# LGIP Review Report

## Torres Shire Local Government Infrastructure Plan

HRP17002/008

Prepared for

Torres Shire Council

4 September 2020

Cardno

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## Document Information

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|---|---|
| Prepared for | Torres Shire Council |
| Project Name | Torres Shire Local Government Infrastructure Plan |
| File Reference | HRP17002-008.LGIP Review Report.001 |
| Job Reference | HRP17002/008 |
| Date | 4 September 2020 |
| Version Number | 001 |

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Effective Date 4/09/2020

Reviewed By:

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Date Approved 4/09/2020

## Document History

| Version | Effective Date | Description of Revision | Prepared by | Reviewed by |
|---|---|---|---|---|
| 001 | 04/09/2020 | Final | Stephen Whitaker | Morgan Wilson (LGIP Reviewer) |
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# 1 Introduction

## 1.1 Background

The Torres Shire Local Government Infrastructure Plan ('the current LGIP') was prepared by Integran, on behalf of Torres Shire Council ('Council'), pursuant to the provisions of the *Planning Act 2016* ('the Planning Act'). The current LGIP provides for the integration of infrastructure planning with land use planning.

The current LGIP was prepared to be consistent with the Torres Shire Council IPA Planning Scheme (17 July 2007) ('the current planning scheme'). The current LGIP was prepared only recently, being adopted for the purposes of public notification in July 2019. However, a new planning scheme has now been prepared for the Torres Shire Council (currently approaching completion for public notification as of August 2020), and as such the current LGIP will require updating to reflect the changes to zoning and land use intent provided for under the new planning scheme. Given that the current LGIP has only recently been prepared, much of the data used in its preparation remains fit for purpose, and the required updating is limited to the extent of ensuring alignment with the new scheme.

## 1.2 Purpose

Cardno has been engaged by the Department of Aboriginal and Torres Strait Islander Partnerships, on behalf of Council, to undertake a review of the current LGIP to ensure it aligns with the new Torres Shire Planning Scheme ('the new planning scheme') which is currently being prepared by Cardno. The purpose of the review is to update the current LGIP as required to reflect the new planning scheme. The review process will result in an interim amendment to the LGIP ('the amended LGIP').

The purpose of this report is to document the methodology used as part of the revision of the current LGIP and document any key assumptions used in the amendment of the LGIP.

## 1.3 Relationship to Existing Material

This report documents the extent to which assumptions and methods have been updated or amended as part of the review of the current LGIP. Whilst this report selectively modifies specific elements of the assumptions documented in the Extrinsic Material to the Local Government Infrastructure Plan (Revision 1.2 – December 2017) prepared by Integran ('the extrinsic material'), this report does not replace the extrinsic material. The extrinsic material remains relevant to the interpretation of the amended LGIP, as modified within this report, and a copy of the extrinsic material has been included as **Appendix A** to this report for ease of reference. This report should be read in conjunction with the extrinsic material.

# 2 Assumptions

**Table 2-1** outlines all assumptions made for the current LGIP, as documented in the extrinsic material (see **Appendix A**) and identifies the nature of, and reasoning for, any amendments to these assumptions as part of the review of the LGIP. Where the assumptions have not been revised, they remain as documented in the extrinsic material.

Table 2-1 Assumptions Review

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| **1.0 Planning Assumptions** | | | | | | | |
| Base Date | | | 1.0 | 2016 | 2016 | No | The base date and projection ranges for population have been retained as the amended LGIP will continue to rely on the 2016 Census data, being the most recent available data. The next Census of Australia will be completed in 2021. |
| Population Projections | | | 1.1 | 2016-2036 | 2016-2036 | No | |
| Population Allocation | Residential Dwelling | | 1.1.1 Table 1.1 | Household size | Household size | No | The established methodology has been retained as there is no reason to alter it to reflect the new planning scheme. |
| | Other Residential Uses | | | Density per hectare | Density per hectare | No | |
| Household Density Assumptions | Single Dwelling | 2016 | 1.1.1 Table 1.3 | 3.58 | 3.58 | No | The household density assumptions have been retained as the new planning scheme is not expected to alter these assumptions. |
| | | 2021 | | 3.52 | 3.52 | No | |
| | | 2026 | | 3.49 | 3.49 | No | |
| | | 2031 | | 3.48 | 3.48 | No | |
| | | 2036 | | 3.49 | 3.49 | No | |
| | | Ultimate | | 3.49 | 3.49 | No | |
| | Multiple Dwelling | 2016 | | 2.52 | 2.52 | No | |
| | | 2021 | | 2.48 | 2.48 | No | |
| | | 2026 | | 2.45 | 2.45 | No | |
| | | 2031 | | 2.45 | 2.45 | No | |
| | | 2036 | | 2.45 | 2.45 | No | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | | Ultimate | | 2.45 | 2.45 | No | |
| Dwelling Composition Assumptions | Residential – Precinct 1 | Attached | 1.1.2 Table 1.3 | 50% | 100% | Yes | Dwelling composition assumptions have been revised to align with the zoning pattern of the new planning scheme. It is noted that the new zones generally align with the current zones as follows:<br>▪ Residential Zone – Precinct 1 equates to the Low Density Residential Zone.<br>▪ Residential Zone – Precinct 2 equates to the Low-Medium Density Residential Zone.<br>▪ Business Zone equates to the Centre Zone.<br>The composition assumptions have been revised to align with that anticipated to occur under the new planning scheme. |
| | | Detached | | 50% | 0% | Yes | |
| | Residential – Precinct 2 | Attached | | 88% | 70% | Yes | |
| | | Detached | | 12% | 30% | Yes | |
| | Business | Attached | | 100% | 100% | No | |
| | | Detached | | 0% | 0% | No | |
| Ultimate Density Assumptions | Residential – Precinct 1 | Excluded Land – Services, Roads | 1.1.2 Table 1.4 | 26.5% | Further discussion in relation to the methodology and assumptions used to generate the ultimate development projections is provided in Section 3.1 of this report. | | |
| | | Lot Size ($m^2$) Attached | | 350 | | | |
| | | Lot Size ($m^2$) Detached | | 800 | | | |
| | | Planned density – Gross (dwellings / ha) | | 14 | | | |
| | Residential – Precinct 2 | Excluded Land – Services, Roads | | 22.5% | | | |
| | | Lot Size ($m^2$) Attached | | 200 | | | |
| | | Lot Size ($m^2$) Detached | | 600 | | | |
| | | Planned density – Gross (dwellings / ha) | | 30.2 | | | |
| | Business | Excluded Land – Services, Roads | | 20% | | | |
| | | Lot Size ($m^2$) Attached | | N/A | | | |
| | | Lot Size ($m^2$) Detached | | N/A | | | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | | Planned density – Gross (dwellings / ha) | | 42 | | | |
| Infrastructure Demand Units | Water Supply network | | 1.2 | Equivalent persons (EP) | Equivalent persons (EP) | No | The relevant provisions of the new planning scheme will not alter or influence these values. These values are determined independent of the planning scheme. |
| | Sewerage network | | | Equivalent persons (EP) | Equivalent persons (EP) | No | |
| | Transport network | | | Vehicle trips per day (VPD) | Vehicle trips per day (VPD) | No | |
| | Stormwater network | | | Impervious hectares (Imp Ha.) | Impervious hectares (Imp Ha.) | No | |
| | Parks and land for community facilities network | | | Persons | Persons | No | |
| Infrastructure Demand – Residential Demand | Water Supply network | | 1.2.1 | Population at each cohort = residential EP | Further discussion in relation to demand generation rates and calculations is provided in Section 3.2 of this report. | | |
| | Sewerage network | | | Population at each cohort = residential EP | | | |
| | Stormwater network | | | Impervious fractions applied based on QUDM Urban residential (low density) development category | | | |

| Parameter | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|
| | Transport network | | Population at each cohort divided by applicable detached household size (Table 1.2) to determine equivalent detached dwellings<br>Demand generation of 6 trips per equivalent detached dwelling | | | |
| | Parks and land for community facilities network | | Population at each cohort | | | |
| Infrastructure Demand – Non-Residential Demand | Water Supply network | 1.2.2 | Equivalent dwellings multiplied by the detached household size at each cohort (in accordance with Table 1.2) | Further discussion in relation to demand generation rates and calculations is provided in Section 3.2 of this report. | | |
| | Sewerage network | | Equivalent dwellings multiplied by the detached household size at each cohort (in accordance with Table 1.2) | | | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | Transport network | | | Equivalent dwellings multiplied by the trip rate per detached dwelling identified in section 1.2.1 (6 trips per equivalent detached dwelling) | | | |
| Non-Residential Demand Generation Rates | Business | Water & Sewer Demand (EDU/Ha) | 1.2.2 Table 1.7 | 25 | Further discussion in relation to demand generation rates and calculations is provided in Section 3.2 of this report. | | |
| | | Transport Demand (EDU/Ha) | | 50 | | | |
| | | Stormwater Demand (Imp. Fraction) | | 0.9 | | | |
| | Conservation | Water & Sewer Demand (EDU/Ha) | | 0 | | | |
| | | Transport Demand (EDU/Ha) | | 0 | | | |
| | | Stormwater Demand (Imp. Fraction) | | 0 | | | |
| | Industry | Water & Sewer Demand (EDU/Ha) | | 15 | | | |
| | | Transport Demand (EDU/Ha) | | 7.5 | | | |
| | | Stormwater Demand (Imp. Fraction) | | 0.9 | | | |
| | Open Space and Recreation | Water & Sewer Demand (EDU/Ha) | | 0 | | | |
| | | Transport Demand (EDU/Ha) | | 0 | | | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | | Stormwater Demand (Imp. Fraction) | | 0 | | | |
| | Non Urban | Water & Sewer Demand (EDU/Ha) | | 0 | | | |
| | | Transport Demand (EDU/Ha) | | 0 | | | |
| | | Stormwater Demand (Imp. Fraction) | | 0 | | | |
| | Special Purpose | Water & Sewer Demand (EDU/Ha) | | 5 | | | |
| | | Transport Demand (EDU/Ha) | | 5 | | | |
| | | Stormwater Demand (Imp. Fraction) | | 0.4 | | | |
| Employment Industry Assumptions | | Agriculture, forestry & fishing | 1.3.1 Table 1.8 | Other | Other | No | The relevant provisions of the new planning scheme will not alter or influence these values. These values are determined independent of the planning scheme. |
| | | Mining | | Other | Other | No | |
| | | Manufacturing | | Industry | Industry | No | |
| | | Electricity, gas, water & waste services | | Industry | Industry | No | |
| | | Construction | | Industry | Industry | No | |
| | | Wholesale trade | | Industry | Industry | No | |
| | | Retail trade | | Retail | Retail | No | |
| | | Accommodation & food services | | Commercial | Commercial | No | |
| | | Transport, postal & warehousing | | Industry | Industry | No | |
| | | Information media & telecommunications | | Commercial | Commercial | No | |
| | | Financial & insurance services | | Commercial | Commercial | No | |
| | | Rental, hiring & real estate services | | Commercial | Commercial | No | |
| | | Professional, scientific & technical services | | Commercial | Commercial | No | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | Administrative & support services | | | Commercial | Commercial | No | |
| | Public administration & safety | | | Community Purposes | Community Purpose | No | |
| | Education & training | | | Community Purposes | Community Purpose | No | |
| | Health care & social assistance | | | Commercial | Commercial | No | |
| | Arts & recreation services | | | Commercial | Commercial | No | |
| | Other services | | | Other | Other | No | |
| | Inadequately described/Not stated | | | Other | Other | No | |
| Future Employment | | | 1.3.2 | The employment model assumes that labour retention, job containment, and unemployment levels are maintained throughout all projection periods. | No change | No | The relevant provisions of the new planning scheme will not alter or influence these values. These values are determined independent of the planning scheme. |
| Floor space assumptions<br><br>Floorspace ($m^2$/employee) | | Retail | 1.3.3<br>Table 1.9 | 30 | 30 | No | The new planning scheme is not considered to alter the assumed density of employees within non-residential floor space. |
| | | Commercial | | 30 | 30 | No | |
| | | Industry | | 150 | 150 | No | |
| | | Community Services | | 25 | 25 | No | |
| | | Other (inc. Home based business) | | 20 | 20 | No | |
| Future Revenue Projections<br><br>Reduction to infrastructure charge revenues | Thursday Island | | 1.4 | 90% reduction | 90% reduction | No | The new planning scheme is not considered to alter these values. |
| | Horn Island | | | 50% reduction | 50% reduction | No | |
| | All other areas | | | 90% reduction | 90% reduction | No | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| PIA Population | | | 1.5 | 5,500 people | 8,975 people | Yes | These values have changed as a result of the planning horizon being extended to reflect the timing of the review of the LGIP and the additional capacity generated in the PIA as a result of the planning scheme. The review shows that further capacity is produced as a result of the planning scheme, which will afford Council greater flexibility in managing population growth. |
| PIA Dwellings | | | 1.5 | 1,600 dwellings | 2,978 dwellings | | |
| PIA Growth Population | | | 1.5 | 4,000 people | 4,006 people | | |
| PIA Growth Dwellings | | | 1.5 | 1,200 dwellings | 1,315 dwellings | | |
| Remaining Capacity | | | 1.5 | 400 dwellings | 1,663 dwellings | | |
| **2.0 Cost Assumptions** | | | | | | | |
| Baseline Valuation | | | 2.1 | See SoW model | See SoW model | No | Schedule of Works data has been generally retained consistent with that data previously used, noting that the planning scheme does not alter these assumptions. |
| Subsidy | | | 2.2 | 91% | | | |
| Water Supply / Sewer | Unit Rates | | 2.3.1 | | | | |
| | Cost Modifiers | On-Cost Allowance (Works) – All existing & future assets | 2.3.2 Table 2.1 | 10% | | | |
| | | Contingency (Time based) (Works) – All future assets | | 7.5% - 25% | | | |
| Transport | Unit Rates | | 2.4.1 | | | | |
| | Cost Modifiers | On-Cost Allowance (Works) – All existing & future assets | 2.4.2 Table 2.3 | 10% | | | |
| | | Contingency (Time based) (Works) – All future assets | | 7.5% - 25% | | | |
| Public Parks and Land for Community Facilities | Unit Rates | | 2.5.1 | | | | |
| | | Land | 2.5.1 | $10/m$^2$ | | | |
| | Cost Modifiers | On-Cost Allowance (Works) – All existing & future assets | 2.5.2 Table 2.6 | 10% | | | |

| Parameter | | | Extrinsic Material Reference | 2016 Value (Integran) | 2020 Value | Change | Discussion |
|---|---|---|---|---|---|---|---|
| | | Contingency (Time based) (Works) – All future assets | | 7.5% - 25% | | | |
| **3.0 Network Planning** | | | | | | | |
| Planning horizon | | | 3.0 | 20 years | 20 years | No | The relevant provisions of the new planning scheme will not alter or influence these values. These values are determined independent of the planning scheme. |

# 3 Revised Methods

## 3.1 Ultimate Development Capacity

The ultimate development capacity calculations for Torres Shire have been updated to reflect the new planning scheme. The following methodology has been employed to calculate the figures produced in the LGIP.

> Available land within each zone and area of interest has been obtained based on the zoning maps of the new planning scheme.

> 15% of the available land has been removed from the calculations to reflect potential constraints and undevelopable land. The balance 85% has been considered the developable land of the zone. This has been applied to all zones. The method employed to calculate density in each zone, as explained in **Table 3-2**, has also included further consideration of the provision of services and other infrastructure within the developable land.

> The developable land has been allocated to each LGIP development type based on the land use intent of the new planning scheme. The values shown in **Table 3-1** have been used.

Table 3-1 LGIP Development Types – Split in Zones

| LGIP Development Type | CTRZ | CFAZ | CFBZ | INDZ | LDRZ | LMRZ | RECZ | RRSZ |
|---|---|---|---|---|---|---|---|---|
| Detached Dwelling | 0% | 0% | 0% | 0% | 100% | 70% | 0% | 100% |
| Attached Dwelling | 20% | 0% | 0% | 0% | 0% | 30% | 0% | 0% |
| Retail | 20% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Commercial | 60% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Industry | 0% | 0% | 0% | 100% | 0% | 0% | 0% | 0% |
| Community Purpose | 0% | 100% | 100% | 0% | 0% | 0% | 0% | 0% |
| Other | 0% | 0% | 0% | 0% | 0% | 0% | 100% | 0% |

Note:

- CFAZ includes Precincts 1, 2, 4, 7 and 8
- CFBZ includes Precincts 3, 5 and 6

> Dwellings and non-residential floor space have been calculated for the developable land in each zone based on the density assumptions shown in **Table 3-2**.

Table 3-2 LGIP Development Types – Densities in Zones

| LGIP Development Type | Method | Inside PIA | Outside PIA |
|---|---|---|---|
| Detached Dwelling | Land Area per Dwelling | ▪ Low Density Residential Zone: 450m$^2$<br>▪ Low-Medium Density Residential Zone: 300m$^2$ | ▪ Low Density Residential Zone: 600m$^2$<br>▪ Low-Medium Density Residential Zone: 600m$^2$ |
| Attached Dwelling | Land Area per Dwelling | 100m$^2$ | 600m$^2$ |
| Retail | Plot Ratio | 2.5 | 50% of Inside PIA |
| Commercial | Plot Ratio | 2.5 | 50% of Inside PIA |
| Industry | Plot Ratio | 1 | 0.5% of Inside PIA |
| Community Purpose | Plot Ratio | ▪ 0.01 in CFAZ<br>▪ 0.5 in CFBZ | 0.5% of Inside PIA |
| Other | Plot Ratio | 0.1 | 0.01% of Inside PIA |

Residential land outside the PIA is subject to substantial constraints that will likely further limit its development potential, beyond the standard 15% included for the balance of the local government area. A lower density of development has therefore been assumed in these areas to account for the constraints.

With respect to the revised ultimate capacity figures presented in the amended LGIP, it is acknowledged that these have increased when compared with the current LGIP and are also in many cases significantly greater than existing provision. The ultimate development capacity has been calculated based on complete build out of the theoretical maximums provided by the planning scheme. The planning scheme seeks to support flexibility in development of Torres Shire through increased development potential in key locations (such as within the Centre Zone) and the inclusion of greater land areas in higher density zones, such as the Centre Zone and the Low-Medium Density Residential Zone. It is highly unlikely that development in Torres Shire will ever fully maximise the development opportunity provided by the planning scheme, noting that the demand for new development is ultimately driven by population and market forces. The approach taken thus represents a conservative and theoretical estimate of a worst-case scenario for development activity in Torres Shire. Ongoing review of the LGIP will also provide a mechanism to monitor development uptake under the planning scheme and afford an opportunity to revise the likelihood of increased demand as part of shorter term demand forecasts.

## 3.2 Demand Generation

The methodology employed as part of this review has resulted in the retention, with limited alteration, of the population and employment projections for Thursday Island, Horn Island, land inside and outside the PIA and the entire Torres Shire local government area between 2016 and 2036. This has occurred as it is noted that the planning scheme is unlikely to cause an alteration in actual population or employment growth. On the basis that the population and employment projections within Torres Shire remain consistent with the original LGIP, it is therefore appropriate to retain the anticipated demand calculated for each five year interval and each catchment, with the exception of the stormwater network. Again, noting that the number of residents and employees remains largely unchanged, the anticipated demand is therefore considered to be consistent. With regard to the stormwater network, anticipated demand was recalculated using a methodology aligned with that used for the ultimate development scenario for this network.

New demand rates have been formulated for the zones provided by the planning scheme, using previously applied demand rates as a baseline data set. These new demand rates have been used to calculate demand at ultimate development, which is noted to be subject to the land use pattern produced by way of development pursuant to the planning scheme. The rates applied appear in Table SC3.1.3 of the amended LGIP.

Assumptions used for each planning scheme zone for the purposes of demand generation at ultimate development capacity were consistent with those discussed in Section 3.1.

## 3.3 Limitations of Assumptions

The review of the LGIP documented herein is based on various assumptions, which have been made to ensure that the LGIP remains current and relevant to the planning scheme. The assumptions made are based on the point in time at which the review was undertaken and factors which have influenced the formulation of these assumptions are subject to change thereafter, which may subsequently alter validity and relevance of the content of the LGIP.

In order to partially account for the changing circumstances that may be encountered in Torres Shire, the assumptions are considered to provide a conservative baseline data from which the LGIP content has been formulated. The assumptions made have been tailored to local conditions where possible and appropriate. The assumptions made are accurate insofar as required for the purpose they are intended. Use of any data formulated based on the assumptions made within this review for a purpose it was not intended may not be appropriate and may result in inaccuracy.

It is recommended that a rolling five year review of the LGIP be implemented to ensure it remains relevant to current circumstances. Any change affecting the assumptions will be clear as part of five year review allowing a response to occur.

# 4 Conclusion and Recommendations

This report documents the methodology and assumptions used to complete a review of the Torres Shire Local Government Infrastructure Plan, to ensure it aligns with the new Torres Shire Planning Scheme. The review has resulted in interim amendments to the current LGIP, resulting in the amended LGIP.

The review of the LGIP has also identified instances where further work may be required to ensure alignment between various policy frameworks, specifically:

- The LGIP is recommended to be subject to ongoing review to maintain alignment with Council's capital budgets and expenditure.
- The amended LGIP relies on 2016 Census data provided by the ABS, as it continues to represent the most accurate and recent data that the LGIP can rely upon. Once data from the 2021 Census is available, it is recommended that the amended LGIP be reviewed and updated as required to reflect this new data.
- A rolling five year review of the LGIP should be implemented to ensure it remains relevant to current circumstances and that any assumptions are producing accurate outcomes.
- A further review of the LGIP should be completed where any major amendments to the planning scheme are completed.

# APPENDIX A

EXTRINSIC MATERIAL

December 2017

Torres Shire Council

# Extrinsic Material to the Local Government Infrastructure Plan

Revision 1.2

town planning | infrastructure | advisory

integran
town planning | infrastructure | advisory

# Document Control

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|---|---|
| **Client** | **Torres Shire Council** |
| **Document Name** | **Extrinsic Material to the Local Government Infrastructure Plan** |
| **Client Number** | |
| **File Location** | M:\1409-2 Torres SC -LGIP\Work\Word\LGIP Document\171220_Rep_Torres_LGIP Extrinsic Material.docx |
| **Date** | December 2017 |
| **Project Manager** | Simon Bentley |

**Document Status**

| Revision No. | Date | Description | Author | Reviewer |
|---|---|---|---|---|
| 1.0 | *11/07/17* | *Draft Report* | SJB | |
| 1.1 | *26/10/17* | *Final Report* | SJB | |
| 1.2 | *20/12/17* | *Final Report* | SJB | |

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# 1.0 Planning Assumptions

Underpinning the Planning Assumptions of the Local Government Infrastructure Plan (LGIP) is the Torres Shire Council (TSC) Population and Demand Model. These Geographic Information System (GIS) models have been developed using a "bottom up" approach, allowing for the spatial allocation of population and demands (residential & non-residential) across all land parcels within the Council area, from the base date of 2016 through to a realistic ultimate capacity determined for the current Planning Scheme. The base assumptions and methodologies employed to develop these models and other key inputs into the Planning assumptions are detailed below.

## 1.1 *Population*

The Medium Series Estimated Resident Populations published by the Queensland Government Statistician's Office (QGSO, 2015ed) were used as a basis for determining population projections across the LGA for the periods 2016 – 2036. These populations have been supplemented by a non-resident worker/tourist population, quantified using Council information about total rooms and vacancy rates.

The population totals for beyond this date have been extrapolated based on totals in previous periods.

### 1.1.1 Current Population

An analysis of the current landuses using Council's existing rating database was performed and verified using quantitative analysis of satellite imagery. These classifications have been used to allocate the current population across the LGA, based on assumptions about household size, dwelling type and in some circumstances dwelling densities (**Table 1.1**).

**Table 1.1. Current Population Allocations**

| Identified Residential Use | Population Allocation Assumption | Source(s) |
|---|---|---|
| Residential Dwelling | Household size –<br>*varies depending on dwelling type* | ABS – PEP Profiles |
| Other Residential Uses | Density per hectare –<br>*varies depending on use* | ABS – PEP Profiles<br>Quantitative analysis of sample sites |

Density per hectare figures for other residential uses were determined using a combination of Australian Bureau of Statistics (ABS) household size data from PEP profiles and a quantitative analysis of sample sites.

Current and projected household sizes for attached, detached, and other dwelling types are shown in **Table 1.2.** These were determined following an analysis of ABS Census data for the region and have been trended forward to 2036 based on QGSO projected changes to household size (QGSO, 2015ed). Projections beyond 2036 have retained the 2036 household size.

**Table 1.2. Household Density Assumptions**

| Dwelling Type | 2016 | 2021 | 2026 | 2031 | 2036 | Ultimate |
|---|---|---|---|---|---|---|
| *Single Dwelling* | 3.58 | 3.52 | 3.49 | 3.48 | 3.49 | 3.49 |
| *Multiple Dwelling* | 2.52 | 2.48 | 2.45 | 2.45 | 2.45 | 2.45 |
| *Other* | 2.27 | 2.23 | 2.21 | 2.20 | 2.20 | 2.20 |

The accuracy of the allocation of population using this approach has been checked through a comparative assessment against ABS population data within census boundaries (e.g. SA1), however it should be noted that there is significant household size variation throughout the Council area as a result of the following:

- Approximately 1 in 5 Indigenous households are overcrowded (ABS 2011 Indigenous Community Profiles), indicating a need for additional housing;
- Dwellings occupied by non-indigenous people who work on Thursday/Horn Island are often singles, couples or small families.

### 1.1.2 Ultimate Population

The ultimate development potential of the Torres Shire Council Planning Scheme was determined through the following process:

- Determination of the developable area of the Council area using the Planning Scheme Provisions:
  - Planning Scheme outcomes and Zone Classifications;
  - Zone Codes provisions;
  - Absolute constraints have been accounted for on the following basis:
    - Planning scheme zoning reflects known absolute site constraints;
    - Preliminary designs of the Wasaga expansion area incorporate applicable site constraints (e.g. waterways) and have been excluded from the determination of developable area.
- Discussions with TSC officers to understand the realistic development trends throughout the LGA, including triggers and barriers impacting upon propensity for particular areas to develop;
- Analysis of household size projections; and
- Assumptions about land requirements for roads, parks and other services, depending on the planning scheme provisions for different zones (i.e. considerations/requirements in urban vs rural zones).

**Tables 1.3** and **1.4** identify the key assumptions made in assessing the ultimate gross density of each residential zone. The application of these assumptions across the region were used in conjunctions with the other processes identified above, in order to determine the ultimate capacity of the Planning Scheme.

**Table 1.3. Dwelling Composition Assumptions for Residential Uses**

| Planning Scheme Zone | Precinct/Intent | % Attached | % Detached |
|---|---|---|---|
| Residential | Precinct 1 | 50% | 50% |
| Residential | Precinct 2 | 88% | 12% |
| Business | | 100% | 0% |

**Table 1.4. Ultimate Density Assumptions**

| Zone | Precinct | Excluded Land - Services, Roads, etc. | Lot Size ($m^2$) – Attached* | Lot Size ($m^2$) - Detached* | Planned density - Gross (Dwellings/Ha)* |
|---|---|---|---|---|---|
| **Residential** | Precinct 1 | 26.5% | 350 | 800 | 14 |
| **Residential** | Precinct 2 | 22.5% | 200 | 600 | 30.2 |
| **Business** | | 20% | N/A | N/A | 42 |

** Lot Size represents a realistic ultimate average size, based on an assessment of planning scheme provisions, market trends and preferences, and matters affecting propensity to develop.*

### 1.1.3 Interim Population Allocation

Growth between 2016 (base year) and ultimate populations have been allocated to each 5-year cohort using a 'gravity model' approach. Consideration was given to factors affecting propensity to develop, including:

- Location with respect to the Priority Infrastructure Area (PIA) (i.e. priority servicing area that must accommodate 10-15 years growth);
- Availability and proximity to infrastructure services;
- The likely staging of development for particular areas based on planning reports and direction from Council planning officers;
- Existence of master plan or development approvals.

## 1.2 *Infrastructure Demand*

TSC's spatial demand models express residential and non-residential demand in varying demand units. These are:

- Water Supply network - Equivalent persons (EP)
- Sewerage network - Equivalent persons (EP)
- Transport network - Vehicle trips per day (VPD)
- Stormwater network - Impervious Hectares (Imp Ha.)
- Parks and land for community facilities network - Persons

These units of measure have been selected as they are commonly used, and easily understood by a reader of the LGIP.

### 1.2.1 Residential Demand

The Residential Demands have been calculated for each network in the following manner:

- Water Supply network
  - Population at each cohort = residential EP
- Sewerage network
  - Population at each cohort = residential EP
- Stormwater network
  - Impervious fractions applied based on QUDM Urban residential (low density) development category
- Transport network
  - Population at each cohort divided by applicable detached household size (Table 1.2) to determine equivalent detached dwellings
  - Demand generation of 6 trips per equivalent detached dwelling
- Parks and land for community facilities network
  - Population at each cohort

### 1.2.2 Non-Residential Demand

Non-Residential Demands for the Water Supply, Sewer and Transport networks have been calculated by applying equivalent dwelling rates per hectare respectively to the developable areas available for non-residential development, derived from the population modelling process. The number of Equivalent dwellings was converted to the relevant demand units using:

- For the water supply and sewer networks - equivalent dwellings multiplied by the detached household size at each cohort (in accordance with Table 1.2)
- For the transport network - equivalent dwellings multiplied by the trip rate per detached dwelling identified in section 1.2.1 (6 trips per equivalent detached dwelling)

The process for determining the existing demand utilised the landuse information developed through the population modelling process, and categorised uses into the most appropriate Planning Scheme Zone to determine generation rates (presented in **Table 1.7**).

The resultant demands have then been factored down in order to represent a reasonable level of development that currently exists on each site. The assessment used to determine these factors considers each sites characteristics with respect to current zoning, location and size, as well as recent trends within the LGA and targeted quantitative analysis, where possible.

**Table 1.7. Non-Residential Demand Generation Rates by Planning Scheme Zone**

| Planning Scheme Zone | Water & Sewer Demand (EDU/Ha) | Transport Demand (EDU/Ha) | Stormwater Demand (Imp. Fraction) |
|---|---|---|---|
| Business | 25 | 50 | 0.9 |
| Conservation | 0 | 0 | 0 |
| Industry | 15 | 7.5 | 0.9 |
| Open Space and Recreation | 0 | 0 | 0 |
| Non Urban | 0 | 0 | 0 |
| Special Purpose | 5 | 5 | 0.4 |

Ultimate future demands are based on demand generation rates per hectare for each non-residential zone presented in **Table 1.7**. If existing demand calculated exceeded the future demand, the existing figures were kept constant for all demand cohorts.

The future non-residential demand calculated through the above process has been trended over the interim 5-year cohorts through until Ultimate, based on the population growth found over the same period. This assumes that the growth in non-residential demand is directly proportional to the rate of growth of residential demand within each of these regions.

## 1.3 *Employment*

The Torres Shire Council Employment Model has been developed to provide important inputs into the LGIP, most notably the existing and future employees and future floor space requirements. The methodology for the employment modelling is detailed below.

### 1.3.1 Current Employment

Australian Bureau of Statistics (ABS) Census data was used to determine an existing employment profile within the Council area by employment sector for the following regions:

- Thursday Island;
- Horn Island; and
- Torres Shire Council.

The employment profile is based on:

- Total population;
- Total current workforce;
- Total potential workforce (residents aged 15 and older);
- Residents who both live and work locally;
- Industry of employment by occupation;
    - For the purposes of the LGIP employment modelling, ABS industry of occupation has been re-categorised into ‘employment sectors’ in order to align with

categories in the LGIP tables. Assumptions made to assign ABS employment industry into LGIP Employment Sector are detailed in **Table 1.8** below.

**Table 1.8. Employment Industry Assumptions**

| ABS Employment Industry Category | LGIP Employment Sector | ABS Employment Industry Category | LGIP Employment Sector |
|---|---|---|---|
| Agriculture, forestry & fishing | Other | Financial & insurance services | Commercial |
| Mining | Other | Rental, hiring & real estate services | Commercial |
| Manufacturing | Industry | Professional, scientific & technical services | Commercial |
| Electricity, gas, water & waste services | Industry | Administrative & support services | Commercial |
| Construction | Industry | Public administration & safety | Community Purposes |
| Wholesale trade | Industry | Education & training | Community Purposes |
| Retail trade | Retail | Health care & social assistance | Commercial |
| Accommodation & food services | Commercial | Arts & recreation services | Commercial |
| Transport, postal & warehousing | Industry | Other services | Other |
| Information media & telecommunications | Commercial | Inadequately described/Not stated | Other |

The following key inputs into Employment Modelling have been produced for each modelled region, using the available ABS data:

- Labour retention rate (Residents working locally ÷ total work force); and
- Job containment rate (Residents working locally ÷ local jobs available)

These attributes are identified in order to assess the employment increase as a result of growth occurring within the LGA.

### 1.3.2 Future Employment

The employment model assumes that labour retention, job containment, and unemployment levels are maintained throughout all projection periods.

The ratio of work force to population is used to determine employment projections in each LGIP projection area for each cohort, in each employment sector. This is applied to the population projections derived from the TSC population model. The outputs of the employment model used to inform the LGIP include:

- Total current jobs within each LGIP projection area for each employment sector; and
- Additional job requirements for growth within the LGA for each projection period, distributed amongst employment sectors in accordance with the current trends

### 1.3.3 Floor Space Requirements

Floor space requirements are calculated based on assumptions about floor space per employee for each employment sector. The assumed floor space requirements are detailed in **Table 1.9**, and have been identified based on industry knowledge and confirmed by TSC Officers as both reasonable and appropriate for use in the LGIP. As with the employment figures, floor space outputs used in the LGIP assumption tables include:

- Total existing floor space requirements within each LGIP projection area for each employment sector; and
- Additional floor space requirements for growth within the LGA for each cohort, distributed mathematically amongst employment sectors within LGIP projection areas.

**Table 1.9. Floor space assumptions by Employment Sector**

| Employment Sector | Floorspace (m²/employee) |
|---|---|
| Retail | 30 |
| Commercial | 30 |
| Industry | 150 |
| Community Services | 25 |
| Other (incl. Home based business | 20 |

## 1.4 *Future Revenue Projections*

A significant proportion of future growth within Torres Shire Council is not considered likely to be subject to Adopted Infrastructure Charges. An assessment has been made on Thursday Island against the existing development and ownership, identifying sites where any future development is likely to be exempt from infrastructure charges. Specifically:

- Land owned by government agencies (local, state, federal);
- Land set aside for reserves;
- Land owned by religious organisations; and
- Land which has no additional development capacity.

This assessment identified that only 7% of land on Thursday Island would be capable of development while also being subject to Adopted Infrastructure Charges.

Horn Island also experiences a significant proportion of development which is exempt from infrastructure charges, however future areas identified for development are considered far more likely to have infrastructure charges applied.

For this reason, the revenue projections have reduced the applicable development charges to future growth by the following amounts, and this is considered to be a reasonable assumption given the potential extent of exempt development identified above.

- Thursday Island – 90% reduction to infrastructure charge revenues
- Horn Island – 50% reduction to infrastructure charge revenues
- All other areas – 90% reduction to infrastructure charge revenues

## 1.5 *Priority Infrastructure Area Capacity*

TSC's growth allocation model considers a range of factors for the distribution and take-up of available capacities across the Planning Scheme, in particular the propensity for areas to develop over time. Based on the assumptions, the modelling indicates that a population of approximately 5,500 people (or 1,600 dwellings) are realistically able to be accommodated within the PIA up until 2031 (the "PIA Period").

The extent of urban population growth allocated within the PIA boundary (approx. 4,000, or 1,200 dwellings) demonstrates a total remaining capacity for approximately 400 dwellings identified at the end of the PIA period. In assessing the PIA capacity, it is important to note the following:

- Overcrowding issues are contributing to modelled household sizes which are significantly higher than what is typically seen in other regions;
- Council has identified a need for additional housing to assist in reducing overcrowding;
- Allocation of the 2031 inside PIA population over the ***total*** PIA dwelling capacity would reduce the average household size by approximately 0.7 people

On this basis, and given Council has identified that the overcrowding is an issue within the LGA, the remaining capacity at the end of the 15 year PIA period is considered appropriate.

Additionally, the available PIA capacity is comprised of a significant amount of infill development, and given the low projected growth, there is significant potential that this capacity may not be fully realised within 10-15 years.

# 2.0 Cost Assumptions

Unit rates used within the Schedule of Works (SoW) model have been derived using the information deemed most accurate and appropriate, which was available at the time the LGIP was being prepared. For asset costing purposes within the SoW model, unit rates for all assets and networks have been indexed to the base year of the model, 2016 using Consumer Price Index (CPI) data from the ABS unless otherwise noted.

## 2.1 *Baseline Valuation*

Existing asset valuations within the SoW model provide an additional level of detail when compared to the standard SoW models 'baseline valuation'. The 'Base Estimate' within the TSC SoW model provides the equivalent valuation figure, however this has been built using a raw unit rate cost in addition to project owners costs (on-costs).

On costs are considered to be an essential element of the 'current replacement cost' identified within Statutory Guideline 03/14, relating to design/redesign, environmental considerations, traffic management and project management among other things, all necessary components of the cost to replace an asset. The Evans and Peck report referenced within the SoW model user manual identifies that many Council's already include on costs within their unit rates. Council has chosen to separate these costs in order to provide additional transparency and ease of understanding within their LGIP documentation.

## 2.2 *Application of Subsidies*

Given the high proportion of exempt development which occurs within the Council area, and the low overall growth, the viability of all networks are dependent upon the availability of subsidies or funding from external sources. Given that the exact value of subsidisation is not able to be known for large portions of the network, the following approach has been adopted:

A 91% subsidy has been applied to all existing and future infrastructure items. This is on the basis that:

- Delivery of ***all*** infrastructure projects are reliant on the cost of materials and works to be 100% funded by external sources; and
- Torres Shire Council assumes a portion of cost which typically includes project management, detailed design, and other overhead expenses.

This is considered to be an accurate representation of the current constraints experienced by Council in planning and delivery of trunk infrastructure assets. It is noted that in some instances, the subsidies may have been greater or less than those assumed, however given the difficulties in obtaining this information for each asset, this approach is considered appropriate.

## 2.3 *Water Supply & Sewerage Network*

### 2.3.1 Water Supply / Sewer Unit Rates

Water Supply and Sewerage network unit rates are derived from asset registers maintained by Council.

Details of these calculations and inputs have been provided in the Cost Input spreadsheet provided as part of the LGIP extrinsic material.

### 2.3.2 Cost Modifiers

In addition to the unit rates identified above, the cost modifiers listed in **Table 2.1** have also been applied as necessary to assets across the water supply and sewerage networks.

**Table 2.1. Asset Cost Adjustments**

| Modifier | Valuation Component | Applies To | Adjustment Factor |
|---|---|---|---|
| On-Cost Allowance | Works | All existing & future assets | 10% |
| Contingency (Time based) | Works | All future assets | 7.5 - 25% |

## 2.4 *Transport Network*

### 2.4.1 Transport Unit Rates

Transport network unit rates are built using contract rates which have been identified by Council officers after a review of recently completed projects.

Details of these calculations and inputs have been provided in the Cost Input spreadsheet provided as part of the LGIP extrinsic material.

### 2.4.2 Cost Modifiers

In addition to the unit rates identified above, the cost modifiers in **Table 2.3** have also been applied as necessary, to assets across the transport network.

**Table 2.3. Asset Cost Adjustments**

| Modifier | Valuation Component | Applies To | Adjustment Factor |
|---|---|---|---|
| On-Cost Allowance | Works | All existing & future assets | 10% |
| Contingency (Time based) | Works | All future assets | 7.5 - 25% |

## 2.5 *Public Parks and Land for Community Facilities Network*

### 2.5.1 Parks Unit Rates

Where no project costs are available, existing park embellishment costs have been established using costs for individual embellishment items. An audit of the current embellishments within existing parks was completed by TSC Officers. This complete embellishment list applies the individual item costs to determine a total embellishment value per park. A summary of these embellishment items and their costs has been included within the Cost input spreadsheet included within the extrinsic material.

Unit rates for land are based on a TSC estimate of $10/m^2$.

### 2.5.2 Cost Modifiers

In addition to the unit rates identified above, the cost modifiers in **Table 2.6** have also been applied as necessary to assets across the transport network.

**Table 2.6. Asset Cost Adjustments**

| Modifier | Valuation Component | Applies To | Adjustment Factor |
|---|---|---|---|
| On-Cost Allowance | Works | All existing & future assets | 10% |
| Contingency (Time based) | Works | All future assets | 7.5 - 25% |

# 3.0 Network Planning

Network planning has been undertaken over a 20 planning horizon from the base date of the LGIP (2016). It is important to note that this does not align with the ultimate development of the Planning Scheme, which based on LGIP modelling and forecasts produced by the QGSO, is currently anticipated to be achieved at or around 2161.

These planning horizons have been selected on the basis that they provide a rational alignment between the infrastructure planning and landuse outcomes envisaged under the TSC Planning Scheme. The considerations given to the planning of each network within the LGIP are as follows.

## 3.1 *Network Planning in General*

An assessment of the future growth characteristics and trends over each network's planning horizon has been performed by Council engineers and planners together with a review into existing network servicing capacity / adequacy through application of the Desired Standards of Service (DSS) identified within the LGIP. The population and demand models completed as a part of the LGIP project have been considered against Council's previously completed network planning in order to reassess its appropriateness and assist in determining where planning 'gaps' may exist that need to be addressed.

## 3.2 *Water Supply Network*

Network planning for the water supply network has been primarily guided by discussions between TSC planners and engineers, in conjunction with the recommendations identified in the following studies and reports, which have informed Council's planning process:

- Total Management Plan and Strategic Asset Management Plan for Water Supply & Sewerage Services (PDR Engineers, 2008)
- Workscope Report (2012, Aecom)

Water supply network planning has been undertaken to a 20 year planning horizon at a level of service that aligns with the DSS in the LGIP.

## 3.3 *Sewerage Network*

Network planning for the sewerage network has been guided by discussions between TSC planners and engineers, in conjunction with the recommendations identified in the following studies and reports, which have informed Council's planning process:

- Total Management Plan and Strategic Asset Management Plan for Water Supply & Sewerage Services (PDR Engineers, 2008)
- Workscope Report (2012, Aecom)

Sewerage network planning has been undertaken to a 20 year planning horizon at a level of service that aligns with the required DSS.

## 3.4 *Stormwater Network*

The stormwater network planning was performed collaboratively through discussions between TSC planners and engineers in order to determine a suitable road network for the LGIP that will support the existing and future needs of the region and that will meet the community outcomes envisaged by the DSS prepared and agreed to by TSC. This has been in conjunction with the content of the following studies and reports, which have informed Council's planning process:

- Total Management Plan - Horn Island Volume 4 - Stormwater (PDR Engineers, 2000)
- Total Management Plan - Thursday Island Volume 4 - Stormwater (PDR Engineers, 2000)

Stormwater network planning has been undertaken to a 20 year planning horizon at a level of service that aligns with the required DSS.

## 3.5 *Transport Network*

The transport network planning was performed collaboratively through discussions between TSC planners and engineers in order to determine a suitable TSC road network for the LGIP that will support the existing and future needs of the region and that will meet the community outcomes envisaged by the DSS prepared and agreed to by TSC. This has been in conjunction with the content of the following studies and reports, which have informed Council's planning process:

- Total Management Plan - Horn Island Volume 3 - Roads (PDR Engineers, 2000)
- Total Management Plan - Thursday Island Volume 3 - Roads (PDR Engineers, 2000)

Transport network planning has been undertaken to a 20 year planning horizon at a level of service that aligns with the required DSS.

## 3.6 *Public Parks and Community Land Network*

In addition to the processes detailed in the above sections, the network planning for public parks and community land was guided by the recommendations identified within the following documents, which have informed Council's planning process:

- Thursday Island foreshore landscape report (RPS, 2015)

The DSS for public parks have been developed using the recommendations from the above reports, and network planning has been undertaken to a 20 year planning horizon.

# 4.0 Financial Modelling Assumptions

Financial modelling inputs for the TSC LGIP SoW model are outlined in **Table 4.1** below, including brief comments and justifications around the appropriateness of the inputs used.

**Table 4.1. Financial Modelling Assumptions within the TSC LGIP SoW model.**

| Financial Modelling Assumptions | | Inputs | Comments/Justification |
|---|---|---|---|
| **Model Setup** | Base Year of Model | 2016 | To align with the Infrastructure Planning and Demand Modelling that has been prepared for the LGIP project |
| | Infrastructure Planning Horizon | 20 | 20 years for all infrastructure networks. This represents the extent to which each network has been planned and alignment of infrastructure and landuse outcomes is reached. |
| | Demand Unit (Unit of Measure) | EP/Trips/ Persons | EP - Water/Sewer networks<br>Trips - Transport network<br>Persons - Parks and land for Community Facilities network |
| **Financial Inputs** | **Discount Rates** | | |
| | Post-tax Nominal WACC to be applied to Expenses (WACC) | 6.00% | Accepted by TSC's Finance Department as appropriately reflecting a long-term view of the cost of financing, including consideration of risks associated with the type of LGIP assets and understanding of the regional nature of the LGA. |
| | Real Post-tax Nominal WACC to be applied to Revenues (RWACC) | 3.99% | The WACC Adjusted for inflation using the Fisher Equation. |
| | **Escalations** | | |
| | Works Escalation Rate (for discounting purposes) | 1.04/2.05 % | Accepted by TSC's Finance Department as appropriately reflecting a long-term view of cost escalations, particularly given the types of LGIP assets and understanding of the regional nature of the LGA. |
| | Land Escalation Rate (for discounting purposes) | 1.93% | Accepted by TSC's Finance Department as appropriately reflecting a long-term view of cost escalations, particularly given the types of LGIP assets and understanding of the regional nature of the LGA. |
| | Modelled Charge Inflation Rate | 1.93% | |

The LGIP SoW model has adopted a "User Pays" approach for the apportionment of infrastructure costs between the users. In addition, this calculation method also employs a discounted cashflow methodology to appropriately model the time value of money over the modelling horizon and to understand the true cost of infrastructure delivery and funding. The SoW model therefore applies the following formula in order to determine a cost per demand unit.

$$\frac{\textit{Existing Infrastructure Value (\$) + NPV (Nominal) of Future Infrastructure Expenditure (\$)}}{\textit{Current Demand (D) + NPV (Real) of Future Demand (D)}}$$

The Net Present Value (NPV) of future infrastructure expenditure is determined using the *Nominal WACC* (6.00%) and *Escalation Rates* (1.04% & 2.05%), to take into account the escalation of the capital spend in the years forward of the base year.

The NPV of future demand is a proxy, used to represent future revenue from infrastructure charges. This is determined using a *Real WACC* (3.99%), which is adjusted to account for inflationary effects.

The use of these equations determines an escalating price path which is driven by the inflation rate. In this way, the contribution rate grows over time in line with other cost growth in works, land, sales and wages.

The final Cost Schedules are presented in the LGIP SoW Model.