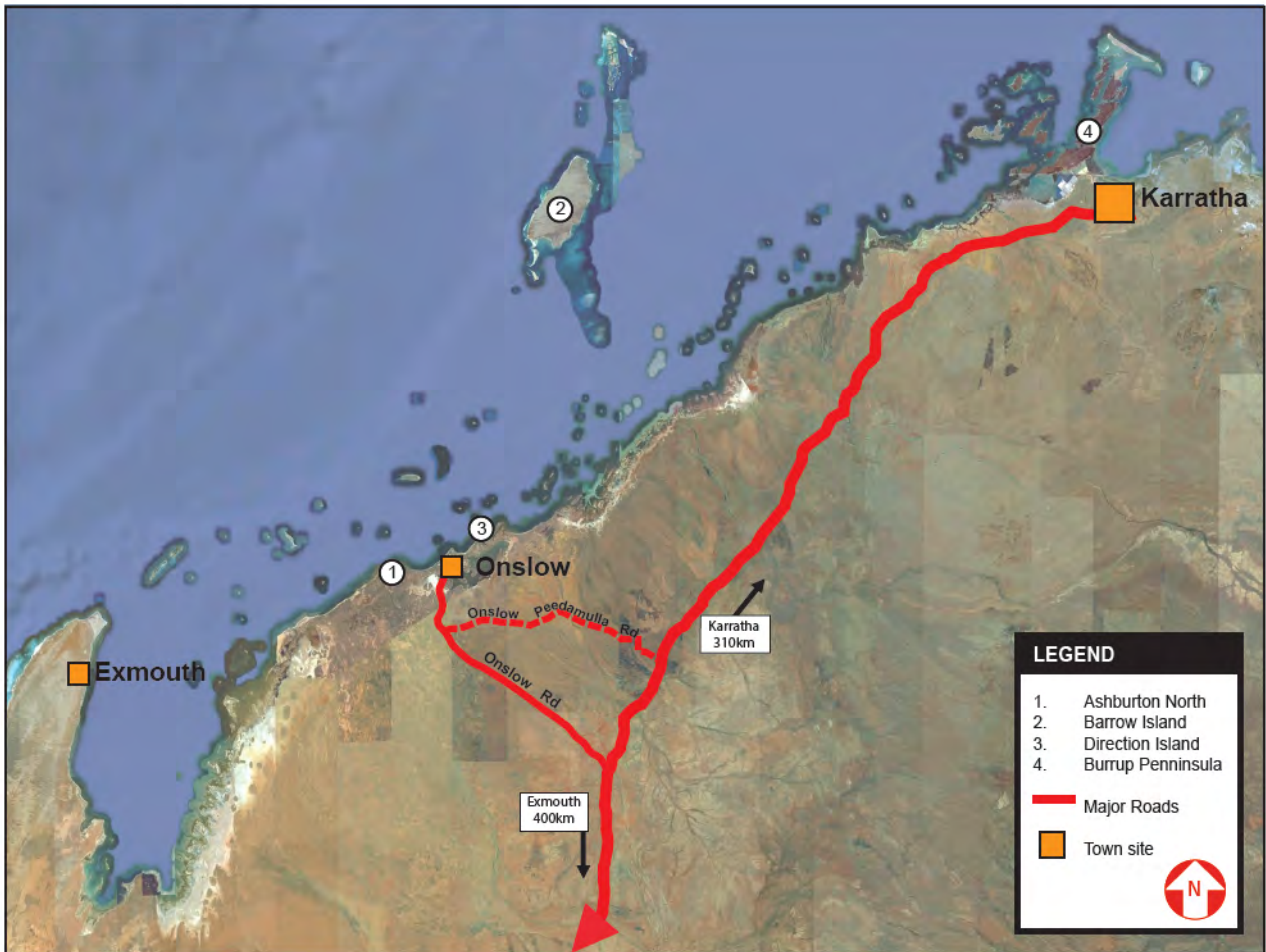
The need for the expansion of the town is not only linked to natural population growth but primarily due to the development of the Ashburton North Industrial Area (ANSIA). The ANSIA is located approximately 11 kilometres south west of Onslow and 2 kilometres east of the Ashburton River on the Pilbara Coast. The ANSIA covers an area of up to 8,000 hectares, making it large enough to accommodate major LNG developments and other prospective industries. The site allows for suitable access to the coast for LNG developments and is large enough to accommodate a mix of future industrial activities. The site will include a port precinct and multi-user facilities on the coastal strip, and a multi-user infrastructure corridor.

Onslow Salt, located directly west of the town, is also considering expansion plans which, together with the flow-on housing demand from service and construction workers, will further add to the immediate need for residential land within Onslow.

Chevron is progressing with the development of its Wheatstone project within the ANSIA, with a State Development Agreement (SDA) being signed in December 2011 and construction commencing towards the end of 2012. BHP Billiton Petroleum's Macedon Project is under construction and BHP/ExxonMobil Joint Venture are also considering the development of their Scarborough discovery within the ANSIA.

REFER TO FIGURE 3 – REGIONAL CONTEXT PLAN

FIGURE 3 - REGIONAL CONTEXT MAP



2.2 LOCAL CONTEXT

The site wraps around the current residential development in the town. The most significant portion of the site is the southern extension of the existing residential development that sits between the existing residential area and the Onslow airport and proposed light industrial area. The eastern and western sides of this portion of land are framed by the existing road into town and the proposed new entrance road. The southern portion of the site is undulating and contains two high points and a ridgeline running approximately through the centre north to south. Vegetation is scattered and low-lying and in very good condition but of no statutory importance.

The site provides three additional contained growth areas of residential development towards the west, which are also framed by the proposed new entrance road. These areas are reasonably flat land with steeper topography in some areas. Vegetation is a mixture of low-lying and some larger vegetation in good condition but also of no statutory importance.

A small portion of the site proposes a northern extension of the town behind Beadon Point. The topography of this portion of land is more steep and dunal. Vegetation in this area is generally low lying and in very good to good condition however is of no statutory importance.

Onslow Salt operations and the salt pile are located approximately 500 metres to the west of the site and the waste water treatment plant (WWTP) is located less than 500 metres from the southern tip of the site. The Onslow Hospital adjoins a portion of the site and the town's Main Street (Second Avenue) is approximately 250 metres to 1 kilometre from the site.

Refer to **FIGURE 4 – LOCAL CONTEXT PLAN**

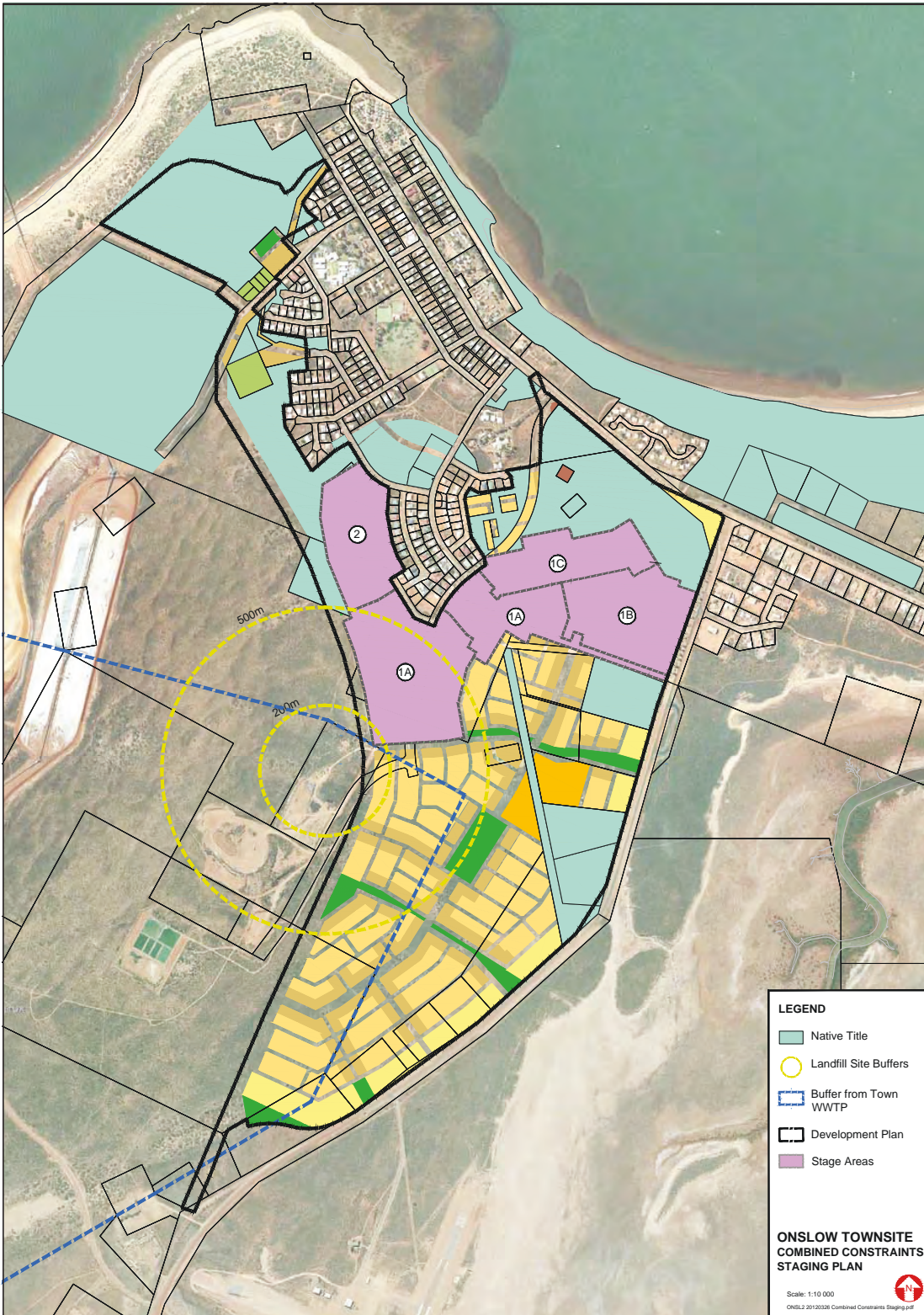
A number of constraints affect the site including waste water treatment plant buffers, the power station buffer, Onslow Salt operations and there 100-year flood line. A number of potentially contaminated sites are also located on the site (refer to figure 6). An approach to each of these constraints is provided in this report.

Refer to **FIGURE 5 – SITE ENCUMBRANCES MAP**

FIGURE 4 - LOCAL CONTEXT MAP



FIGURE 5 - SITE ENCUMBRANCES MAP



2.2.1 SOCIAL/COMMUNITY

2.2.1.1 Population

The resident population of Onslow, as defined by the 2006 Census, is approximately 576 persons. However, there is evidence to suggest that the population at the time was actually higher and closer to 700. The population potentially increases yet again when fly-in-fly-out workers, visitors and tourists are considered.

Many residents, both permanent and semi-permanent, use the coastal and marine environment for recreational and commercial activities. The town has traditionally been a small fishing community and has not been affected by the mining and resource industry boom to the same extent as many towns in the Pilbara.

The demographic profile of existing Onslow residents is detailed within the Onslow Townsite Strategy (2011), section 3 and the Onslow Regional HotSpots Land Supply Update (2011). In summary the following is evident within Onslow.

- In comparison to other Pilbara towns, Onslow has a larger proportion of its resident population aged 65 and over.
- The majority of Onslow's occupied private dwellings recorded in the 2006 Census were family households (65.5%).

- Baseline resident population growth in Onslow is weak; therefore, any significant population growth will depend on business investment in oil and gas and/or salt projects.
- Population numbers and levels of residential permanency will significantly fluctuate according to development stages of the ANSIA and FIFO work practices adopted by major employers.
- Employment/population forecasts prepared by State Government agencies indicate some population growth between 2011 and 2016 before a significant steep change in population in 2017 (total population of 2,201) and 2022 (total population of 3,756) as a result of LNG projects entering the operational phase. Construction workforces based at the ANSIA could reach around 6,500 persons (may be higher or lower based on project timing) at any one time.
- The Department of State Development (DSD) is currently leading State Government negotiations on the development of industry at the ANSIA and infrastructure requirements for the town, using a conservative base estimate of 1,500 additional residents in Onslow by 2016 for forward planning.
- The demand for dwellings is predicted to be 1,600 with an associated population increase of 3,500 persons in Onslow in the longer term (OTS 2011).

A number of assumptions have been used to model the above statistics.

2.2.1.2 Community Facilities

Onslow townsite has a total area of 514 hectares with 73% of this area occupied by urban land uses (Pilbara Framework: Regional Profile Aug 2009; DPI Mapping and Spatial Data 2008). The land uses in the urban area comprise residential, commercial, community and industrial facilities.

The retail floor space in town is 1,140m² (Pilbara Framework: Regional Profile – Onslow Dec 2008) generally located on the Second Avenue, the current main street. There are 22 hectares of Industrial zoned land in town and 88 hectares of industrial land used for Onslow Salts operations. There is also 490 hectares of strategic industrial land zoned in the ANSIA, which is proposed to be rezoned from Rural to ‘Strategic Industrial’ under a series of Scheme Amendments.

In 2008 there were 279 dwellings located in Onslow calculated by the number of domestic water connections.

Community facilities include the primary school, which also accommodates a limited number of secondary students, TAFE facility, the district hospital, a library, Shire offices and council chambers, the police station, FESA and courthouse, a community garden and sports oval, a church, recreation facilities and a proposed new recreation complex that will contain a swimming pool.

REFER TO FIGURE 6 – COMMUNITY FACILITIES MAP

2.2.2 LESSONS LEARNT FROM ONSLOW’S PAST

The history and past development in Onslow give some clues and lessons that are useful to and applicable to the current expansion of the town.

Climate

Onslow is accustomed to extreme weather events, being located in the most cyclone prone part of Australia’s coastline and on average being impacted by a cyclonic event every 2 years. The original site of the town of Onslow was approximately 16 kilometres to the south west of the current townsite and was relocated to its present location in 1925 due to cyclones and continual flooding of the Ashburton River. Onslow is therefore highly influenced by environmental conditions and climate responsive design is crucial to all future development in the town including the impacts of flooding, storm surge, cyclones and the high temperatures that are experienced in the region.

Infrastructure

Servicing in the town of Onslow is one of the key factors to unlocking land for development, most notably the provision of water. Recently all development in the town was put on hold pending the provision of additional water to the town. This matter has since been addressed by the WaterCorp however work is still underway to determine short-medium term supply. Water efficiency is a crucial element of the proposed expansion of the town with exploration of stormwater harvesting and grey water reuse initiatives being investigated.

Other infrastructure, such as the existing waste water treatment site, remain in close proximity to the townsite and its future impact on the growth of Onslow will be critical to the town’s ability to meet population demands.

FIGURE 6 – COMMUNITY FACILITIES MAP



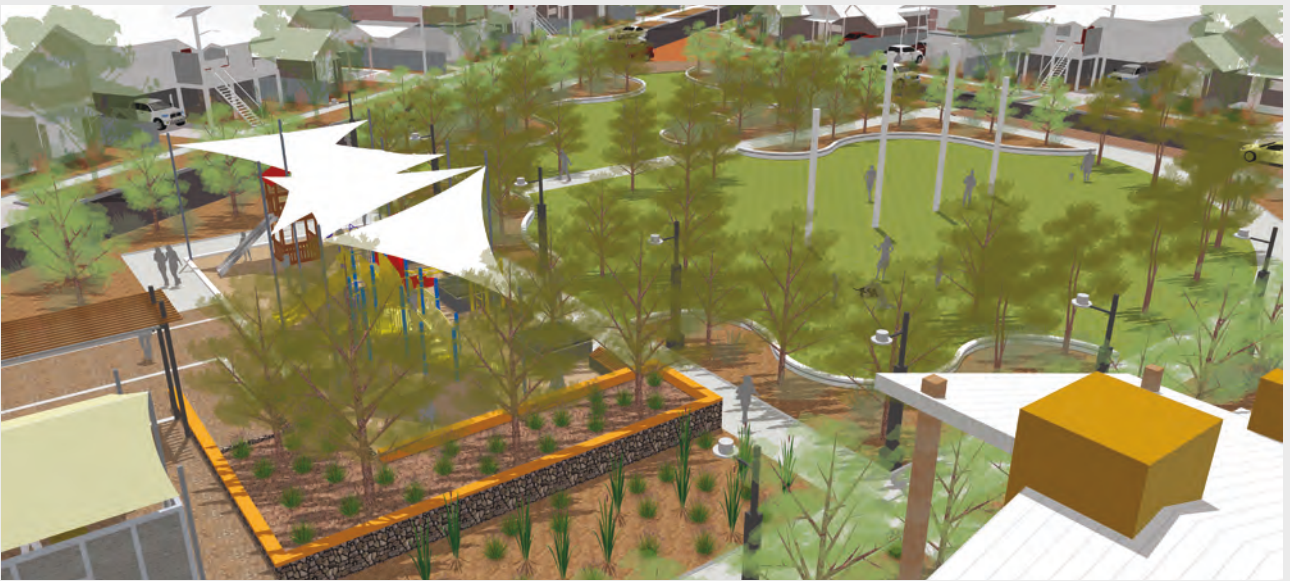
Built Form

The development of some areas within Onslow has produced valuable lessons that are applicable to future development in Onslow. Historical expansions of town are sometimes seen as isolated from the existing townsite and having a homogenous housing product. The lessons learnt include consideration of how integration into the community 'of new workers'. Housing designs also need to be responsive to site conditions while allowing flexibility, so design differences produce an interesting product that the community is proud of.

The Structure Plan aims to encourage new housing to be consistent with the established urban character of Onslow, which was a clear outcome of community workshops and feedback held throughout 2011-2012. Furthermore, the draft Onslow Vernacular Handbook outlines various design strategies to further encourage that new housing typologies integrate seamlessly into the existing townsite.

It is suggested that the draft Onslow Vernacular Handbook be a precursor to development of any built form guidelines, whether for the existing townsite or the new urban areas.

“The region’s population will grow in the future, fuelled by specific resource development projects, the sustainable development of Karratha and Port Hedland and a more diverse economy.”



CONCEPTUAL ONLY

3. PLANNING FRAMEWORK

3.1 STRATEGIC FRAMEWORK

3.1.1 STATE PLANNING STRATEGY (1997)

The State Planning Strategy (SPS) provides the basis for long-term State and regional land use planning and coordinates a whole-of government approach to planning.

The vision for the Pilbara Region as identified in the State Planning Strategy is as follows:

“In the next three decades, the Pilbara Region will be a world leading resource development area focusing on mineral extraction, petroleum exploration and production and the primary stages of downstream processing. The region’s population will grow in the future, fuelled by specific resource development projects, the sustainable development of Karratha and Port Hedland and a more diverse economy. A growing tourism industry will have developed based on the region’s unique natural environment.”

The SPS identifies a series of strategies to achieve the above vision, which are based on the environment and resources, community, economic and infrastructure principles. These strategies include:

- Protect sensitive environmental and heritage areas;
- Address the need for the provision of social facilities;
- Improve town amenity;

- Give greater emphasis to local recruitment and training of the work-force;
- Promote opportunities for economic development;
- Minimise the detrimental impact of fly in, fly out (FIFO) resource development projects;
- Provide coordination of government agencies to minimise the obstructing/delaying of resource developments and associated infrastructure needs;
- Provide strategic transport linkages within and to the Pilbara Region;
- Improve access to water supplies for domestic and industrial usage; and
- Ensure infrastructure provision is the focus of government agencies.

The Structure Plan has been created in accordance with the Pilbara vision set out in the State Planning Strategy as it is considered to be integral to the overall development of towns throughout the Pilbara and the remainder of the State.

In particular the Structure Plan aims to enhance the cohesiveness and overall functioning of the entire town, not just the development area, and has planned for accommodation and facilities for the resources sector in the town. The Structure Plan also provides a comprehensive redevelopment of the town by linking with key infrastructure and future upgrade plans.

3.1.2 PILBARA FRAMEWORK REGIONAL PROFILE (2009)

The Pilbara Framework Regional Profile (2009) has been published by the WAPC and provides the Pilbara with a settlement-focused development structure to provide guidance for infrastructure investment and context for local government to prepare strategic direction documents and scheme amendments.

Onslow is noted as a regional support centre for the offshore oil and gas industry, as well as supporting tourism, pastoral, fishing and the salt mining industry. It is noted as a secondary settlement in the region, behind centres such as Port Hedland and Karratha.

Key issues identified for Onslow are the 15.2% decrease in population between 1996 and 2006, the lowest population turnover of the region at 52%, the potential constraints of acid sulfate soils and storm-surge inundation for low-lying coastal areas.

Facilities include a district status hospital, primary school and TAFE, Police station and courthouse and a fully lit sporting oval, harbour and boat ramps.

The Profile identifies pressure for land in Onslow (limited), although to a lesser extent than Karratha, Port Hedland and Newman.

Growth for Onslow is predicated on organic growth in relation to current industry, however will largely be driven by plans for the Ashburton North Strategic Industrial Area (ANSIA), located 11 kilometres to the east of Onslow. This growth will in turn drive the provision of hard and soft infrastructure. As a better understanding of resource based projects becomes apparent a clearer picture of population growth relating to Onslow will emerge. This may challenge current estimates.

3.1.3 ONSLOW TOWNSITE STRATEGY (2010)

The proposal to locate LNG facilities at the Ashburton North Strategic Industrial Area (SIA) and the potential change in operational practices at Onslow Salt has prompted the development of the Onslow Townsite Strategy (OTS) to provide the town of Onslow with a long term plan for sustainable future growth.

The OTS aims to ensure that the characteristics that set Onslow apart from other resource driven towns in the Pilbara are maintained and enhanced.

Five development scenarios are generated in the OTS to gauge the potential demand for housing and residential land. A 'high' development scenario is anticipated for Onslow based on the anticipated development of the Ashburton North SIA and Council's position on fly-in fly-out activities. The OTS therefore anticipates an additional 1,600 dwellings will be required for Onslow.

The OTS outlines development principles and the desired future character of the following areas, which are identified in the Onslow Townsite Strategy map:

- New Residential Areas
- Commercial Centre
- Onslow Salt Area
- Townsite Industrial Areas
- Beadon Creek Harbour
- Airport Area
- Beaches
- Transient Workforce Accommodation

Strategy actions are then outlined regarding roads and transport, commerce, heritage protection reserves and buffer areas, residential areas,

FIGURE 7 - ONSLOW REGIONAL HOTSPOTS MAP



industry, community facilities, tourism and utility infrastructure. The Structure Plan follows on directly from the identified strategy actions and implementation methods.

The Onslow Townsite Strategy (OTS) forms the strategic platform upon which the Structure Plan is predicated. The Vision and Objectives for the OTS have been extended into a sustainability framework that has guided the preparation of the Structure Plan.

REFER TO FIGURE 8 - ONSLOW TOWNSITE STRATEGY (EXTRACT)

3.1.4 WATER PLANNING FOR THE PILBARA REGION 2010-2030 (2010)

The Pilbara regional water plan sets the strategic directions for the management and development of the Pilbara's limited water resources in a sustainable manner that is compatible with its natural environment, cultural and spiritual values and quality of life. It provides a strategic overview of the major challenges facing the Pilbara region today and those that are likely to face the region in the future as the region responds to regional growth, climate variability and a longer-term drying climate trend.

To meet these challenges, a vision for the region's water future to 2030 has been developed with an action plan over a five-year time frame.

The provision of water is a key consideration for any development in Onslow. This document assists in resolving this critical issue. Water infrastructure provision in the development area will correspond with the vision outlined in this document.

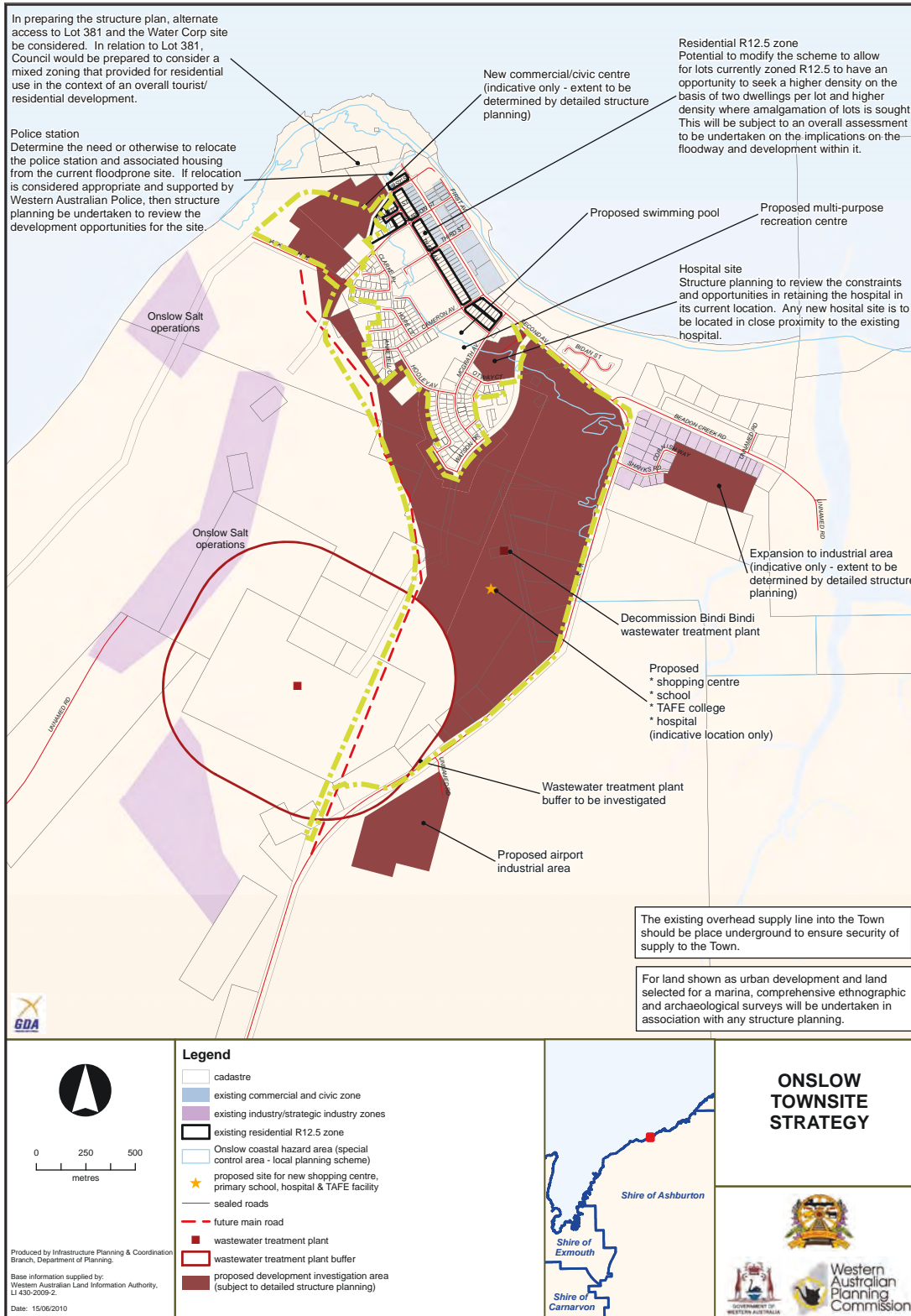
3.1.5 ONSLOW REGIONAL HOTSPOTS LAND SUPPLY UPDATE (2011)

The Onslow Regional Hot Spots Land Supply Update is part of a series of publications prepared by the Department of Planning for the WAPC to assess the future land supply in regional centres in Western Australia. The planning and infrastructure coordination needed to meet future demand of these centres is also outlined.

The Key points regarding Onslow are as follows:

- Recent growth trends in Onslow have been negligible with the exception of a brief period in the late 1990s and early 2000s coinciding with the development of the salt industry. Development at the ANSIA will have major implications for the town. Impacts will vary according to the number of resource projects that establish there, whether downstream industries will also locate, the timing of these, and the work and living practices adopted by the major employers.
- Land development and use within the town is constrained by storm-surge and flood risk; the need for Native Title clearances; a number of noise and odour buffers associated with Onslow Salt, Onslow airport and other infrastructure; limited water supply; and key utility infrastructure reaching maximum capacity.
- The local government (Shire of Ashburton) is actively taking on an investment role in the town with such projects as developing an industrial estate at the Onslow airport.
- There is sufficient zoned land to meet past growth demand trends; however, the recent decision by Chevron to exploit the Wheatstone gas field and locate onshore processing at the ANSIA triggers the need for additional land to be rezoned, approved for subdivision and developed.

FIGURE 8 - ONSLOW TOWNSITE STRATEGY (EXTRACT)



Growth for Onslow is predicated on organic growth in relation to current industry, however will largely be driven by plans for the Ashburton North Strategic Industrial Area (ANSIA), located 11 kilometres to the east of Onslow. This growth will in turn drive the provision of hard and soft infrastructure. As a better understanding of resource based projects becomes apparent a clearer picture of population growth relating to Onslow will emerge.

The Future Development Overview for Onslow includes possible expansion areas that coincide with the Structure Plan area.

REFER TO FIGURE 7 – ONSLOW REGIONAL HOTSPOTS MAP



3.1.6 PILBARA INFRASTRUCTURE AND PLANNING FRAMEWORK (2012)

The WAPC has prepared a draft ‘Pilbara Planning and Infrastructure Framework’ for the Pilbara region, which was released for public comment in February 2011.

The document sets out a settlement-focused regional development structure for the region, will provide a framework for public and private sector investment and a context for the preparation of local planning strategies and local planning schemes by local authorities. The document will act as the overarching regional plan for the Pilbara.

Specifically in relation to Onslow the Framework identifies that ‘Onslow’s future is largely dependent on the construction of processing facilities for off-shore hydrocarbons at the ANSIA. While a permanent workforce in Onslow is encouraged, growth will be largely dependent on the proportion of fly-in fly-out workers during the construction and operations phases. Onslow will continue to depend on Karratha for higher order community and commercial facilities.’

The Framework includes a growth plan for Onslow and includes the site as a residential and commercial expansion area.

The area of the Structure Plan is consistent with the expansion areas indicated in the draft Pilbara Infrastructure and Planning Framework. The Framework indicates that some higher densities may be suitable for the town. The Structure Plan has been created to be consistent with the Framework.

3.2 STATUTORY FRAMEWORK

3.2.1 SHIRE OF ASHBURTON TOWN PLANNING SCHEME No. 7

The Shire of Ashburton Town Planning Scheme No. 7 (the Scheme) covers the entire district of the Shire of Ashburton and sets out the policies, reserved land, zoned land and the land uses permissible in these different areas.

One of the aims of the Scheme that relates directly to Onslow is 'to facilitate the orderly development of Onslow Structure Plan', which the Onslow Townsite Strategy has replaced.

The Onslow townsite has four zones that are intended to accommodate urban development being:

- Residential;
- Urban Development;
- Commercial and Civic; and
- Tourism.

Residentially zoned land is located centrally in the town radiating from the main street and is assigned a density of either R12.5 or is split coded R12.5/30. The higher density coding can be used if there is access to reticulated sewage.

The Urban Development zone is located on the outskirts of the urban area of Onslow. Development in the Urban Development zone currently requires the preparation of a Structure Plan at the Council's discretion, however this discretion is to be removed as part of Scheme Amendment No.21.

The Commercial and Civic zone encompasses the main street of Onslow, while the Tourism zone is generally located on the foreshore.

There are three specific Special Control Areas established for Onslow being the Onslow Coastal Hazard Area, the Onslow Strategic Industrial Buffer and the Onslow Airport Height Restrictions Area.

There are a number of current Scheme Amendments underway that have implications for Onslow and this Structure Plan; they are briefly summarised as follows.

- **Scheme Amendment No. 8** - Modifications to the Strategic Industrial zone to prohibit Transient Workers Accommodation.
- **Scheme Amendment No. 9** - Add the Ashburton North Strategic Industrial Area as a Special Control Area under the Scheme and remove reference to development in the Strategic Industry zone being in accordance with the structure plan and add Appendix 11 to the Scheme, which sets out the intended direction for the Ashburton North Strategic Industrial Area.
- **Scheme Amendment No. 10** - Assign an area of the SIA to Chevron and its operations that will incorporate zoning, reservations and provisions under the Scheme for this area.
- **Scheme Amendment No. 11** - To rezone Onslow Strategic Industrial zone to Rural and to delete the Onslow Strategic Buffer Area.
- **Scheme Amendment No. 13** - Amend Residential R12.5 zoned land in Onslow to Residential R20 and allow greater density or R30 where lots can be amalgamated.
- **Scheme Amendment No. 14** - Allow Transient Workers Accommodation to be considered for approval by the Shire in Commercial zones.

- Scheme Amendments No's 15 and 16 – Rezone portions of Onslow Airport to Mixed Business and prepare a draft development plan and subdivision.
- Scheme Amendment No. 17 – Zone land in the ANSIA to 'Strategic Industry' and 'Other Purposes - Infrastructure' and add an additional TWA for construction workers only.
- Scheme Amendment No. 18 – Zone land in the ANSIA to 'Industry'.
- Scheme Amendment No. 19 – Rezoning of infill development sites, designed to be consistent with this Development Plan, to Residential R20 and R12.5/30.

The Council also anticipates preparing a Scheme Amendment and policy in relation to multiple dwellings in early 2012.

Scheme Amendments 21 and 22 have been lodged with the Shire and specifically relate to the site. Scheme Amendment No. 22 proposes to remove the density coding for existing land zoned "Urban Development" in order to allow flexibility throughout the Structure Plan. Scheme Amendment No. 21 proposed to rezone the remaining portions of land within the Structure Plan area to "Urban Development". These two Scheme Amendments have been lodged concurrently with this Structure Plan, and are intended to be considered in conjunction with each other.

REFER TO FIGURE 9 - TPS7 EXTRACT

The local statutory framework that applies to Onslow is currently subject to a number of minor changes that are intended to enable further residential and industrial development within the Onslow townsite and within the ANSIA. These factors correspond with the intention of the

Structure Plan, to provide for additional growth in the town. This growth is mainly influenced by the development of the ANSIA.

The Scheme Amendment to rezone the entire site to Urban Development is the reason that this Structure Plan is being prepared, in accordance with Scheme requirements in the Urban Development zone.

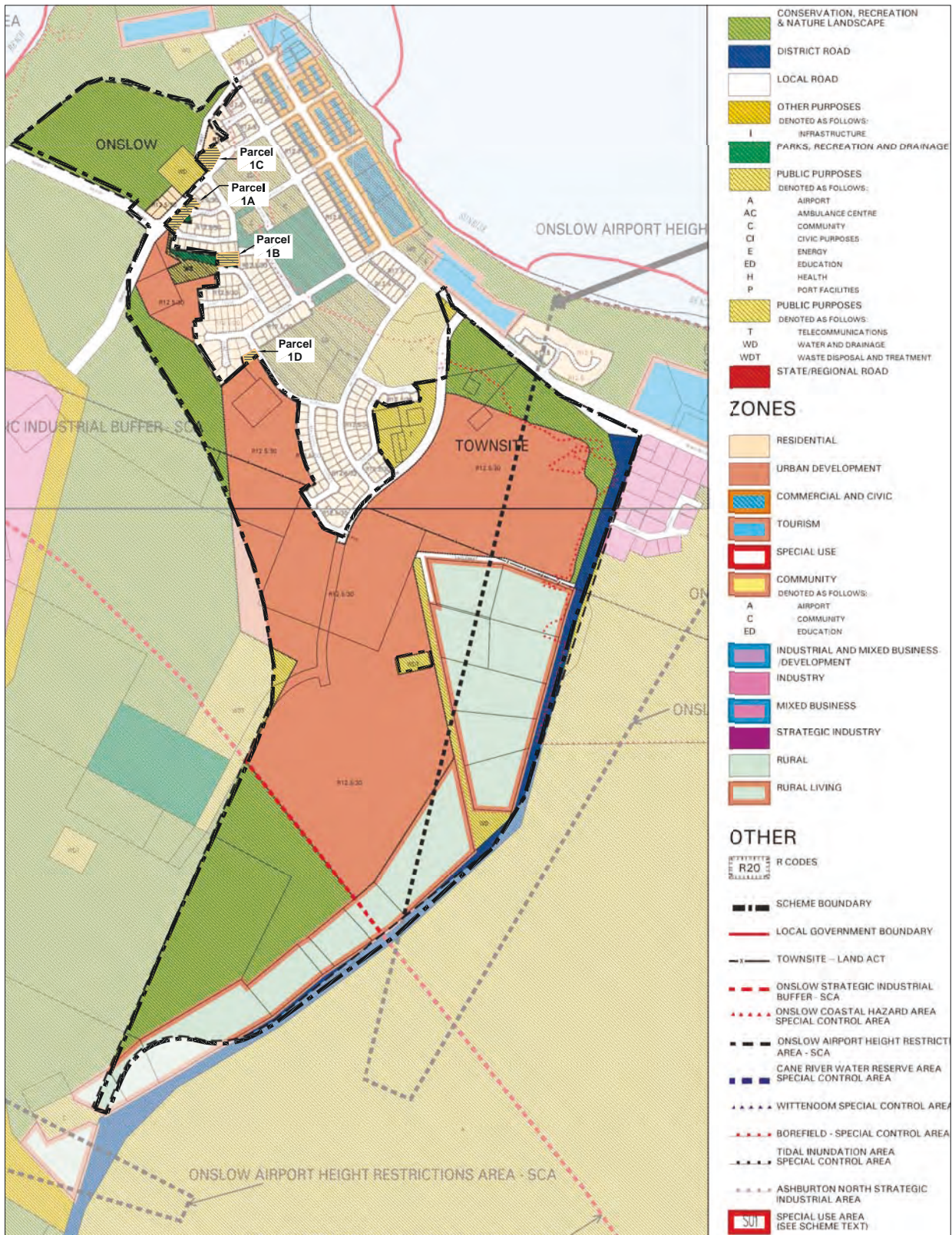
3.2.2 STATEMENT OF PLANNING POLICY 2.6 – STATE COASTAL PLANNING POLICY

The State Coastal Planning Policy provides guidance for planning in coastal environments and applies throughout Western Australia to land use and development abutting the coast.

The objectives of the State Coastal Planning Policy are to:

- protect, conserve and enhance coastal values, particularly in areas of landscape, nature conservation, indigenous and cultural significance;
- provide for public foreshore areas and access to these on the coast;
- ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities; and
- ensure that the location of coastal facilities and development takes into account coastal processes including erosion, accretion, storm surge, tides, wave conditions, sea level change and biophysical criteria.

REFER TO FIGURE 9 - TPS7 EXTRACT





The Policy states, that while development setbacks to the coast should be varied according to the circumstances of any particular proposal, as a general guide, a total setback in the order of 100 metres from the horizontal setback datum (HSD) will be expected.

The State Coastal Planning Policy also states around 20 general policy measures, which should be achieved by planning instruments and processes; a series of requirements for coastal plans and building height limits for development on the coast.

As Onslow is located abutting the Indian Ocean, the State Coastal Planning Policy will be considered in determining appropriate development in coastal areas.

A review of this Policy is currently underway. A Coastal Vulnerability Study for the town of Onslow has been undertaken as part of this project. Further to this, the Shire has initiated Scheme Amendment No. 24 which would see a 1 in 100 year flood level of 5.9m AHD being applied to residential development. These levels then vary depending on the proposed land use. The Shire’s Scheme Amendment also stipulates a limit to the amount of fill for new land development.

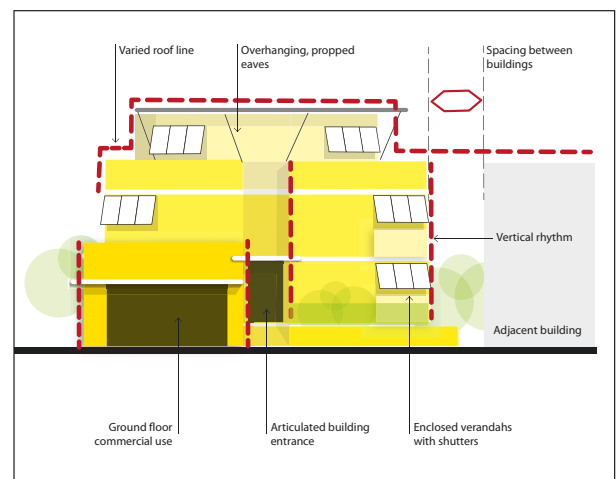
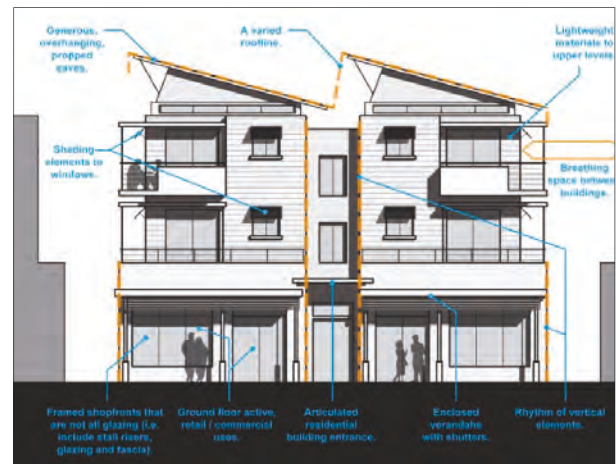
Consideration has therefore been given in the design of the Structure Plan to how the town functions now and how it will address climate change, storm surge and other climatic factors in the future.

Furthermore, it is noted that Scheme Amendment No. 24 has been used to inform planning applications in its current state, with approvals being issued by the Joint Development Assessment Panel (JDAP) with proposed finished floor levels consistent with Scheme Amendment No. 24.

3.2.3 DRAFT ONSLOW INTERIM TOWN CENTRE DESIGN GUIDELINES

The Onslow Interim Town Centre Design Guidelines give a preliminary insight into the built form objectives that are also intended for the Structure Plan area and address matters such as climate responsive design, built form, streetscape, car parking, services and ecologically sustainable design.

The Town Centre Design Guidelines prepared by TPG were adopted by the Shire on 15 February 2012 as a Local Planning Policy.



4. STRUCTURE PLAN

4.1 SITE CONTEXT

The Structure Plan area comprises approximately 190 hectares of Unallocated Crown Land (UCL) situated to the south of the existing Onslow town site, which is located approximately 1400km north of Perth. The Ashburton North Strategic Industrial Area (ANSIA) is located approximately 11km to the south-west.

Exmouth is some 400 kilometres to the south-west by road, whilst Karratha/Dampier are located some 310 kilometres by road to the north-east.

4.1.1 HISTORY AND EXISTING LAND USES

Onslow was originally founded in 1883 as a port at the mouth of the Ashburton River for exporting wool from the sheep stations of the Pilbara hinterland. It was named after the then Chief Justice of Western Australia, Sir Alexander Campbell Onslow (1842–1908). Wool continued to be the major industry for the next eighty years of the town's history, despite extraordinary extremes of drought and flood that characterise the region and are related to the passage or absence of cyclones.

Although a large jetty was built at the original site of Onslow, repeated damage whenever a cyclone hit or the Ashburton River flooded led government officials in Perth to establish a new town well away from the river after another cyclone in January 1925. The new location for Onslow proved rather better protected from the cyclones' violence.

During World War II, Onslow was utilised for servicing submarines due to the deep water adjacent to Beadon Point. Large refueling tanks are still evident around the townsite. Onslow was the most southerly town in Australia bombed by the Japanese. Since the war, the declining purchasing power of wool has, in spite of consistently good rainfall on the inland sheep stations since the late 1960s, led to a change in focus of Onslow's economy from wool to salt production and tourism.

The most distinguishable land use function in the Onslow region currently, (with the exclusion of the offshore oil and gas industry) is the Onslow Salt operations. The angular slopes of the salt stockpile rises sharply from the surrounding landscape.

The pastoral industry is also dominant in the region, with angular fencelines, old windmills and bore tanks, scattered throughout the region. Fishing is widespread, on both a commercial and recreational basis, with the rock groyne at Beadon Creek, boat launching area and berthing jetty evidence of the fishing culture.

The Onslow lighthouse is situated on top of the town's high dunal areas, and is a significant cultural and navigational feature of Onslow.

The Thalanyji People are the local traditional owners of the Onslow area. The Thalanyji cultural tradition is associated with the rainbow serpent that created the underground tunnels in the area, which link all of the water bodies around the townsite, including the rivers, creeks and freshwater soaks. The Thalanyji hold the areas around the freshwater soaks and the hunting grounds of the Ashburton River and Beadon Creek as sacred.

The site is complex and includes a number of existing uses. The majority of land in the site is vacant Crown land and has no known current formal use or activity. Other uses include:

- Lot 590 - Private lease. Currently contains a dwelling, outbuildings and horses.
- Part of Lot 303 - A large piece of Government land containing a range of infrastructure assets including a portion of Onslow Salt.
- Two portions of road reserve that will be closed including Eagles Nest Road.
- A number of Rural Living zoned lots that are located adjacent to the current entrance road to the town. There are private leases over a number of these lots.
- Lot 129 - Contains the Bindi-bindi Waste Water Treatment Plant, which will be decommissioned.

- A portion of Lot 302 - The current town rubbish dump, which is proposed to be relocated.
- Reserve 47957 - Contains the current Water Corporation Waste Water Treatment Plant, which is planned to be upgraded.

4.1.2 EXISTING ROADS

Onslow is connected to the region and the state via the North-West Coastal Highway. The North-West Coastal Highway runs along the north west coast of Australia from Geraldton (where it connects with the Brand Highway) to the Great Northern Highway (approximately 40 kilometres south-west of Port Hedland). The Highway is part of the Western Australia's strategic road network (Route 1) and is operated by Main Roads Western Australia.

The town is connected to the North-West Coastal Highway by Onslow-Mount Stuart Road. Onslow-Mount Stuart Road connects to the North-West Coastal Highway approximately 80 kilometres south-east of Onslow. The road was constructed in the 1980's and is currently maintained by Main Roads Western Australia. It is a two lane sealed single carriageway, with some substandard curves, a narrow sealed width and shows some signs of deterioration.

Onslow-Mount Stuart Road wraps around the eastern side of town to the foreshore where it connects to Second Avenue (Onslow's main commercial and retail street).

A second access to Onslow from the North-West Coastal Highway is provided through Twitchen Road. However, this is an unsealed road and is not always accessible. Onslow – Mount Stuart Road has also at times not been accessible, due to flooding, which has resulted in town being isolated. Access is also available, depending on conditions, from Peedamulla Road.

The extension of the town has been designed with due regard being given to the proposed new town entrance road as proposed in the OTS. The new entrance road is designed in such a way that access in and out of the town is not compromised in the event of flooding and storm surge events. The entrance road will predominantly be used by residents and visitors and will separate large industrial vehicles from this traffic. The proposed road network through the site will connect with the new entrance road and the existing road network in the town.

REFER TO FIGURE 10 - ACCESS PLAN

4.1.3 SURROUNDING LAND USES AND FEATURES

The area subject to this Structure Plan forms a southward extension of the current Onslow townsite. The townsite accommodates a range of residential densities from R12.5 to R12.5/30. The townsite also contains a hospital, two schools and a range of community and recreational facilities. The townsite is affected by the 'Onslow Coastal Hazard Area Special Control Area (SCA)', and 'Onslow Airport Height Restrictions Area SCA' under the Scheme.

Onslow is bordered to the west by a Strategic Industrial Area buffer and to the east by the Onslow Airport and Port landholdings. There is also an industrial area located to the east of the current townsite and a number of rural landholdings to the south of the Structure Plan area.

The topography of the Onslow area is characterised by undulating dunal systems (including longitudinal, coastal and fringing dunes), alluvial / colluvial plains and low lying systems (including supratidal flats, samphire / salt flats, claypans, tidal creeks, intertidal flats and mangroves) and is located within the Exmouth soil-landscape province.

The Onslow settlement is situated on a large sandy island, the most seaward point of which is located over an old coral reef forming Beadon Point (HGM, 1990). Land system units in the area comprise:

- dune fields supporting soft Spinifex grassland;
- bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches; and
- undulating sand plains, dunes and level clay plains supporting soft Spinifex grasslands and minor tussock grasslands (Van Vreeswyk et al., 2004).

The site is generally covered in low-lying scrub. There is no significant vegetation in a statutory context located on the site.

The soils of the area are predominately hard alkaline red soils in the plains with red sands in the dune fields (Beard, 1990). The surface geology of the project area is described in more detail in Table 2.

FIGURE 10 - ACCESS PLAN

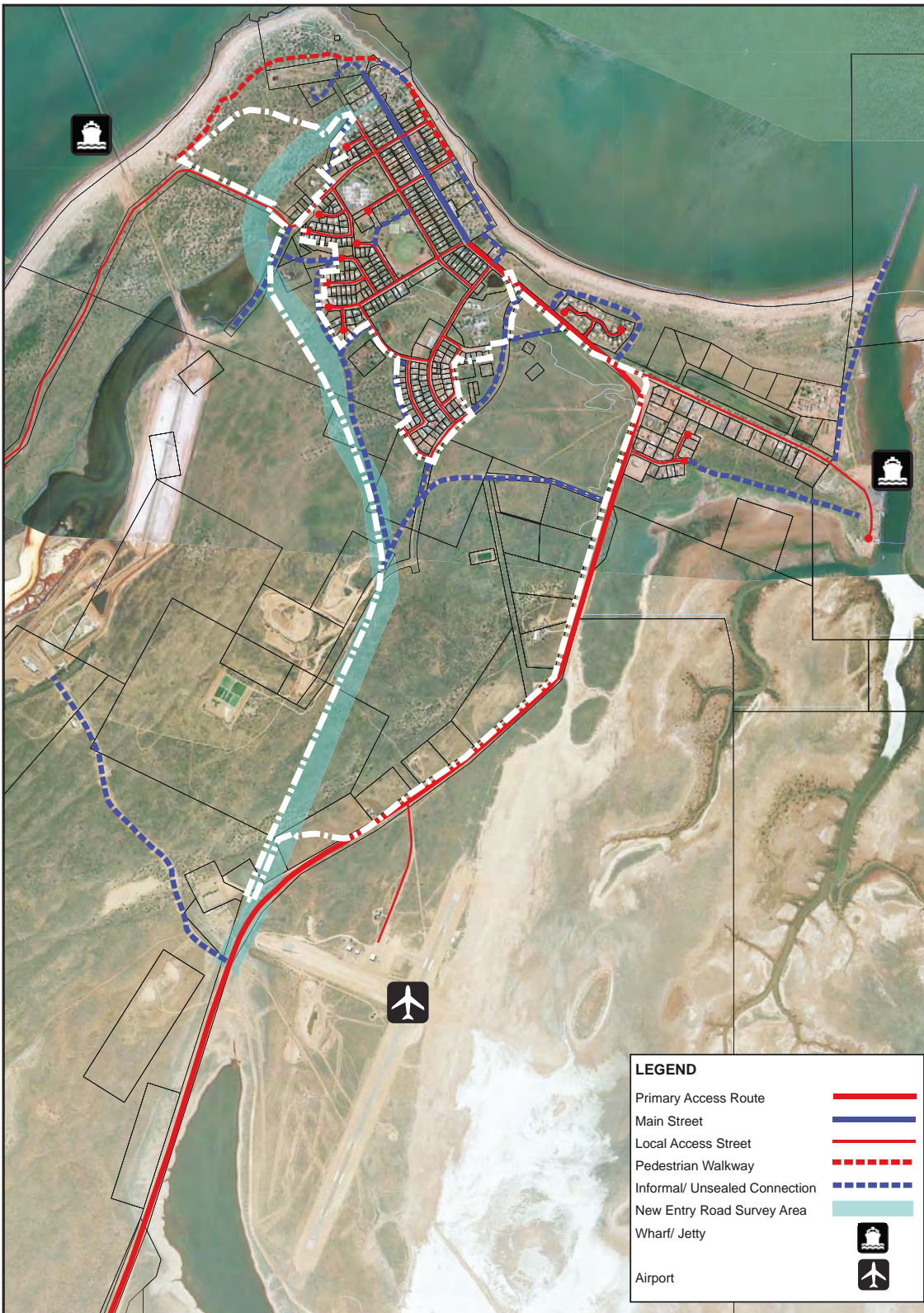


TABLE 2 - SOILS OF THE PROJECT AREA (GEOLOGICAL SURVEY OF WESTERN AUSTRALIA, 2008)

Unit Name	Code	Description
Coastal Dunes 38488	Qdc	Beach sand, sand dunes, coastal dunes, beaches and beach ridges, calcareous and siliceous, locally shelly and/or cemented (beach rock), locally reworked.
Lake Deposits 38492	Qt	Lacustrine or residual mud, clay, silt and sand, commonly gypsiferous and/or saline; playa, claypan and swamp deposits; peat; peaty sand and clay, halitic and gypsiferous evaporates.
Estuarine and Delta Deposits 38489	Qe	Coastal silt and evaporate deposits, estuarine, lagoonal and lacustrine deposits.
Colluvium 38491	Qrc	Colluvium, sheetwash, talus; gravel piedmonts and aprons over and around bedrock; claysilt- sand with sheet and nodular kankar; alluvial and aeolian sand-siltgravel in depressions and broad valleys in Canning Basin.

4.2 CONSULTATION

The consultation process to prepare this Structure Plan began before LandCorp became involved in the project with the preparation of the Onslow Townsite Strategy. The OTS has formed the basis for the expansion area and objectives of the project. The consultation for the OTS was undertaken in 1999 and 2000 as part of the preparation of the Onslow Structure Plan.

In August 1999 a discussion paper was prepared, and released. This raised a number of issues relating to the Onslow townsite and surrounds. The release of the discussion paper was followed by a public meeting in Onslow. This meeting was attended by about 20 residents of the town, as well as members of the study team. One letter was received in response to the discussion paper.

A second public meeting was held in January 2000. Members of the Onslow community were given a briefing on the industrial land use planning being undertaken by the then Department of Resources Development (DRD), and information was provided by the Shire of Ashburton on how the structure plan process would relate to the preparation of TPS No. 7.

In 2010, LandCorp assembled a project team to collate information on portions of government land that may be suitable for development to meet anticipated growth demand. A due diligence report was prepared by the project team by October 2010.

Since this time discussions with key stakeholders such as the Shire of Ashburton, the Department of Planning, the Department of State Development and service providers have been ongoing. Substantial changes occurred including the State direction to locate the Wheatstone Operations Village in town.

A five-day public and stakeholder consultation 'charette' was undertaken in July 2011. This process produced, among other information, a Vision Plan for the expansion of the town.

A portion of the Vision Plan has been adapted to create this Structure Plan. The recent adoption of the Stage 1 Development Plan, which this supersedes, has undergone extensive consultation and review by local and state government, as well as the public and any feedback received has been fed directly into this Structure Plan.

The Structure Plan has to date been through a rigorous consultation process. From the lodgment stage we anticipate that the Structure Plan will follow the normal statutory referral and advertising process.



OUTCOMES FROM ONSLOW CHARRETTE

4.3 PROJECT OBJECTIVES

The project objectives for the Structure Plan and associated urban expansion of Onslow have been developed from a range of sources, including key strategic documents and stakeholder and community consultation. Based on the above, a set of guiding objectives have been developed and incorporated into the Structure Plan, as outlined in the table below.

As preparation of the Structure Plan has progressed, strategies have also been developed to assist in implementing the objectives. Furthermore, how this Structure Plan responds to those strategies has also been outlined and presented as part of this report.

VISION THEME		OBJECTIVES (These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.	STRATEGY (Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).	DEVELOPMENT PLAN RESPONSE (The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).
Community Wellbeing	C1	To create a unique place through the incorporation of cultural, natural, social and heritage considerations into community wellbeing elements of the plan.	Indigenous and European cultural and heritage sites to be integrated, where applicable, within open space areas, avoided, to ensure protection and conservation or treated under appropriate legislation.	Areas thought to compromise indigenous significance have been incorporated into future public open space as part of the overall DP (the Plan). Investigations are on going to protect and enhance these areas where appropriate.
	C2	To enable social relationships, build community capacity and facilitate interaction within and between communities.	Ensure the location and design of public open space facilitates passive recreational opportunities as well as serving as a gathering space for community events.	The Plan seeks to provide for areas of passive open space, active open space, areas that will include storm water drainage management functions, whilst also ensuring a sustainable approach to open space provision, management and maintenance. These areas have been located to ensure that future residents do not have to walk longer than 5 minutes or 400m to access one or more of these types of open space.
	C3	To provide accessible community infrastructure.	Aim to provide concentrated and thought through public open space, to ensure these areas are designed to maximise community activity and use through a quality design.	As per comment DP2 above. The design principles for each of these public spaces will provide for a connection back to its location, re-enforcing a sense of place and will ensure the space alludes to the Onslow 'lifestyle' and historical theming; pedestrian amenity and scale; be sensitive to local conditions; and create meaningful and practical connections, informal and formal recreation.
			Ensure the development plan includes future provision for a second school site and ensure the design is flexible enough to meet a range of additional educational needs into the future.	A second school site has been included within the Development Plan area, based on the projected population for Onslow townsite. This activity has been located to maximise a walkable catchment from surrounding residential. The site has been designed to be flexible enough to accommodate a primary school or a hybrid school model, should it be required.

VISION THEME	OBJECTIVES (These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.	STRATEGY (Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).	DEVELOPMENT PLAN RESPONSE (The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).
	C3 To provide accessible community infrastructure.	Provide a clear hierarchy of streets and roads that connect and filter toward the existing main street in the town centre to enhance a sense of connection and integration to the heart of town.	The central ridge road that connects the active open space area and the school has been designed specifically to connect seamlessly into Second Avenue to strengthen the relationship between the residential expansion areas and the existing town centre/main street. An extension of McGrath Avenue also connects directly with key community facilities associated with the existing Recreation Precinct
Design Excellence	D1 To identify the opportunities and constraints of the surrounding context and the site and provide a placed based response.	Design and orientate the street network to maximise climate responsive design by, where possible, orienting streets north south so as to: - Provide uninterrupted spaces between buildings to allow breezes to flow through the precinct so that all can capture breezes; - Provide sufficient lot width to enable flexible dwelling layouts that capture available breezes and direct them through habitable areas; and - Minimise year round morning and afternoon heat gain by presenting short ends of the houses to the east and west and thereby reducing exposure and heat load on walls and glazing of the dwelling. The new entrance road will function as a barrier against flood and storm surge events.	The street network has been designed to provide a balance between enhanced connectivity between the existing townsite and the future residential areas, to respond to the topography, as well as encourage the orientation of lots to enable the dwellings to be sited to maximise opportunities to respond to the local climate. Further, built form details will be the subject of design guidelines. The role of the New Entrance Road is intended to be designed to assist with flood and storm mitigation. Further details are pending this element of the Plan.
	D2 To protect and enhance Onslow's heritage.	Provide, where appropriate, built form that responds to the character and vernacular of Onslow.	LandCorp in partnership with SoA, will undertake the preparation of Design Guidelines for future residential built form. These Guidelines will build upon the Interim Town Centre Design Guidelines (by TPG), outcomes of the Onslow Charrette and Vision Plan 2011, the Onslow Vernacular Study by CODA and the Draft Sustainability Report prepared by JBA and be incorporated into the Shire's town planning scheme and policy manual.

VISION THEME		OBJECTIVES	STRATEGY	DEVELOPMENT PLAN RESPONSE
		(These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.	(Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).	(The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).
D3	To provide connectivity between places, permeability and legibility through a clear network and hierarchy of streets and public spaces.		An interconnected street grid network that provides good internal permeability and frequent connections with the existing urban fabric, avoiding where possible the creation of enclaves.	The street network has been designed as a modified grid that drapes itself across the topography, connects into the existing urban structure and responds to local conditions. Street blocks have been designed to encourage good connectivity as well as walkability.
			The new entrance road and existing main road into town to act as the logical urban limits to the town providing separation from adjacent existing and proposed Industrial activities including the wastewater treatment plant, the airport and Onslow Salts operations.	The OTS includes a general alignment of a new entrance road for Onslow. The primary purpose being to provide flood free access for the townsite to the airport. Other factors include providing a barrier between the townsite and external uses and constraints such as Onslow Salt operations and key infrastructure such as the Waste Water Treatment Plant, locate to the west of the road. The Plan has confirmed this general alignment and in principle key stakeholders have given support for the Road in its proposed location.
			The new entrance road into the townsite will avoid where possible passing any existing and future industrial developments or as a minimum ensure the interface between industrial activities and residential is well designed.	The New Entrance Road diverts from Onslow Road approximately 500m from the proposed entrance to the Airport and new Light Industrial Area (LIA). Preliminary designs for the LIA elements of the Airport depict a significant landscape buffer between any future industrial activities. Further, the Development Plan has proposed Live Work lots to interface with Onslow road, reducing conflict between future residential activities and any future LIA activities located at the Airport and the existing LIA area at Beadon Creek.
			Ensure any large single use sites that have a primarily residential function are designed to integrate into the existing urban area.	In regards to the Wheatstone Operations Village site, development within the precinct will provide for pedestrian friendly streetscapes with passive surveillance of the public domain. It is likely that the Wheatstone Operations Village will ultimately accommodate approximately 560 occupants. This will be undertaken in a staged manner, with the first stage expected to accommodate 320 occupants.

VISION THEME		OBJECTIVES <small>(These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.</small>	STRATEGY <small>(Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).</small>	DEVELOPMENT PLAN RESPONSE <small>(The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).</small>
	D4	To maximise and ensure the safe movement of pedestrians, cyclists and vehicles through the site	An interconnected cycle and pedestrian network will seek to encourage non-vehicular means of movement.	The Plan identifies where shared paths and footpaths will be provided. These have been located on Neighbourhood Connector roads and on higher order Access streets respectively. All other lower order roads cycling will be on-street with a footpath on one side of the street. Further, the Plan will also seek to encourage non-vehicular means of active transport by designing the public realm to encourage walking and cycling by implementing wider street reserves which can support the retention/new plantings of shading street trees. This creates more walkable environments and adds substantially to pedestrian/cycling amenity. Shaded nodal points featuring either shade trees and/or artificial shade structures should be considered.
	D5	To provide a diverse mix of uses, buildings, densities and housing types to meet local needs.	Provides diverse residential lot types and sizes to cater for a range of household types and lifestyles.	The Plan proposes a mix of lot sizes to accommodate a range of housing typologies, which in turn will allow a range of demographics to reside within Onslow. These range from R5 Large Live Work Lots up to potentially R40. A range of widths and depths has also been provided to ensure typology diversity.
			Higher densities shall be located and distributed around the high amenity public open space areas and along higher order connector and distributor streets.	Higher densities, including grouped housing sites will be sited close to or adjacent areas of high amenity and/or public open space. Development will be required to overlook these areas to ensure passive surveillance of public areas. Residential design guidelines will also address this issue through built form provisions.
	D6	Strengthen local sense of place.	Refer S1, 6 & 8 above.	
	D7	Develop a secure and safe community.	Ensure lots front onto and overlook public realm areas facilitating a high level of passive surveillance and assist in creating a safe and attractive pedestrian oriented urban environment.	Refer DP15 comment above
	D8	To provide high quality well designed buildings.	Produce Design Guidelines that respond to the local climate, topography and local character and build in sustainability measures.	LandCorp will undertake the preparation of design guidelines for future residential built form. These guidelines will build upon the Interim Town Centre Design Guidelines (by TPG), outcomes of the Onslow Charrette and Vision Plan 2011, the Onslow Vernacular Study by CODA and the Draft Sustainability Report prepared by JBA.

VISION THEME		OBJECTIVES	STRATEGY	DEVELOPMENT PLAN RESPONSE
		(These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.	(Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).	(The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).
	D9	To provide flexible and accessible buildings and open spaces that respond to the climate and context.	Ensure the function and design of open space caters for drainage requirements and facilitates pedestrian movement between residential areas and the existing town centre.	Refer comments DP2, DP3 & DP13 above.
			Ensure housing forms respond to environmental factors such as climate, extreme weather conditions and flooding impacts.	Refer DP8 comment above.
Economic Health	Ec1	To provide infrastructure in a coordinated, cost effective and timely manner.	Exclude all retail and commercial activities from the development plan area that will affect the viability of the existing town centre but retain flexibility in the plan to allow for this form of development, should the need arise. Examine possibilities for community use of Chevron “micro-commercial” facilities (i.e. deli or similar that maybe approved on their super lot)	The Plan excludes further commercial/retail that will affect the viability of the existing Town Centre. The Plan has been structured to better connect the expansion area with the Town and Main street to ensure good access between the future residential areas and the existing centre. Provisions have been included for the Chevron Operations Village site to ensure what is included will not affect the viability of activities within the Town Centre. Notwithstanding, the structuring of the Plan has been designed with sufficient flexibility to accommodate local services should it be viable to do so.
	Ec2	To provide infrastructure that has minimal environmental impact or net benefit, where appropriate (Green Infrastructure).	Refer S24 & 26 above.	
	Ec3	To facilitate local job creation and create diverse employment and learning opportunities.	Facilitate local economic growth through the provision of composite type lots that encourage home based business that will not detract from the viability of the town centre or be those uses that are better located within the light industrial areas.	The Plan includes Large Live Work Lots along Onslow Road to provide opportunity for small scale home based business opportunities. The intention for these lots is two fold, firstly to provide sufficient size lots to attract small-scale business that will not normally locate in the Town Centre/Mainstreet or the Light Industrial Areas. Secondly, provide a better interface between LIA activities east of Onslow Road and the future Residential areas.
	Ec4	To attract businesses that will generate or support long-term growth via inter-relationships, innovation, or productivity or offer complementary goods and services infrastructure.	No specific Strategy relevant to the Development Plan	

VISION THEME		OBJECTIVES (These objectives have been sourced primarily from the Onslow Townsite Strategy (OTS). Some enhancement has occurred following the outcomes of the community and stakeholder consultation linked to producing the Onslow Vision Plan.	STRATEGY (Strategies have been developed to implement the Objectives. These have evolved from the OTS Strategies and ongoing community and stakeholder consultation linked to producing the Onslow Vision Plan. The following strategies are primarily focussed on the Development Plan. Accordingly there may be some Strategies that are not relevant to the Development Plan itself and therefore there may be gaps within the Strategy column).	DEVELOPMENT PLAN RESPONSE (The following identifies specifically how the strategies have been addressed as part of the Development Plan (DP). It should be noted that there are also a number of associated documents that will accompany the DP that will address in detail how the Strategy will be implemented. These are identified further within the DP report).
	Ec5	To facilitate the diversity and expansion of Onslow's economy, by building on the town's human resources, skill base and environmental quality, whilst strengthening regional linkages, providing sufficient support networks, fostering innovation and rewarding enterprise.	No specific Strategy relevant to the Development Plan	
Environmental Leadership	E1	To protect and enhance natural landform and biodiversity.	Facilitate the retention of Onslow's unique landscape characteristics, notably significant natural features, vegetation and landscape systems.	The Plan identifies POS in the landscape, which has been retained with native vegetation whilst providing a drainage function. The modification of natural landform and amount of cut and fill earthworks to be minimised to the extent possible. Contiguous POS has been provided with native vegetation in order to provide local wildlife corridors across the site. Endemic species are to be used in landscaping including road verges to the greatest extent possible with local native and/or regionally suitable plant species to enhance biodiversity.
	E2	To maintain or improve surface and groundwater quality and the predevelopment water balance of the site.	Implement innovative water sensitive urban design (WSUD)	Stormwater will be retained and infiltrated on site where feasible as described in the Local Water Management Strategy (LWMS) as part of the Development Plan.
	E3	To reduce overall water use through efficiency measures and optimise the use of recycled water.	Ensure water efficiency and best practice measures are implemented throughout the development area from the lot through to townscale initiatives.	The Local Water Management Strategy (LWMS) being prepared as part of the Development Plan provides the guidelines for the implementation of: Best practice sustainable water management Reduced water consumption and wastewater volumes Stormwater treatment and reuse for landscape amenity Best practice demand management measures Fit-for-purpose alternatives The Shire is currently developing a proposal for a recycled water scheme for Onslow, which will aspire to provide a fit-for-purpose recycled water source for the irrigation of all the Shire's POS areas.

VISION THEME		OBJECTIVES	STRATEGY	DEVELOPMENT PLAN RESPONSE
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	E4	To reduce energy use and increase energy efficiency.	Implement means by which to reduce not only the operational but embodied energy and greenhouse gas emissions both during, and for the life of the development.	The Plan has been designed to ensure the maximum numbers of lots are orientated appropriately for the climate. Design Guidelines (refer to 8) for the built form are being developed which will capture means by which energy efficiency and demand management measures can be implemented.
	E5	To increase renewable energy production and offset carbon emissions.	Facilitate the implementation of local renewable energy sources.	The Plan, via the Design Guidelines has the potential to support the installation of solar hot water systems, and residential and municipal small scale renewable energy schemes.
	E7	To encourage efficient resource use and low or non-toxic materials.	Minimise the consumption of materials and resources in construction of civil infrastructure, buildings and landscaping and maximize the usage of non-toxic building materials where possible.	The Plan supports the use of locally sourced materials and resources wherever possible. The Design Guidelines will aim to reduce non-toxic building materials.
	E8	To decrease the volume of waste output to landfill.	Significantly reduce waste output to landfill through a site waste management plan.	Waste management and minimisation plans will be required as part of the Design Guidelines during construction which will complement Shire initiatives. Design guidelines will seek to reduce building waste and implement onsite recycling.

4.4 ENVIRONMENTAL

4.4.1 TOPOGRAPHY

The topography of the Onslow area is characterised by undulating dunal systems (including longitudinal, coastal and fringing dunes), alluvial/colluvial plains and low-lying systems (including supratidal flats, samphire/salt flats, claypans, tidal creeks, intertidal flats and mangroves) located within the Exmouth soil-landscape province.

The Onslow townsite's greatest spot heights range between approximately 5m AHD and 21m AHD and are associated with the longitudinal coastal and fringing dunes, some of which allow for views across the existing townsite. Similarly, areas of low relief are associated with the supratidal flats, claypans, tidal creeks, intertidal flats and mangroves, which are generally below 5m AHD.

The Onslow townsite and surrounds is a gently inclined, deeply shaded red-brown sand plain with a sparse scattering of low, elongated linear dunes running in an approximate north-east and northerly direction, supporting soft spinifex and grasslands. Defining the western edge of the coastal plain are a series of low, domed dunes that line the shores which have north-east and north-west facing aspects.

Higher dunes form occasional hills throughout the townsite, some with commanding views, including the primary dunal ridge in the Beadon Point vicinity and the area that houses the town's existing lighthouse and communication towers.

4.4.2 LANDFORMS/GEOMORPHOLOGY

Land systems mapping is based on regional patterns in topography, soils and vegetation. The land system mapping classifies the Pilbara region into 102 systems, with the study area comprising just one (refer to Table 3).

TABLE 3 – LAND SYSTEM OF THE STUDY AREA (SOURCE: ENV, 2011)

Land System	Description	Extent within Pilbara Region (km ²)	Proportion of the Pilbara Region (%)
Dune	Dune fields supporting soft spinifex grasslands	138	0.1

ENV identified the following geological units within the study area, based on mapping by the Geological Survey of WA (1990):

- Beaches and Coastal Dunes – light grey, unconsolidated and poorly consolidated quartzose calcarenite; and
- Claypans, poorly sorted clay, silt, sand and minor pebbles.



4.4.3 FLORA AND VEGETATION

ENV also undertook a Level Two Flora and Vegetation assessment of the subject area (refer to Appendix 2). The assessment identified a total of 109 taxa from 77 genera and 31 families within the study area. Average plant species richness was 17.7 taxa per quadrat + 6.8 from a total of 22 sites.

No species listed under the Environment Protection and Biodiversity Conservation Act 1999, gazetted as Declared Rare Flora under the Wildlife Conservation Act 1950, or listed as Priority Flora by the Department of Environment and Conservation were recorded in the study area.

Six introduced plant species were recorded in the study area with two of the introduced species, Mesquite and Athel Pine, being listed as Declared Plants under the Agriculture and Related Resources Protection Act 1976.

Four vegetation associations were mapped in the study area. None of the associations are listed as Threatened Ecological Community's under the Environmental Protection and Biodiversity



Conservation Act, as Environmentally Sensitive Areas under the Environmental Protection Act 1986, or as Priority Ecological Communities by the Department of Environment and Conservation.

There was a range of vegetation conditions identified throughout the study area; from vegetation in very good condition, to areas that were completely degraded, however most of the study area was considered in very good to good condition. Threats to vegetation in the study area include the presence of introduced species, tracks, previous clearing and dumped rubbish.

The flora and vegetation identified within the study area do not appear to form any statutory constraint to development.

4.4.4 FAUNA

ENV has undertaken a Level One Fauna assessment for the study area (refer to Appendix 2). The study area consisted of two fauna habitat types: shrubland of Acacia species over Hummock grassland and Beach. The shrubland was considered to have moderate habitat value mainly because of the lack of vegetation structure and lack of trees.

The sandy substrate is considered to have potential to provide habitat for a range of reptile fauna. The Beach was also considered as having moderate fauna value due to its value for resident wading bird as well as a range of migratory terns and shorebirds that have been recorded in Onslow yet were absent during the study.

A total of 279 vertebrate fauna have been previously recorded within the vicinity of Onslow, including four amphibian species, 70 reptile species, 176 bird species and 29 mammal species. Many of the species recorded in previous studies are unlikely to occur in the study area on a regular basis as the records cover a large area comprising a wide range of habitats.

During the study undertaken by ENV, a total of 49 vertebrate fauna species were recorded including one amphibian, three reptiles, two mammals and 43 bird species. The amphibian recorded (Green Tree Frog) had not previously been listed for the Onslow area in database searches, and appears to have been transported to the area, as its natural range in Western Australia is the Kimberley. This was the only vertebrate recorded during the survey, which had not been previously recorded.

A total of 44 conservation significant fauna were identified as having the potential to inhabit the study area, including a large number of migrant shorebirds (20 species) and migratory terns (four species) that are likely to be found on Beach habitat. Four of the 44 species are considered as 'Possible' to occur within the study area; a further 30 were considered as 'Likely' to occur; five were noted as 'Present' (with current project records), and five species were considered as 'Unlikely' to occur within the study area.

A total of five vertebrate species of conservation significance were recorded by ENV: the Western Star Finch is a small resident breeding bird that requires permanent water and grass seeds. A further four species are listed as migratory: the Eastern Reef Egret, Eastern Osprey, Caspian Tern, and Rainbow Bee-eater. Although listed as migratory species, the Eastern Reef Egret and Rainbow Bee-eater may breed locally. Nests of Eastern Osprey were present, which confirms that this bird breeds locally.

The fauna identified within the study area do not appear to form any statutory constraint to development.

Whilst not directly impacting the Structure Plan area, it is acknowledged that there is an existing Osprey nest in the Onslow Lighthouse, which is significant to Onslow. This area has therefore been set aside for further investigation, to determine appropriate measures to protect the Osprey.

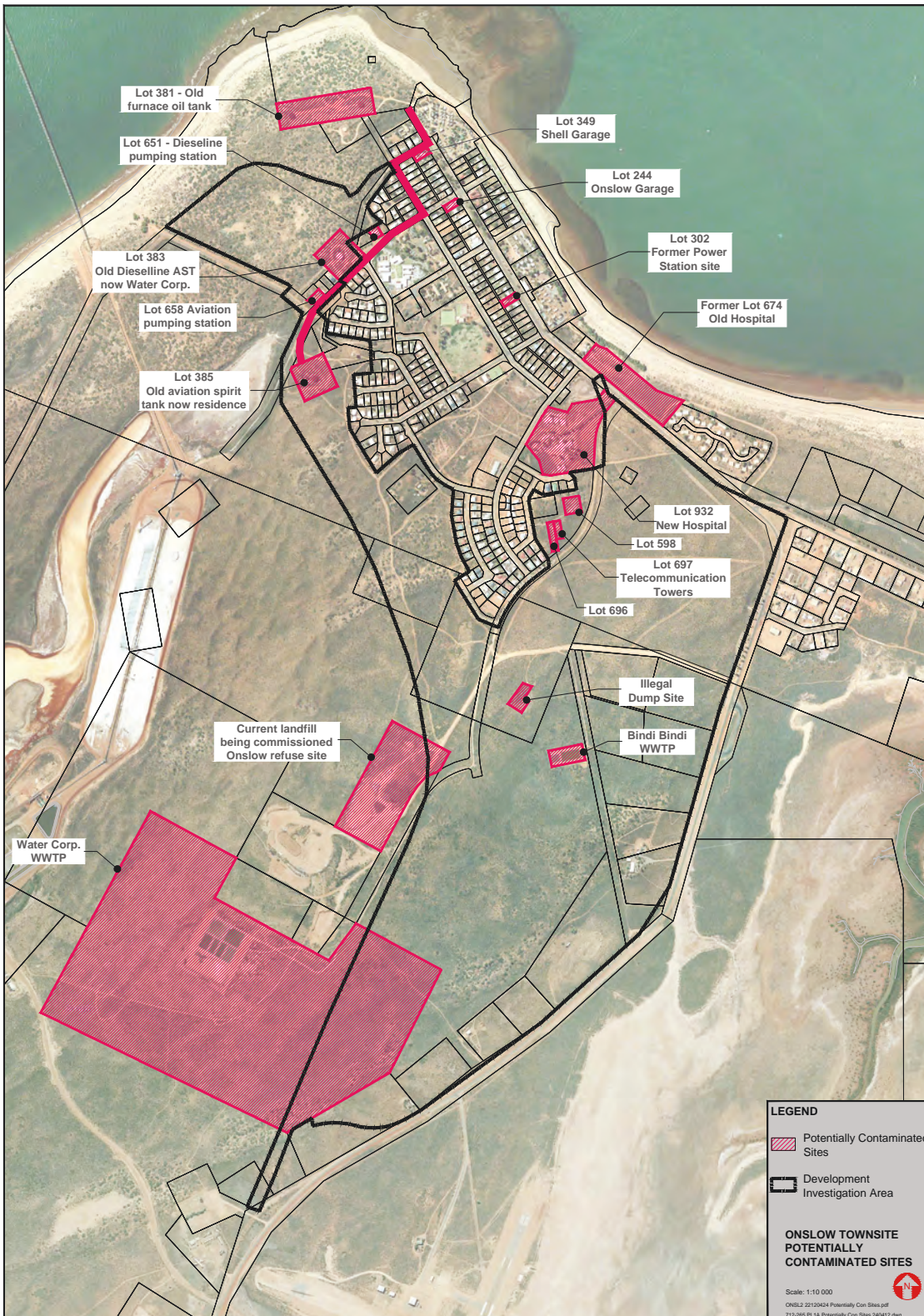
4.4.5 ACID SULFATE SOILS/CONTAMINATION

Aecom also covered potential soil contamination within the geotechnical aspect of its Due Diligence report (refer to Appendix 3). Aecom identified that Acid Sulfate Soils were not considered to form a constraint to development. This was also confirmed by the ASS risk mapping (Landgate 2010) shows that the study area predominantly falls within the category of "no known ASS disturbance risk (<3m from surface)".

In regards to potential soil contamination, there are a number of sites throughout Onslow which may be contaminated based on previous land uses. A summary of potentially contaminated sites within the Structure Plan area is shown in figure 11.

In light of current heritage regulations underway, no geotech has been able to proceed to further investigate these areas and it is proposed this work is to be carried out prior to subdivision.

FIGURE 11 - SITE CONTINUMATTION MAP

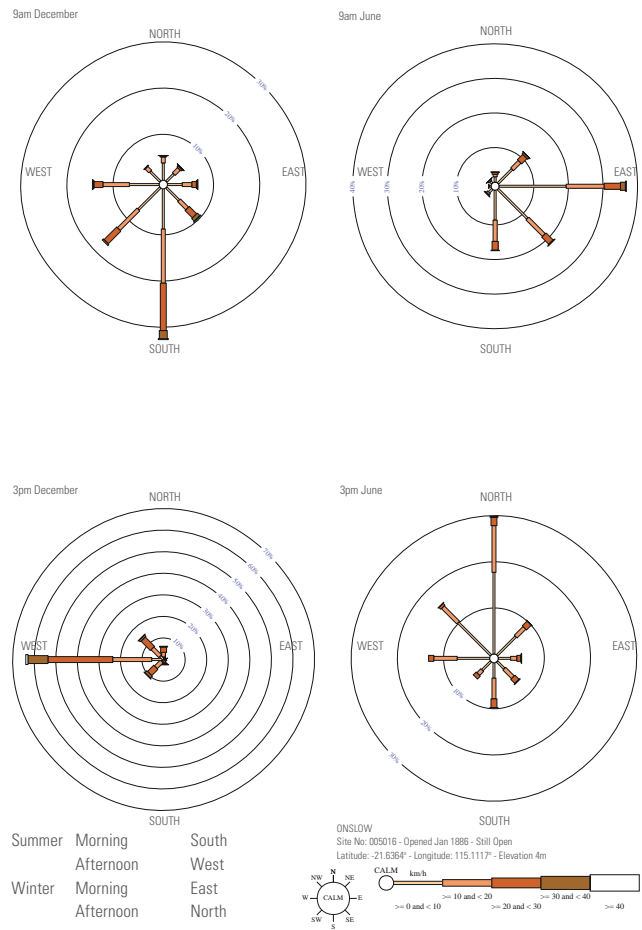


4.4.6 CLIMATE

The study area is located in the Carnarvon region of Western Australia. The Carnarvon region has an arid tropical climate with two distinct seasons; a hot summer from October to April and a mild winter from May to September. The area experiences a wide temperature range, with an average annual maximum daytime temperature of 31.3°C. In summer, maximum daytime temperatures often exceed 35°C, whilst in winter, minimum night time temperatures may fall to 12.5 °C.

Rainfall in this region is often sporadic throughout the year (in summer and winter). The Onslow area has an average annual rainfall of 276.3mm (BoM, 2011) with the majority of rainfall occurring during the summer months (refer to figure 11). Summer rainfall is typically associated with tropical storms in the north, or tropical cyclones that cross the coast and move inland. Winter rainfall is commonly the result of cold fronts moving north easterly across the State.

For the three months preceding the survey, ENV identified that Onslow received 385mm of rainfall (February - April 2011), compared with the long-term average of 122.1mm for the same period. Rainfall for the year to date (January to May 2011) was 469.8mm compared with 150mm for the long term average for the same period. Overall, rainfall was well above the long-term average.



4.4.7 NOISE

4.4.7.1 Proposed Town Access Road

Lloyd George Acoustics Pty Ltd (LGA) were commissioned by LandCorp to analyse the noise impacts of relocating the town entrance road to the western side of the town, where it would act as a physical buffer to Onslow Salt. The predicted levels of noise were modelled using SoundPLAN 7.0 software and assessed against the WAPC's State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP5.4).

The following assumptions have been made to establish the parameters to undertake an accurate assessment:

- Onslow Road being four lanes wide, on a single carriageway and located in the centre of the road reserve;
- Heavy (AustRoads class 3 upwards) and non-heavy vehicles (AustRoads classes 1 and 2) have been considered to adapt to realistic conditions;
- It is assumed that the road will follow the existing ground contours;
- The road surface is assumed to be 14mm chip seal, which represents the worst-case for noise emissions;
- Vehicle speed is assumed to be 70km/hr;
- A traffic volume of 12,660 vehicles per day is assumed based on the ultimate development of Onslow.

The following table identifies the outdoor noise criteria stipulated in SPP5.4.

TABLE 4 – OUTDOOR NOISE CRITERIA (SOURCE: WAPC)

Period	Target	Limit
Day (6am to 10pm)	55 dB LAeq(Day)	60 dB LAeq(Day)
Night (10pm to 6am)	50 dB LAeq(Night)	55 dB LAeq(Night)

The predicted daytime noise levels at the Onslow Salt noise monitoring location at the end of Clarke Place is 53 dB.

The noise modelling shows that for the most part, the noise target will be achieved at existing residences. The one exception is a residence at the end of Anketell Court, which is subject to noise levels between 55-60 dB during the day. It is noted that there are no areas where the noise limit will be exceeded. In accordance with SPP5.4, it is reasonable for a road to be constructed adjacent to existing houses provided that the noise limit is not exceeded.

As such the proposed new access road location is considered satisfactory, although noise mitigation measures should be considered where practicable.

Any future residential development should not be permitted in areas above the limit. In some sections the daytime noise limit contour extends beyond the proposed road reserve. If houses closer to the road are desirable, consideration will need to be given to noise mitigation and acoustic design measures adopted so that the noise impacts are minimised at these locations.

The most practical solution would likely be to reduced traffic speeds or construct the road using a quieter road surface through these critical sections.

4.4.7.2 Airport/Port

The existing noise levels based on current aircrafts operating out of Onslow Airport are not considered to represent a constraint to development. The Shire of Ashburton are currently undertaking work to realign and upgrade the airport to allow larger aircrafts to access Onslow, however due to the runway being realigned away from the townsite, it is not considered to have any impact on the urban expansion area.

4.4.7.3 Onslow Salt

As part of LandCorp's ongoing work to deliver land in Onslow, Amendment No. 19 (which relates to various infill lots) was referred to the Environmental Protection Authority (EPA) for assessment. As part of its assessment of Amendment No. 19 to TPS7, the EPA advised the following in regards to potential noise impacts on the townsite from Onslow Salt:

- *“Notification to be placed on the certificate of title of each new subdivided lot wholly or partly within 500m of Onslow Solar Salt operation to alert prospective purchasers to the potential noise impacts; and*
- *The facades of buildings fronting or perpendicular to the Onslow Solar Salt operation incorporate architectural treatments to minimise noise impacts.”*

Therefore it is considered that any issues relating to noise can be appropriately managed at subdivision and development application stage through notifications on titles and acoustic design measures, as recommended by the EPA. Furthermore, provisions to address noise will also be incorporated into future design guidelines, where appropriate.



4.4.8 WASTE WATER TREATMENT PLANT BUFFER

Given the potential constraints the WWTP buffer places on land and the various elements involved in the assessment of actual boundary of the buffer area, the Structure Plan illustrates the potential for residential development within the existing buffer area. However, the Structure Plan states that an odour model assessment must be undertaken prior to the approval of any development or subdivision application within the WWTP buffer.

Irrigation systems should also include either a soil moisture or evapo-transpiration sensor to help prevent unnecessary irrigation in the event of mild weather or rain event.

Final tree species are yet to be selected however it is anticipated that primarily native species will be selected for residential streets. The planting of vegetation is expected to commence upon completion of civil engineering works, prior to the construction of homes. The landscape design will incorporate recreation and environmental requirements, whilst focusing on maintenance minimisation principles and techniques to ensure the long term viability and sustainability of these open spaces.

4.4.9 PUBLIC OPEN SPACE AND RELATIONSHIP TO NATURAL ENVIRONMENT

Emerge Associates were commissioned by LandCorp to develop a Landscape Design Strategy to ensure that any landscaping within the Structure Plan area can be appropriately managed and maintained, whilst minimising maintenance resources (refer to Appendix 5).

The Structure Plan proposes to provide 5% of the developable area as POS (Refer to Appendix 6).

As part of the Structure Plan, multiple use/drainage corridor parks are proposed. These corridors will form part of larger corridor system that dissects the future expansion area from west to east connecting the existing natural bushland surrounding the Onslow Salt Operations to the tidal flats of Beadon Creek. If possible, existing vegetation will be retained within these corridors to assist in fulfilling an environmental role such as habitat including flora and fauna linkages, with the connection to the surrounding existing ecosystems.

A number of medium sized to smaller local parks will be provided in the Structure Plan area. Typically these parks will consist of a central built feature such as a picnic shelter and playground or BBQ only. Where playgrounds & BBQ's are included, appropriate shading with shade sails or fixed structures will be incorporated. Turf areas for small scale active recreation are to be kept to areas which are functional and fit for purpose in their sizing.

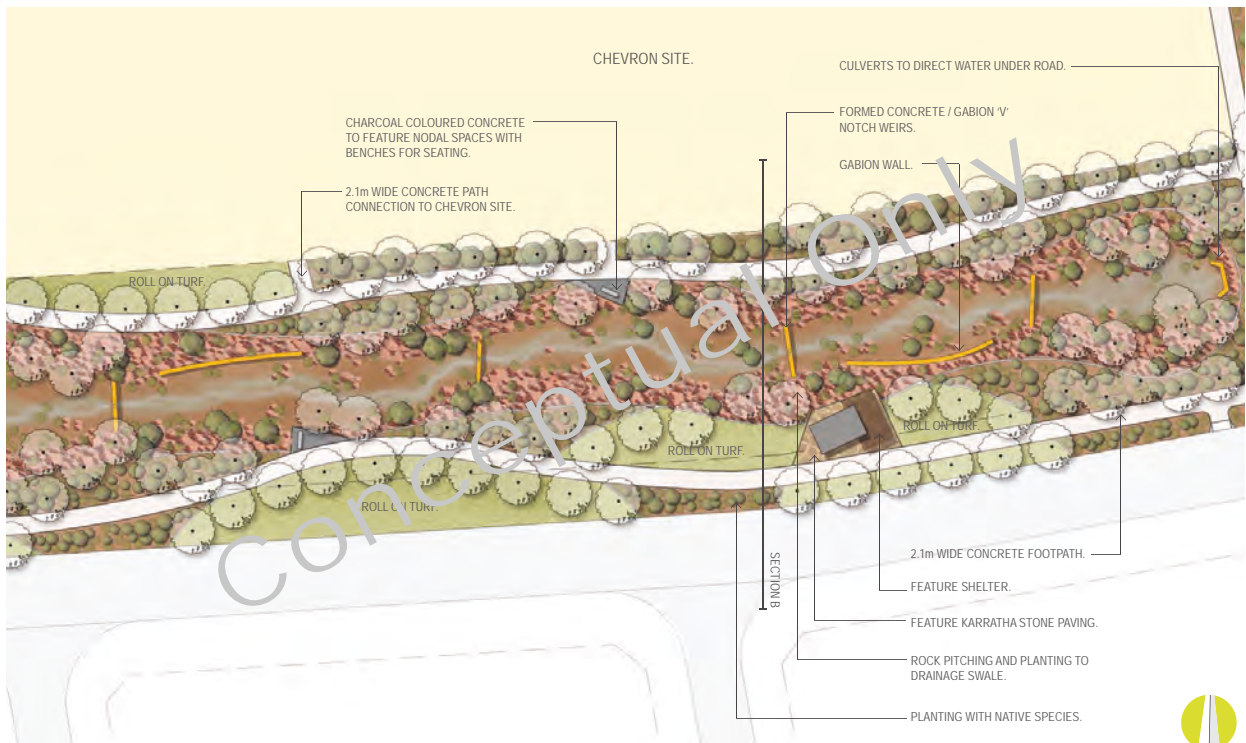
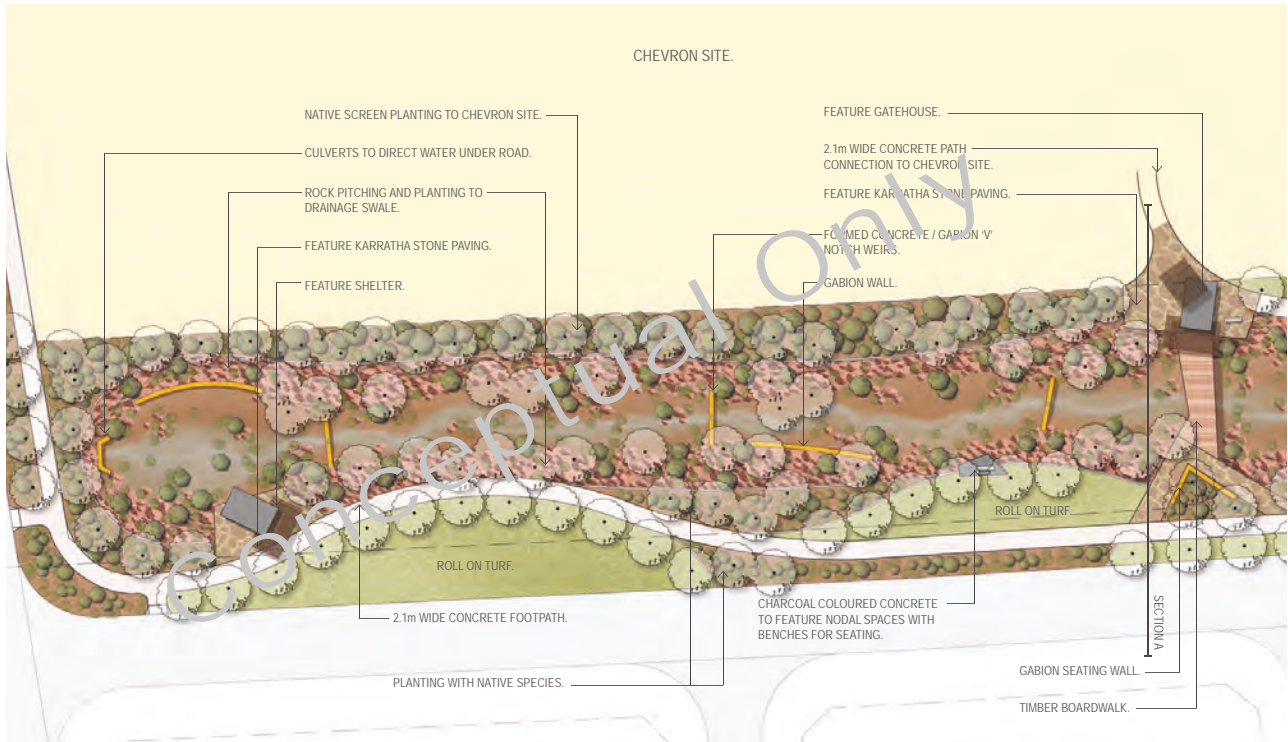
Hard landscape areas shall reflect the local materials available within the north-west, but be adequately shaded with trees to prevent oppressive solar radiation. Path systems will link to the adjoining residential streets to provide access as necessary in accordance with Australian Standards and disability requirements.



POS CONCEPTS (SOURCE: EMERGE ASSOCIATES)



POS/ DRAINAGE CONCEPT (SOURCE: EMERGE ASSOCIATES)



4.5 COASTAL VULNERABILITY

4.5.1 SEVERE STORM SURGE (S1)

MP Rogers & Associates (MP Rogers) was commissioned by LandCorp to undertake an assessment of the appropriate setback to account for the action of physical coastal processes in line with the State Coastal Planning Policy (SPP2.6), as well as to investigate potential coastal inundation in order to determine the appropriate development levels (refer to Appendix 7).

Onslow is located north of latitude 30 degrees within the cyclone prone area identified by SPP2.6. Subsequently, the impact of cyclonic events is to be used for calculations of the Severe Storm Erosion (S1) allowance at Onslow. Furthermore, the coastline around Onslow is relatively exposed with only a few small islands located offshore, therefore Onslow is expected to bear the majority of the force from an approaching cyclone.

Storm surges at Onslow are likely to be dominated by cyclonic activity. Cyclones and low pressure storms close to the Onslow coastline will create increased water levels due to the barometric pressure difference. The magnitude of this water level rise is dependent on the central pressure of the cyclone and the proximity to the cyclone's eye.

Severe storm erosion modelling was undertaken on the following six profile intervals, with each representing distances inland from the shoreline:

1. Interval 0m – 5,200m
2. Interval 5,200m – 6,400m
3. Interval 6,400m – 7,800m
4. Interval 7,800m – 8,600m
5. Interval 8,600m – 9,400m
6. Interval 9,400m – 10,200m

During the severe storm erosion modelling it was observed that the majority of the S1 allowance for Profile 6 (Intervals 9,400m to 10,200m) was caused by elevated water levels overtopping the +3m AHD primary dune system. These low dune heights are believed to be the result of rapid shoreline accretion, which has prevented the build up of substantial primary dune heights.

The large S1 value for Profile 6 (Intervals 9,400m to 10,200m) is therefore more attributed to inundation of the profile, rather than erosion. It follows therefore that if development of this area was required, filling and earthworks could be used to greatly reduce the inundation of the profile and therefore the S1 allowance. If this filling is undertaken it would be reasonable to expect an erosion response similar to that determined for Intervals 8,600 m to 9,400 m. As a result, a S1 allowance of between 78 and 253 m would be appropriate for this section of coast depending on the amount of filling and earthworks that would be completed.

Table 5 outlines the simulated severe storm erosions for Onslow using the SPCP storm.

TABLE 5 – SEVERE STORM EROSION SUMMARY (SOURCE: MRA)

Intervals	S1 Allowance
0 – 5,200m	63m
5,200 – 6,400m	68m
6,400 – 7,800m	99m
7,800 – 8,600m	30m ¹
8,600 – 9,400m	78m
9,400 – 10,200m	78m ² – 253m

¹ 30m recommended to allow for potential damage to the sea-wall and wave overtopping.

² 78m S1 allowance is based upon the area being filled before development.

4.5.2 HISTORICAL SHORELINE MOVEMENT (S2)

S1 is considered to account for the short term changes to the shoreline, whereas S2 is intended to account for the longer term storm timescale of shoreline change. To determine the S2 allowance, MP Rogers have examined historical shoreline movement trends and predicted likely future shoreline movements.

Based on MP Rogers shoreline movement modelling in accordance with SPP2.6, the appropriate S2 allowance for the 100 year planning horizon for Intervals 0m – 1,200m is 219m.

4.5.3 SEA LEVEL CHANGE ALLOWANCE (S3)

In 2007, SPP2.6 recommended an estimate of sea level rise based on the mean of the median model of these scenarios, which equated to a rise in sea level of approximately 0.38m over 100 years. However, the recent position statement released by the WAPC in 2010 requires that development now allows for a 0.9m sea level rise by 2110.

SPP2.6 requires that for sandy coasts, like Onslow, the recession be taken as 100 times the estimated rise in sea level. This would be 90m based on WAPC's position statement. Therefore the S3 factor is taken to be 90m for the Onslow coastline, except for the area protected by the seawall. Due to the engineering nature of the seawall and its founding at 0m AHD, it is considered that the seawall would be able to withstand the higher prediction of 0.9m sea level rise to 2110 provided it is maintained and upgraded as required. Therefore no S3 allowance is included between Intervals 7,800m – 8,600m.

4.5.4 TOTAL RECOMMENDED SETBACK

Based on the appropriate allowances for S1, S2 and S3, the required setback to development required to adhere to the requirements of SPP2.6 can be established. Table 6 summarises the required allowances and outlines the required physical process setback (PPS) for Onslow, and this is further illustrated in Figure 12.

TABLE 6 – TOTAL RECOMMENDED PHYSICAL PROCESSES SETBACK

		Allowance for Intervals						
Factor	0m – 1,200m	1,200m – 5,200m	5,200m – 6,400m	6,400m – 7,800m	7,800m – 8,600m	8,600m – 9,400m	9,400m – 10,200m	
	S1	63m	63m	68m	99m	30m ¹	78m	78m ² – 253m
S2	219m ³	20m	20m	20m	0m	20m	0m	
S3	90m	90m	90m	90m	0	90m	90m	
Total Recommended PPS	372m	173m	178m	209m	30m ⁴	188m	168m ² – 343m	

- 1 Allowance for possible seawall damage and wave overtopping.
- 2 Based upon the area being filled before development.
- 3 Precautionary allowance for proximity to 4 Mile Creek entrance.
- 4 Relative to the rear of the seawall crest.

The PPS is to be measured from the horizontal setback datum (HSD), which for this section of coast is the seaward extent of the ephemeral vegetation. Where the seawall is located the PPS is considered to be taken from the rear of the seawall crest.

Where the required setback changes along a continuous section of coastline a 200m transition zone is used. Changes to the required setback distance are linearly apportioned over this 200m transition zone. This has been considered in the preparation of the proposed Structure Plan.

4.5.5 SEVERE STORM INUNDATION

As part of MP Rogers' investigations, the inundation of the area surrounding Onslow was also mapped for the 100 year event, for both the current day scenario as well as for the year 2110, which represents a 100 year planning horizon.

Given the proximity of the Onslow townsite and proposed development areas to the coastline it is expected that these areas would experience the full coastal inundation water levels and therefore an inundation level of +5m AHD was used for the study. Based on the modelling by MP Rogers', a substantial area of the Onslow townsite and its surrounds could be inundated under the +5m AHD design event water level.

It can be seen that the Onslow Salt Jetty acts as a narrow channel allowing inundation to occur behind the dune systems. Even without this breach, the low-lying area behind the western dunes would be inundated as flood waters flow north from Four Mile Creek. Beadon Creek also acts as an open floodway allowing inundation of the townsite from the east as well as inundation of the land surrounding the Onslow Airfield.

The exact elevation of water levels inland from the coastline would have to be determined through the

use of extensive hydrodynamic modelling. However for those regions close to the coastline the +5m AHD inundation level is believed to be accurate.

In order to determine the inundation level for 2110, a sea level rise allowance of 0.9m was added to the +5m AHD. Based on modelling using the greater inundation level, it can be seen that there are substantially more channels through the dune systems surrounding Onslow than for the 2011 inundation modelling. This is likely to indicate that the inland inundation water levels are more similar to the coastal water levels.

Four Mile Creek and the breaches through the Beadon Point dunes will allow inundation of the land behind the western dune systems.

Beadon Creek continues to act as an open floodway allowing inundation of the townsite from the east as well as inundating the land surrounding the Onslow Airport.

The exact elevation of water levels inland from the coastline would have to be determined through the use of extensive hydrodynamic modelling. However for those regions close to the coastline the +5.9m AHD inundation level is believed to be accurate.

4.5.6 RECOMMENDED FINISHED FLOOR LEVELS

It is recommended by MP Rogers' that the finished floor levels (FFL) for development should include a freeboard (or factor of safety) above the identified inundation level to minimise the risk of inundation during extreme events. For residential or non-emergency response infrastructure, MP Rogers' recommends a freeboard of 0.5m. The recommended FFL's are outlined in table 7.

TABLE 7 - FFL'S FOR RESIDENTIAL & NON-EMERGENCY RESPONSE INFRASTRUCTURE

100 year water level	5.0m AHD
Allowance for Climate Change to 2110	0.9m
Factor of Safety	0.5m
Total Recommended FFL for Residential or Non-Emergency Response Infrastructure	6.4m AHD

The above is considered an acceptable level of risk. However it is generally accepted that a lower level of risk should be adopted for critical infrastructure, particularly infrastructure that would be required in response to an emergency. This would include hospitals, evacuation centres, emergency services and the like. In light of this, MRA recommends the freeboard be increased, in accordance with table 8.

TABLE 8 - FFL'S FOR CRITICAL INFRASTRUCTURE

100 year water level	5.0m AHD
Allowance for Climate Change to 2110	0.9m
Factor of Safety	1.5m
Total Recommended FFL for Residential or Non-Emergency Response Infrastructure	7.4m AHD

Conversely, for low value infrastructure such as industrial land and transport laydown areas, a higher level of risk could be adopted, as well as a reduced planning horizon, however these types of developments should be considered individually on their own merits.

It should be noted that the FFL's recommended by MRA refer to the floor level of infrastructure. It may be possible that the floor level of infrastructure is elevated above the surrounding ground level, however it would also be recommended that the ground level be sufficiently elevated to withstand the 100 year water level event at the end of the planning horizon (i.e. 5.9m AHD or greater).

4.5.7 DRAFT SCHEME AMENDMENT No. 24

The intent of Scheme Amendment No. 24 is to insert provisions into TPS7 to provide the opportunity to allow development to occur that reflects the direction of State Planning Policy 2.6 and 3.4. Importantly, the draft provisions acknowledge a different development level requirement for commercial and residential development, with the commercial development on the ground floor above the 50 year ARI development level.

Importantly, Amendment No. 24 provides a realistic means by which Onslow can develop in the foreseeable future. The Shire has reviewed the MP Rogers report and concluded that in order to reflect the requirements of SPP2.6 and 3.4, that a finished floor level for residential or non emergency response infrastructure (i.e. essentially all residential landuse) of 5.9m AHD is necessary (rather than 6.4m AHD).

Amendment No. 24 aims to ensure that residential development reflects a minimum floor level above the 100 year ARI development level. The benefit of this approach is that it helps to preserve the streetscape of the Onslow townsite by maintaining a development presence nearer to the existing street levels. The current Scheme approach requiring commercial development to be above the 100 year ARI level would mean that there would be no opportunity for development to reflect street level as it would be in 2060. Depending on the location of the 'temporary use', a development may be approved to finished floor level equivalent to 25 year ARI in 2040 (where the finished floor level is to be between 4.0m - 4.8m AHD) but such uses will need to be removed at the end of 2040. Where a defined finished floor level is between 4.9m - 5.8m AHD, but such uses will need to be removed or adapted at the end of 2060.

All Planning Approvals within the revised Onslow Coastal Hazard Area will require a memorial on title that clearly defines that the development on the land may be subject to storm surge and flooding.

4.6 HYDROLOGY/LOCAL WATER MANAGEMENT STRATEGY

Hyd2o were commissioned by LandCorp to undertake a hydrological assessment of Onslow and prepare a Local Water Management Strategy (LWMS) (refer to appendix 8). The LWMS provides an integrated total water cycle management approach to the entire Structure Plan area, with an assessment of the pre-development environment, development of water use sustainability initiatives, a stormwater and groundwater management strategy and a plan for implementation of future subdivision plans.

The LWMS has been prepared in accordance with the principles, objectives and key criteria of the WAPC's Better Urban Water Management, the constraints and opportunities identified for the existing drainage system and input from key government agencies including the Department of Water (DoW), the Water Corporation (Water Corp) and the Shire of Ashburton.

4.6.1 PREDEVELOPMENT ANALYSIS

Based on an analysis of the pre-development environment, the following key constraints and opportunities were identified:

- The site is not subject to surface water flooding from regional watercourses;
- Groundwater levels are well below the likely development levels of the site and are unlikely to be a key factor for the establishment of development levels and stormwater infrastructure, except when considering any improvements to the performance of the existing low lying stormwater basins for the existing townsite;

- Coastal inundation and storm surge will be a key factor in establishing development levels within the site;
- Local groundwater of suitable quality for use in irrigation of public open spaces and drainage corridors is likely to be limited and alternative water sources and technologies for any irrigation of these areas will be necessary; and
- Testing of hydraulic conductivity indicates infiltration of stormwater on site during frequently occurring events is feasible to retain stormwater on site and protect receiving environments.

4.6.2 DESIGN CRITERIA

A series of design criteria were developed from the hydrological analysis undertaken and these were used to inform the design of the Structure Plan. Table 9 outlines the key elements and their associated design criteria.

TABLE 9 - KEY ELEMENTS

Strategy Elements	Criteria
Water Use Sustainability	
Water Efficiency	Reduce consumptive use through adoption of waterwise practices
Water Supply	Develop 'fit for purpose' water supply strategy and minimise potable water use where drinking quality water is not essential
Wastewater	Provide a wastewater system which meets agency requirements
Stormwater	
Flood protection	Provide flood paths for overland flows with the development area which exceed the capacity of piped drainage Provide 100 year ARI floodways for safe conveyance of flood flows from the site Establish minimum habitable floor levels at 0.5m above the 100 year ARI flood levels
Serviceability	Road drainage system to be designed so that roads will be passable in the 1 in 5 year event
Ecological Protection	1 in 1 year 1 hour storm event to be retained on site (where possible) otherwise 1 year flows maintained at estimate predevelopment levels Establishment of storage invert levels no lower than seasonal maximum groundwater levels Implement non-structural controls
Groundwater	
Fill Requirement and Subsoil Drainage	Establish development levels with acceptable clearance above post development groundwater levels If require, provide subsoil drainage to control any post development groundwater rise
ASS and Contamination	If required, criteria and management of ASS to be handled as a separate process to LWMS consistent with Department of Environment requirements

Stormwater Management

Based on the hydrological modelling undertaken, the following structural and non-structural stormwater controls have been identified and incorporated into the Structure Plan:

Non-Structural Controls

- Planning: POS locations and configurations (including multiple use corridors);
- Landscape: vegetation (native plantings) and soil selection, water sensitive urban design (WSUD) integration;
- Education: Point of sale WSUD education package;
- Maintenance: POS areas, street sweeping, manhole education; and
- Monitoring: Post development program and review.

Structural Controls

- Bioretention storage: 1 year treatment area;
- Use of natural detention storage areas; and
- Establishment of swales in linear POS corridors.

The above measures represent best practice design as outlined in DoW's Stormwater Management Manual for WA (2007).

4.6.3 GROUNDWATER MANAGEMENT

Finished lot levels will be in excess of 4m above the maximum groundwater table within the site, therefore there is no subsoil drainage required for the proposed development. No imported fill is required and earthworks will be undertaken across stages, as earthworks for the site will comprise a cut to fill operation.

Water quality aspects of groundwater management will be achieved via biofiltration areas located in POS and drainage corridors to treat stormwater runoff prior to infiltration.

4.6.4 COASTAL INUNDATION MANAGEMENT

As detailed in section 4.5 of this report, MP Rogers detail a total recommended finished floor level of 6.4m AHD, inclusive of a 0.5m freeboard. However, this Structure Plan reflects the Shire's position in support of a finished floor level of 5.9m AHD.

Following a storm event, flow paths for the exit of coastal inundation from the existing townsite is recommended that the existing watercourse/drain which flows to the Beadon Creek harbour be extended toward the town and graded appropriately to enable drainage from the townsite to access this outlet.

4.6.5 URBAN WATER MANAGEMENT PLANS

It is anticipated that individual Urban Water Management Plans (UWMP) will be prepared and submitted to support future subdivision applications. These UWMP's will address:

- Demonstrated compliance with LWMS criteria and objectives to the satisfaction of the Shire and DoW.
- Agreed/approved measures to achieve water conservation and efficiencies of water use.
- Detailed stormwater management design including the size, location and design of public open spaces, integrating major and minor flood management capability.
- Management of groundwater levels including proposed development levels and any subsoil drainage, if required.
- Specific structural and non-structural BMPs and treatment trains to be implemented including their function, location, maintenance requirements, expected performance and agreed ongoing management arrangements.
- Management of subdivision works, including development of a strategy for sediment control during construction.
- Implementation plan including roles, responsibilities, funding and maintenance arrangements.
- Specific monitoring and reporting to be undertaken for each UWMP area consistent with the monitoring program defined in the LWMS.
- Contingency plans, where necessary.

It is expected that further details relating to POS and drainage integration will be provided through future UWMP’s, including refinement of stormwater modelling, preparation of detailed landscaping plans and detailed design drawings. Preparation of UWMP’s will be the responsibility of future proponents.

4.6.6 MONITORING

It is not envisaged that any further additional pre-development groundwater or surface water modelling will be required to inform the UWMP and subdivision process.

Given the depth to groundwater over the site, post-development monitoring of groundwater levels is not proposed. Similarly, as surface flows for frequently occurring storm events are proposed to be retained and infiltrated within the site, monitoring of surface water quality is not considered necessary.

On this basis, an alternative monitoring program of system performance is recommended for the site against a standardized proforma, which will assess the performance of the system against its design. Further details of the monitoring program are to be identified in future UWMP’s, however as a guide, table 10 outlines the monitoring schedule.

TABLE 10 - MONITORING SCHEDULE

Monitoring	Method	Frequency/ Timing
Piped System	Inspect for sedimentation. Identify areas where piped drainage system capacity has been exceeded within monitoring period.	Minimum twice yearly for 3 years post development
Swales	Inspect for erosion and deposition.	
Drainage Corridors	Assess peak levels within monitoring period against original design.	
Bioretention/ Infiltration Areas	Assess vegetation health.	
Receiving Environments	Review frequency of offsite discharge. Assess status of receiving environments.	

4.6.7 MOSQUITO HAZARD

Development in close proximity to mosquito breeding habitat pose a significant threat to public health. In order to protect the health and lifestyle of communities, planning for new communities needs to have due regard to the proximity of mosquito breeding habitat and its potential impact on future land use.

To minimise disease vector and nuisance insect impacts, the stormwater strategy for the site is based on retention and infiltration of stormwater during minor events, with all new stormwater storage and infiltration areas located well above the regional groundwater table.

With respect to infiltration timeframes, infiltration modelling performed for the site indicates that water will be infiltrated within all swales and storages well within a day after a storm event, which complies with Better Urban Water Management (WAPC, 2008) requirements with respect to disease vector and nuisance insect management of infiltration within 96 hours.

In terms of stormwater, disease vector and nuisance insect impacts are therefore not considered to be a problem for the site.

For the existing townsite, the local water management strategy (LWMS) also provides detailed information of the existing drainage system and its performance which will ultimately assist the Shire in addressing any existing disease vector and nuisance insect issues.

4.7 GEOTECHNICAL

Golder Associates (Golder) were employed to undertake a desktop geotechnical analysis of the Structure Plan area (refer to Appendix 9). Based on Golder's report, the following geological units are identified as present within and close to the Onslow townsite:

- Beach and coastal sand dunes (Qs) - light grey sand and unconsolidated and poorly consolidated quartzose calcarenite. This unit occurs over the majority of the site and may comprise a variable cover of sand over limestone.
- Limestone units (Qbt) - calcarenite and calcirudite, coralgall reef deposits, shallow marine and minor eolian. This unit occurs adjacent to the north east of the site.
- Clay pan deposits (Qp) - poorly sorted clay, silt, sand and minor pebbles. This unit occurs to the west of the site.
- Supratidal flats (Qt) - calcareous clay, silt and sand with authigenic gypsum and superficial algal mats and salt crusts. This unit occurs relatively close to the eastern boundary of the site.
- Intertidal flats and mangrove swamps deposits (Qw) - calcareous clay, silt and sand. This unit similarly occurs relatively close to the eastern edge of the site.

The results of the study indicate that the Structure Plan area is likely to be relatively level and underlain predominantly by beach and coastal dune deposits. It is also likely that limestone units may be encountered at shallow depths. These areas will require careful consideration during earthworks.

In regards to site works required to facilitate subdivision, the in situ material removed during earthworks is considered to generally be suitable for re-use as structural fill. This is important given the scarcity of suitable fill sources in Onslow.

The permeability of sandy soil may also be suitable for onsite disposal of stormwater, however this is dependent on the percentage of silty or clayey fines within the material. The permeability of the soil is to be assessed during a pre-earthworks investigation.

LandCorp is currently working with Department of Premier and Cabinet and DIA to obtain consent to disturb the ground in order to further investigate environmental issues and undertake detailed geotechnical investigations.

4.8 HERITAGE

4.8.1 EUROPEAN HERITAGE

There are no buildings or places of European heritage significance listed on the State Register or National Trust Register located on the Structure Plan area.

The Onslow townsite contains a number of Category B and C heritage sites on the Municipal Inventory. None of the identified sites on the Municipal Inventory are located on the subject site.

REFER TO FIGURE 13 - MUNICIPAL INVENTORY MAP



FIGURE 13 - MUNICIPAL INVENTORY MAP



4.8.2 INDIGENOUS HERITAGE

A search of the Department of Indigenous Affairs Aboriginal Heritage Enquiry System has been undertaken and has identified the following Registered Aboriginal Sites and Surveys within proximity to the study area:

TABLE 11 - REGISTERED ABORIGINAL SITES, ONSLOW

Registered Aboriginal Sites, Onslow							
Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Information	Site No.
6617	Permanent Register	Closed	No Restriction	Burubarladji	Mythological	-	P06362
6618	Permanent Register	Closed	No Restriction	Dew Talu	Ceremonial	Water Source	P06363
6620	Permanent Register	Closed	No Restriction	Jinta 2.	-	Water Source	P06365
8920	Permanent Register	Open	No Restriction	Onslow 1	Artefacts/ Scatter, Midden/ Scatter	-	P03563
24401	Lodged	Open	No Restriction	Os06-01	Artefacts/ Scatter, Midden/ Scatter	Archaeological Deposit, Shell	-

Whilst five registered sites are listed as in or around the study area, advice from DIA has confirmed only one site (8920) is actually located within the borders of the Structure Plan. The site is located in the area of the Structure Plan that is shown on the north of Simpson Street. This parcel of land is considered a longer term development opportunity as it is also potentially constrained by changes to state policy on coastal setbacks. Further investigations will be required before any potential development could occur.

TABLE 12 - ABORIGINAL HERITAGE SURVEYS, ONSLOW

Aboriginal Heritage Surveys, Onslow		
Report ID	Catalogue Number	Title
17410	HSR P 1984 KEE (OWE)	Report of the Survey for Aboriginal Sites. Onslow - Mt Stuart Road, West Pilbara, WA.
20598	HSR GM 2003 MUR	Report on Aboriginal Heritage Investigations: Proposed Onslow road train assembly area, borrow pit expansion area, and Ashburton fencing programme.
17913	HSR P 1989 QUA (OWE)	Report on a Survey for Aboriginal Sites at the Proposed Exmouth Salt Pty Ltd Saltworks, Onslow. December 1989.

If any proposed ground disturbance will affect an Aboriginal site protected by the Aboriginal Heritage Act, a Section 18 Application to disturb the site under the Aboriginal Heritage Act will be required.

FIGURE 14 - NATIVE TITLE DETERMINATION IN ONSLOW TOWNSITE

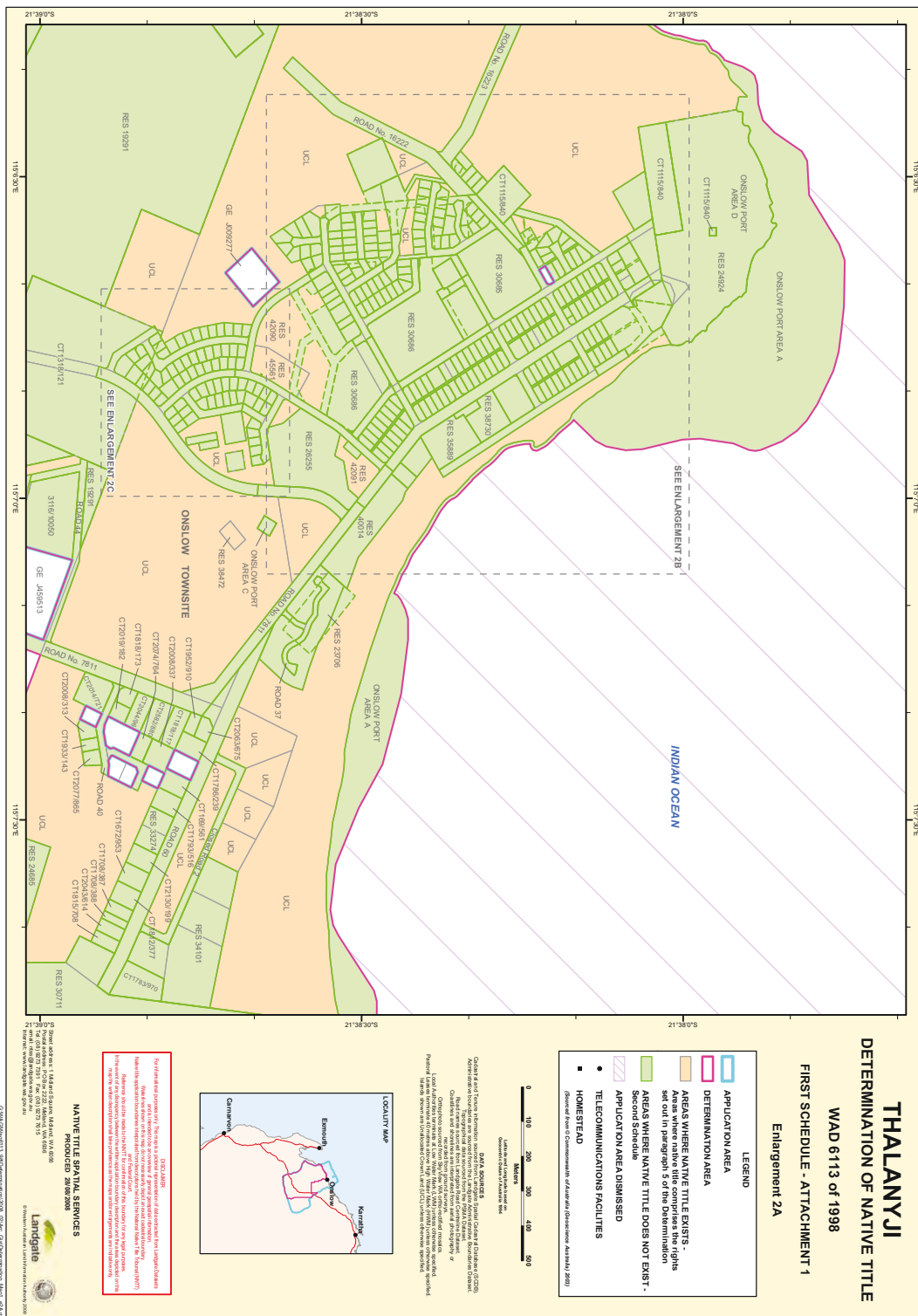
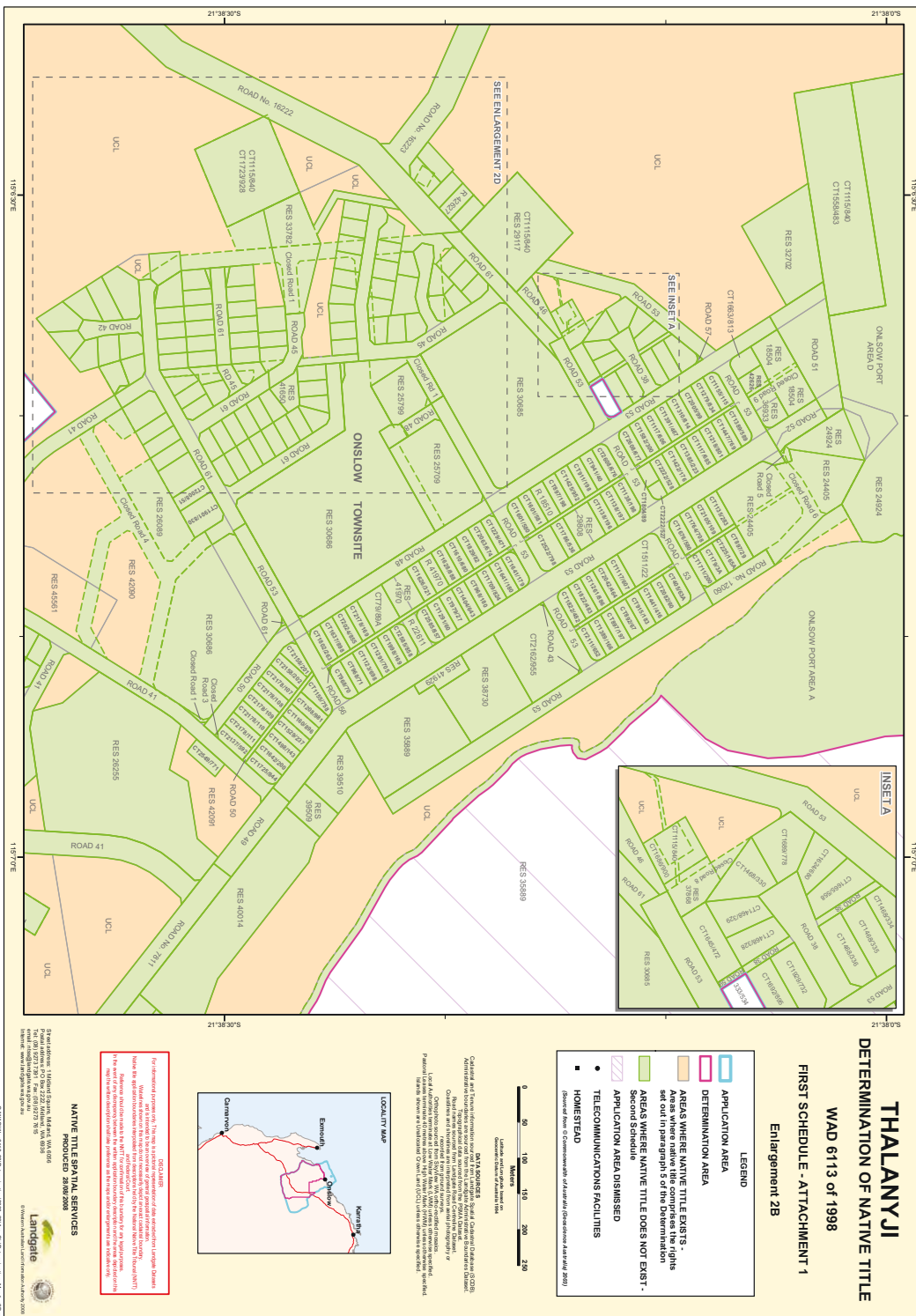


FIGURE 15 - NATIVE TITLE DETERMINATION IN ONSLOW TOWNSITE



4.9 TRAFFIC AND MOVEMENT

Riley Consulting was commissioned by LandCorp to assess and report on the traffic and transport impacts from the expansion of the Onslow townsite (refer to Appendix 9). The findings of the report are outlined below.

4.9.1 TRAFFIC IMPACT ASSESSMENT

The forecast traffic volumes are included in table 13 in order to determine whether, from a general planning perspective, any roads require upgrading. The traffic volumes shown in table 13 are based on ultimate residential development figures.

TABLE 13 – LOCAL ROADS REVIEW SUMMARY WITH FULL DEVELOPMENT

Road	Type	Volume (vpd)	Comment
First Avenue	Access Street	<100	Appropriate flow for classification
Second Avenue	District Distributor	2,800 - 3,600	Appropriate flow for main street
Third Avenue	Access Street	400 - 950	Appropriate flow for classification
First Street	Access Street	550	Appropriate flow for classification
Simpson Street	Local Distributor	1,610	Appropriate flow for classification
Cameron Avenue	Access Street	940	Appropriate flow for classification
McGrath Road	Local Distributor	<500	Appropriate flow for classification
Watson Drive	Local Distributor	1,200	Appropriate flow for classification
Beadon Creek Road	Local Distributor	<1,000*	Appropriate flow for classification

* Subject to level of access provided by industrial development

The expected traffic demands on the existing road network are considered to fall within the desirable daily flows appropriate to their classification. Onslow - Mount Stuart Road, which is the primary regional road linking Onslow to the North West Coastal Highway, is currently being upgraded from a 6 metre wide carriageway, to a 7.2 metre wide carriageway with 1 metre sealed shoulders. This upgrade is being undertaken by Main Roads WA and is necessary to meet the expected demands from the Onslow townsite expansion and development of the ANSIA.

4.9.2 PROPOSED ROAD LAYOUT

Following on from Table 13, the following table 14 outlines the general design characteristics for each of the road classifications applicable to Onslow, as per Liveable Neighbourhoods. It should be noted that the cross-sections are indicative only and the final width of each of the roads, namely the new access road which is identified as a neighbourhood connector road, is to be determined upon detailed design, to the satisfaction of the Shire.



TABLE 14 – ROAD HIERARCHY AND GENERAL DESIGN

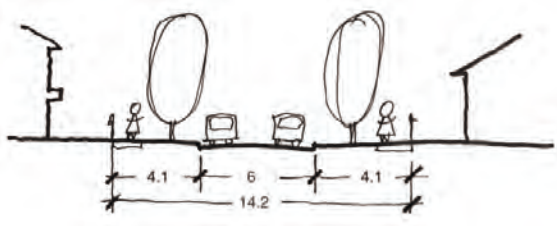
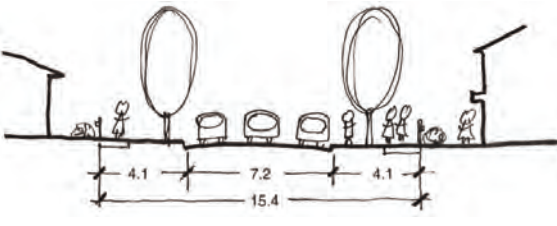
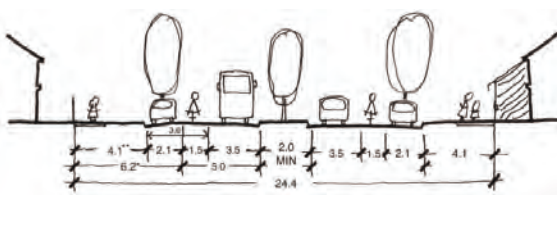
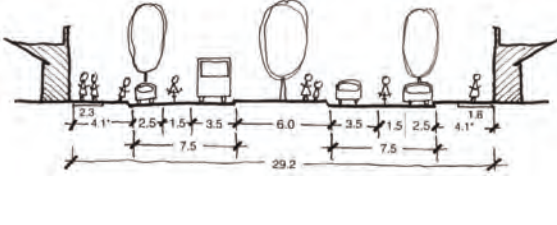
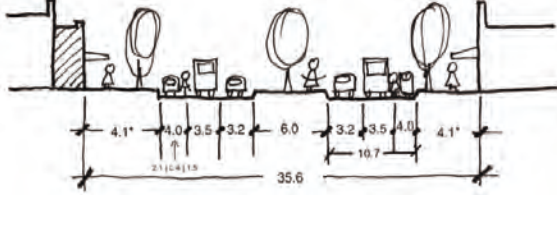
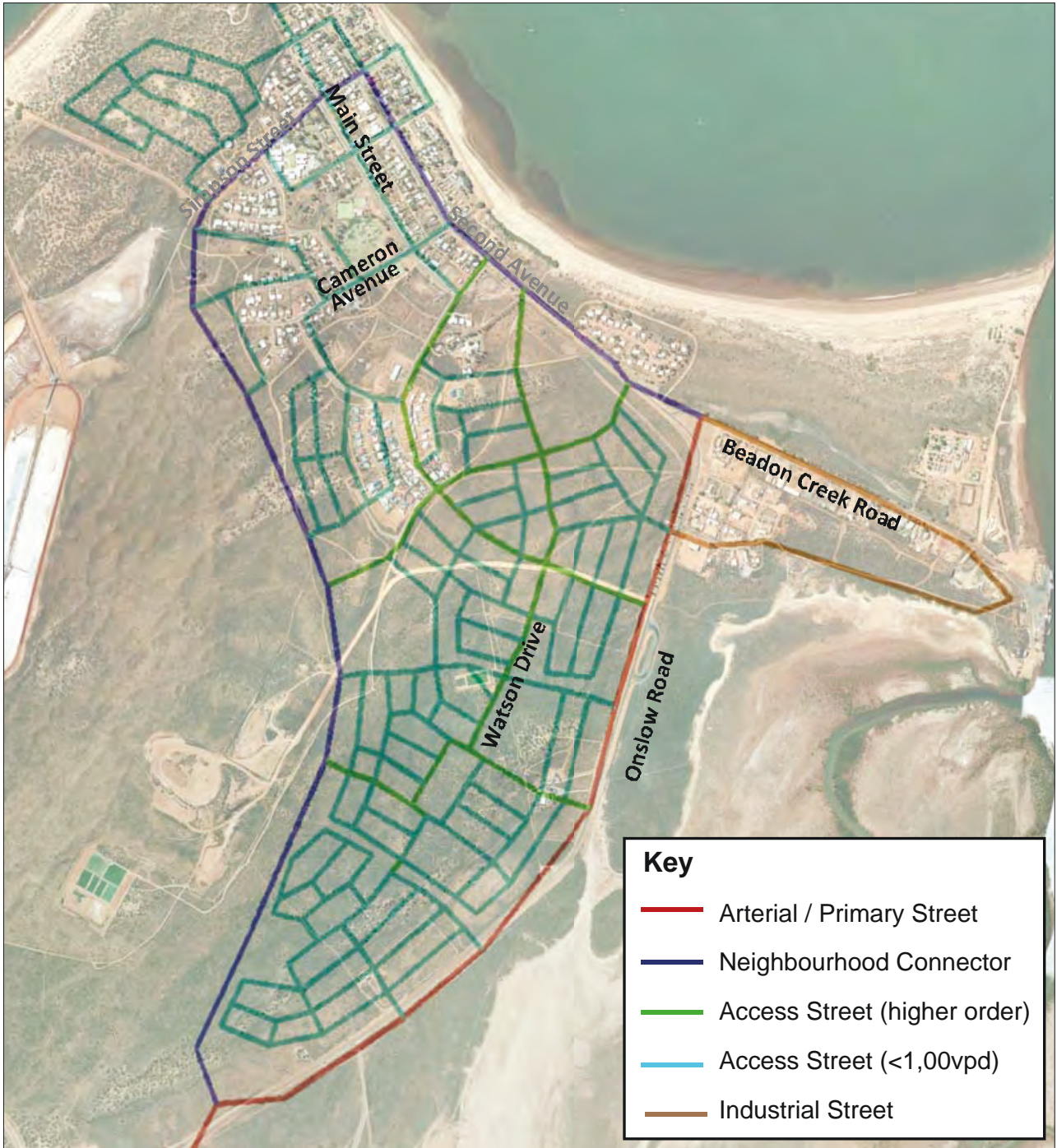
Indicative Daily Traffic Flow	Classification	Design Characteristics	Cross Section Liveable Neighbourhoods
<1,000	Access Street	Narrower access streets (5.5 – 6m) may be appropriate in locations further away from centres and activity where traffic flows are less than 1,000vpd and a low on-street parking demand exists.	 <p>A cross-section diagram of an access street. It shows a central roadway of 6.0m width, flanked by sidewalks of 4.1m each. The total width is 14.2m. There are trees and a person walking on the sidewalks, and a car on the roadway.</p>
1,000 – 3,000vpd	Higher Order Access Street	Wider access streets (7 – 7.5m) cater for higher traffic volumes and are located closer to neighbourhood centres.	 <p>A cross-section diagram of a higher order access street. It shows a central roadway of 7.2m width, flanked by sidewalks of 4.1m each. The total width is 15.4m. There are trees and a person walking on the sidewalks, and a car on the roadway.</p>
3,000 – 7,000vpd	Neighbourhood Connector	Generally 2-lan undivided. These are 'special' streets and their design needs to have regard to context, function and adjacent land uses.	 <p>A cross-section diagram of a neighbourhood connector. It shows a 2-lane undivided roadway with a 2.0m minimum median. The total width is 24.4m. Sidewalks are 4.1m wide. Lane widths are 3.5m and 3.0m. There are trees and a person walking on the sidewalks, and a car on the roadway.</p>
7,000 – 20,000vpd	District Distributor B	Typically will have 1 clear lane of travel in each direction and a parking/maneuvering lane.	 <p>A cross-section diagram of a district distributor B. It shows a 1-lane roadway with a 7.5m width, flanked by sidewalks of 4.1m each. The total width is 29.2m. There are trees and a person walking on the sidewalks, and a car on the roadway.</p>
15,000 – 35,000vpd	District Distributor A	Typically have service roads and development frontage with ample on-street parking to support a mixture of land uses. Direct vehicle access from adjoining property should be limited where no service roads are provided.	 <p>A cross-section diagram of a district distributor A. It shows a 1-lane roadway with a 10.7m width, flanked by sidewalks of 4.1m each. The total width is 35.6m. There are trees and a person walking on the sidewalks, and a car on the roadway.</p>

FIGURE 16 - ROAD HIERACHY MAP



4.9.3 TRAFFIC MANAGEMENT

Four way intersections have been incorporated into the Structure Plan as this is consistent with the existing character of Onslow. Riley has stated that these are not considered to be a safety hazard where traffic volumes are less than 2,000vpd. Four-way priority control intersections are also considered appropriate where volumes do not exceed 5,000vpd where an offset on the terminating streets is provided. Alternatively, medians on the terminating streets could also be used.

To reduce the opportunity for speeding, Riley recommends that corner radii, in accordance with Liveable Neighbourhoods, be used within the Structure Plan area. The recommended radii are:

- 6 metres - access street/access street intersections; and
- 9 metres - access street/neighbourhood connector.

Where larger vehicles are expected, such as buses accessing the school, larger radii may be required and should be considered at subdivision stage.

4.9.4 ONSLOW ROAD - ACCESS REVIEW

In November 2011, Riley Consulting also prepared a road review of the current Onslow Road, based on the Vision Plan. The following comments were made in this regard.

Onslow Road has a posted speed limit of 110kph between North West Coastal Highway and the outskirts of the Onslow townsite. The speed limit then reduces to 80kph in the vicinity of the airport. Riley recommends the current 80kph speed limit continue until such time that development occurs adjacent to the road, when a reduction to 70kph is appropriate and should continue through to the port industrial area.

The design of the entry intersection for the town has been planned to accommodate large trucks accessing the port. Therefore traffic using the new entrance road from the town centre will need to give way or stop for traffic on Onslow Road. It is recommended that the intersection and road alignment be designed to an 80kph speed limit, with the future posted speed limit to be 70kph.

To control traffic, Riley outlines that traffic calming devices may be implemented. Riley recommends the following traffic calming measures:

- Devices be placed at intervals of approximately 120m where a target speed of 50kph is required.
- For the new entrance road, devices placed at a spacing of 150 - 200m is sufficient.

The traffic islands could be either be landscaped using water efficient, native vegetation, or the islands could be used to showcase the history of the town or the current land use to create a sense of place.

4.9.5 PEDESTRIAN/CYCLE NETWORKS

Current planning guidelines suggest that all streets be provided with a footpath wherever possible, and where traffic flows exceed 1,000vpd, a footpath should be provided on both sides. The Structure Plan provides for a school site that is within walking distance for the majority of households and therefore roads approaching the school site are to be provided with a footpath to both sides of the road, with one being a shared path.

Cycling is considered to be safe on the majority of local streets where traffic flows do not exceed 1,000vpd. On neighbourhood connector roads, shared paths should be provided as a safe alternative to on-road cycling. Off-street routes are desirable to provide recreational cycling opportunities.

Streets identified as neighbourhood connector roads would usually be appropriate for a bus service. A public transport service is currently not financially viable in Onslow, however private buses are expected to transport workers between the Onslow townsite and the ANSIA. It is also recommended that a sponsored bus service be investigated for the town that can also be used for other activities, outside of mining.

Figure 17 - PEDESTRIAN/ CYCLE NETWORK (SOURCE: RILEY CONSULTING)



4.9.6 CONNECTIVITY, ACCESS AND WALKABILITY

Throughout consultation, walkability and connectivity were consistently raised as a key that needed to be integrated into any future planning for Onslow.

The road network included in the Structure Plan area has been designed to ensure a seamless connection and integration into the existing road network. However a major connection to the existing Second Avenue will act as a spine for the Structure Plan area. McGrath Avenue is also to be extended through the Stage 1 subdivision area and connect to Onslow Road.

The new town entrance road not only forms the western boundary of the Structure Plan area and a major new access route into Onslow, but also provides a major connection between the existing town centre area and the northern expansion areas.

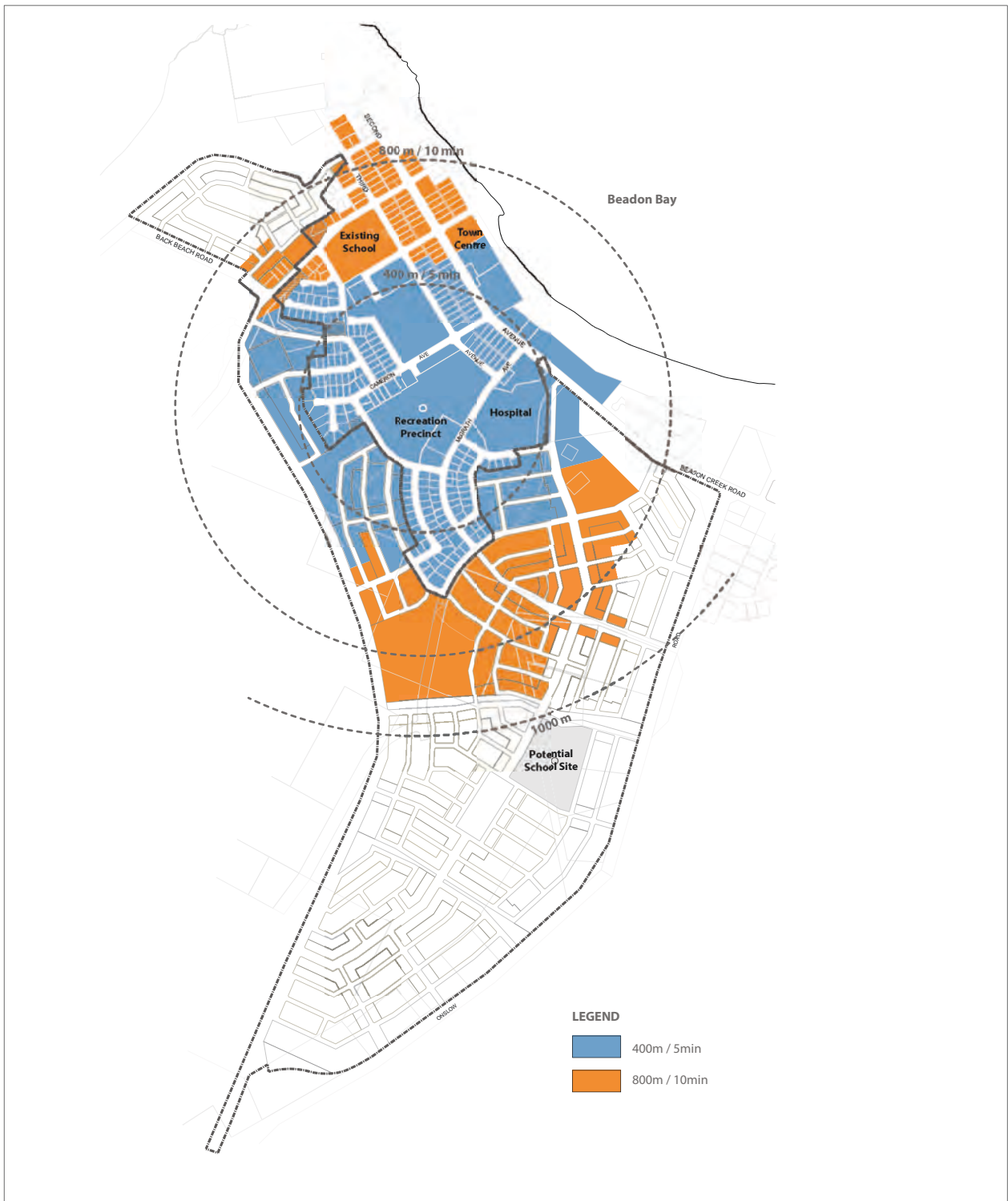
The treatment of intersections, namely four-way intersections has been designed to comply with AustRoads and Liveable Neighbourhoods standards, whilst also being consistent with the existing townsite by avoiding roundabouts, thereby successfully integrating into the existing road network.

The overall street network has been designed to provide short links and block lengths to encourage walkability by establishing shorter distances to parks and community facilities (refer to Figure 18).

The Structure Plan indicates shared paths along the main arterial roads in order to provide safe separation between pedestrians/cyclists and vehicles travelling along these roads. This also allows three major cycle connections; along Onslow Road, the new access road and along the central road through the Structure Plan area, connecting the existing townsite to the expansion area.



FIGURE 18 - ONSLOW TOWNSITE WALKABILITY MAP



Outside of these main arterial roads, where the traffic volumes are significantly less, cyclists are able to safely use the road network. The Structure Plan also identifies a number of roads where footpaths are to be installed on both sides of the road to maximise connectivity and walkability. Within the Stage 1 area specifically, a footpath on both sides is to be installed on the main east-west road connecting Onslow Road to the Chevron site and surrounding expansion area.

In terms of pedestrian and cycle movement throughout Onslow, dual use path's are proposed to be constructed as per Figure 16, as these will achieve the greatest connectivity to the surrounding areas. Key pedestrian linkages are to be designed and treated using shading and other mechanisms to maximise non-vehicle transport. Pedestrian paths will also be provided along one side of each of the lower order access streets.

4.10 ENGINEERING/INFRASTRUCTURE

Wood and Greive Engineers (WGE) have been commissioned by LandCorp to undertake an analysis of the current service infrastructure in Onslow and determine the future needs based on the Structure Plan. WGE's servicing strategy is shown in Appendix 9.

4.10.1 WATER SUPPLY

Onslow is supplied with potable water by the Water Corporation (WaterCorp), sourced from the Cane River alluvial aquifer located approximately 30km east of Onslow. It comprises 12 production bores and is licensed to draw 0.35 gigalitres per annum (GL/a) of water. The Onslow Water Supply Scheme is currently operating close to full capacity, drawing 0.31 GL (supplying 370 services) from the source in 2009/10. Water is treated at the borefield and conveyed to the Onslow townsite via a 200mm diameter distribution main (that runs through the airport). Water is stored in three water tanks of varying capacity within the town, including two pressure tanks (0.25 ML and 0.1 ML) and a storage tank (2.3 ML).

Part of the initiative is to use treated wastewater for irrigation of existing parks and ovals (The proposed Onslow Recycled Water Scheme) which has the potential to save 100kL/ day of scheme water in the short term thereby freeing up water for additional residential connections.

Investigations and design development are currently underway to expand the water supply system to support additional growth in Onslow. Four additional production bores have been installed as part of the investigations for connection to the water supply scheme. A booster pump station and upgrading of the transfer pipeline is also required to transfer the water into town, which is scheduled for completion in September 2013. The additional bores and infrastructure will increase capacity from 1250kL/day to 1900kL/day and 0.31GL/yr to 0.55GL/yr increasing the capacity by 60% by servicing an additional 200 services (460 people) up from the current 370 services.

As there is currently an issue with the back-up supply of water, WaterCorp will also likely require a new tank and booster pump station to be commissioned prior to providing all or a portion of the additional 200 services which is programmed for completion by mid 2014. Without such a tank and booster pump station, WaterCorp needs to undertake specific calculations to determine the proportion of the 200 services that could be made available for the initial stages. The proposed tank and booster is located within the north-east corner of the existing WaterCorp site, which is relatively elevated, and once commissioned, the existing two ground tanks and one elevated tank within the townsite can be decommissioned. The stage 1 upgrades are illustrated in Appendix 9

Beyond the additional supply from the bore expansion, further expansion of the bore field by increasing the groundwater extraction licence may provide additional capacity, however an alternative source such as desalination plant will need to be investigated to service the expected ultimate growth. Chevron is required, under the Wheatstone State Development Agreement (SDA) to upgrade water infrastructure to support the Onslow Townsite. The water infrastructure project is yet to be defined however it is likely that such infrastructure will be located outside the Structure Plan area. In addition, the project schedule is still to be determined.

4.10.2 WASTE WATER/EFFLUENT DISPOSAL

WaterCorp manages the wastewater system which currently services Onslow. The Onslow wastewater treatment plant (WWTP) has a treatment capacity for 1000 equivalent population, estimated at 460 kL/d. The plant is licensed to treat 200 kL/d which was previously considered sufficient to cater for natural growth in the town. The plant's disposal capacity is estimated at 290 kL/d by way of two infiltration areas. There is capacity to support nominal population growth with the wastewater flow currently at 180 kL/d.

Current flow forecasts indicate that the current treatment capacity will be exceeded in 2013, and the disposal capacity exceeded in 2016. An upgrade is required to meet increased demand associated with population growth and additional flows from the Bindi Bindi community.

WaterCorp has indicated that an expansion to the pond system will be required, which will need to be operational by 2016. This will increase treatment capacity to 920 kL/d. Two additional infiltration basins are also required and will need to be operational by 2013, with a further basin required by 2016. This will increase disposal capacity to 740 kL/d. Further expansion of the pond system and infiltration basins will be required by 2022 should anticipated population growth be realised.

Consideration needs to be given to the possibility of additional land requirements and extension of odour buffers when planning for expansion and/or relocation of wastewater treatment facilities. WaterCorp have indicated that the expanded treatment facilities can be accommodated within their current land holdings. In the case of the WWTP buffer, further modelling has refined the extent of the expected ultimate buffer requirements as illustrated on the Structure Plan in Appendix 1.

Alternative treatment methods and a relocation of the WWTP have been considered to minimise or eliminate the impact of the WWTP buffer on the extent of residential development required to meet population and housing demand. The area affected by the proposed buffer is currently indicated as land subject to further investigation until associated feasibility studies have been completed.

The current WaterCorp Sewer Scheme Design is shown in Appendix 9, as well as the proposed sewer concept plan. The Concept plan rationalises the number of proposed pump stations to service the development area by considering the proposed bulk earthworks over the site.

The Bindi Bindi Community along Second Avenue is serviced by its own effluent treatment ponds that are separate to the main town wastewater treatment facility operated by the Water Corporation. The treatment ponds are within the proposed greenfields development area and the associated buffer affects the initial stages of development. Planning, lead by DSD and through collaboration with the Department of Housing and WaterCorp, will decommission the Bindi Bindi WWTP and connect it to the WaterCorp facility. This work is currently being progressed to ensure the initial land release can proceed. Decommissioning of the Bindi Bindi WWTP and connection to the towns facilities will include rerouting the pumping station and approximately 500m of sewer line along Second Avenue. The entire Structure Plan area is to be sewerred in accordance with the draft Country Sewerage Policy and this is to be reflected in detail as part of any future subdivision application.

4.10.3 EARTHWORKS

A relatively aggressive earthworks strategy is proposed with the aim of achieving a balance of cut to fill over the site. The bulk earthworks will also be required to achieve the desired stormwater strategy described in the proceeding section.

Appendix 9 illustrates the proposed earthworks concept plan, as well as the cut to fill contours associated with achieving the desired levels.

Based on the geotechnical analysis undertaken by Golder and Associates (refer to appendix 10), geotechnical conditions are expected to support such an earthworks strategy.

Furthermore, it is recommended building levels be set to the following parameters:

- Minimum 0.3m freeboard to 100year storm event return period where a defined overland flood path is provided.
- Minimum 0.5m freeboard to 100year storm event flood levels where a defined overland flood path is not provided.
- Adequate freeboard to the 100year return period cyclonic storm surge allowing for climate change. This building level recommended in MP Rogers & Associates (2011) Coastal Vulnerability Assessment is 6.4m AHD, which allows for 0.5m freeboard, but this level is yet to be confirmed and adopted. The Shire is currently reviewing what an acceptable level of risk and associated freeboard should be applied.

4.10.4 STORMWATER DRAINAGE

The stormwater strategy for the development area will be governed to ensure flood protection for property and infrastructure during high intensity storms characterised by cyclone susceptible areas such as Onslow. To achieve the flood protection strategy, significant earthworks over the Structure Plan area are proposed to “grade out” localised low points within the dunal system and to provide adequate falls toward flood relief areas. Approximately half of the Structure Plan area (eastern half) is proposed to flood route to existing Beadon Creek via a defined low point along Onslow Road and associated downstream swale to the flood plain.

The western half of the catchment is proposed to discharge and be attenuated within natural depressions immediately west of the development area. These depressions are suitably elevated to promote infiltration and are adequately vegetated to minimise scouring. These depressions will be designed to attenuate flows with a controlled discharge being provided toward the natural low lying area between Onslow Salt and the ocean which ultimately discharges to the ocean via Four Mile Creek.

Consistent with the requirements of the Department of Water (DoW) and with consideration of downstream receiving environments, consideration will also be given to detaining stormwater associated with the 1 in 1 year ARI events within suitably elevated areas to promote on-site infiltration where appropriate. Furthermore, swale drains and piped networks will be designed to cater for the 1 in 5 year ARI events.



Typically, cyclonic areas in the north-west of Western Australia rely on overland conveyance as opposed to traditional pit and pipe systems found in Perth. However, the existing townsite currently contains pit and pipe infrastructure. There are issues with the traditional swale drain conveyance approach due to loss of developable land, aesthetics and maintenance of the swales. It is therefore proposed to adopt a hybrid strategy where pit and pipe network will be utilised in the upper catchments and the traditional swale drain conveyance will be adopted where flows become excessive making pipes unfeasible. A copy of the current drainage concept plan for the Structure Plan area is shown in appendix 9.

The existing townsite stormwater system includes a hybrid of pipe and table drain conveyance measures. There are a number of ocean outfalls via flood gated piped networks extending through the existing rockwall. There is also a catchment serviced by a series of basins located at McGrath Avenue/Third Avenue and McGrath Avenue/Second Avenue. These basins ultimately discharge into the ocean at the eastern extent of the existing rockwall, however this system performs inadequately due to the basins being too low and the outfall being silted-up and consequently being too high. The Shire is currently considering measures to address this issue.

There is also a concern regarding the discharge of floodwater entering the townsite during a storm surge. A flood gated relief toward Beadon Creek is currently being considered where such relief is less affected by siltation.

There are nominal catchments that discharge into the existing townsite catchments. The existing drainage systems will be reviewed and infrastructure upgraded to cater for the additional catchment areas as required.

4.10.5 POWER SUPPLY

Electricity is provided for Onslow by a 3MW (installed capacity) gas engine turbine power plant operated by Onslow Electric Power (OEP), a privately owned independent power producer. The plant is connected to Dampier to Bunbury Natural Gas Pipeline (DBNGP) through BHP Billiton Petroleum's gas lateral to the Tubridgi facilities and then via a Horizon Power pipeline to the power station. The plant's capacity is augmented by Horizon Power's 2.6 MW emergency diesel generators provided with 15 days of fuel supply.

Horizon Power supplies the natural gas to OEP, with the OEP then supplying 50-60 per cent of its output to Onslow Salt and the remainder supplied to Horizon Power to distribute to the Onslow township via an 11 kilovolt-amp (kVA) overhead network. The contracts between Onslow Electric Power and Horizon Power expire in November 2014.

Horizon Power's contracted capacity to supply the Onslow community will require augmentation to support both current and future demand in Onslow. The draft Pilbara Planning and Infrastructure Framework also identifies expansion of power generation in Onslow as one of its 2015 utility infrastructure priorities.

In total, an additional ~36MW may be required in Onslow by 2025. Horizon Power is currently considering options, including replacement of existing generation units at the existing site, however capacity of the existing gas pipeline and land availability at the existing site will need to be considered. Should Onslow Salt move to supply its own power, an extra 50-60% supply will be available to the town. Investment in additional distribution network infrastructure will also be required to ensure the provision of an adequate electricity supply to proposed urban expansion areas.

For a gas-fired power station of between 10MW and 20MW capacity, EPA Guidance Statement No. 3 specifies a generic buffer distance of 2-3 kilometres to sensitive land uses. It is therefore expected that any proposed plant of this size will be located in a new location (as opposed to upgrade on existing) given the limitations it would place on the expansion of the town.

Chevron is required, under the Wheatstone SDA to upgrade power infrastructure to support the Onslow townsite. The power infrastructure project is yet to be defined however it is likely that such infrastructure will be located outside the Structure Plan area. In addition, the project schedule is yet to be determined.

The State Government announced on 29 January 2010 that it has committed the funds required to complete the \$130 million Pilbara Underground Power Project, funded through the Royalties for Regions. The project, managed by Horizon Power will see the overhead lines replaced with underground cables in the towns of Karratha, South Hedland, Onslow and Roebourne. The Onslow and Roebourne undergrounding projects are both scheduled to commence in 2013. The undergrounding of the power lines will assist with power disruption in severe climatic conditions.

4.10.6 TELECOMMUNICATIONS

Telstra is the telecommunications owner and service provider for all communication services at Onslow. The current configuration to each dwelling is copper network with fibre backbone as per information obtained from a Dial-Before-You-Dig search. Telstra has also provided Next-G and GSM mobile coverage at Onslow.

An application will also be made to NBN Co. to determine whether the development area is within the National Broadband Network Fibre Footprint, and is eligible for provision of communications through NBN co, via the Structure Plan application process.

4.10.7 GAS SUPPLY

There is no gas infrastructure within the vicinity capable of supporting domestic services.

4.11 ECONOMIC

Onslow is significantly isolated from most regional towns in the Pilbara and given its current population of approximately 700, the town can only support a certain level of retail and commercial activities. However with the growth and employment activities stemming from the ANSIA in the short term, the additional population is likely to drive increases in retail and commercial activities located in the town centre.

4.11.1 POPULATION FORECASTS AND KEY DRIVERS

Recent population projections from the Department of State Development (DSD) and Department of Planning (DoP) in planning for the development of the ANSIA have identified a sharp increase in Onslow's population and dwelling requirements between 2012 and 2016. The table below indicates the projected population increase and dwelling requirements as per DSD and DoP's forecasts.

	People	Permanent Dwellings	FIFO Dwelling Units
2015	1500	682	237
2022	1800	818	338
Total	3300	1500	575

Therefore, an additional 3300 people are expected to reside in Onslow by 2022. In generating these population figures, a ratio of 70:30 - families/singles has been used. This growth will largely be driven by:

- Industry operational workforce (BHP and Chevron);
- Indirect workers (workers who move to Onslow due to opportunities generated by industry projects e.g. suppliers, tradesmen etc); and
- Consequential workers (workers who move to Onslow because of flow-on economic opportunities such as health, education, service industries etc) .

Onslow's economy into the future will, continue to be, influenced primarily by the fortunes of the oil, gas and salt industries and to a lesser extent, commercial fishing and tourism. The development of the ANSIA, which is located approximately 11km southwest of Onslow, is likely to facilitate significant long-term economic growth in Onslow, with sharp growth in the short-term, in conjunction with the population growth. In 2006, the most common employment sectors were mining (Onslow Salt) (18.8%), construction (10%), public administration and safety (10%) and health care and social assistance (9.6%). Major employers within Onslow include Onslow Salt and businesses servicing offshore oil and gas operations, commercial fishing and charter operations. The tourism sector also provides additional employment for the resident population.

4.11.2 RETAIL AND COMMERCIAL

The above population increase and economic growth is likely to result in increased demand for retail and commercial activities within Onslow. It is acknowledged that the OTS has recommended that the Commercial Centre be extended northward into areas that are not subject to flooding. However as part of the preparation phases to the Structure Plan the project team investigated the demand for increased commercial/retail floorspace and determined that the additional floorspace required to accommodate growth could be comfortably accommodated within the existing commercial zoned area of the main street. The project team also explored the potential impacts of a new commercial area may have on the existing commercial activities. Some of these identified were:

- Separation of ‘new and old’ Onslow, a key issue of prior expansion;
- Reduced legibility and cohesion;
- Reduced walkability, thus increased vehicle use;
- Undermining of recent investment in existing area; and
- Undermining of established local business.

With flooding impacts largely driving the need for additional commercial land the Team undertook to investigate new building typologies that could be considered to minimise the impacts of flooding. Elevated built forms have been explored and included within a set of interim Town Centre Design Guidelines, which have been adopted as a Local Planning Policy by the Shire.

In light of the aforementioned the project team have recommended retaining the current location for the town centre, along with an enhanced connection to the foreshore utilising alternative build form approaches to mitigate flood risk. Further, that there should be limited additional commercial uses located within the residential expansion area so as not to affect the viability of the town centre and avoid developing a ‘two-town’ scenario.

In light of the Shire’s draft Scheme Amendment No. 24, the town centre, in its current location, can be redeveloped to meet the needs of the town. This is becoming increasingly evident via recent JDAP determinations for significant development in the town centre and this Structure Plan seeks to reinforce and support it, rather than risk competing with it.

The Structure Plan does however include a new school/tertiary education site to accommodate school education for families in Onslow as well as tertiary education and training for employees associated with the various employment sectors in Onslow. This will help to ensure the long-term sustainability of Onslow and assist in attracting and retaining permanent residents to the town. The Site can also accommodate community uses should they be required.

Development of the Watson Drive Precinct will provide for pedestrian friendly streetscapes with passive surveillance of the public domain. It is likely that the Wheatstone Operations Village will ultimately accommodate approximately 560 occupants. This will be undertaken in a staged manner, with the first stage expected to accommodate 320 occupants.

It is expected that the commercial activities located in the Wheatstone Operations Village such that they will be accessible to the wider Onslow community if required.

4.11.3 TOURISM

Onslow is a popular holiday destination, attracting visitors travelling along the North West Coastal Highway (and Warlu Way) as well as residents of the region's inland mining towns. A small but consistent number of retirees stay in Onslow for extended periods during winter, enjoying Onslow's relaxed lifestyle. A number of tourism services

operate in Onslow, including fishing, charter and eco-tours to the nearby Mackerel and Montebello Islands, which operate from Beadon Creek Harbour, historical sites such as the Old Onslow townsite, Onslow Salt tours and natural attractions such as the Ashburton River, termite mounds and Sunrise, Sunset and Four Mile beaches.

IAN BLAIR MEMORIAL BOARDWALK



4.12 PLANNING AND DESIGN

4.12.1 STRUCTURE PLAN DESIGN RATIONALE

The design of the Structure Plan is based around the provision of an interconnected street grid network that provides good permeability and connections with the existing urban fabric, whilst facilitating opportunities for climate responsive development.

REFER TO APPENDIX 1 - STRUCTURE PLAN

The new entrance road and existing main road into town act as the logical urban limits of the town providing separation from adjacent existing and proposed industrial activities including the waste water treatment plant, the airport and Onslow Salts operations.

Punching-through and rationalizing of existing road networks into the development area have achieved integration with the existing residential development in the townsite. The hierarchy of roads also favours connection to the existing

main street in the town centre, thus encouraging inclusion, rather than segregation.

The design and location of open space has been based around catering for the site's drainage requirements while also providing opportunities to facilitate pedestrian movement between residential areas and the existing town centre located to the north of the site. Public open spaces have been located so as to maximise their use by encompassing nearly all of the Structure Plan area within a five minute walkable catchment.

Potential sites of heritage significance have been integrated within open space areas, thereby ensuring the protection and conservation of these elements.

The location and design of the central main public open space will facilitate passive recreational opportunities as well as serve as a gathering space for community events.

"This Expansion Plan aims to support and progress the Shire of Ashburton's community vision that Onslow be a vibrant, sustainable and prosperous place for work, living and leisure – for both residents and visitors."



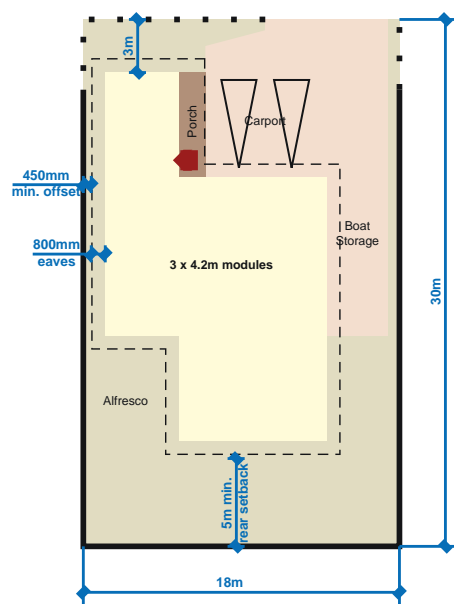
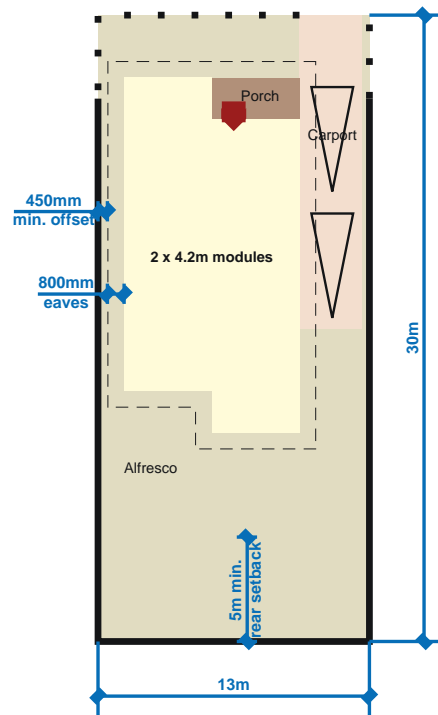
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4.12.2 LOT LAYOUT AND TOPOGRAPHY – CLIMATE RESPONSIVE DESIGN

The Development Plan provides diverse residential lot types and sizes to cater for a range of household types and lifestyles. Generally lot types have been distributed based on providing higher densities around the high amenity public open space areas.

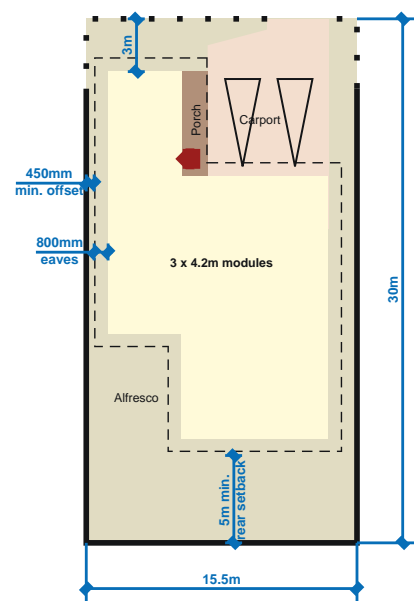
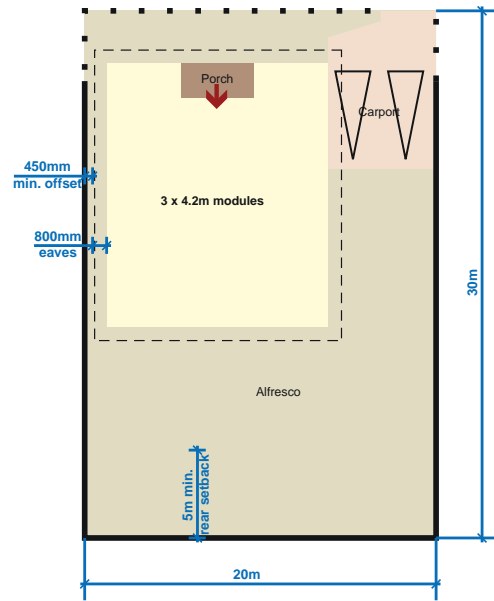
The design of the Development Plan ensures lots will front onto and overlook public realm areas facilitating a high level of passive surveillance and assist in creating a safe and attractive pedestrian oriented urban environment. Lots fronting open space and drainage areas are generally serviced via rear laneways, however, where rear access is not provided for park fronted lots, it is envisaged that the overlooking of open space areas shall be achieved through the creation of battleaxe lots accessed from side roads.

Generally each street block is provided with a minimum depth of 60 - 65 metres to provide a minimum lot depth of 30 - 32.5 metres. The lower density single residential lots then vary on the allocated density to provide diverse residential lot types and sizes to cater for a range of household types and lifestyles.



The lot depth and width configurations have been identified so as to ensure the development of single residential housing will adequately cater for house designs with due consideration for the provision of garaging and access (including visitor parking on driveways) and boat storage.

In regards to the Large Live-Work Lots, a much larger lot has been allowed for. This is reflective of the current lot layout along Onslow Road, and was also a factor that was expressed by the community during the Charrette. These lots are to be approximately 2,500m² in order to accommodate a single residential dwelling facing the adjoining residential area, whilst still allowing sufficient space at the rear to accommodate a non-residential land use, ancillary to the dwelling. Building footprints and locations, access and other arrangements are to be prescribed through a future LDP, in order to ensure that the objectives for this precinct are met.



4.12.3 POPULATION AND RESIDENTIAL DENSITIES

The Development Plan provides for a diversity of residential living options within residential development ranging in density from R5 to R40. The distribution of residential density has been based on the provision of higher densities around the local town centre and overlooking high amenity public open space areas.

The Development Plan incorporates provisions in which development at the higher density is only permitted on land that is a minimum of 2,500m² in area or comprises an entire street block. Notwithstanding this, any development at the higher density will still be limited to 2 storeys, ensuring it is consistent with that of adjacent development developed at a lower density.

Tables 17 and 18 below summarise the estimated development yields and population generated under the Development Plan.

TABLE 17 - DEVELOPMENT AREAS SUMMARY

Land Use	Land Area (hectares)	Percentage of Development Plan
Park/Drainage	11.2168ha	5.9%
School	4.7324ha	2.5%
Chevron Site	9.0ha	4.8%
Residential R5	15.0956ha	7.8%
Residential R20	58.6697ha	31%
Residential R30	35.2414ha	19%
Areas subject to Detailed Design	7.8083	4%
Roads	46.0320ha	24%

TABLE 18 - ESTIMATED DWELLING YIELD AND POPULATION

Residential Type	Estimated Number of Dwellings (average)	Estimated Population ¹ (based on average dwelling yield)
R5	75 dwellings	150 persons
R20	1066 dwellings	2132 persons
R30	1067 dwellings	2134 persons

¹ Based on an average household size for a normalised Australian city of "2.5 persons" (KCNP Summary, p34).

It should be noted that the dwelling yields identified above are based on the minimum lot sizes associated with that density coding and therefore are subject to change once detailed planning is complete.

4.12.4 COMMUNITY FACILITIES (SCHOOLS AND TAFE)

The Onslow Townsite Strategy identified the need to provide a second school site in the expansion area that this Development Plan includes. The type of school is not defined, however a flexible site that has been designed to meet a range of additional educational and possible community use has been set aside.

The school site may be used for additional primary overflow, a secondary school or TAFE facilities. It is understood that the existing primary school in the town is being planned to be expanded in its current location so it is unlikely that the second school site will be needed for primary students.

Negotiations with the Department of Education will be ongoing to determine the best use for the second school site.

4.12.5 SOCIAL INFRASTRUCTURE CONTRIBUTION

The purpose of the Development Plan is to provide land for anticipated growth in Onslow in an affordable and timely manner. The amount of land that is released to the market will be targeted to ensure the cost of housing is accessible and affordable.

The Development Plan has considered existing community facilities such as the sports precinct, community garden and main street and provided a development pattern and road network that links with these facilities. The growth expected in the town will provide a population base that will generate use and expansion of existing facilities. New public open spaces and a second school site are also provided to ensure adequate additional facilities to the town to meet the demand that the expansion will create.

The Development Plan aims to enhance the quality of life of all residents in Onslow by providing affordable housing and catering for the anticipated growth expected in Onslow while maintaining the unique character of Onslow that continues to ensure a long term residential population in the town. In the longer term the development will continue to benefit the community as it provides a climatically responsive design with the provision of facilities for the benefit of the entire community such as a second school site and due to the accessible and legible street pattern provided.

Open space is provided in the Development Plan in accordance with Councils intention to provide adequate and useable public open space but to ensure the area of open space provided can be maintained and serviced by the local authority in the long term. For this reason (and water efficiency) less than the usual 10% requirement has been provided. Public open space has been designed to be accessible to the community with dotted pocket parks providing local public open space through the expansion area.

A legible and readable street pattern is incorporated into the Development Plan to ensure good access, community safety and security.

4.12.6 RETAINING HERITAGE/CHARACTER

Sites of potential heritage significance have been integrated within open space areas in an effect to help protect and conserve.

Areas shown as 'subject to further investigations' provide flexibility of future development. This area may be determined as suitable only for use as open space to protect significant heritage values, determined to be suitable for development if it will not impact on identified values, or may be suitable for a mixture of both.

4.13 SOCIAL IMPACT STATEMENT

It is widely recognised that the expansion of Onslow and the development of the ANSIA are inextricably linked. The Onslow townsite expansion is to be developed by LandCorp as part of the ongoing development (including development of a general industrial area at the ANSIA) that will facilitate the growth of the town and ensure the long term viability and sustainability of Onslow.

Based on extensive discussions with the Shire and WAPC, LandCorp has prepared a Social Impact Statement (SIS) in accordance with the Shire's Local Planning Policy (refer to Appendix 9). The SIS addresses the commitment of LandCorp to undertake a significant planning and land release to allow for the creation of 1,500+ residential lots in Onslow, whilst managing the social impacts resulting from this.

In parallel, LandCorp is undertaking a land rationalisation exercise throughout the existing townsite to develop and release a number of vacant land parcels that will provide for approximately 30 dwellings at the end of 2012.

Onslow Vision '...Onslow be a vibrant, sustainable and prosperous place for work, living and leisure - for both residents and visitors.'



5. PLANNING MERIT

5.1 ORDERLY AND PROPER PLANNING

The principles of orderly and proper planning require that new development be a logical and efficient extension to existing development and be consistent with the planning vision or intent for the area. In addition to this to provide for the needs of the present without compromising the ability of future generations to meet their own needs.

The proposed Development Plan will provide the opportunity for the urban subdivision and development of the site in an orderly manner with logical connections and extensions made to roads and services in the existing townsite.

The Development Plan has also been formulated in consideration of a number of published State and local documents including the draft Pilbara Planning and Infrastructure Framework (2011), the Onslow Regional HotSpots Land Supply Update (2011) and the Onslow Townsite Strategy (2011) that indicated the potential for residential, commercial and tourism development on the site.

The Development Plan will also have due regard to the provisions of the Scheme which generally require the preparation of a development plan for land zoned Urban Development. The majority of the site is zoned Urban Development. The remainder of the site that is not appropriately zoned is the subject of Scheme Amendments 21 and 22 to be rezoned to Urban Development.

The Development Plan has been specifically designed to incorporate the characteristics that are unique to Onslow to ensure the development that will occur as a result of this Development Plan does not compromise the future generations of Onslow. The characteristics of Onslow that are incorporated into the design include a climatically responsive design, that respects and builds upon the current pattern of development in the town, takes into account the extreme weather events that Onslow experiences and incorporates water wise and energy saving initiatives.

For the above reasons the proposed Development Plan is considered to be in accordance with the principals of orderly and proper planning.

5.2 DEMAND FOR PROPOSED DEVELOPMENT

The lack of essential services and numerous land constraints have significantly restricted the growth of housing stock in Onslow. The commencement of various major offshore oil and gas resource projects in the northwest in recent years, has resulted in a phenomenal increase in the median house price in Onslow. The median house price in Onslow has increased six-fold between 2003 and 2010 as a result of these projects and the gross undersupply of housing. The median house price was \$100,000 in 2003, which increased to \$615,000 in 2010 (compared to \$496,000 in Perth). Rents have also increased substantially as a result of virtually zero vacancy rates, with weekly rents of over \$2,000 common throughout Onslow.

With the planning for the ANSIA being progressed, and with Chevron committing to the development of its Wheatstone liquefied natural gas (LNG) project, demand for housing and property is unlikely to ease if new housing is not made available. The Development Plan aims to ease the pressures on the housing market and meet demand in the short term, with the delivery of a range of in-fill lots and stage 1 (for which planning is well progressed) as well as the long term, with an ultimate increase in dwellings of approximately 1,200 by 2022. In order to deliver the required housing stock, in line with the commencement of the Wheatstone project, the planning for Onslow needs to be expedited.

5.3 SITE SUITABILITY AND RELATIONSHIP TO EXISTING TOWN CENTRE

The current planning framework identifies the site as suitable for future urban expansion and generally as a future urban development area.

Two main factors influencing the sites suitability are coastal vulnerability and the existing and proposed entrance road to the town. The site is considered suitable or able to be billed to be suitable for development above the 1 in 100 year flood level. The development site is shaped by the proposed new entrance road and existing main road into town, which flank the eastern and western extremities of the development area and provide a logical urban limit to the town.

The Development Plan has been designed to support and enhance the continued growth of the existing town centre with the main north-south road linkage providing logical connection to the main street and only small or home-based provision of commercial facilities are proposed in the Development Plan area so as not to compete with the towns existing facilities.

The Development Plan will provide an increased resident base that will cater for the anticipated growth demand in Onslow and will continue to support the growth of existing commercial and industrial facilities in the town.

The gradation of residential densities around areas of high amenity ensures appropriate interfaces to surrounding areas are achieved. Also, the linking of existing roads through the development area will ensure integration of the expansion area with the existing townsite.

The site is therefore suitable for development from a statutory, coastal vulnerability and integration with the existing townsite facilities perspective.

5.4 ACCESS TO EXISTING AND PROPOSED SERVICES AND INFRASTRUCTURE

The provision of services to Onslow is complex and upgrades to all relevant services are currently been considered and implemented by relevant service providers.

The Development Plan takes advantage of the existing community facilities available in Onslow such as the sports precinct and the community gardens with direct road access into the existing town and with the road hierarchy priority favouring access into the existing towns road network and main street.

Higher order retail, commercial and industrial needs will continue to be available in the main street to the north west and existing and proposed industrial areas to the east.

5.5 SUSTAINABILITY

LandCorp is committed to demonstrating high quality design and sustainability initiatives in land and building development to promote resource efficiency and encourage lifestyle opportunities that integrate with their surrounding community and the natural environment.

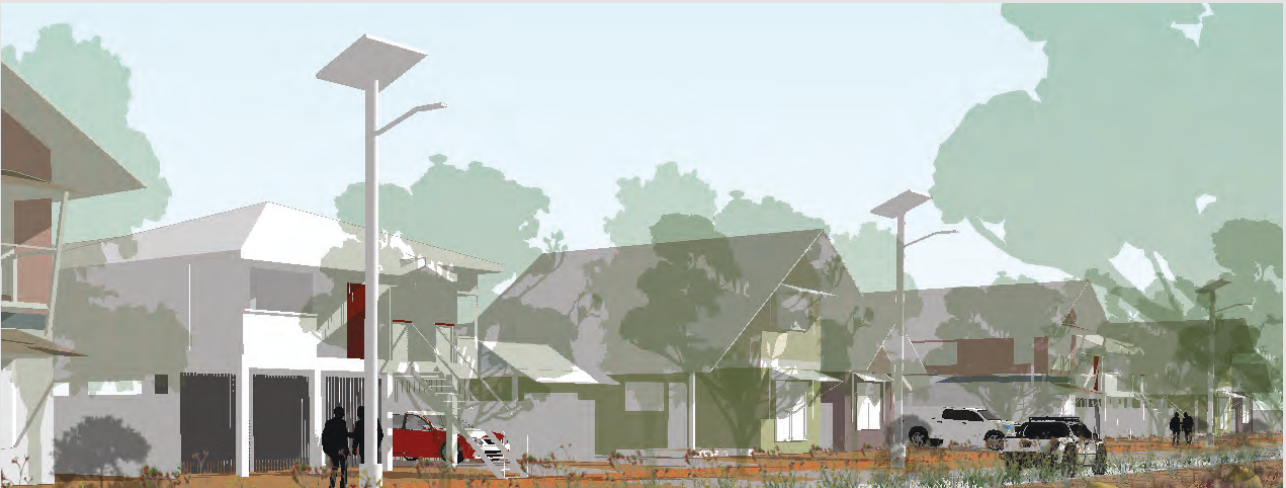
In keeping with the project objectives outlined earlier, Josh Byrne and Associates (JBA) were engaged by LandCorp to develop a Sustainability Strategy that outlines the overarching framework and initiatives to be applied in the short term to achieve immediate benefits, as well as establish mechanisms that appreciate over time (refer to Appendix 12). The Strategy applies a flexible approach to ensure it is able to evolve over time and also integrates LandCorp's sustainability elements.

The Strategy has been developed in accordance with the project objectives outlined in section 4.3 and contains a series of initiatives and implementation methods that have been developed assist the preparation of this Development Plan.

The initiatives outlined in the draft Strategy will also then be utilised to assist in preparing design guidelines for Onslow to ensure that the sustainability measures identified in the Strategy can be realised in the short and long term. It should be noted that the Strategy is in draft form and is subject to change in the future.



“This plan provides the building blocks for a vibrant, sustainable and prosperous future for Onslow, and considers the significant opportunities that are currently presented to the Town.”



6. IMPLEMENTATION AND STAGING

6.1 INDICATIVE TIMELINES AND STAGING

The release of lots associated with the expansion of Onslow is expected to be undertaken in stages, to ensure that lots are made available as soon as possible to meet the increasing demand. A separate development plan for stage 1 has been submitted, in order to allow the progression of the stage 1 subdivision.

Stage 1 consists of the Chevron Village site as well as 220 lots extending east from the Chevron site. These lots are a logical and efficient extension of the current townsite and can be serviced to facilitate development. Whilst the subdivision application for Stage 1 has already been submitted and is progressing with the WAPC, the subdivision is consistent with this Development Plan and the overall vision for Onslow. The expedited development of Stage 1 will ensure that adequate lots can be provided to Chevron as per the Wheatstone SDA, whilst also providing a steady flow of lots onto the private market.

The following stages will be progressed systematically, upon endorsement of the Development Plan, subsequent Scheme Amendments and the availability of infrastructure.

6.2 DEVELOPMENT CONTRIBUTIONS

Development contributions are not specified under the Shire of Ashburton Scheme for the Onslow townsite. Given that LandCorp, as the proponent, intends to construct the first stages of the development area, development contributions are not anticipated. It is therefore considered reasonable that if LandCorp is not the proponents for future development stages that all services and roads required are to be constructed by the relevant developer/proponent and therefore development contributions would also not be required. A condition to reflect this arrangement has been included on the Development Plan.

Should the Shire of Ashburton identify a need to upgrade existing facilities in the town as a result of the development resulting from the Development Plan it is considered reasonable for the town to require development contributions on an impact created scenario (i.e. a per lot contribution). At this stage there is no known direct upgrades required to the existing town that are not already funded by the State Agreement and therefore no development contributions are specified in this document.

6.3 APPLICATION FOR SUBDIVISION

Given the increasing pressure to deliver land to accommodate Chevron's operational village and operational workforce, in accordance with the Wheatstone SDA, a subdivision has been designed and lodged with the WAPC, for the Stage 1 area. The plan of subdivision is consistent with the development plan and therefore is not considered to have an adverse affect on the future planning for Onslow.

The subdivision has been split into two separate applications, which will be progressed concurrently. One application involves the creation of a 9ha superlot to accommodate Chevron's operational village. The second application will create 220 residential lots east of the Chevron site, incorporating a range of lot sizes and types, as well as areas of public open space. Approximately 50 of these lots are required by Chevron, to meet their requirements as part of the Wheatstone SDA, however it is considered that the remaining lots will be sufficient to meet immediate demand in the short term, until further land is released. The remaining lots are to be privately sold in order to meet the demand placed on Onslow by the various major projects in and around the town.

It is anticipated that the remaining stages of subdivision and development will not be progressed until the development plan and subsequent scheme amendments are finally endorsed by the Shire and WAPC.

6.4 DESIGN GUIDELINES

To assist in creating a sustainable, visually interesting and attractive place, design guidelines will be prepared at a future date to control the design of built form within the Development Plan area.

It is envisaged that design guidelines will build upon the planning and urban design principles identified in this report and incorporate the use of climate responsive design principles and architectural design elements that are culturally and locally relevant so as to ensure new development exhibits a unique local style or Onslow vernacular.

Design guidelines will incorporate a range of provisions relating to elements including climate responsive design, building design and materials, orientation and surveillance, setbacks, garaging and access (including boat parking), design and location of screening/fencing, signage, landscaping, and noise attenuation (for development that may be subject to road noise associated the new entrance road and existing road into town or Onslow Salt Operations). However, given the current water shortages in Onslow, water efficiency will be a key element of the guidelines.

Landscape and urban design elements will be utilised to bolster the creation of an effective sense of place and connectivity. The design guidelines may form part of the Shire's Policy Manual and be enforced accordingly.

6.5 LOCAL DEVELOPMENT PLANS

The Development Plan identifies several land parcels for which a Local Development Plan (LDP) is required to be prepared, prior to the commencement of any development.

A LDP may be required (by the developer, an owner of the land or the Shire) to be adopted by Council prior to any subdivision and/or substantial development and used as the basis for the determination of all development applications to the Shire of Ashburton.

The LDP will enhance, elaborate and expand the details and provisions contained in this Part as well as supplement the provisions of the Scheme and the R-Codes. LDP's are required to address the following:

- a) building envelopes;
- b) setbacks;
- c) interfaces with public open space and drainage areas;
- d) distribution of land uses within a lot (Large Residential Lifestyle lots);
- e) vehicular access and parking;
- f) loading and unloading areas, storage yards and rubbish collection closures;
- g) the location, orientation and design of buildings and the space between buildings; and

- h) such other information considered relevant by the Shire of Ashburton.

Variations to the provisions of the R-Codes other than density shall be considered.

The Local Government may advertise a LDP in accordance with Clause 5.7 of TPS7. Appeal rights are available to the applicant under Clause 5.18 of TPS7.

“The growing resources industry, specifically the planned development of the ANSIA and associated major hydrocarbons processing facilities, has resulted in the potential for significant population growth in Onslow.”



PREPARED BY TPG - CONCEPTUAL ONLY

7. CONCLUSION

This Development Plan has been prepared in order to facilitate the orderly future expansion of the town of Onslow to cater for the anticipated growth in the town associated primarily with the construction and operation of facilities at the ANSIA.

The Development Plan and this supporting report demonstrate how the proposed development is in accordance with State and Local Government vision for the site, in particular the draft Pilbara Planning and Infrastructure Framework (2011), the Onslow Regional HotSpots Land Supply Update (2011), the Onslow Townsite Strategy (2011) and the objectives of the Shire of Ashburton Town Planning Scheme No. 7 and proposed Scheme Amendments No. 21 and 22.

The proposed residential land use with a variety of densities and housing types represents the highest and best use for the site and the design and layout is based on sound design intent. Following adoption of the Development Plan, it is envisaged that further discussions will be held with the servicing authorities to ascertain the timing of providing appropriate services to the land and for a subdivision application to be lodged with the WAPC for consideration and determination.

Based on the consistency of the Development Plan with the agreed vision for the site and that the design represents the optimal development outcome for the site, it is requested that the Shire and WAPC approve the Development Plan at its earliest convenience to enable subdivision and development to occur.

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APPENDIX 2

ENV ONSLOW TOWNSITE STRATEGY FLORA, VEGETATION AND FAUNA ASSESSMENT

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APPENDIX 3

AECOM ENVIRONMENTAL DUE DILIGENCE

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APPENDIX 4

LLOYD GEORGE & ACOUSTICS ONSLOW SALT ACOUSTIC ASSESSMENT

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APPENDIX 5

EMERGE ASSOCIATES LANDSCAPE DESIGN GUIDELINES

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APPENDIX 6

INDICATIVE PUBLIC OPEN SPACE SCHEDULE

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APPENDIX 7

MP ROGERS AND ASSOCIATES ONSLOW TOWNSITE PLANNING COASTAL SETBACKS
AND DEVELOPMENT LEVELS

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APPENDIX 8

HYD20 LOCAL WATER MANAGEMENT STRATEGY

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APPENDIX 9

WGE ENGINEERING SERVICING REPORT

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APPENDIX 10

GOLDER ASSOCIATES DESKTOP GEOTECHNICAL STUDY

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APPENDIX 11

RILEY CONSULTING TRANSPORT ASSESSMENT

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APPENDIX 12

JBA DRAFT SUSTAINABILITY STRATEGY

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