



Department of Planning,
Lands and Heritage

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Western Australia.*

A stylized, semi-transparent map of Christmas Island serves as the background for the upper half of the cover. The map shows a dense network of roads and land parcels in various shades of blue and green. The title text is overlaid on the left side of this map.

Indian Ocean Territories Land Capacity Analysis

Shire of Christmas Island

November 2020

Executive Summary

The Regional North Land Capacity Analysis provides an overview of existing and future land capacity based on forecast population growth for the settlements in the Shire of Christmas Island. In particular, it examines the land identified for residential, rural residential, commercial and industrial use that is capable of substantial further development.

This study categorises current and future land uses according to broad land-use types. The land use types are effectively a rationalisation of existing zones and reserves of the local planning scheme. The 'future' land use types have been identified through consideration of a number of strategic documents, including local planning strategies and structure plans and growth plans where relevant.

For this report the following planning instruments that have informed the settlement land-use mapping:

- Shire of Christmas Island Local Planning Scheme No. 2; and
- Shire of Christmas Island Local Planning Strategy 2015.

When these planning instruments are reviewed, it is anticipated that the land capacity analysis will be used to guide and inform their future preparation.

Ultimately this analysis establishes the potential population yield of current and future residential lands for each relevant settlement, and then considers possible implications for the local government area's land supply situation in the context of the *Western Australia Tomorrow 2031* population forecasts.

Based on the current extents of zoned residential land and land identified for future residential purposes, this analysis suggests that there is a sufficient amount of land capable of substantial further development to cater for a considerable expansion of Christmas Island's existing population.

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The Department of Planning, Lands and Heritage acknowledges the traditional owners and custodians of this land. We pay our respect to Elders past and present, their descendants who are with us today, and those who will follow in their footsteps.

Disclaimer

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1. Introduction

The Indian Ocean Territories Land Capacity Analysis provides a broad overview of the existing and future land capacity of the settlements on Christmas Island and the Cocos (Keeling) Islands with respect to potential population growth. In particular, it examines land identified for residential, commercial and industrial development.

This document presents the land use mapping and associated analysis as it relates to the Shire of Christmas Island local government area.

Notably, the analysis suggests there is sufficient land capable of substantial further development (based on the current extents of zoned residential land and land identified for future residential purposes) to cater for a considerable expansion of Christmas Island's existing population.

The information presented in this document may provide a basis for a range of strategic planning including:

- assisting planning and provide direction for strategic infrastructure coordination;
- informing the preparation and/or review of local planning strategies, schemes and structure plans; and
- more detailed land supply analysis, including further investigation into the infrastructure requirements to service potential development of the future land supply.

Given the dynamic nature of planning and development, it is intended that this paper will be amended periodically to reflect future updates to local planning instruments as relevant.

Notwithstanding this, the information contained in this document has been prepared for guidance purposes only.

2. Settlement land use mapping

The Department of Planning, Lands and Heritage (DPLH) has prepared mapping that captures the spatial extents of current and future land use in the Christmas Island settlement (**Map 1**).

Further context on how this mapping has been developed is provided below.

2.1 Current and future land use

For the purpose of this study, the mapping categorises current and future land uses into broad land-use types. It effectively rationalises and consolidates existing zones and reserves in local planning schemes with intended future land uses identified in a number of strategic documents, including local planning strategies and structure plans.

The areas identified on the maps are based on the general consideration of:

- current zonings and reservations within applicable local planning schemes; and
- other strategic planning documents including local planning strategies, structure plans, layout plans and/or growth plans where relevant.

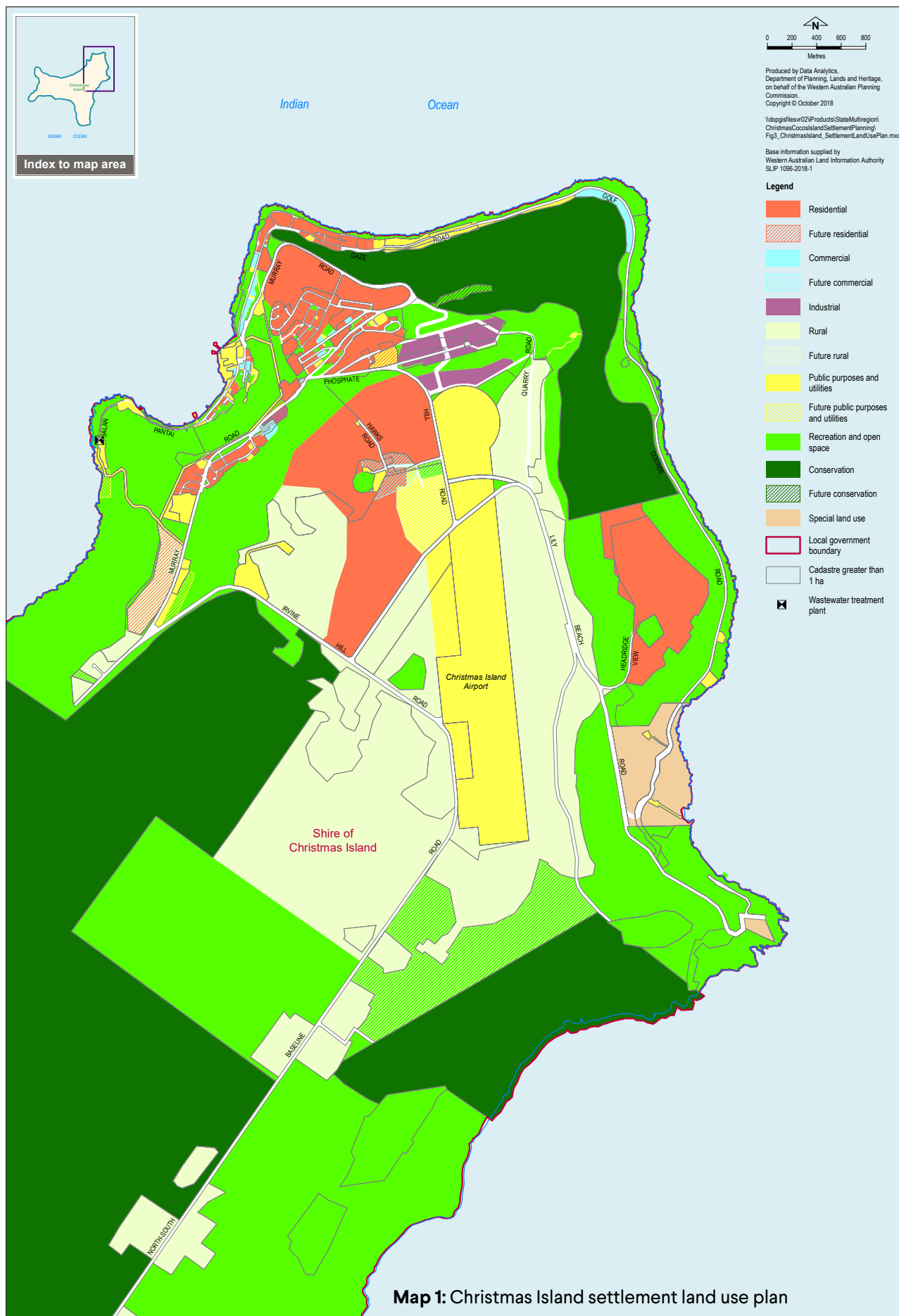
The extent of current land uses generally reflect that of applicable existing zones and reserves in current local planning schemes; and future land uses generally reflect where land has been identified in other documents for a different (typically more intensive) land use than that identified in the current scheme.

Planning instruments that have informed the preparation of the settlement land-use mapping for Christmas Island include the:

- Shire of Christmas Island Local Planning Scheme No. 2; and
- Shire of Christmas Island Local Planning Strategy 2015.

As a general guide, a broad description of what each land-use category considers is provided below:

Residential	Areas that are predominantly currently zoned in relevant local planning schemes for residential land uses
Future residential	Areas that have been identified predominantly for future residential land uses through relevant strategic planning processes
Rural residential	Areas that are predominantly currently zoned in relevant local planning schemes for rural residential land uses
Future Rural Residential	Areas that have been identified predominantly for future rural residential land uses through relevant strategic planning processes
Rural smallholdings	Areas that are predominantly currently zoned in relevant local planning schemes for rural smallholdings land uses
Future Rural Smallholdings	Areas that have been identified predominantly for future rural smallholdings land uses through relevant strategic planning processes
Commercial	Areas that are predominantly currently zoned in relevant local planning schemes for commercial land uses
Future commercial	Areas that have been identified predominantly for future commercial land uses through relevant strategic planning processes
Industrial	Areas that are predominantly currently zoned in relevant local planning schemes for industrial land uses
Future industrial	Areas that have been identified predominantly for future industrial land uses through relevant strategic planning processes
Rural	Areas that are predominantly currently zoned in relevant local planning schemes for rural land uses
Future Rural	Areas that have been identified predominantly for future rural land uses through relevant strategic planning processes
Infrastructure and Public Purposes	Areas that are predominantly currently reserved in relevant local planning schemes for infrastructure and/or public purposes
Future Infrastructure and Public Purposes	Areas that have been identified predominantly for future infrastructure and/or public purposes through relevant strategic planning processes
Recreation	Areas that are predominantly currently reserved in relevant local planning schemes for recreation purposes
Future Recreation	Areas that have been identified predominantly for future recreation purposes through relevant strategic planning processes
Conservation	Areas that are predominantly currently reserved in relevant local planning schemes for conservation purposes
Future Conservation	Areas that have been identified predominantly for future conservation purposes through relevant strategic planning processes
Special land use	Areas that are currently zoned in relevant local planning schemes for specific purposes that do not align with other broad land-use categories as described, or where their inclusion may unduly distort the results of the associated analysis
Investigation area	Areas that have been identified through relevant strategic planning processes where alternative future land uses may be considered subject to further investigation. This may include areas from plans in preparation or in draft form



2.2 Development status

To gain a general understanding of the potential capacity of currently zoned and potential future-zoned land within each settlement, a broad assessment has been undertaken of the development status of applicable land identified for **residential, commercial** and **industrial** purposes. Generally, the assessment involved a visual interpretation of aerial photography and cadastral information.

This assessment has been undertaken for those settlements where the applicable land uses exist within the map extents.

Applicable areas within the Christmas Island map extents have been assessed and considered as being 'developed' or 'capable of substantial further development' as described below.

Developed: 'broadly considered as land where development exists or where the necessary infrastructure and services to accommodate development exist. Subdivision is generally consistent with its zoning, however existing urban areas that could potentially accommodate increases in density through urban infill are considered to be 'developed.'

Capable of substantial further development: Land 'capable of substantial further development' consists of undeveloped or underdeveloped land on greenfield sites, where subdivision reflective of its zoning is yet to exist. In some instances however, land may have conditional subdivision approval or be part of a broader structure planning process that still needs to be finalised. It is important to note that the development of areas that are currently considered to be capable of substantial further development may be subject to a number of constraints; including scheme amendments, structure planning, infrastructure provision, environmental and heritage issues.

Table 1 summarises the development status of each applicable land-use category in terms of area.

Table 1: Shire of Christmas Island – development status of land

	Total (ha)	Developed (ha)	Capable of substantial further development (ha)
Residential	288	48	240
Future Residential	20	0	20
Residential and Future Residential	308	48	260
Commercial	10	5	5
Future Commercial	8	0	8
Commercial and Future Commercial	18	5	13
Industrial	24	6	18
Future Industrial	0	0	0
Industrial and Future Industrial	24	6	18

3. Capacity analysis

The assessment of development status of current and future land use areas enables a broad-level capacity analysis of the potential capacity of currently zoned and potential future-zoned land within the Shire of Christmas Island. The Department of Planning, Lands and Heritage has prepared such an analysis that:

- estimates the potential additional population yield of current and future residential lands; and
- considers possible implications with regard to the local government area's residential land situation in the context of a number of nominal population scenarios.

Table 2 in section 3.1 summarises the estimated additional capacity of each applicable land-use category in the Christmas Island settlement. Further analysis is presented in section 3.2 that relates this information to three nominal population scenarios.

When considering the outputs of the analysis, it is important to note that additional capacity is assumed to be accommodated exclusively in areas that are currently considered as being capable of substantial further development. This means that the estimates generally do not account for possible land capacity increases due to infill and/or redevelopment of existing developed areas, and from this perspective are considered broad in nature and likely underestimate the potential overall capacity.

A capacity analysis for commercial and industrial lands necessarily requires assumptions to be made on employment density. There are currently limitations in the available data required in order to make reasonable assumptions in this regard. In particular, relatively small statistical sample sizes – something that is prevalent in regional and remote areas – compromise the reliability of using the available data for such an application. It is considered that further investigation is required to ascertain representative rates of employment density for commercial and industrial lands in regional areas, and accordingly such an analysis is not included in this paper at this stage.

3.1 Potential capacity of residential lands

For **residential** land uses, potential capacity has been calculated according to scenarios that assume different average development densities that are applicable to each of those land uses.

Potential additional lot and population yields have been estimated for each respective current and future land use category and this is presented in **Table 2**.

Based on the potential population yield calculations in **Table 2**, estimated total population figures for the Shire of Christmas Island are provided for low, medium and high density development scenarios, which are presented in **Table 3**. Within each scenario, two subsets are considered:

- 'A' considers the potential additional population yield of all residential, rural residential and rural smallholdings land capable of further development at the average density or lot sizes attributable to that particular scenario; and
- 'B' considers the potential additional population yield of all residential, future residential, rural residential, future rural residential, rural smallholdings and future rural smallholdings land capable of further development at the average density or lot sizes attributable to that particular scenario.

These figures assume that all additional population in the local government area is accommodated on residential, rural residential and rural smallholdings lands deemed capable of substantial further development within the Christmas Island settlement.

Table 2: Shire of Christmas Island – estimated capacity of residential lands deemed capable of substantial further development

Estimated capacity of residential and rural residential lands deemed capable of substantial further development				Estimated potential population yield from additional lots ²
Relevant land-use category	Area (ha)	Average density / average lot size	Potential lot yield ¹	
Residential	240	R10	1,560	4,212
		R20	3,120	8,424
		R30	4,680	12,636
Future Residential	20	R10	130	351
		R20	260	702
		R30	390	1,053
Residential and Future Residential	260	R10	1,690	4,563
		R20	3,380	9,126
		R30	5,070	13,689

¹ For residential land, the 35 per cent of land necessary to support land requirements for public open space and streets (Liveable Neighbourhoods, 2007) has been factored into these figures. For rural residential and rural smallholdings lands, a 25 per cent allowance from gross land areas has been applied to account for the relevant land requirements to support development for these particular land uses.

² The population yield per dwelling is calculated at 2.7 people per dwelling unit (average people per household for the Christmas Island SA2 – Australian Bureau of Statistics, 2016 Census).

Table 3: Shire of Christmas Island – estimated potential population capacity

Scenario ¹ (average density of residential land / average lot size of rural residential land / average lot size for rural smallholdings land)		Current population ²	Estimated potential population yield from additional lots ³	Estimated total population ⁴
1. Low-density scenario (R10 / 4 ha / 40 ha)	1A	1,921	4,212	6,133
	1B	1,921	4,563	6,484
2. Medium-density scenario (R20 / 2 ha / 20 ha)	2A	1,921	8,424	10,345
	2B	1,921	9,126	11,047
3. High-density scenario (R30 / 1 ha / 8 ha)	3A	1,921	12,636	14,557
	3B	1,921	13,689	15,610

¹ Scenarios consider the estimated potential population capacity of the Shire of Christmas Island through estimating the potential additional population capacity of land within all relevant settlements with a residential land use that has been deemed capable of substantial further development.

² Christmas Island Statistical Area Level 2, 2017 Preliminary Estimated Residential Population (Australian Bureau of Statistics, 3218.0 – Regional Population Growth 2016–17).

³ As per the relevant assumptions as described for **Table 2**.

⁴ The 'estimated total population' is the sum of the 'current population' and the 'estimated potential population yield from additional lots' columns.

3.2 Comparison of potential capacity estimates with population scenarios

Currently, the State Demographer does not produce official population forecasts for the Shire of Christmas Island.

To provide a point of comparison for interpreting the potential capacities of residential land as determined through this analysis, three population scenarios are considered. These are presented in **Table 4**.

The figures in the 'additional population' column are the difference between each scenario and Christmas Island's 2017 Preliminary Estimated Residential Population from the Australian Bureau of Statistics, 3218.0 – Regional Population Growth 2016-17.

Table 4: Shire of Christmas Island
– nominal population scenarios

	Population	Additional population
Current population	1,921	-
Scenario A	3,000	1,079
Scenario B	4,000	2,079
Scenario C	5,000	3,079

It is important to note that these scenarios are nominal only and do not necessarily reflect historical or likely future trends. The rate of population growth on Christmas Island will inevitably be linked to future economic development and the rate at which this occurs.

3.2.1 Estimated additional residential land requirements to accommodate population forecasts

Table 5 presents estimates for the amount of residential land that would be required to accommodate the additional population for each of the population forecasts. Estimates are presented according to three different average densities of residential development, being R10, R20 and R30.

These estimates are compared to the total of all current residential and future residential land identified in relevant Shire of Christmas Island settlements as being capable of substantial further development. The figures under the 'surplus' column indicate the magnitude of the potential surplus of residential land from the extents currently identified once the additional forecast population been allowed for. A negative figure in this column indicates a shortfall in the identified areas of residential lands with respect to that required to accommodate the additional population from the relevant forecast.

The estimates in **Table 5** assume:

- all population growth occurs on residential and future residential land that has been identified as being capable of substantial future development in this analysis. To keep the calculations relatively straightforward, they do not consider additional population being accommodated on rural residential or rural smallholdings lands, nor do they take into account potential increases in population occurring due to infill development. They therefore likely overestimate residential land requirements;
- a 35 per cent allowance from gross land areas for various requirements to support development (e.g. public open space, streets, other infrastructure); and
- the number of people per dwelling remains constant.

Based on the current extents of zoned residential land and land identified for future residential purposes, this analysis suggests that there is a sufficient amount of land capable of substantial further development to cater for a considerable expansion of Christmas Island's existing population.

Table 5: Shire of Christmas Island – estimated additional residential land requirements to accommodate population forecasts

Scenario	Additional population	Current and future land capable of substantial further development (ha) ²	Residential ¹					
			R10 average density		R20 average density		R30 average density	
			Estimated land required to accommodate additional population (ha) ³	Surplus (ha) ⁴	Estimated land required to accommodate additional population (ha) ³	Surplus (ha) ⁴	Estimated land required to accommodate additional population (ha) ³	Surplus (ha) ⁴
Scenario A	1,079	260	61	199	31	229	20	240
Scenario B	2,079	260	118	142	59	201	39	221
Scenario C	3,079	260	175	85	88	172	58	202

¹ These estimates assume that all population growth occurs on residential and future residential land that has been identified as being capable of substantial future development in this analysis. To keep the calculations relatively straightforward, they do not consider additional population being accommodated on rural residential or rural smallholdings lands, nor do they take into account potential increases in population occurring due to infill development. They therefore likely overestimate residential land requirements.

² Total area of current and future residential lands capable of substantial further development for entire local government area as per relevant figures from **Table 1**.

³ A 35 per cent allowance from gross land areas to support land requirements for public open space and streets (Liveable Neighbourhoods, 2007) and a population yield per dwelling of 2.7 people per dwelling unit (average people per household for the Christmas Island SA2 – ABS 2016 Census) have been factored into the estimated areas of residential land required to accommodate forecast additional populations.

⁴ A positive figure in this column indicates that the additional population under the relevant population forecast should be able to be accommodated within the areas of residential and future residential land currently identified, without additional residential land being required. A negative figure represents the shortfall in the identified areas of residential lands with respect to that required to accommodate the additional population.