# APPENDIX R – TRAFFIC IMPACT ASSESSMENT

***RMA Engineers Pty Ltd***

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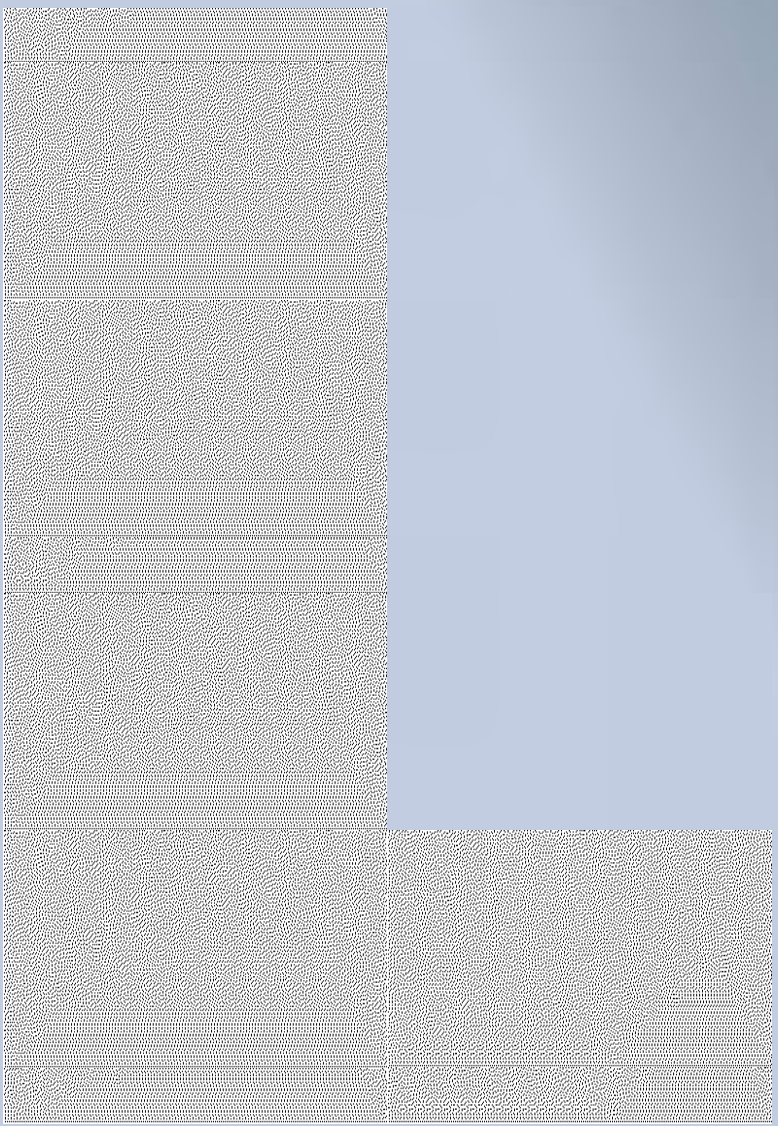

# TRAFFIC IMPACT ASSESSMENT

## Toowoomba Region Sports Precinct - Charlton

Traffic Engineering Report

Client Toowoomba Regional Council

Project Number 16567

# REPORT CONTROL SHEET

| Report Details | |
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| **Project No.:** | 16567 |
| **Site:** | Toowoomba Region Sports Precinct, Charlton |
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*[1]Review of discussions relating to the Local Government Infrastructure Designation Prelodgement review and commentary by Toowoomba Regional Council (March 2022) only.*



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# Contents

# 1. Introduction

RMA Engineers has been engaged by Toowoomba Regional Council (TRC) to undertake a Traffic Impact Assessment (TIA) for a proposed sports precinct at Charlton. The Toowoomba Regional Sports Precinct (TRSP) is intended to cater for existing and future demand for sporting facilities in the greater Toowoomba area.

This report includes consideration of:

- A previous assessment undertaken by HIG (*Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case*, 2021), which details the traffic impact outcomes for the external road network. These findings are considered part of this assessment and are detailed in later chapters.
- A Local Government Infrastructure Designation Prelodgement review and commentary by Toowoomba Regional Council in March 2022.

The assessment has been undertaken generally in accordance with the road transport related requirements identified in the TRC Planning Scheme and Department of Transport and Main Roads (DTMR) *Guide to Traffic Impact Assessment* (GTIA).

## 1.1 Report objectives and scope

The purpose of this report is to document an investigation of traffic and transport impacts of the proposed development on the surrounding road network in accordance with GTIA and TRC requirements.

This report considers:

- Estimated development traffic generation, distribution and operational assessment as described in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2021).
- Development access arrangements, as considered in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2021).
- Site concept layout review.
- Car parking provision, circulation and dimensions.
- Design and service vehicle access.
- Compliance with local government planning criteria.

Where required, this report makes recommendations for the mitigation of development impacts.

## 1.2 Reference material

In preparing this report, reference has been made to the following:

- Australian Standard 2890 *Parking Facilities*
- Austroads *Design Vehicles and Turning Path Templates Guide* (2013)
- Austroads *Guide to Road Design* (2021)

- Austroads *Guide to Traffic Management* (2017)
- Disability (Access to Premises – Buildings) Standards *Disability Discrimination Act 1992* (2010)
- DTMR *Guide to Traffic Impact Assessment* (GTIA) (2018)
- GenEng *Gowrie Junction Road Intersection Concept Design Option 3 – Intersection layout plan* (3 May 2022)
- GenEng *Toowoomba Regional Sports Precinct – Entry Road and Intersection Design Report* (May 2022)
- Harrison Infrastructure Group (HIG) *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (2021)
- Toowoomba Regional Council *Local Government Infrastructure Designation Toowoomba Region Sports Park – Prelodgement: First Designator Review* (March 2022)
- Toowoomba Regional Council Planning Scheme (2021)
- Toowoomba Regional Council *Toowoomba Region Sports Precinct Business Case* (2020)
- Toowoomba Regional Council *Toowoomba Regional Sports Precinct Component Schedule* (2019)

# 2. Proposed development

## 2.1 Introduction

The proposed Toowoomba Region Sports Precinct is a multi-use facility which aims to accommodate a variety of sporting activities for all ages and levels of ability. The precinct is intended to cater for current and anticipated future demand throughout Toowoomba and the greater Darling Downs region.

The precinct is proposed as a phased development comprising Stages 1 to 7. A potential Stage 8 is beyond the planning horizon and will be considered at a future period. This report examines Stages 1 to 7 only.

The major components of Stages 1 to 7 include soccer fields, ovals, baseball/softball diamonds, rugby fields, relocation of the existing shooting club and archery, and various clubhouses. As part of Stage 6, a premier hub and associated fields are proposed, which are intended to cater for larger events and crowds. All stages include associated car parking and internal road connections.

## 2.2 Location and descriptions

The site is located approximately 9km north-west of the Toowoomba CBD. The majority of site land is currently classified as sport and recreation in the TRC Planning Scheme. A small section of land (linking to Gowrie Junction Road) is classified as rural. It is bounded by land classified as rural to the north, east and south, and medium impact industry to the west.

The subject site and the surrounding zone classifications are illustrated in Figure 2-1.

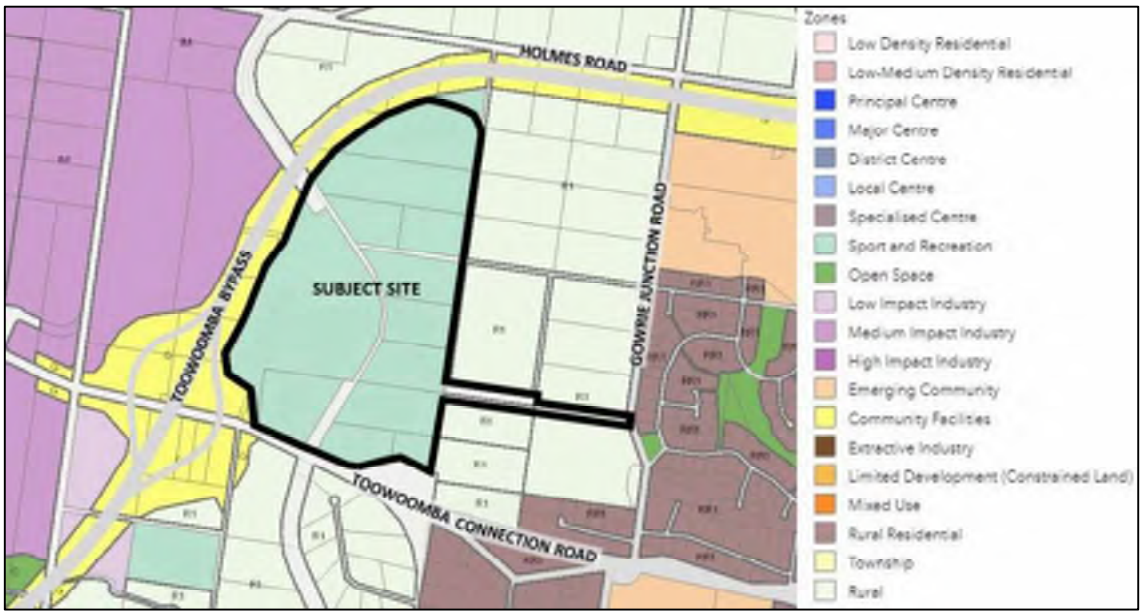



**Figure 2-1: Locality plan and Planning Scheme zones**

The Toowoomba Bypass (Toowoomba Second Range Crossing) is not yet shown in Council mapping and has been approximated for the purposes of this figure.

The site encompasses the following lots:

- Lot 24 on SP214746
- Lot 276 on SP268291
- Lots 110-111 on SP272107

- Lots 112-117 on A345
- Lots 118-119 on SP203198
- Lot 100 on SP270472
- Lot 114 on SP285263

## 2.3 Proposed development layout

The proposed development concept layout is attached in Appendix A and shown in Figure 2-2. The layout is an initial concept which will be refined in future design stages.

The site is proposed to be accessed via new intersections at Gowrie Junction Road (all movements) and Toowoomba Connection Road (left in/left out). Further detail on these access arrangements is provided in Section 5.1.


**Figure 2-2: Development concept layout**

## 2.4 Yield and staging

As discussed in Section 2.1, the sports precinct is proposed as a staged development. A potential Stage 8 is beyond the current planning horizon and will be considered at a future stage.

The development staging is depicted in Figure 2-3 and in more detail in Appendix A..

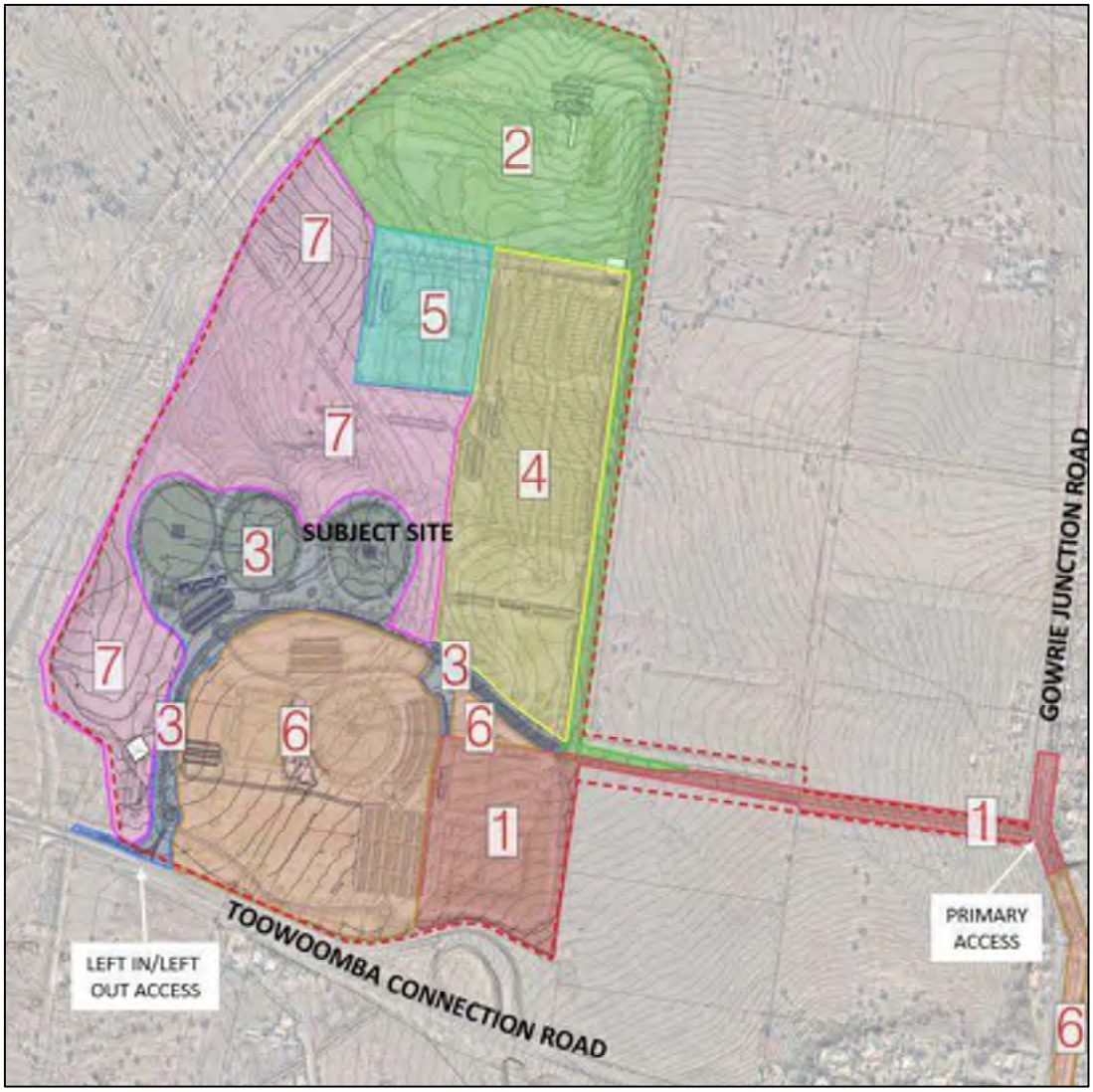



**Figure 2-3: Development staging**

Stages 1 to 7 of the development are summarised in Table 2-1.

**Table 2-1: Development yield and staging**

| Stage | Element | Facility/infrastructure |
|---|---|---|
| 1 | Southern rectangular fields | 4 fields |
| | Clubhouse | 1 building |
| | Gowrie Junction Road intersection | All movements intersection |
| | Access road to Gowrie Junction Road (southern side only) | - |
| | Retain existing shooting club and archery | - |
| 2 | Relocate shooting club and archery | - |
| | Indoor range | - |
| | Shared clubhouse | 1 building |
| | Access road | - |
| | Internal roundabout | - |
| | Access road to Gowrie Junction Road (northern side) | - |
| 3 | Ovals | 3 ovals |
| | Practice nets | 13 nets |
| | Clubhouse | 1 building |
| | Internal road | - |
| | Access to Toowoomba Connection Road | Left in/left out intersection |
| 4 | Diamond fields | 4 fields |
| | Rectangular fields | 4 fields |
| | Shared fields | 2 fields |
| | Clubhouses | 2 buildings |
| | Internal roads | - |
| 5 | Northern rectangular fields | 6 fields |
| | Clubhouse | 1 building |
| 6 | Premier hub (stage 1 of building) | 1 building (stage 1) |
| | Premier oval | 1 oval |
| | Premier rectangular field | 1 field |
| | Internal roads | - |
| | Local park and playground north of southern soccer fields | - |
| | Boulevard road (northern side only) | - |
| | Gowrie Junction Road upgrade to Toowoomba Connection Road (potential) | - |
| 7 | District park and facilities | - |

The potential future Stage 8 comprises numerous elements including an athletics track, hardcourts, an aquatic centre and indoor sports centre.

# 3. Existing transport environment

The TRC Planning Scheme road hierarchy classifications for the surrounding area are shown in Figure 3-1. Recent changes to the road network are not yet correctly depicted in Council mapping, including the Toowoomba Bypass (Toowoomba Second Range Crossing) alignment, associated connections and the Hermitage Road alignment. The relevant road network is further discussed in Section 3.1 and 3.2.

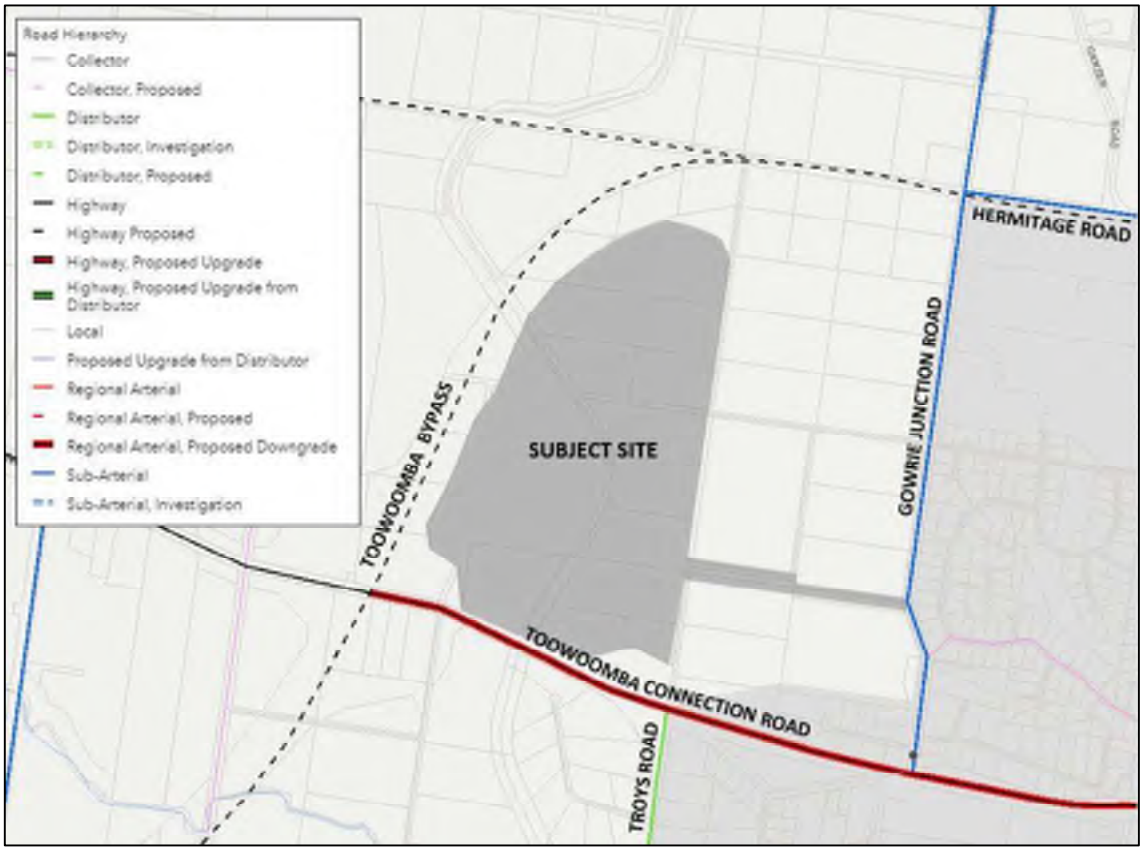



**Figure 3-1: TRC road network hierarchy map**

## 3.1 Surrounding road network

### 3.1.1 Toowoomba Connection Road

Toowoomba Connection Road is classified as a regional arterial proposed downgrade under the TRC Planning Scheme, and is under the jurisdiction of DTMR (road 315). It extends from the Warrego Highway and Toowoomba Bypass connection at Helidon Spa, to the Toowoomba Bypass eastern ramp connections just west of the subject site.

In the vicinity of the subject site Toowoomba Connection Road has the following characteristics:

- Divided road with two lanes in each direction
- Lane widths of approximately 3.5m
- Varying road reserve widths due to Toowoomba Bypass connectivity and recent alignment modifications
- Posted speed limits varying between 80km/h and 90km/h

Toowoomba Connection Road in the vicinity of the site is shown in Figure 3-2.

**Figure 3-2: Toowoomba Connection Road looking west (subject site on the right)**

### 3.1.2 Gowrie Junction Road

Gowrie Junction Road is classified as a sub-arterial under the TRC Planning Scheme. It extends from Toowoomba Connection Road in the south to Morris Road in Gowrie Junction in the north.

In the vicinity of the subject site Gowrie Junction Road has the following characteristics (refer to Figure 3-3):

- Two-way two-lane arrangement
- Varying lane widths between 3m and 4.7m
- Varying road reserve width between approximately 35m and 40m
- Posted speed limits varying between 60km/h and 80km/h

**Figure 3-3: Gowrie Junction Road looking north (subject site on the left)**

### 3.1.3 Hermitage Road

Hermitage Road is classified as a sub-arterial under the TRC Planning Scheme. It extends from Gowrie Junction Road in the west to Mort Street in the east. The section of Hermitage Road in the vicinity of the site was constructed in 2017 as part of local road realignments required to incorporate the Toowoomba Second Range Crossing (TSRC).

In the vicinity of the subject site Hermitage Road has the following characteristics (refer to Figure 3-4):

- Two-way two-lane arrangement
- 3.5m lane widths
- Unknown road reserve width (yet to be depicted in Council and other mapping)
- 60km/h posted speed limit

**Figure 3-4: Hermitage Road looking east from Gowrie Junction Road**

## 3.2 Key intersections

The existing Toowoomba Connection Road/Gowrie Junction Road intersection and proposed access intersections were examined in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020).

Summaries of the report findings regarding the Toowoomba Connection Road/Gowrie Junction Road intersection and access arrangements are provided in Sections 4.2.3 and 5.1, respectively.

Council has requested (Local Government Infrastructure Designation Prelodgement review, March 2022) that the Gowrie Junction Road/Hermitage Road intersection also be assessed. This intersection is described in the following section.

### 3.2.1 Gowrie Junction Road/Hermitage Road intersection

The Gowrie Junction Road/Hermitage Road signalised intersection is located approximately 140m north of the main site access location and was constructed in 2017 as part of Toowoomba Second Range Crossing works.

The intersection configuration is shown in Figure 3-5. It includes channelised turning provision and a left turn slip lane from Hermitage Road. The intersection does not include any pedestrian crossing or cyclist provision.

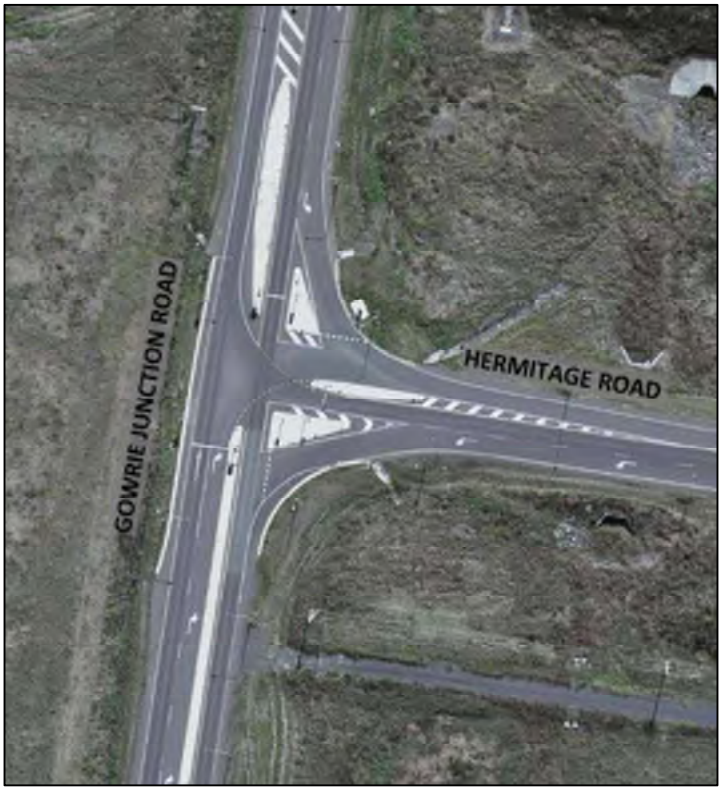



**Figure 3-5: Gowrie Junction Road/Hermitage Road intersection**

## 3.3 Crash data

Queensland Government crash data (received 29 February 2020) was reviewed as part of the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (HIG, 2020). No crash patterns were identified at the proposed site access locations and at the Toowoomba Connection Road/Gowrie Junction Road intersection.

## 3.4 Traffic data

Loop count data for the Gowrie Junction Road/Hermitage Road intersection has been obtained from DTMR for the period 6-13 March 2022.

The Saturday 9-10am and Friday 4-5pm peak hour volumes are shown in the following figure.

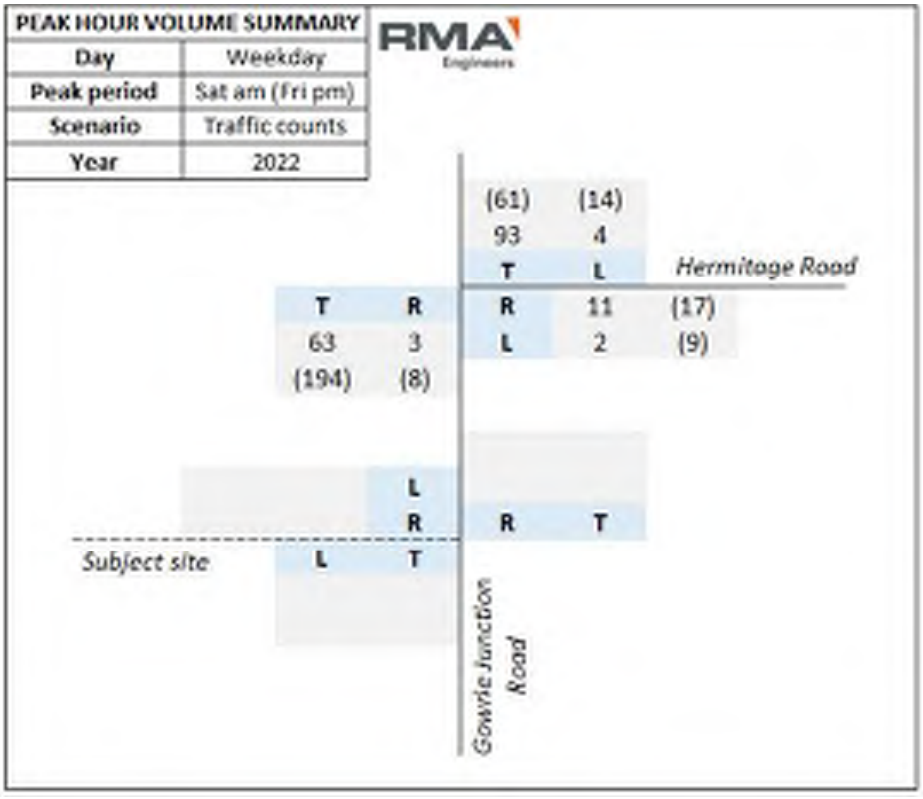



**Figure 3-6: Gowrie Junction Road/Hermitage Road intersection 2022 traffic count data**

A 2.5% linear growth rate has been adopted for future volume estimates, as implemented in the HIG assessment report.

# 4. External traffic impact

The development traffic impact to the external road network has been considered as follows:

- The *Traffic Impact Assessment - Toowoomba Region Sports Precinct Business Case* (HIG, 2021) (referred to as the HIG report) operational assessment outcomes are considered part of this assessment and are detailed below.
- Additional investigations for the Gowrie Junction Road/TRSP Access Road and Gowrie Junction Road/Hermitage Road intersections have been undertaken, as requested by Council.

The findings from these assessments are summarised in the following sections.

## 4.1 Assessment years

The Stages 1-7 development traffic impact has been considered at 2030 and 2040 (ten-year design horizon as required by TRC).

The construction period is currently estimated as 10-20 years. A 2030 assessment year with development Stages 1-7 has been adopted as a conservative approach, to consider the potential full impact of the development on the surrounding road network.

## 4.2 HIG report operational assessment

A TIA assessment was previously undertaken by HIG (*Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case,* 2021) for the site. The report details the traffic impact outcomes for the external road network. These findings are summarised below

### 4.2.1 Development traffic

Development traffic generation has been estimated in the HIG report. The generation is based on typical usage schedules by day and season. The report is provided in Appendix B.

The following assumptions were also adopted:

- Vehicle occupancy of 1.5 persons per vehicle across all sports
- Average vehicle turnover of two hours (hourly turnover of 50%) for all sports
- The precinct peak hour generation aligns with the peak periods of the adjacent Toowoomba Connection Road

The report adopts the following peak periods for assessment:

- Winter season Friday afternoon peak hour
- Winter season Saturday morning peak hour

The assumptions and data specified in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020) result in the following traffic generation for Stages 1-7:

- Saturday am peak hour: 834 vehicles per hour
- Friday pm peak hour: 707 vehicles per hour
- Peak daily volume (Saturday): 9,138 vehicles per day

The Saturday morning and Friday afternoon peak hour distribution and traffic volumes are shown in Figure 4-1 and Figure 4-2, respectively, as extracted from the report.

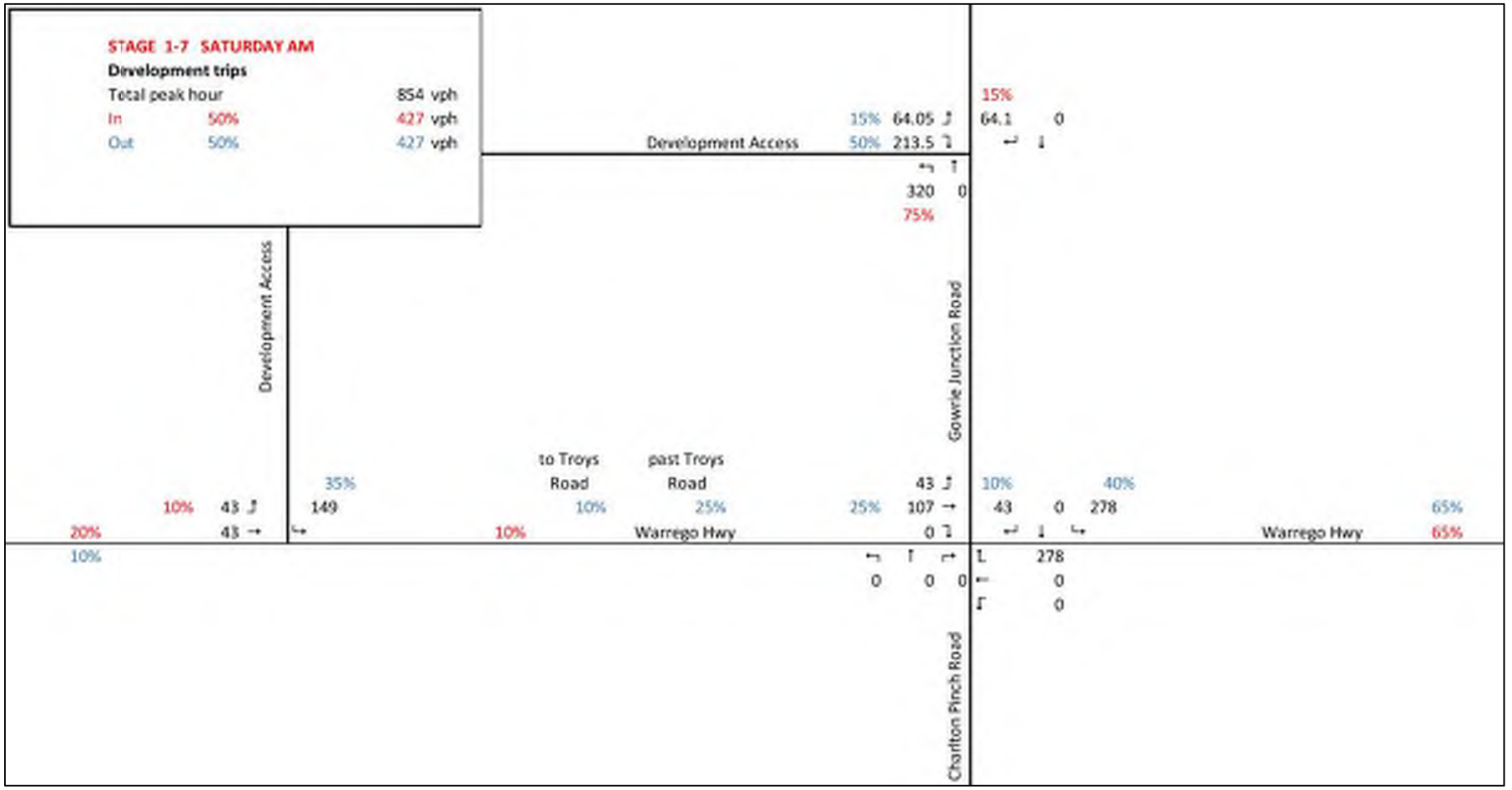



**Figure 4-1: Stage 1-7 Saturday am peak development distribution and volumes (*Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2021))**

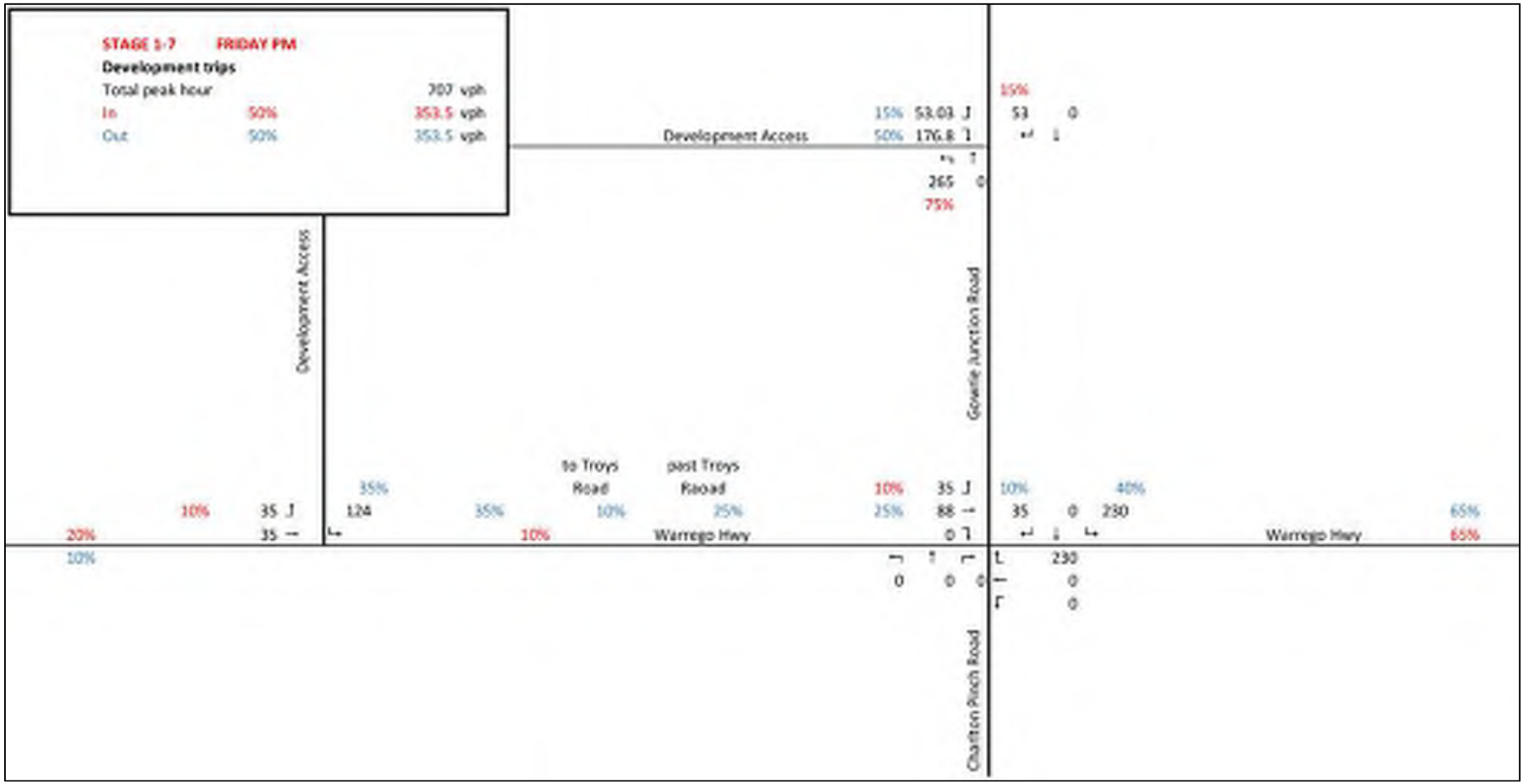



**Figure 4-2: Stage 1-7 Friday pm peak development distribution and volumes (*Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2021))**

### 4.2.2 Operational assessment

SIDRA analysis was conducted for the following intersections as part of the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (HIG, 2021):

- Toowoomba Connection Road/Gowrie Junction Road signalised intersection (State-controlled intersection)
- Gowrie Junction Road/TRSP Access Road priority-controlled intersection (TRC-controlled intersection)

A summary of the operational assessment findings is provided below.

Toowoomba Connection Road/Gowrie Junction Road intersection

The HIG report shows that the existing Toowoomba Connection Road/Gowrie Junction Road intersection operates within acceptable performance limits at the 2030 assessment year, the required assessment horizon as specified in the GTIA (DTMR, 2018). No upgrades are recommended to the existing intersection arrangement. It is noted that this intersection was upgraded to its current form in 2016, and no crashes have been recorded in the previous five years at this location.

Gowrie Junction Road/TRSP Access Road

As described in the HIG report, the proposed Gowrie Junction Road access priority intersection is shown to operate within acceptable performance limits at the 2040 ten-year design horizon.

Events

The report also considered the impact of larger regional events at the site. An event attracting 3,000 people with an average vehicle occupancy of 1.5 persons per vehicle would generate 2,000 vehicles to the site (4,000 vehicle movements). This compares to a peak Saturday estimate of 9,200 vehicles per day. It is noted that public transport has not been considered and the actual number of vehicles is likely to be fewer due to the likely use of buses for event patrons. The report indicates that, therefore, event days are likely to generate a relatively similar vehicle volume to a peak season Saturday volume.

### 4.2.3 External road network

The development traffic impact to key external roads was also examined as part of the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (HIG, 2020) report. A summary of these findings is provided below.

Toowoomba Connection Road

As described in the TIA, Toowoomba Connection Road is expected to cater for 33,800 vehicles per day at the 2040 design horizon, which is within the capacity of the existing four-lane cross section. Therefore, upgrade to Toowoomba Connection Road is not considered warranted.

Gowrie Junction Road

The TIA reports that Gowrie Junction Road is expected to cater for 6,700 vehicles per day at the 2040 design horizon, which is beyond the capacity of the existing road cross section (7m sealed pavement width). The HIG report recommends that Gowrie Junction Road be upgraded between the site access and Toowoomba Connection Road to a 12m wide distributor standard to accommodate development traffic volumes.

It is noted that upgrade of Gowrie Junction Road north of the TRSP Access Road has not been examined and is dependent on future development in the area (particularly Meringandan, Highfields

and Gowrie), road network changes (such as an Old Goombungee Road-Mort Street link) and associated traffic volume growth.

## 4.3 Operational assessment

Following review of the ongoing findings and design, Council has requested that the following intersections be examined in addition to the HIG report:

- Gowrie Junction Road/Hermitage Road signalised intersection (TRC-controlled intersection)
- Gowrie Junction Road/TRSP Access Road as a signalised intersection (design undertaken by GenEng and endorsed by Council, provided in Appendix B).

### 4.3.1 Development traffic

Development traffic generation and distribution has been adopted from the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020). The report is provided in Appendix B.

The following assumptions were also adopted for assessment of the Gowrie Junction Road/Hermitage Road intersection:

- 70% of development traffic travels to/from northern Toowoomba, Blue Mountain Heights and Highfields via Hermitage Road.
- 30% of development traffic travels to/from Gowrie Junction and other localities to the north/west.

The resulting traffic volumes are depicted in the following figure.

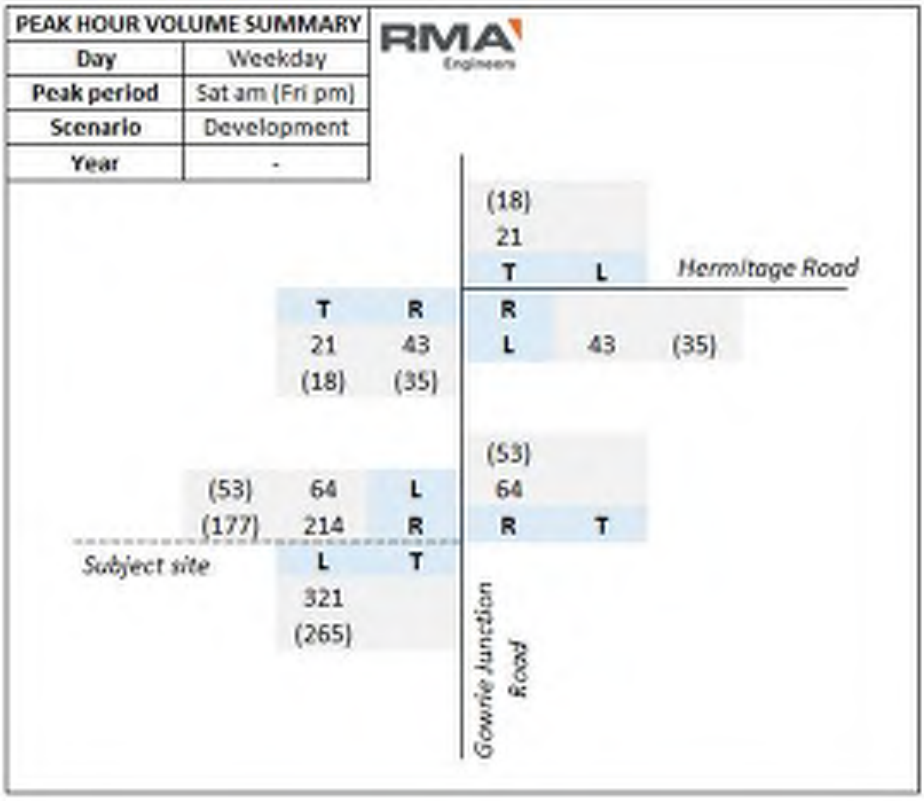



**Figure 4-3: Stage 1-7 Peak hour development distribution and volumes – Gowrie Junction Road/Hermitage Road intersection**

### 4.3.2 Operational assessment

A summary of the operational assessment findings is provided below.

Gowrie Junction Road/Hermitage Road intersection

The Gowrie Junction Road/Hermitage Road intersection has been modelled in SIDRA for the 2030 2040 assessment years. The assessment shows operation within acceptable performance limits. No upgrades are recommended to the existing intersection arrangement. It is noted that this intersection was constructed in 2017 as part of Toowoomba Second Range Crossing (Toowoomba Bypass) works. No crashes have been recorded in the previous five years at this location.

The SIDRA output data is provided in Appendix D.

Gowrie Junction Road/TRSP Access Road

The Gowrie Junction Road/TRSP Access Road intersection has been modelled in SIDRA with a signalised arrangement. A concept design which has been endorsed and provided by Council is shown in Figure 4-4.

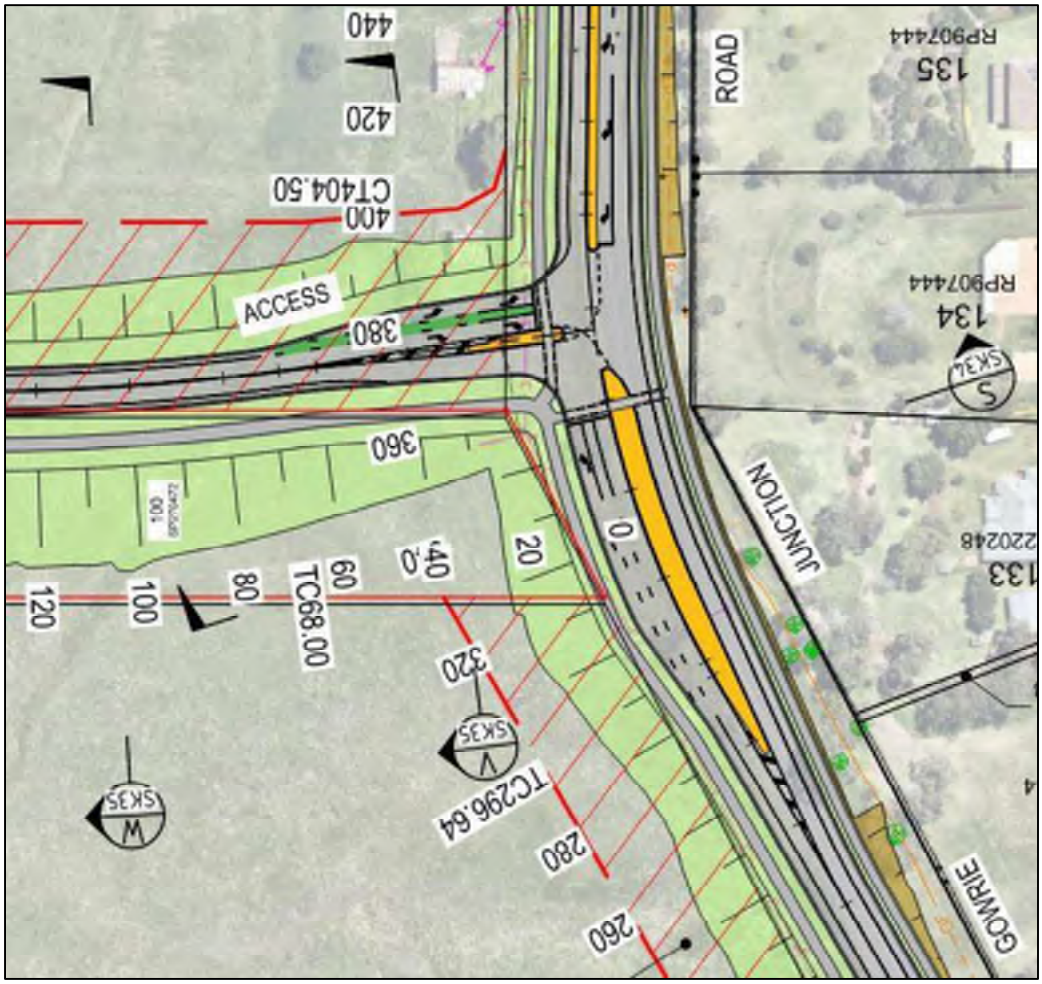



**Figure 4-4: Gowrie Junction Road/TRSP Access Road intersection layout (provided by Council)**

The assessment shows operation within acceptable performance limits. No adjustments are recommended to the proposed intersection arrangement. The SIDRA output data is provided in Appendix D.

# 5. Site access review

A review of access provision to the site has been undertaken for the proposed development. The outcomes of the review are discussed in the relevant sections below.

The site layout is at a conceptual stage and will be refined in future design stages. The proposed development layout is provided in Appendix A.

## 5.1 Access intersections

Two access locations are proposed for the site. The access intersection layouts and turning provisions were considered as part of the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020). A summary of the proposed access intersections is provided below.

All pedestrian and cyclist transport is proposed to be provided via Gowrie Junction Road. This is based on previous discussions with Council which considered the nature and suitability of both access locations. Toowoomba Connection Road is a high-speed road with limited active transport connectivity, therefore provision of cycle and pedestrian paths is not considered necessary or appropriate.

### 5.1.1 Gowrie Junction Road access

The Gowrie Junction Road/TRSP Access Road intersection is proposed at the eastern extent of the development site. A concept design which has been endorsed and provided by Council is shown previously in Figure 4-4.

The configuration comprises:

- Signalised intersection
- Channelised right turn (short) (CHR(S)) and auxiliary left turn (short) (AUL(S)) lanes
- Pedestrian crossings on the southern Gowrie Junction Road and site access legs
- On-road cycle lanes on Gowrie Junction Road and the site access approach
- Off-road shared pedestrian/cycle lanes on the western side of Gowrie Junction Road and southern side of the site access

### 5.1.2 Toowoomba Connection Road access

The Toowoomba Connection Road/Site access priority intersection is proposed at the southern side of the development site. A concept layout as extracted from the *Toowoomba Region Sports Precinct Business Case* (TRC, 2020) is shown in Figure 5-1. The intersection comprises left in/left out movements for the site access, including an auxiliary left turn (AUL) lane as recommended in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020).

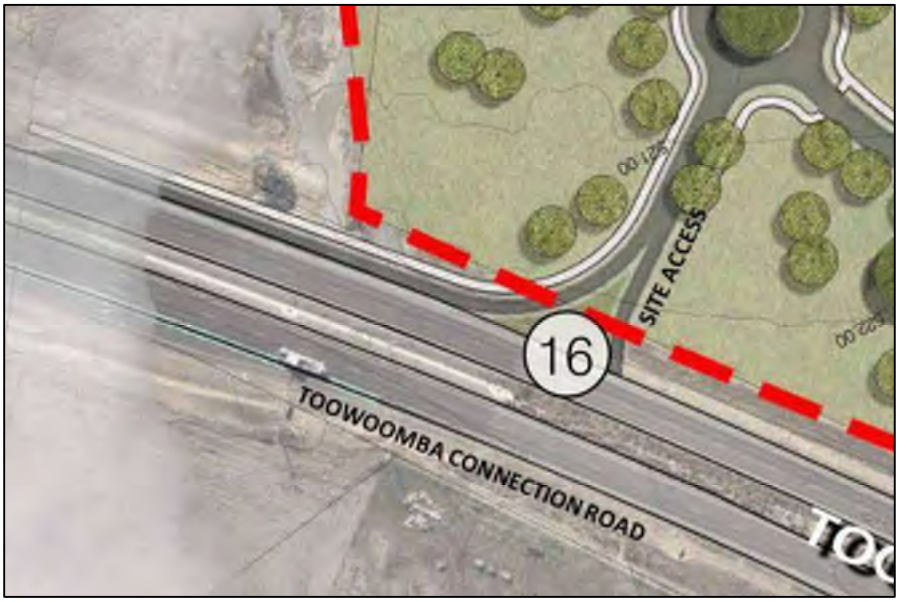



**Figure 5-1: Toowoomba Connection Road/Site access intersection concept layout**

## 5.2 Access road design

The following is a summary of an initial investigation regarding the planning and future design of Gowrie Junction Road and TRSP Access Road, and the implications for servicing the development.

### 5.2.1 Gowrie Junction Road (south of the TRSP Access Road)

Background

The *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020) recommends that Gowrie Junction Road be upgraded between Toowoomba Connection Road and the site to a 12m distributor standard, including two 3.5m wide traffic lanes and a 2.5m wide shared cycle/breakdown lane. The report recommends that this upgrade coincides with the first stage likely to generate a reasonable volume of cyclists, expected at either Stage 1 (soccer) or Stage 3 (rugby).

The majority of the alignment of Gowrie Junction Road appears favourable to upgrade of Gowrie Junction Road to a 12m cross section including a significant shared path on the western side. The existing terrain is difficult and will likely present problems for future design/construction between chainages 520m to 720m due to a combination of the wider cross section (up to 16.5m for turning lanes, cycle lanes and through lanes) and steep terrain.

Geometric considerations

Gowrie Junction Road is a sub arterial road and a key link in the active transport network. Note that there is a particular steep section on the existing alignment of 13%, approx. chainage 430-580m.

The proposed location of the TRSP Access Road intersection is chainage 660m. The existing curve radius at this location is 200m and Gowrie Junction Road is superelevated throughout the curve. Based on Austroads, it is considered desirable for the superelevation to be retained in any future design based on the horizontal geometry and design speed of this section of Gowrie Junction Road.

Due to the steep terrain and width of the design cross section, many of the batter slopes required for the upgrade of Gowrie Junction Road will need to be 1(V):2(H) batter slopes to minimise the impact of the earthworks. Even at 1(V):2(H) some of these batter slopes, particularly on the eastern side, may encroach into private property requiring resumption of land.

Further investigations may be warranted to consider realigning Gowrie Junction Road between Chainages 520-720m (approx.) to retain the kerb alignment on the eastern side of the road. This will push the fill batter out on the western side and into private property and require resumption. The land on the western side is largely rural and may allow batter slopes to be flattened to a more desirable 1(V):4(H) if sufficient land can be acquired.

Services

The provision of new or upgraded services in Gowrie Junction Road to the TRSP may present the following issues, if not undertaken in conjunction with Gowrie Junction Road upgrades:

- Installation of a watermain on eastern (RHS) of road will result in the watermain being under the roadway during future upgrade of Gowrie Junction Road. The watermain cannot be installed clear of the future road alignment prior to the road upgrade as there is a significant embankment on the eastern side of the road (CH 560-680m) required for the road upgrade.
- Installation of watermain on the western side of Gowrie Junction is not recommended prior to the upgrade of Gowrie Junction Road. If water main is installed at this location before a Gowrie Junction Road upgrade, the new service will end up under substantial fill embankment due to widening works required to upgrade Gowrie Junction Road.

Summary

It is recommended that, if the watermain follows the Gowrie Junction Road alignment, that Gowrie Junction Road is upgraded prior to, or in conjunction with, the installation of the watermain. Alternatively, another route to the TRSP development site could be considered.

### 5.2.2 Gowrie Junction Road (north of the TRSP Access Road)

Upgrade of Gowrie Junction Road north of the TRSP Access Road is dependent on future development in the area (particularly Meringandan, Highfields and Gowrie), road network changes (such as an Old Goombungee Road-Mort Street link) and associated traffic volume growth.

It is therefore recommended that the timing of potential upgrades are periodically considered with intensification of surrounding land use.

### 5.2.3 TRSP Access Road

The alignment and geometry of the TRSP Access Road and associated Gowrie Junction Road intersection has been examined as part of concept design development undertaken by GenEng in coordination with Council.

The layout endorsed by Council (*Gowrie Junction Road Intersection Concept Design Option 3*, dated 3 May 2022) and associated resumptions are shown in Appendix B.

# 6. Site layout review

A review of parking, access, servicing and design vehicle manoeuvring has been undertaken for the proposed development. The outcomes of the review are discussed in the relevant sections below.

The site layout is at a conceptual stage and will be refined in future design stages. The proposed development layout is provided in Appendix A.

## 6.1 Internal road network

The internal road network hierarchy is proposed as shown in Figure 6-1. It includes various road types based on connectivity and likely usage.

The internal road features and widths are summarised in Table 5-1.

**Table 6-1: Internal road features**

| Type | | Road corridor width | Lanes | | On-road cycle path | | Shared path | | Pedestrian path | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | No. | Width | No. | Width | No. | Width | No. | Width |
| **A** | Single lane carriageway with cycle lane | 27.6m | 2 | 3.60m | 2 | 1.5m | 1 | 3.0m | - | - |
| **B** | Two dual lane carriageways with central median | 29.1m | 4 | 3.70m | 2 | 2m | 1 | 3.0m | 1 | 1.8m |
| **C** | Single lane carriageway | 15.2m | 2 | 3.70m | - | - | 1 | 3.0m | 1 | 1.8m |
| **D** | Single lane carriageway | 11.9m | 2 | 3.70m | - | - | 1 | 3.0m | - | - |
| **E** | Single lane carriageway | 5.5m | 2 | 2.75m | - | - | - | - | - | - |
| **F** | Single lane carriageway with carpark connection | 16.5m | 2 | 3.25m | - | - | - | - | 1 | 1.8m |
| **G** | Single lane carriageway | 12.0m | 2 | 3.25m | - | - | 1 | 2.5m | - | - |

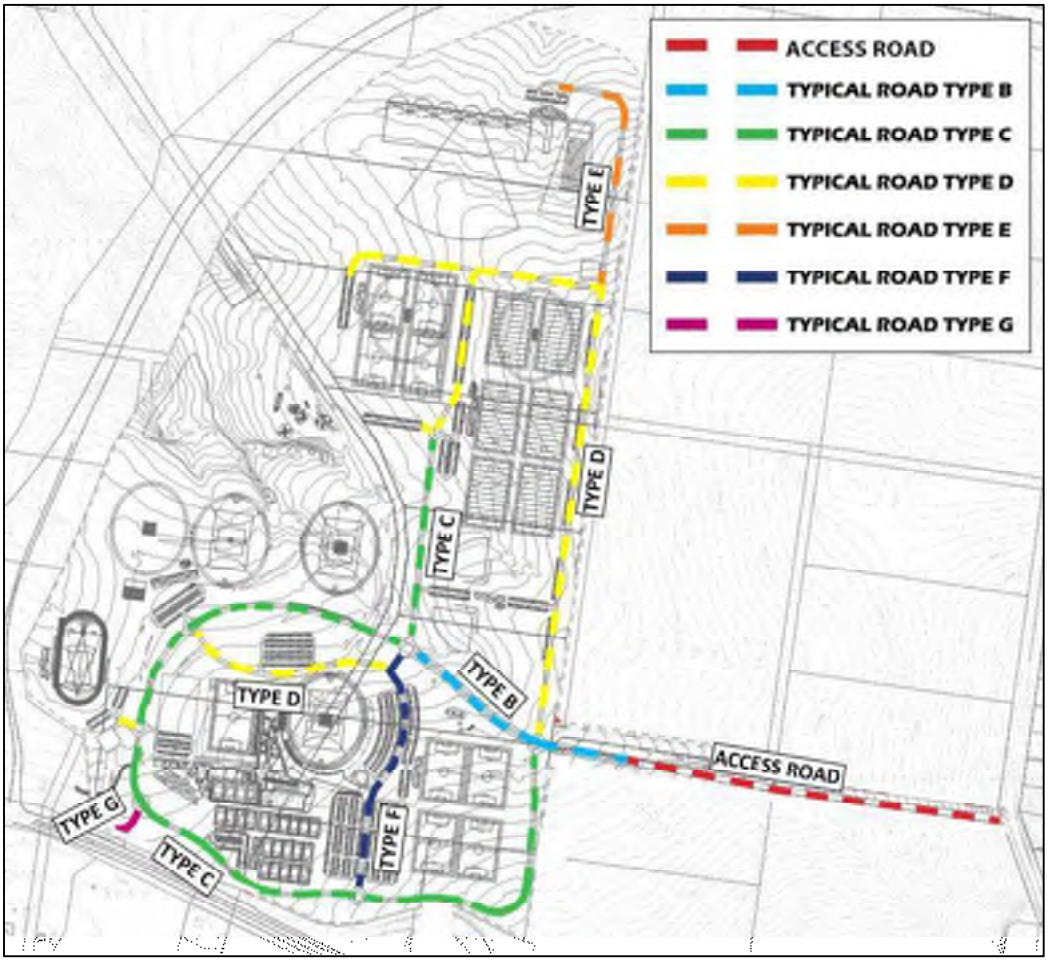



**Figure 6-1: Internal road types**

The minimum pavement width for TRC urban road typical cross sections is 6.0m (3.0m wide lanes). The proposed internal road types generally comply with these lane width requirements, with the exception of lane widths for road type E. Road type E is proposed for the link to the shooting club and archery, only. It is recommended that the road type E cross section is updated in detailed design to include a 6.0m pavement width (3.0m minimum lane widths) to comply with TRC standards.

The proposed pedestrian, cycle and shared path widths have been considered against the TRC Planning Scheme (2021), Queensland IPWEA *Street Design Manual* (2021) and Austroads *Guide to Road Design Part 6a: Pedestrian and Cyclist Paths* (2017) guidelines. A summary of requirements is provided in Table 6-4.

**Table 6-2: Path width requirement**

| Path type | Proposed width | Minimum width requirement (m) | | |
|---|---|---|---|---|
| | | TRC | IPWEAQ (low use, low priority corridor) | Austroads |
| **Pedestrian path** | 1.8m | 1.5m | 1.5m low use, low priority corridor | 1.2m general low volume<br>1.8m wheelchairs to pass |
| **Shared pedestrian/cycle path** | 2.5-3.0m | 2.5m | 2.5m standard width | 2.5m commuter<br>3.0m recreation |
| **On-road cycle lane** | 1.5-2.0m | 1.5m | 1.5m | - |

The proposed path widths meet or exceed the minimum requirements, and are considered appropriate for the site. The road type cross sections are shown in Figure 6-2 to Figure 6-8.

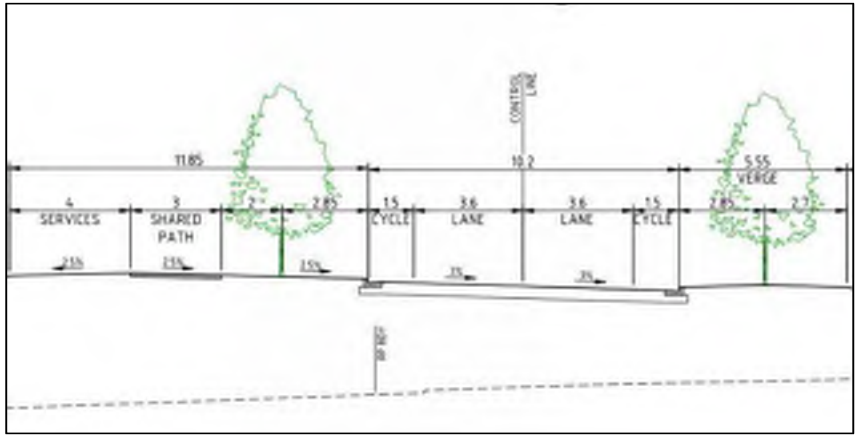



**Figure 6-2: TRSP Access Road – Single lane carriageway with cycle lanes (Option 3 CH.105 as extracted from GenEng *Entry Road and Intersection Design Report*, 2022)**

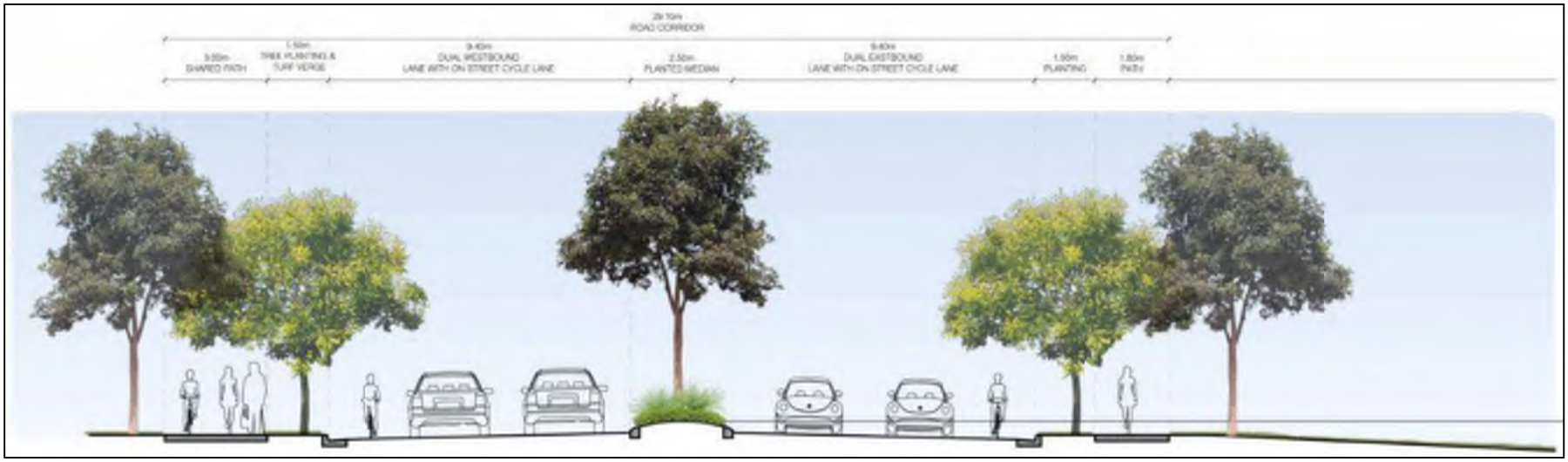



**Figure 6-3: Typical road Type B – Two dual lane carriageway with central median**

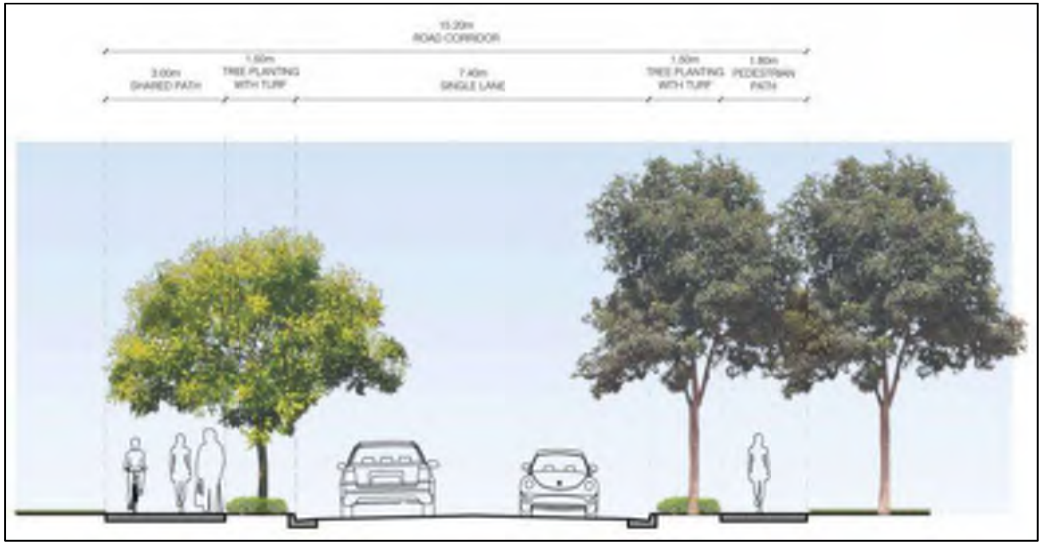



**Figure 6-4: Typical road Type C – Single lane carriageway**

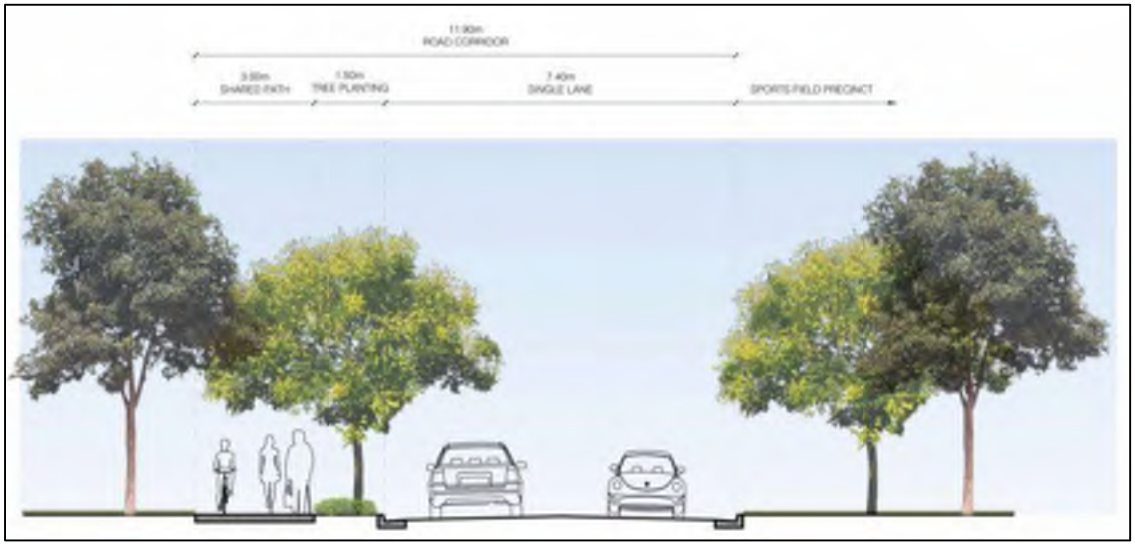



**Figure 6-5: Typical road Type D – Single lane carriageway**

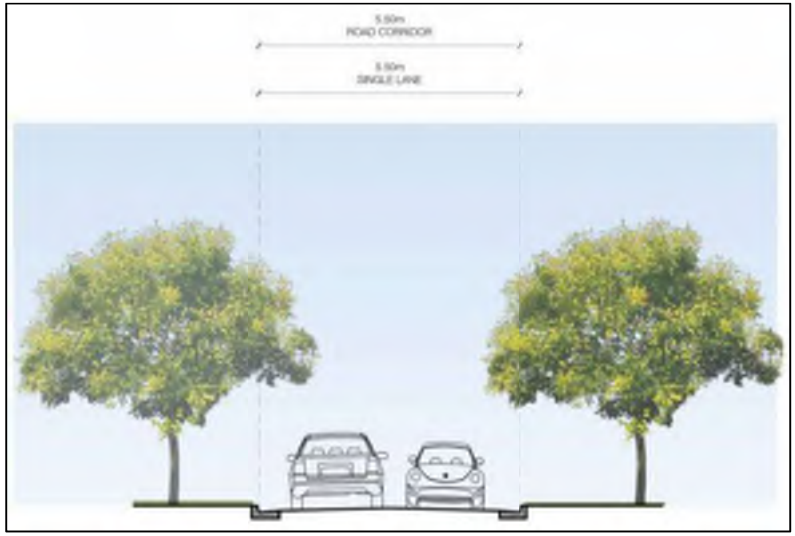



**Figure 6-6: Typical road Type E – Single lane carriageway**

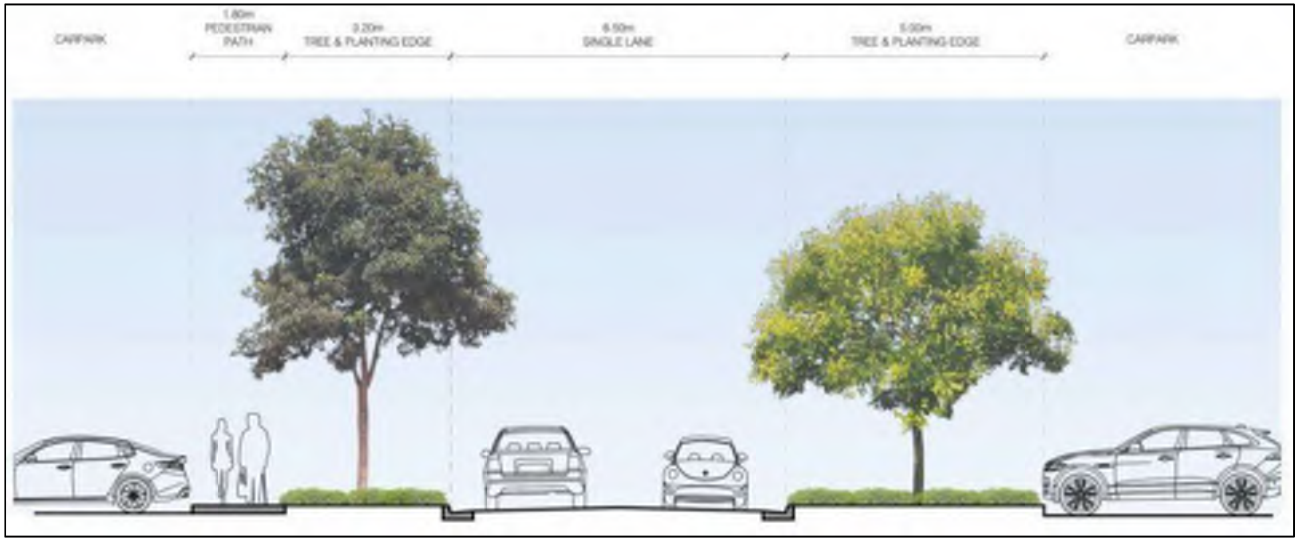



**Figure 6-7: Typical road Type F – Single lane carriageway car park connection**

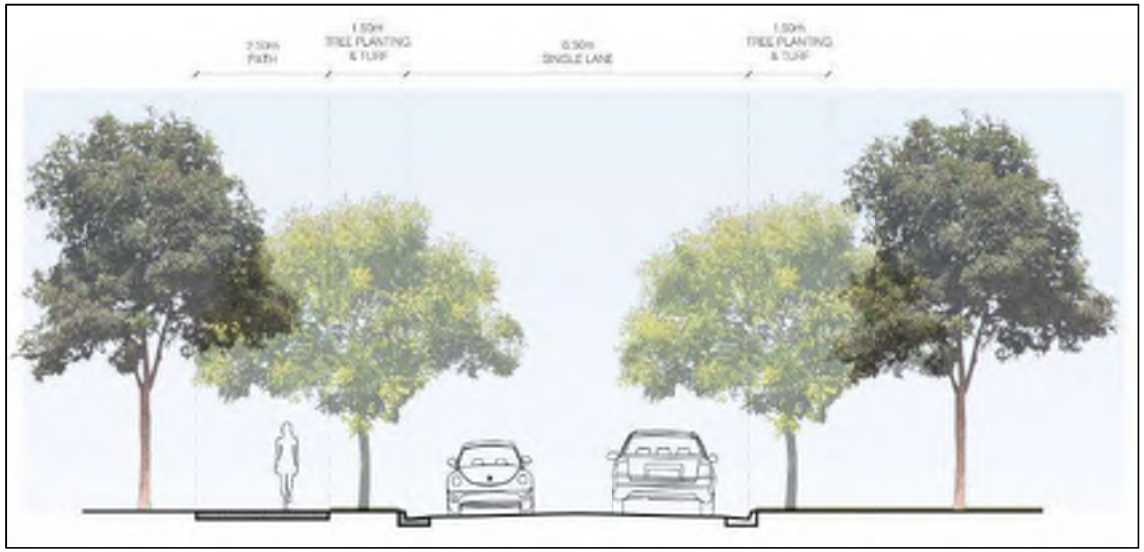



**Figure 6-8: Typical road Type G – Single lane carriageway**

## 6.2 Internal intersections

The development layout provided in Appendix A is an initial concept which will be refined in future design stages. It is understood that the internal intersections have not been designed to any particular standard (e.g. adjustments in entry/exit curve geometry) at this conceptual design stage. It is recommended that the internal intersections are designed in accordance with relevant Austroads standards, with consideration to the following:

- Potential pedestrian/cyclist crossing locations.
- Minimum roundabout central island radius of 8.0m (for a driver speed of 50km/h) and approximately 8.0m circulating lane width, based on Austroads *Guide to Road Design Part 4B – Roundabouts* (2021) requirements.
- If required, mountable aprons for roundabouts to accommodate 'design' and 'check' vehicles.

Further considerations of intersection design are discussed in Section 6.9.

## 6.3 On-site car parking provisions

The TRC Planning Scheme *Transport, Access and Parking Code* does not include parking rates for developments described as *major sport, recreation and entertainment facility*.

The proposed car parking provision has been compared to the rates described in the *Toowoomba Regional Sports Precinct Component Schedule* (2019), attached in Appendix B. The required and proposed car parking is summarised in Table 5-3. Car parking has been compared per facility and per stage. It is noted that Stage 8 is beyond the planning horizon.

**Table 6-3: Car parking**

| Stage | Facility | | | Parking rate | | Car parks per facility | | Car parks per stage | |
|---|---|---|---|---|---|---|---|---|---|
| | Element | No. | Facility | Car parks | Unit | Required | Proposed (including PWD) | Required | Proposed (including PWD) |
| 1 | Southern rectangular fields | 4 | field | 40 | per field | 160 | 202 | 160 | 202 |
| | Clubhouse | - | | - | | 0 | 0 | | |
| 2 | Relocate shooting club and archery | 1 | site | 50 | for site | 50 | 54 | 50 | 54 |
| | Indoor range | | | | | | | | |
| | Shared clubhouse | | | | | | | | |
| 3 | Ovals | 3 | oval | 40 | per field | 120 | 153 | 120 | 153 |
| | Practice nets | 13 | net | - | | 0 | 0 | | |
| | Clubhouse | - | | - | | 0 | 0 | | |
| 4 | Diamond fields | 4 | field | 40 | per field | 160 | 104 | 400 | 402 |
| | Rectangular fields | 4 | field | 40 | per field | 160 | 298 | | |
| | Shared fields | 2 | field | 40 | per field | 80 | | | |
| | Clubhouses | - | | - | | 0 | | | |
| 5 | Northern rectangular fields | 6 | field | 40 | per field | 240 | 202 | 240 | 202 |
| | Clubhouse | - | | - | | 0 | | | |
| 6 | Premier hub (stage 1 of building) | - | | - | | | 105 | 120 | 519 |
| | Premier oval | 1 | oval | 40 | per field | 40 | 387 | | |
| | Premier rectangular field | 1 | field | 40 | per field | 40 | | | |
| | Local park and playground north of southern soccer fields | 1 | park | 40 | for site | 40 | 27 | | |
| 7 | District park and facilities | 1 | park | 40 | for site | 40 | 53 | 40 | 53 |
| | | | | **Total Stages 1-7** | | **1,130** | **1,585** | **1,130** | **1,585** |

The summary shows that the total proposed parking yield exceeds the requirements set out in the component schedule by 455 spaces.

Stage 5 indicates a requirement of 240 spaces and a proposed yield of 202 spaces. This is a shortfall of 38 spaces. The combined parking requirement to this point (Stages 1 to 5) is 970 spaces and 1,013 spaces are proposed. As the greater area parking provision exceeds requirements for Stages 1 to 5, the shortfall in spaces at Stage 5 is not considered to be an issue. The proposed parking yield for all other stages exceeds requirements.

The additional car parking is predominantly found in Stage 6 and is associated with the premier facilities. The component schedule document does not specify parking rates for the premier fields, therefore the standard rate of 40 car parks per field has been adopted, resulting in 120 required parking spaces. The proposed parking yield for Stage 6 is 519 spaces. As the premier fields and facilities are expected to cater to a larger number of spectators, this parking yield is considered to be reasonable for the site.

It is also noted that an event day is likely to generate up to 2,000 vehicles (as discussed in Section 4.2.2). Therefore, the greater provision of parking is considered appropriate for the site.

There is also opportunity to provide overflow parking for events in the area to the south of the premier precinct which, with the greater provision of parking throughout the site, is considered appropriate for the overall proposal.

## 6.4 Provisions for persons with disabilities (PWD)

For PWD parking requirements, reference is made to the TRC Planning Scheme, Australian Standards 2890.6 and the *Disability (Access to Premises – Buildings) Standards* 2010.

There is no specified rate of accessible parking spaces for this category of site. The majority of uses, including schools and residential accommodation, require one PWD space per 100 standard spaces. Other uses such as retail and hospitals require one PWD space per 50 standard spaces. It is recommended to adopt the rate of one per 100 spaces, as a rate representative of general requirements.

The PWD required parking yield and proposed provision is summarised in Table 6-4.

**Table 6-4: Required PWD parking spaces**

| Stage | Adopted PWD parking rate | Car parking provision (not including PWD parking) | PWD parking required | PWD parking provision |
|---|---|---|---|---|
| **1** | 1 per 100 (or part thereof) car parking spaces | 200 | 2 | 2 |
| **2** | | 52 | 1 | 2 |
| **3** | | 150 | 2 | 3 |
| **4** | | 392 | 4 | 10 |
| **5** | | 200 | 2 | 2 |
| **6** | | 505 | 6 | 14 |
| **7** | | 50 | 1 | 3 |
| | | **Total Stages 1-7** | **18** | **36** |

The proposed PWD parking provision meets the adopted requirements.

PWD spaces with associated shared zones are proposed at the entrance or adjacent to clubhouses and recreation areas (where applicable), as required by the TRC Planning Scheme.

Accessibility is recommended to be provided via kerb ramps from the proposed PWD shared zones. The PWD spaces and associated shared zones meet the dimensional requirements of AS2890.6.

It is recommended that PWD parking and related walking and wheelchair unloading areas do not exceed 1:33 gradient in any direction (assuming bituminous seal and outdoors) and include slip-resistance surfaces.

## 6.5 On-site bicycle provisions

The bicycle parking requirements for the proposed development were considered in accordance with the TRC Planning Scheme, which references Austroads *Guide to Traffic Management Part 11: Parking*. Austroads generally specifies 1 bicycle parking space per 200m$^2$ net floor area (NFA) for sports facilities. It is recommended that bicycle parking is considered with ongoing planning and design, with consideration to parking provision within clubhouses (if appropriate) as well as in outdoor areas at key fields and facilities.

## 6.6 Pedestrian and cycle connectivity

The development is proposed to include pedestrian and cycle links throughout the site. Pedestrian paths and/or shared paths are proposed as part of all but one road type (E), with connections to off-road shared paths through the site.

The proposed pedestrian footpaths are 1.8m wide, exceeding the minimum TRC, IPWEAQ and Austroads requirements, as described in Section 6.1. 1.8m is the minimum requirement that allows for two wheelchairs to pass. The proposed cycle and shared paths also meet minimum requirements.

Wheel stops are recommended to be provided for all perpendicular car parking spaces adjacent to footpaths to prevent vehicles overhanging the kerb and impeding on the pedestrian paths.

Crossing of circulation roads are recommended to include wombat crossings to help increase pedestrian safety as well as helping to retain lower speeds conducive of the facility (refer to Section 5.9.4).

## 6.7 On-site parking layout and geometric review

The car parking layout shown in the conceptual development plans attached in Appendix A have been reviewed in accordance with Australian Standard 2890.1 – *Off street car parking*.

### 6.7.1 Car parking and circulation dimensions

Parking space dimensions have been considered in accordance with AS2890.1 for a user class of 2 (sports facilities). The relevant dimensions for 90-degree car parking are summarised in Table 6-5.

**Table 6-5: Car parking dimensions**

| Layout element | AS2890.1 dimension requirement (class 2) | Proposed dimension |
|---|---|---|
| **Width (m)** | 2.5m | 2.5m |
| **Length (m)** | 5.4m | 5.4m |
| **Aisle width (m)** | 5.8m | 6.2m |

As shown, the proposed car parking spaces and aisle widths meet the dimensional requirements of AS2890.1. It is recommended that wheel stops are provided for parking spaces adjacent to pedestrian paths.

AS2890.1 specifies that circulation roads within the parking areas are 5.5m wide between kerbs for two-way roads. A number of locations do not meet this minimum width requirement. The swept path assessment described in Section 6.9 also indicates that circulation is constrained. Therefore, it is recommended that the detailed design stage incorporates circulation road widths of a minimum 5.5m width in all locations.

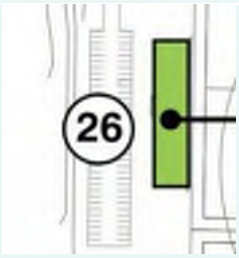
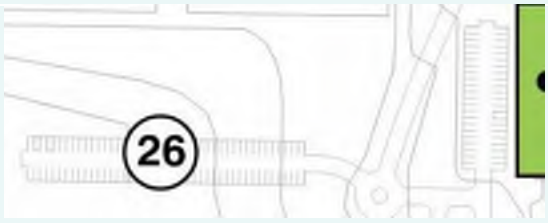
### 6.7.2 Blind aisles

Car parking within the site includes numerous blind aisle locations, as shown in Table 6-6. AS2890.1 includes the following relevant specifications for blind aisles:

- Minimum 1.0m extension beyond the last parking space.
- For sites open to the public, the maximum acceptable length of a blind aisle is the width of six spaces plus 1.0m, unless provision is made for cars to turnaround at the end of the aisle and drive out in a forward direction.

Aisles are proposed to be extended by a minimum of 1.5m at some blind aisle locations. However, all proposed car parks with blind aisles extend beyond the width of six spaces. Therefore, all proposed blind aisle locations within the site require turnaround provision.

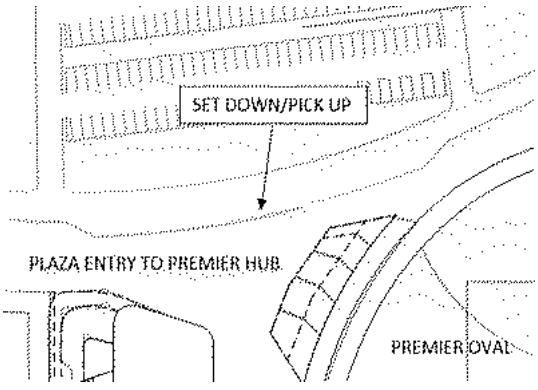
**Table 6-6: Blind aisle locations**

| Stage (facility) | Car park |
|---|---|
| **Stage 2 (shooting club and archery car park)** |   |
| **Stage 4 (diamond fields car park)** |   |
| **Stage 5 (northern rectangular fields car park)** |   |
| **Stage 4 (diamond fields car park) and Stage 7 (district park park)** |   |

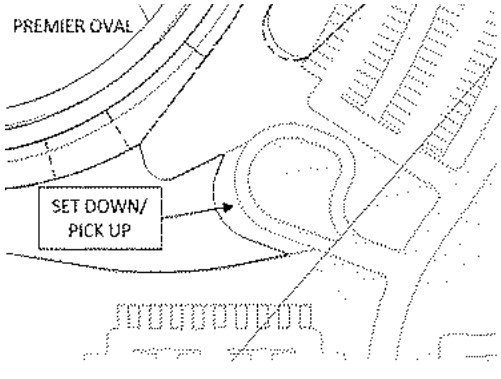
It is recommended that these parking locations include turnaround provision and that vehicles are able to drive out in a forward direction.

### 6.7.3 Passenger set down/pick up areas

Two passenger set down/pick up areas have been proposed as part of Stage 6, either side of the premier oval. The two bays are shown in Figure 6-9.




Stage 6 (premier hub) – north of premier oval




Stage 6 (premier hub) – south of premier oval

**Figure 6-9: Passenger set down/pick up locations**

The northern parallel bay dimensions comprise (approximately):

- 80m length (12 passenger vehicles)

- 3.6m bay width
- 6m adjacent two-way road width

The southern circular set down/pick up area dimensions comprise (approximately):

- 30m length (five passenger vehicles)
- 3.5-5.5m varying width
- 3.3m adjacent one-way road width

From a preliminary review, the set down/pick up bay dimensions meet the space and aisle width requirements for parallel parking set out in AS2890.1. However, a swept path assessment indicates that the arrangement of the circular set down/pick up area does not accommodate design vehicle movements, particularly in relation to the circulating lane width and curve radii. Refer to further discussion in Section 6.9. It is recommended that this arrangement is reconsidered in detailed design.

### 6.7.4 Transport mode share

91% of transport trips in Toowoomba are undertaken in private vehicles, compared to 56% in Greater Brisbane (*How Queensland Travels*, DTMR). This trend is generally expected to continue for the Toowoomba area within the site design horizon.

During regularly scheduled after school and weekend sport, private vehicle transport is therefore expected to be utilised by the majority of visitors, and represents peak traffic volumes for the site. Bus mode share is expected to be greatest on event days (school sports carnivals, entertainment events, significant sporting matches, etc.).

It is anticipated that event management plans will be adopted for the various event types, and will include consideration of:

- Expected mode share and parking requirement for private vehicles, taxi services and buses.
- Measures to provide bus priority for site entry/exit.
- Bus and taxi set down, pick up and parking locations.
- Designated parking areas for buses and private vehicles, including cordoned areas, detours and management of vehicle movements.

Event management plans can be revised as data and trends from each event are incorporated in to the management planning for the site.

### 6.7.5 Bus turnaround provision

It is recommended that suitable measures for bus turnaround and parking is identified for each development stage. This may comprise temporary measures such as a graded areas adequate for the required manoeuvring, prior to permanent provision in ongoing stages.

### 6.7.6 Speed control

AS2890.1 recommends the use of traffic control devices for parking aisles exceeding 100m in length. A number of car parks exceed this length:

- 170m between rectangular field precincts 2 and 3
- 120m south of the oval fields
- 105m south of rectangular field precinct 3

- 150m-360m between the premier oval and rectangular field precinct 1

Speed control devices (such as speed platforms/humps or wombat crossings) are recommended in the long aisles in these parking areas. Angle parking on one side of internal roads has not been considered for speed control.

### 6.7.7 Queuing provisions

AS2890.1 specifies minimum queuing lengths for parking areas. It is noted that these lengths are based on potential queuing in car parks with boom gates and ticket issuing devices at entry points, with consideration to the time required for a vehicle to stop at the payment point, offer payment, receive change if necessary and depart (as described in Austroads *Guide to Traffic Management Part 2 Traffic Theory*, 2015). The queuing requirement is therefore considered to be conservative.

It is assumed that access preference is based on location and distribution only, not on internal car park location. Therefore, the number of parking spaces served by each entrance has been adopted as per the traffic distribution in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (2020):

- 90% of parking spaces served by the Gowrie Junction Road entrance
- 10% of parking spaces served by the Toowoomba Connection Road entrance

Gowrie Junction Road access

At the Gowrie Junction Road access, the required queuing space (6m per vehicle) for car park access is 150m (25 vehicles). This is based on the Stages 1-7 Saturday morning inflow. The available queue length to the first internal intersection or potential parking manoeuvre is approximately 860m from the property boundary. Therefore, the queuing area is considered to be adequate for the site.

Toowoomba Connection Road access

At the Toowoomba Connection Road access, the required queuing space (6m per vehicle) for car park access is 36m (six vehicles). This is based on the Stages 1-7 Saturday morning inflow. The available queue length to the first internal intersection or potential parking manoeuvre is approximately 65m from the property boundary. It is noted that an additional 100m of queueing space is available beyond the property boundary, as part of the auxiliary left turn lane from Toowoomba Connection Road. Therefore, the queuing area is considered to be adequate for the site.

## 6.8 Servicing

The TRC Planning Scheme *Transport, Access and Parking Code* does not include service vehicle parking provision rates for developments described as *major sport, recreation and entertainment facility*.

Service vehicle parking provision has not been considered as part of this initial concept design. It is expected that service vehicle provision will be considered with ongoing development design when service and refuse requirements and locations are identified. It is recommended that vehicle manoeuvring and parking is considered for all clubhouse and premier hub servicing locations.

## 6.9 Swept path assessment

### 6.9.1 Design vehicle

A 14.5m long rigid bus/coach has been adopted as the design vehicle for the site and a check vehicle in certain situations. This vehicle is becoming more representative of bus transport through private service providers (i.e. for transport of school students and sporting teams) and is larger than the

standard 12.5m bus utilised by TransLink. TransLink's *Public Transport Infrastructure Manual* adopts 14.5m buses for design purposes and for coach layover facilities. The bus dimensions are based on the Austroads *Design Vehicles and Turning Path Templates Guide* (2013) and are shown in Figure 6-10.

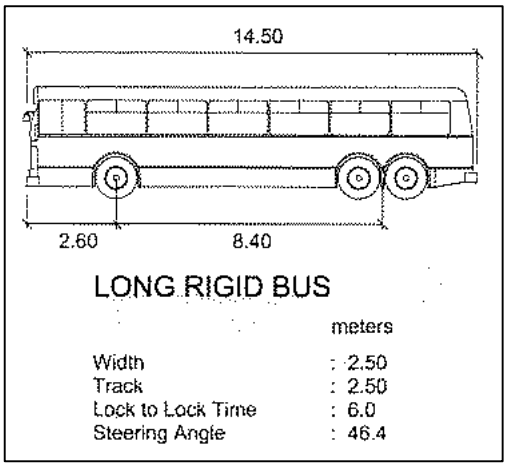



**Figure 6-10 Design vehicle – 14.5m bus/coach**

A swept path assessment has been undertaken for the design vehicle at constrained areas in the internal road network and set/down pick up areas in accordance with Australian Standards requirements. The assessment results are provided in Appendix E. It is noted that the provided layout is at conceptual stage and does not include site-specific detail such as curve radii, delineation and kerbs. Therefore, the swept path assessment provides an indication only of the suitability of the road network and intersections. The key findings and recommendations from the assessment are:

- Access intersections:
  - Provide intersection configurations as discussed in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (2020).
  - Initial assessment indicates that the vehicle is able to enter and exit the site in accordance with requirements.
- Internal intersections:
  - Internal intersections may need to be widened to accommodate turning movements.
- Roundabouts:
  - The circulating lane widths require widening to accommodate the design vehicle (see previous discussion in Section 6.2).
  - Indicate if/where the central island is mountable.
  - Consider entry and exit curves to suit the design vehicle.
- Circular set down/pick up area:
  - The design vehicle is not able to manoeuvre through the facility.
  - Widen the roadway width and increase curve radii to accommodate design vehicle movements.
  - Reconsider arrangement to maximise set down/pick up bay yield (i.e. not on a curve).
- Parallel set down/pick up area:
  - The design vehicle is able to manoeuvre in and out of the set down/pick up bay, in

combination with passenger vehicles utilising the facility.

It is recommended that detailed design of the internal road network considers the above findings.

### 6.9.2 Passenger vehicle

A swept path assessment was undertaken for manoeuvring of B99 passenger vehicles within selected parking areas.

The swept path assessment results are included in Appendix E. They indicate that the examined car park circulation roads do not provide adequate width and/or curve radii to allow vehicles to pass (refer to discussion in Section 6.7.1). It is recommended that the car park geometry continues to be refined in detailed design.

# 7. Compliance with Council planning criteria

The proposed development has been reviewed in accordance with the TRC Planning Scheme *Development codes,* as relevant to this TIA report. The tables and compliance responses are provided at Appendix F.

From the review, the following non-compliance items were identified:

- PO10, relating to set down/pick up facilities for bus, taxis and private vehicles. These areas are recommended to be considered further in detailed design, as discussed in more detail in Sections 6.7.3 and 6.9.1.

Other items were found to be not applicable at this stage of development and will be examined further in future design stages.

# 8. Summary and recommendations

RMA Engineers has been engaged by Toowoomba Regional Council to undertake a Traffic Impact Assessment (TIA) for a proposed sports precinct at Charlton. The Toowoomba Region Sports Precinct is intended to cater for existing and future demand for sporting facilities in the greater Toowoomba area.

The following is a summary of the findings and recommendations of the TIA:

Operational assessment:

The operational assessment was undertaken as part of the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020), with the following outcomes:

- The number of vehicle trips that will be generated by Stages 1-7 of the development is estimated at 834 vehicles during a Saturday morning peak hour period, and 9,138 vehicles per day.
- The existing Toowoomba Connection Road/Gowrie Junction Road intersection is shown to operate within acceptable performance limits at the 2030 assessment year (as applicable for a State-controlled intersection assessment).
- The proposed Gowrie Junction Road access intersection is shown to operate within acceptable performance limits at the 2040 ten-year design horizon, as both priority and signalised arrangements.
- Toowoomba Connection Road is expected to cater for 33,800 vehicles per day at the 2040 design horizon, which is within the capacity of the existing four-lane cross section. Therefore, upgrade to Toowoomba Connection Road is not considered warranted.
- Gowrie Junction Road is expected to cater for 6,700 vehicles per day at the 2040 design horizon, which is beyond the capacity of the existing road cross section (7m sealed pavement width). Gowrie Junction Road is recommended to be upgraded between the site access and Toowoomba Connection Road to a 12m wide distributor standard to accommodate development traffic volumes.

Site access:

- The site is proposed to be accessed via Gowrie Junction Road (all movements) and Toowoomba Connection Road (left in/left out). Assessment of queuing provision found that available queue lengths are adequate for the site.
- The Gowrie Junction Road/TRSP Access Road intersection is proposed at the eastern extent of the development site. A concept design which has been endorsed by Council and includes signalisation, channelised turning lanes, pedestrian crossings and cyclist provision.
- The Toowoomba Connection Road access is proposed as a left in/left out arrangement and is recommended to incorporate AUL turning provision, as described in the *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* report (HIG, 2020).
- Initial investigation regarding the planning and future design of Gowrie Junction Road and the implications for servicing the development was undertaken. The geometry and service considerations that are summarised in Section 5.2 will need to be considered in future design stages.
- Upgrade of Gowrie Junction Road north of the TRSP Access Road is dependent on future development in the area (particularly Meringandan, Highfields and Gowrie), road network changes (such as an Old Goombungee Road-Mort Street link) and associated traffic volume growth.

  It is therefore recommended that the timing of potential upgrades are periodically considered with intensification of surrounding land use.

Internal site layout:

- Proposed internal road cross sections comply with TRC typical cross section requirements, with the exception of road type E. It is recommended that the road type E cross section includes a 6.0m pavement width (3.0m minimum lane widths) to comply with TRC road hierarchy standards.
- Proposed pedestrian, shared and on-road cycle paths meet or exceed minimum TRC, IPWEAQ and Austroads requirements.
- It is understood that the internal intersections have not been designed to any particular standard at this conceptual design stage. It is recommended that the internal intersections are designed in accordance with relevant Austroads standards, with consideration to the following:
  - To cater for the recommended design and check vehicles.
  - Potential pedestrian/cyclist crossing locations and type (i.e. wombat crossings).
  - Minimum roundabout central island radius of 8.0m (for a driver speed of 50km/h) and approximately 8.0m circulating lane width, based on Austroads Guide to Road Design Part 4B – Roundabouts (2021) requirements.
  - If required, mountable aprons for roundabouts to accommodate design vehicles.

Car parking

- 1,585 car parking spaces are proposed for Stages 1-7. The total parking yield exceeds minimum requirements and is considered appropriate for the site.
- 36 PWD car parking spaces are proposed for Stages 1-7, exceeding minimum requirements.
- It is recommended that bicycle parking is considered in accordance with Austroads *Guide to Traffic Management Part 11: Parking* requirements as part of ongoing planning and design, with consideration to parking provision within clubhouses (if appropriate) as well as in outdoor areas.
- The proposed car parking spaces and aisle widths meet the dimensional requirements of AS2890.1. It is recommended that wheel stops are provided for parking spaces adjacent to pedestrian paths.
- It is recommended that the design of car parking areas incorporates circulation road widths of a minimum of 5.5m requirement in all locations.
- The site car parking areas include numerous blind aisle locations. To comply with AS2890.1, it is recommended that the ends of all blind aisle sections include a 1.0m aisle extension beyond the last parking space, or turnaround provision where the length of the blind aisle is greater than six parking spaces.
- From a preliminary review, the set down/pick up bay dimensions meet the space and aisle width requirements for parallel parking set out in AS2890.1. However, a swept path assessment indicates that the arrangement of the circular set down/pick up area does not accommodate design vehicle movements, particularly in relation to the circulating lane width and curve radii.
- Mode share is expected to be dominated by private vehicle trips during regular sporting schedules and represents peak traffic volumes for the site. Bus mode share is expected to be greatest on event days (school sports carnivals, entertainment events, significant sporting matches, etc.). It is recommended that event management plans are adopted for the various event types as they proceed.
- It is recommended that suitable measures for bus turnaround and parking is identified for each development stage. This may comprise temporary measures such as a graded areas adequate for the required manoeuvring, prior to permanent provision in ongoing stages.

- Speed control devices (such as speed platforms/humps or wombat crossings) are recommended in the long aisles in these parking areas

Servicing:

- Service vehicle parking provision has not been considered as part of this initial conceptual design. It is expected that service vehicle provision will be considered with ongoing development design. It is recommended that vehicle manoeuvring and parking is considered for all clubhouse and premier hub servicing locations.

Swept path assessment:

- A 14.5m long rigid bus/coach has been adopted as the design vehicle for the site. This vehicle is representative of bus transport through private service providers (i.e. coaches for transport of school students and sports teams).
- The swept path assessment indicates that internal intersections, set down/pick up areas and car park layouts require reconfiguration to accommodate the design vehicle and passenger cars (refer to Section 6.9 for detail). It is noted that the provided layout is at a conceptual stage and does not include site-specific detail such as curve radii, delineation and kerbs. Therefore, the swept path assessment provides an indication only of the suitability of the road network and intersections.

Code compliance:

- The proposed development has been reviewed in accordance with the TRC Planning Scheme *Development codes,* as relevant to this TIA report. One non-compliant item was identified, relating to the set down/pick up facilities. These areas are recommended to be considered further in detailed design, as discussed in more detail in Sections 6.7.3 and 6.9.1. Other items were found to be not applicable at this stage of development and will be examined further in future design stages.

A summary of the recommendations outlined in this report are provided in Table 8-1.

With respect to the consideration and implementation of the above findings and recommendations, the proposed development can proceed without any unacceptable or adverse impacts on the external road network.

The internal layout intent and parking quantity proposed is considered adequate. The design elements of the internal layout (circulation road, intersection and car parking areas) will need to be refined and optimised within future design stages of the project. No constraints have been identified at this stage that would compromise the layout design from meeting the relevant standards.

**Table 8-1 Recommendations**

| Facility | | Recommendation | Reference |
|---|---|---|---|
| **External road network** | **Gowrie Junction Road (south of TRSP Access Road)** | Upgrade Gowrie Junction Road between Toowoomba Connection Road and the site to a 12m distributor standard, including two 3.5m wide traffic lanes and a 2.5m wide cycle/breakdown lane. It is recommended that these works coincide with the first stage expected to generate a reasonable volume of cyclists. | *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (HIG, 2020) |
| | **Gowrie Junction Road (north of TRSP Access Road)** | It is recommended that the timing of potential upgrade to Gowrie Junction Road north of the TRSP Access Road is periodically considered at each development stage, and as surrounding land use intensifies (particularly Meringandan, Highfields and Gowrie). | Section 5.2.2 |
| **Access intersections** | **Gowrie Junction Road** | Provide a Gowrie Junction Road/TRSP Access Road intersection as per GenEng *Gowrie Junction Road Intersection Concept Design Option 3 – Intersection layout plan* (2022). | Section 4.3 |
| | **Toowoomba Connection Road** | Provide a priority intersection, comprising:<br>▪ Provision for left in/left out movements only<br>▪ Stage 1 turn lane provision:<br>○ Auxiliary left turn (AUL) lane | *Traffic Impact Assessment – Toowoomba Region Sports Precinct Business Case* (HIG, 2020) and Section 5.1.1 |
| **Internal road** | | Increase road type E pavement width to 6.0m. | Section 6.1 |
| **Internal intersections** | | Consider the following elements in further design, in addition to relevant Austroads standards:<br>▪ Potential pedestrian/cyclist crossing locations.<br>▪ Cater for the recommended design and check vehicles.<br>▪ Minimum roundabout central island radius of 8.0m (for a driver speed of 50km/h) and approximately 8.0m circulating lane width, based on Austroads *Guide to Road Design Part 4B – Roundabouts* (2021) requirements.<br>▪ If required, mountable aprons for roundabouts to accommodate design vehicles. | Section 6.2 |
| **Car parking** | **General** | Provide wheel stops for all perpendicular car parking spaces adjacent to footpaths, to prevent vehicles overhanging the kerb and impeding on the pedestrian paths. | Section 6.6 |
| | **PWD** | Accessibility is recommended to be provided via kerb ramps from the proposed PWD shared zones. The PWD spaces and associated shared zones meet the dimensional requirements of AS2890.6.<br>It is recommended that PWD parking and related walking and wheelchair unloading areas do not exceed 1:33 gradient in any direction (assuming bituminous seal and outdoors) and include slip- | Section 6.4 |

| Facility | | Recommendation | Reference |
|---|---|---|---|
| | | resistance surfaces. | |
| | **Car parks** | Incorporate minimum circulation road widths of 5.5m in all locations in detailed design of car parking spaces. | Section 6.7.1 |
| | **Blind aisles** | Provide turnaround provision at blind aisle locations exceeding maximum blind aisle length of six spaces (width) as specified in AS2890.1 | Section 6.7.2 |
| | **Speed control** | Provide speed control devices for parking aisles exceeding 100m in length. | Section 6.7.6 |
| **Set down/pick up areas** | **Circular facility** | Widen roadway width and increase curve radii to accommodate design vehicle movements.<br>Reconsider arrangement to maximise set down/pick bay yield (i.e. not on a curve). | Section 6.9.1 |
| **Event management plans** | | Provide event management plans for the various event types, with consideration to:<br>▪ Expected mode share and parking requirement for private vehicles, taxi services and buses.<br>▪ Measures to provide bus priority for site entry/exit.<br>▪ Bus and taxi set down, pick up and parking locations.<br>▪ Designated parking areas for buses and private vehicles, including cordoned areas, detours and management of vehicle movements.<br>Event management plans can be revised as data and trends from each event are incorporated in to the management planning for the site. | Section 6.7.4 |
| **Bus turnaround provision** | | It is recommended that suitable measures for bus turnaround and parking is identified for each development stage. This may comprise temporary measures such as a graded areas adequate for the required manoeuvring, prior to permanent provision in ongoing stages. | Section 6.7.5 |
| **Bicycle parking** | | It is recommended that bicycle parking is considered with ongoing planning and design, with consideration to parking provision within clubhouses (if appropriate) as well as in outdoor areas at key fields and facilities. | Section 6.5 |
| **Servicing** | | It is expected that service vehicle parking provision will be considered with ongoing development design. It is recommended that vehicle manoeuvring and parking is considered for all clubhouse and premier hub servicing locations. | Section 6.8 |

# Appendix A Development layout

# OVERALL PLAN

1. **Main Access from Gowrie Junction Road**
2. **Toowoomba Connection Rd Highway Entry - Left In / Left Out**
3. **Tree Lined Avenue Entry Road**
4. **Premier Hub Setdown Area and Overflow Parking**
5. **Premier Hub**
6. **Premier Oval**
7. **Premier Rectangular Field**
8. **Rectangular Field Precinct 1**
9. **Formalised Car Parking**
10. **Open Parkland and Maintenance Compound**
11. **Oval Field 1**
12. **Oval Field 2**
13. **Diamond Fields Precinct**
14. **Rectangular Field Precinct 2**
15. **Rectangular Field Precinct 3**
16. **Shooting and Archery Precinct**
17. **Oval Field 3**
18. **District Park**
19. **Boundary Planting Screen Buffers**
20. **Stormwater Treatment Channels and Basins**
21. **Upgrade of Gowrie Junction Road between new Site Access and the Toowoomba Connection Road. Upgrade to include 2.5m on-road cycle lanes in each direction.**


SCALE
1:4000 @ A1
1:8000 @ A3

0m 400m 800m

LEGEND
Site Boundary

# TOOWOOMBA REGION SPORTS PRECINCT

## 2020 MASTER PLAN

PO BOX 1640, Buddina, QLD 4575 T: 07 5493 4677 E: admin@greenedgedesign.com.au www.greenedgedesign.com.au

N

SCALE: AS SHOWN @A1
DRAWING: DC-03 [O]
PROJECT: 19009
DATE: 26-05-2022

CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD

LEAD CONSULTANT: OTIUM SPORT + LEISURE

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# DETAILED PLAN NORTHERN PRECINCT

1. Indoor and Outdoor Shooting Precinct
1a. Indoor Shooting Range
1b. Skeet Shooting Range
1c. Long Range Shooting
2. Archery Precinct
3. Planted Screen Buffer with Safety Bund (2m high) and Security Fence
4. Shared Shooting and Archery Clubhouse and Parking
5. Rectangular Fields Precinct 2
6. Rectangular Field Precinct 2: Shared Rectangular Fields with Oval Overlay
7. Rectangular Field Precinct 3: Rectangular Fields with Oval Overlay
8. Rectangular Field Precinct 3: Clubhouse and Parking
9. District Level Playground
10. District Level Park
11. Dry Creek (with Stormwater Treatment)
12. Amphitheatre Capitalising on the Natural Topography
13. Dry Creek Stormwater Channels
14. Oval Field Precinct - Refer to Southern Precinct Plan
15. Shared Use Clubhouse Rectangular Fields
16. Shared Path along former Rail Corridor
17. Shared Pedestrian/Cycle Pathways
18. Car Parking
19. Planted Vegetation Buffers
20. Public Amenities
21. Small Play Space Associated with Club Facility
22. Northern Precinct Maintenance Shed / Compound


SCALE
1:2000 @ A1
1:4000 @ A3

0m 200m 400m

LEGEND
Site Boundary
Suggested PWD Parking

# TOOWOOMBA REGION SPORTS PRECINCT

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PROJECT: 19009
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# DETAILED PLAN SOUTHERN PRECINCT

1. Premier Oval
2. Premier Rectangular Field
3. Premier Hub (Amenities)
4. Premier Hub Setdown Area and Overflow Parking
5. Entry Parkland
6. Maintenance Access Track to Adjoining Site
7. Small Play Space Associated with Club Facility
8. Rectangular Fields Precinct 1
9. Oval Field 3
10. Oval Field 1
11. Oval Field 2
12. Southern Precinct Maintenance Shed / Compound
13. Planted Vegetation Buffers
14. Access from Gowrie Junction Road
15. Planted Embankments
16. Toowoomba Connection Road Entry - Left in / Left Out Arrangement
17. Existing Troys Road Interchange
18. Tree Lined Avenue Entry Road with Central Median
19. Shared Path along former Rail Corridor
20. Shared Pedestrian/Cycle Pathways
21. Shared Use Oval Clubhouse
22. Overflow (Event) Parking
23. Spectator Viewing Mounds (Nom. 3m above fields)
24. Practice Nets
25. Local Playground / Park
26. Rectangular Fields Clubhouse
27. Diamond Fields
28. Diamond Fields
29. Car Parking
30. Drop off and PWD parking
31. Shared Diamond Fields Clubhouse
32. Dry Creek Stormwater Channels
33. Rectangular Field Precinct 2 - Refer to Northern Precinct Plan


SCALE
1:2000 @ A1
1:4000 @ A3

0m 200m 400m

LEGEND
Site Boundary
Suggested PWD Parking

# TOOWOOMBA REGION SPORTS PRECINCT

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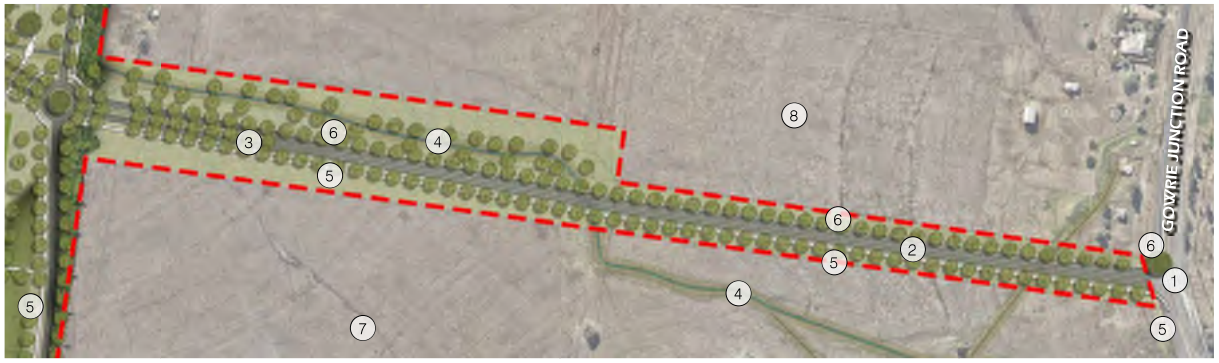
# DETAILED PLAN ACCESS ROAD



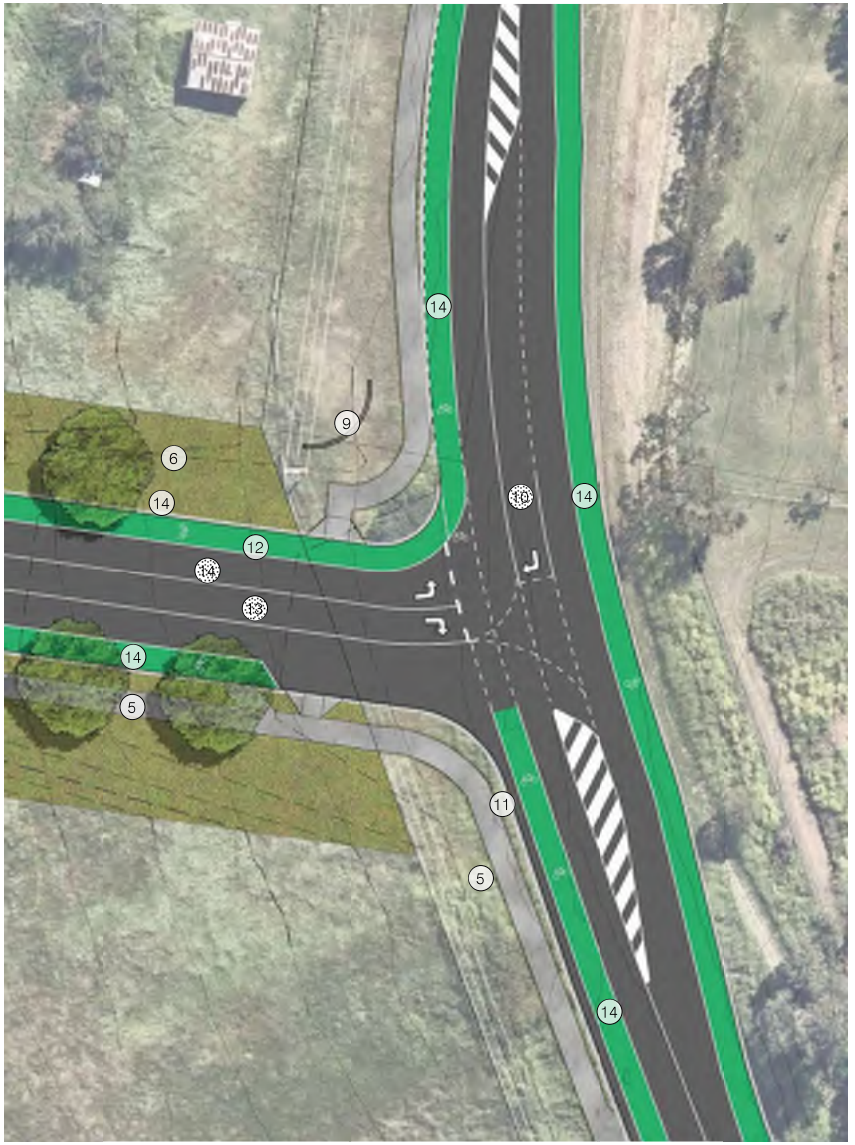

SCALE
1:2000 @ A1
1:4000 @ A3

0m 200m 400m

LEGEND
Site Boundary

1. **Main Access Intersection with Gowrie Junction Road**
2. **Tree Lined Avenue Entry Road without Planted Median**
3. **Tree Lined Avenue Entry Road with Planted Median**
4. **Dry Creek Stormwater Channels (Existing Alignment)**
5. **Shared Pedestrian/Cycle Pathways (Nom. 2.5m wide)**
6. **Pedestrian Path (Nom. 1.8m wide)**
7. **Existing Land Owned by T.R.C.**
8. **Existing Agricultural Land Use**
9. **Sports Facility Entry Statement & Signage**
10. **Right Turning Lane**
11. **Left Inbound Deceleration Lane**
12. **Left Exit Lane**
13. **Right Exit Lane**
14. **2.5m On-Road Cycle Lane**


ARTIST IMPRESSION OF ENTRY STATEMENT & SIGNAGE



GOWRIE JUNCTION
DETAIL PLAN

SCALE
1:250 @ A1
1:500 @ A3

0m 20m 40m

PRELIMINARY ADVICE FROM H.I.G. SUGGESTS A SIGNALLED INTERCHANGE WITH SINGLE RIGHT TURN EXIT ONTO GOWRIE ROAD AND A SINGLE LEFT LANE EXIT. ENTERING THE SITE HEADING NORTH A DECELERATION LEFT LANE IS RECOMMENDED AND A RIGHT TURN LANE IS TO BE PROVIDED ON THE SOUTHBOUND DIRECTION CARRIAGEWAY. DISCLAIMER: DESIGN SHOWN IS NOT AN ACURATE ENGINEERED SOLUTION AT PRESENT

# TOOWOOMBA REGION SPORTS PRECINCT

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CONSULTANTS: GHD

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# CAR PARK SPACE QUANTITIES

| ACTIVITY | ZONE | FIELDS/COURTS | RATE | REQUIREMENTS | ACHIEVED | PWD |
|---|---|---|---|---|---|---|
| Recreation | Local | 1 | 25 | 25 | 25 | 2 |
| Recreation | District | 1 | 50 | 50 | 50 | 3 |
| Premier Fields | | 2 | 75 | 150 | 377 | 10 |
| Rectangular Fields Precinct 2 | North | 6 | 50 | 300 | 292 | 6 |
| Rectangular Fields Precinct 1 | South | 4 | 50 | 200 | 200 | 2 |
| Rectangular Fields Precinct 3 | North | 4 | 50 | 200 | 200 | 2 |
| Oval Fields 1, 2 & 3 | | 3 | 50 | 150 | 150 | 3 |
| Diamond Fields | | 4 | 25 | 100 | 100 | 4 |
| Archery / Shooting | | 1 | 50 | 50 | 52 | 2 |
| Premier Hub | | 1 | 50 | 50 | 100 | 5 |
| *Sub-total* | | | | *1275* | *1546* | |
| *Events Allowance#* | Approx No. | | | *300* | *600* | |
| *PWD Parking** | | | | - | *39* | *39* |
| *No. of Additional Parking Spaces Provided* | 607 | | | | | |
| Total | | | | 1575 | 2185 | |


SCALE
1:4000 @ A1
1:8000 @ A3

0m 400m 800m

LEGEND
Site Boundary

# TOOWOOMBA REGION SPORTS PRECINCT

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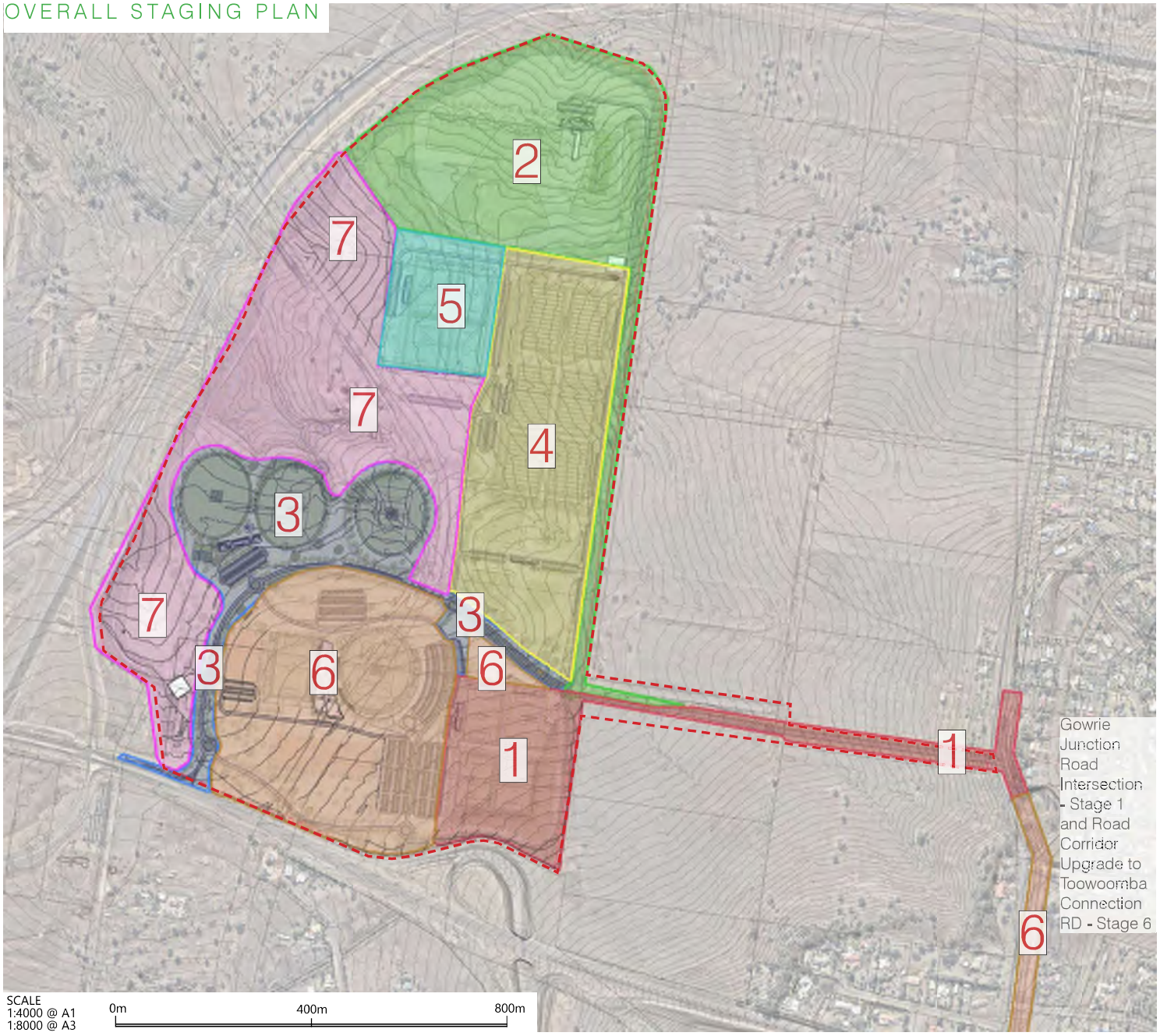
# OVERALL STAGING PLAN




## STAGING SEQUENCE

Stage 1
Southern rectangular fields, clubhouse, parking, access road boulevard to be south side only leading to Gowrie Junction Road intersection. Existing shooting club and archery to remain.

Stage 2
Relocation of shooting club and archery, indoor range, shared clubhouse, parking and access road. Construct roundabout and northern side of boulevard road. Provide access to Toowoomba Connection Rd.

Stage 3
Ovals, practice nets, clubhouse, parking and road access.

Stage 4
Diamond Fields, rectangular fields, shared fields, clubhouses, parking and access roads.

Stage 5
Northern rectangular fields, clubhouse and parking.

Stage 6
Premier Hub, premier oval, premier rectangular field, parking and access roads. Local park and playground north of southern soccer fields and construct north side of boulevard road.
Potential upgrade to Gowrie Junction Road to Toowoomba Connection Road.
Include Entry Parkland, Southern and Northern Setdown areas and overflow parking areas

Stage 7
District Park and facilities including parking, access, playground and stormwater treatment channels.

# TOOWOOMBA REGION SPORTS PRECINCT

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PROJECT: 19009
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CONSULTANTS: GHD

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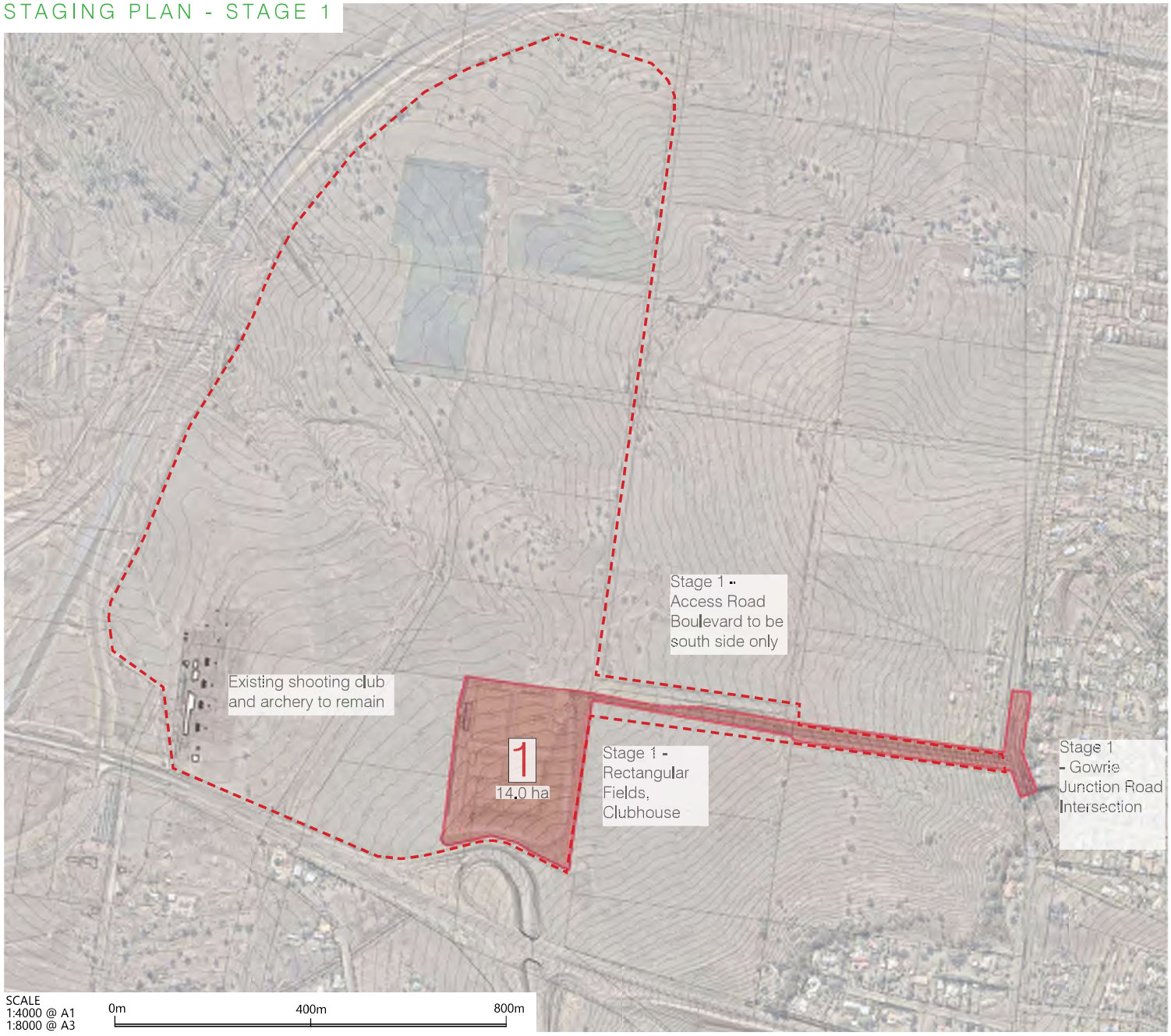
# STAGING PLAN - STAGE 1




## TOOWOOMBA REGION SPORTS PRECINCT

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PROJECT: 19009
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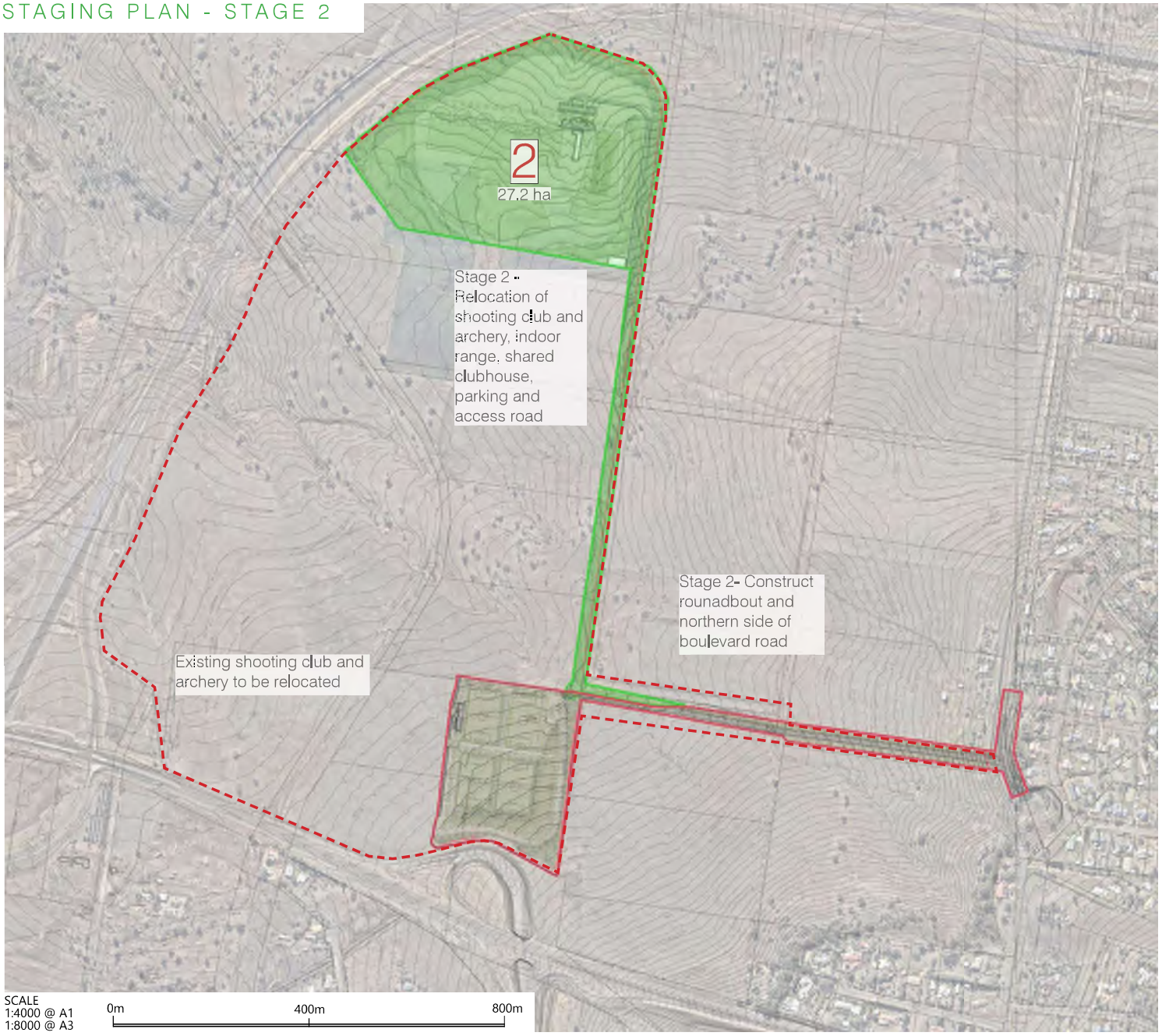
# STAGING PLAN - STAGE 2




## TOOWOOMBA REGION SPORTS PRECINCT

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PROJECT: 19009
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CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
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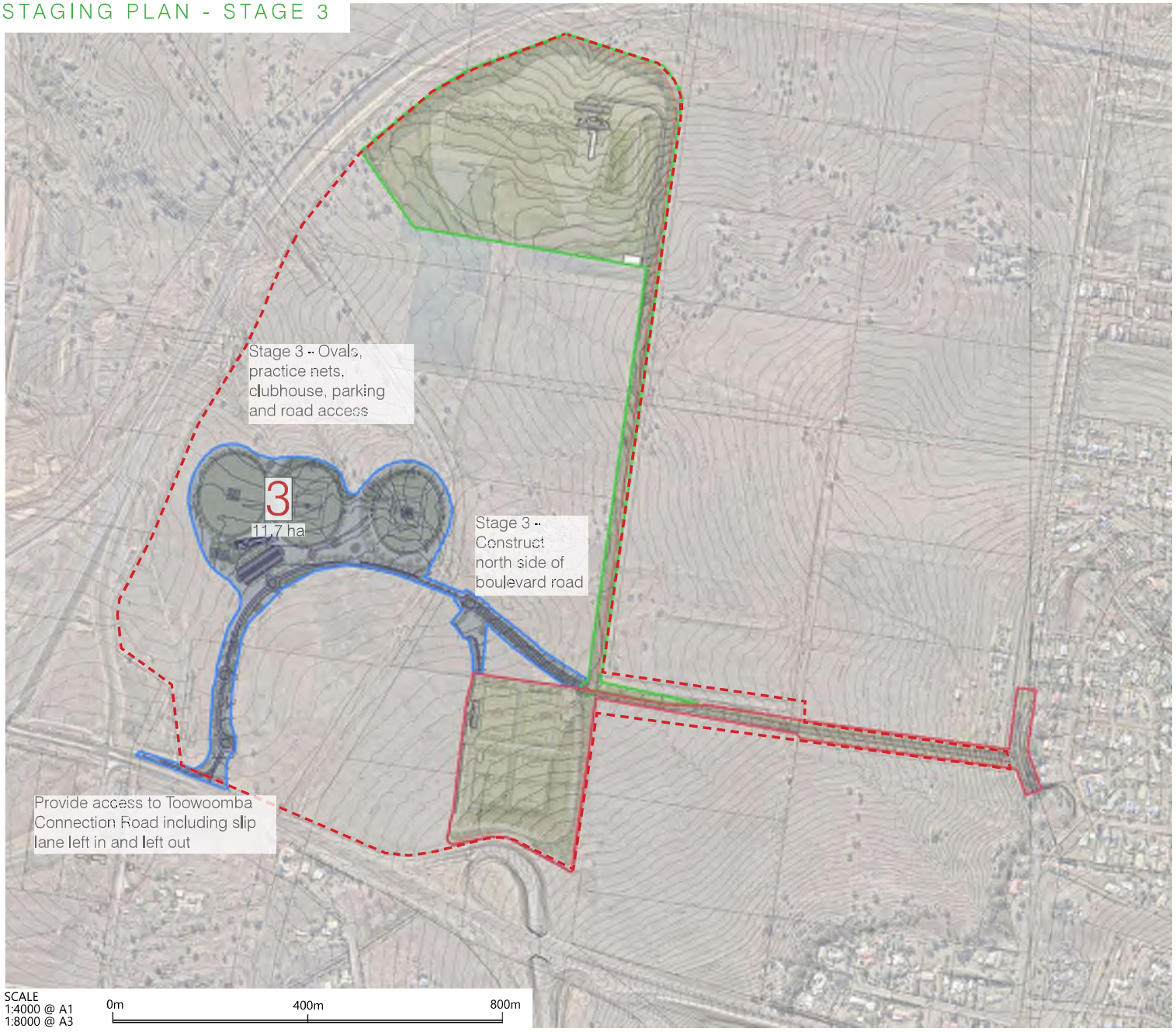
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGING PLAN - STAGE 3




## TOOWOOMBA REGION SPORTS PRECINCT

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SCALE: AS SHOWN @A1
DRAWING: DC-37 [0]
PROJECT: 19009
DATE: 26-05-2022

CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGING PLAN - STAGE 4


SCALE
1:4000 @ A1
1:8000 @ A3

0m 400m 800m

## TOOWOOMBA REGION SPORTS PRECINCT

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SCALE: AS SHOWN @A1
DRAWING: DC-38 [O]
PROJECT: 19009
DATE: 26-05-2022

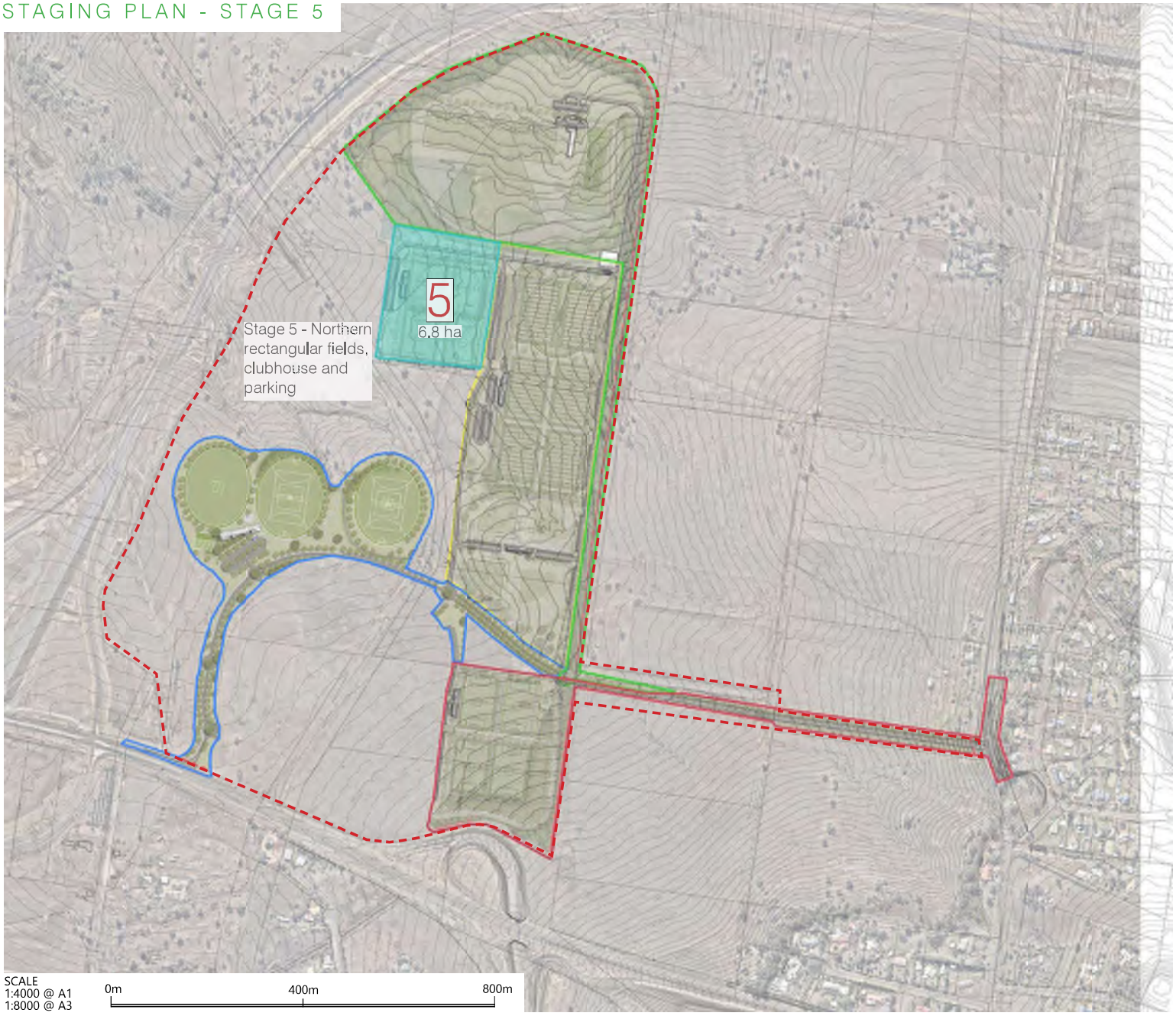
CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGING PLAN - STAGE 5




## TOOWOOMBA REGION SPORTS PRECINCT

2020 MASTER PLAN

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SCALE: AS SHOWN @A1
DRAWING: DC-39 [0]
PROJECT: 19009
DATE: 26-05-2022

CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGING PLAN - STAGE 6


## TOOWOOMBA REGION SPORTS PRECINCT

2020 MASTER PLAN

PO BOX 1640, Buddina, QLD 4575 T: 07 5493 4677 E: admin@greenedgedesign.com.au www.greenedgedesign.com.au

N

SCALE: AS SHOWN @A1
DRAWING: DC-40 [0]
PROJECT: 19009
DATE: 26-05-2022

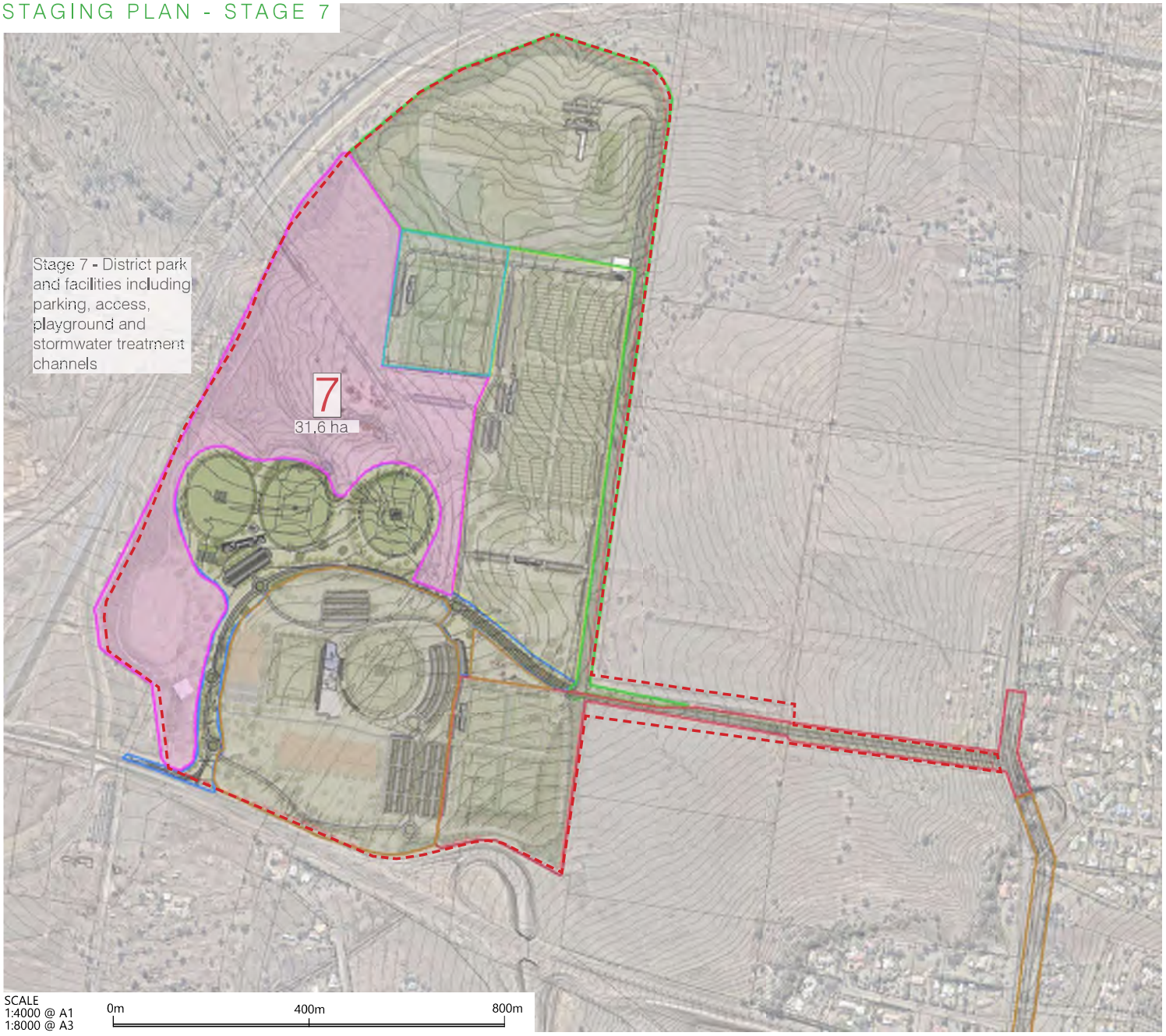
CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGING PLAN - STAGE 7




# TOOWOOMBA REGION SPORTS PRECINCT

## 2020 MASTER PLAN

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N

SCALE: AS SHOWN @A1
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PROJECT: 19009
DATE: 26-05-2022

CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD, Open architecture studio

LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

# STAGE 1 PLAN - WEST

1. Rectangular Principal Field
2. Rectangular Fields x 3
3. Rectangular Field Precinct Clubhouse
4. Turf Embankment Max 1:4 Slope
5. Car Park - Nom 140 Spaces plus 4 PWD
6. Stage 1 of Main Boulevard - South Carriageway only (Two way traffic)
7. On-Road Cycle Lane Exit Path to Off-Road Path
8. Shared Path
9. Improved Dry Creek Channel
10. Temporary Overflow Car Park - Nom 60 Spaces
11. Drainage Culvert Under New Road
12. Existing Pressure Sewer
13. Planted Screen Buffers
14. Access from Gowrie Junction Road - Joins DC-43
15. Shade Tree Planting
16. Existing Drainage Lines


SCALE
1:1000 @ A1
1:2000 @ A3

0m 100m 200m

LEGEND
Site Boundary

Draft Issue Note:
Levels shown are preliminary design and refinement with earthworks model is to be undertaken. Levels may change in order to balance the earthworks.

# TOOWOOMBA REGION SPORTS PRECINCT

## 2020 MASTER PLAN

PO BOX 1640, Buddina, QLD 4575 T: 07 5493 4677 E: admin@greenedgedesign.com.au www.greenedgedesign.com.au

N

SCALE: AS SHOWN @A1
DRAWING: DC-42 [0]
PROJECT: 19009
DATE: 26-05-2022

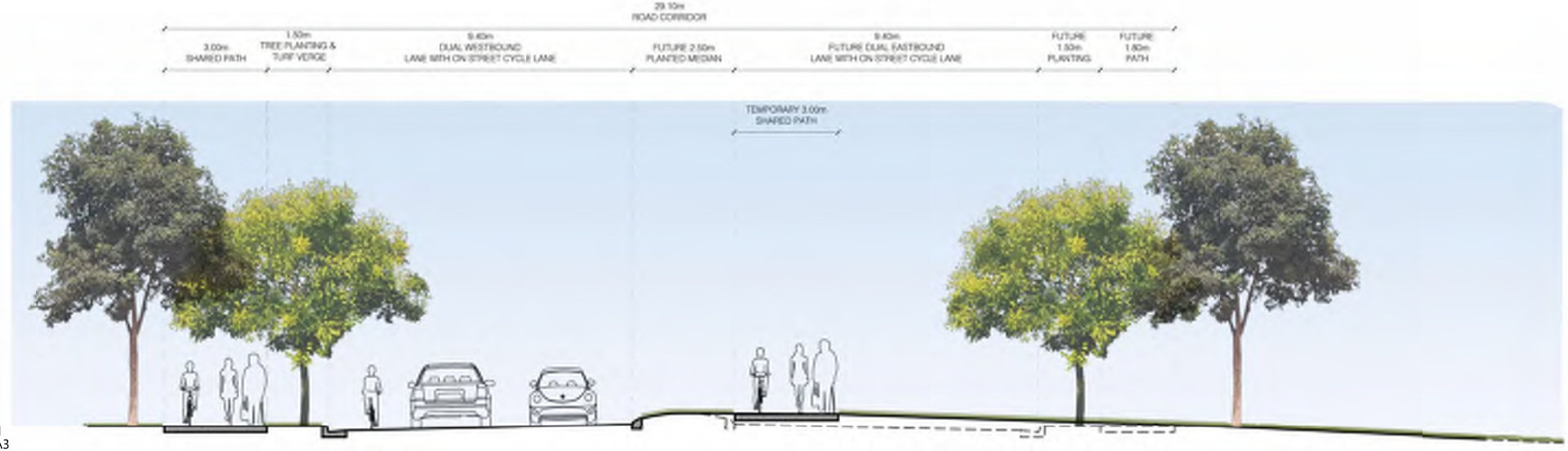
CLIENT: TOOWOOMBA REGION
CONSULTANTS: GHD, Open Architecture Studio
LEAD CONSULTANT: OTIUM SPORT + LEISURE

GREENEDGE DESIGN
creative thinking | design edge
Landscape Architecture | Urban design | Master Planning | Environmental

## STAGE 1 PLAN - EAST

1. **New Road Intersection - Stage 1 (no signals)**
2. **Entry Signage Structure**
3. **Entry Road - Constructed to Final Design with On-Road Cycle Lanes**
4. **Planted Embankment Max 1:2 Slope**
5. **Rock Boulder Retaining Wall in Places to Avoid Embankment Extending Beyond the Boundary**
6. **Shared Path**
7. **Pedestrian Path**
8. **Improved Dry Creek Channel**
9. **Drainage Culvert Under New Road**
10. **Existing Pressure Sewer**
11. **Access to Sports Precinct - Joins DC-42**
12. **Shade Tree Planting**
13. **Existing Drainage Lines**


## SECTION S1-1 THROUGH STAGE 1 BOULEVARD




SCALE
1:50 @ A1
1:100 @ A3

# TOOWOOMBA REGION SPORTS PRECINCT

## 2020 MASTER PLAN

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N

SCALE: AS SHOWN @A1
DRAWING: DC-43 [O]
PROJECT: 19009
DATE: 26-05-2022

CLIENT: TOOWOOMBA REGION

CONSULTANTS: GHD

LEAD CONSULTANT: OTIUM SPORT + LEISURE

Open architecture studio

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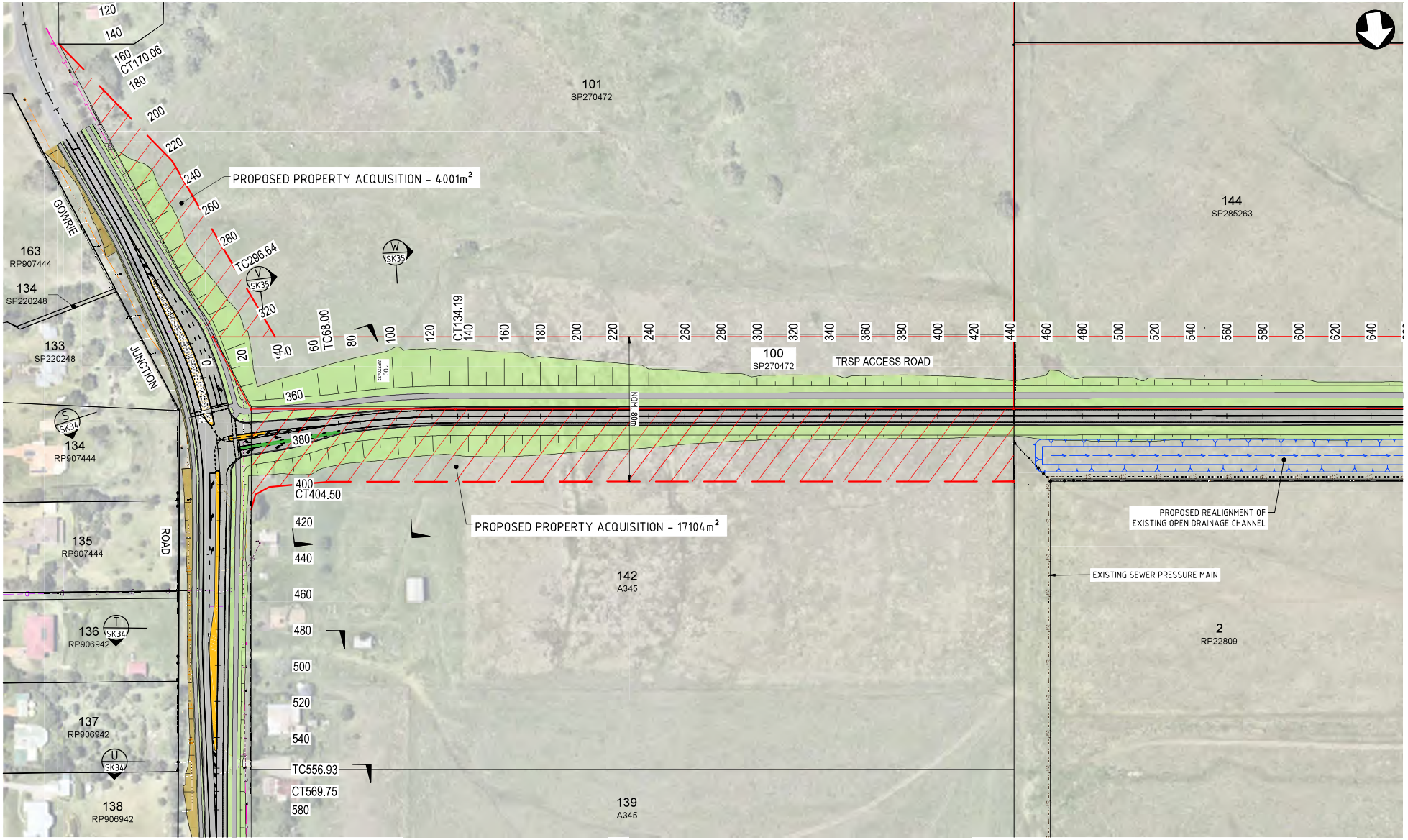
# Appendix B Previous documentation




GENERAL ARRANGEMENT PLAN – OPTION 3
SCALE 1:1000

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SCALE 1:1,000 (A1)
SCALE 1:2,000 (A3)

CONCEPT
NOT FOR CONSTRUCTION

| REV. | DATE | DRAWN | APP'D | DRAWING REVISION |
|---|---|---|---|---|
| C | 03/05/22 | BE | BL | ISSUED FOR REPORT |
| B | 06/04/22 | BE | BL | ISSUED FOR REVIEW |
| A | 31/03/22 | BE | BL | ISSUED FOR REVIEW |

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www.genengsolutions.com.au

CLIENT: TOOWOOMBA REGIONAL COUNCIL
PROJECT: TOOWOOMBA REGION SPORTS PRECINCT
DRAWN: B ENRIGHT | CHECKED: B LUSK | ENGINEER: | SURVEYOR: DOWNES GROUP
DESIGNED: B ENRIGHT | HORIZ. DATUM: GDA2020 | VERT. DATUM: AHD DERIVED

TITLE: GOWRIE JUNCTION ROAD INTERSECTION
CONCEPT DESIGN OPTION 3
GENERAL ARRANGEMENT PLAN

| SHEET | SCALE | JOB No | SHEET No | REVISION |
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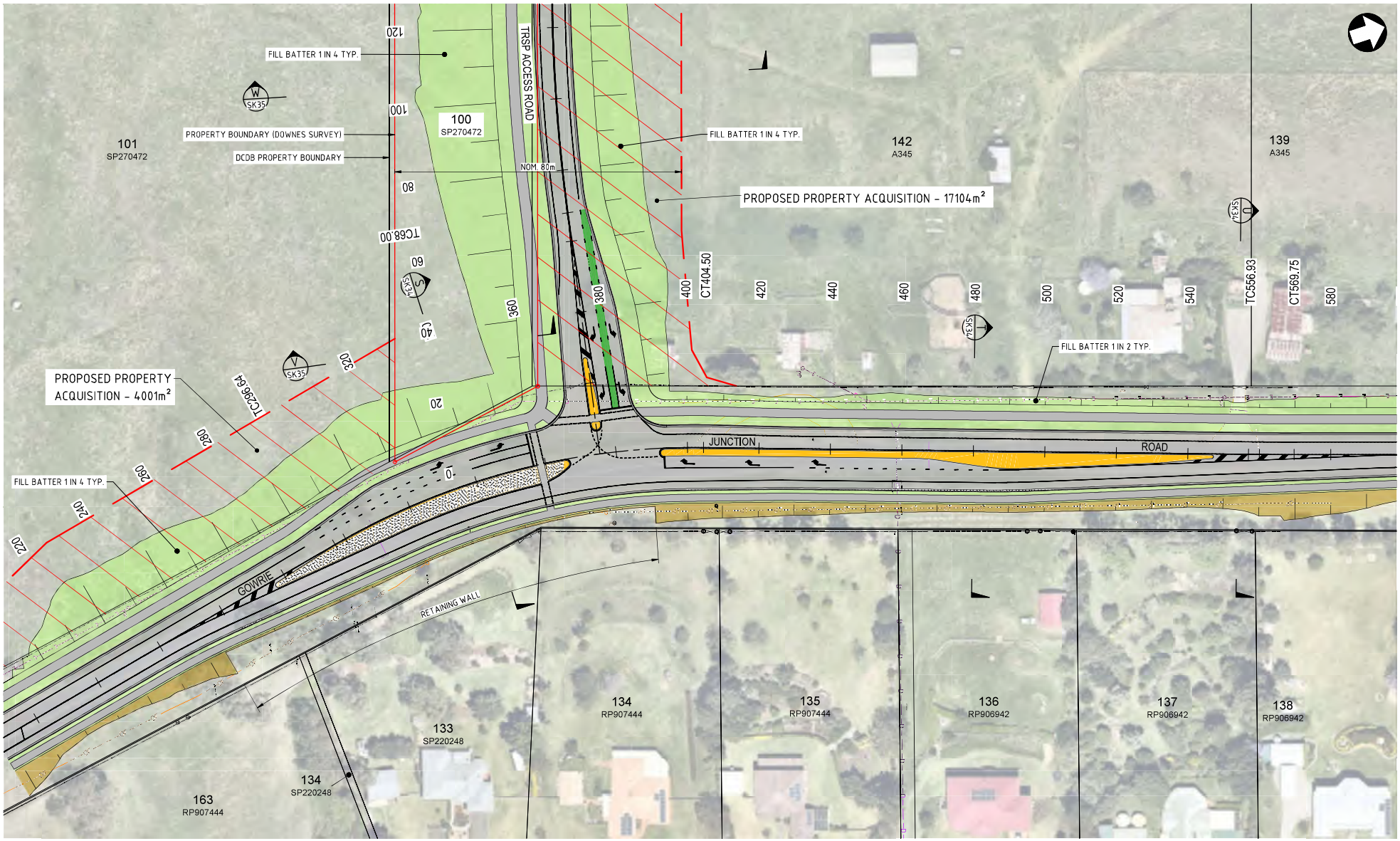


INTERSECTION LAYOUT PLAN - OPTION 3

SCALE 1:500

0 5 10 15 20m

SCALE 1:500 (A1)
SCALE 1:1,000 (A3)

CONCEPT
NOT FOR CONSTRUCTION

| REV. | DATE | DRAWN | APP'D | DRAWING REVISION |
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DRAWN: B ENRIGHT
DESIGNED: B ENRIGHT
CHECKED: B LUSK
ENGINEER:
SURVEYOR: DOWNES GROUP
HORIZ. DATUM: GDA2020
VERT. DATUM: AHD DERIVED

TITLE: GOWRIE JUNCTION ROAD INTERSECTION
CONCEPT DESIGN OPTION 3
INTERSECTION LAYOUT PLAN

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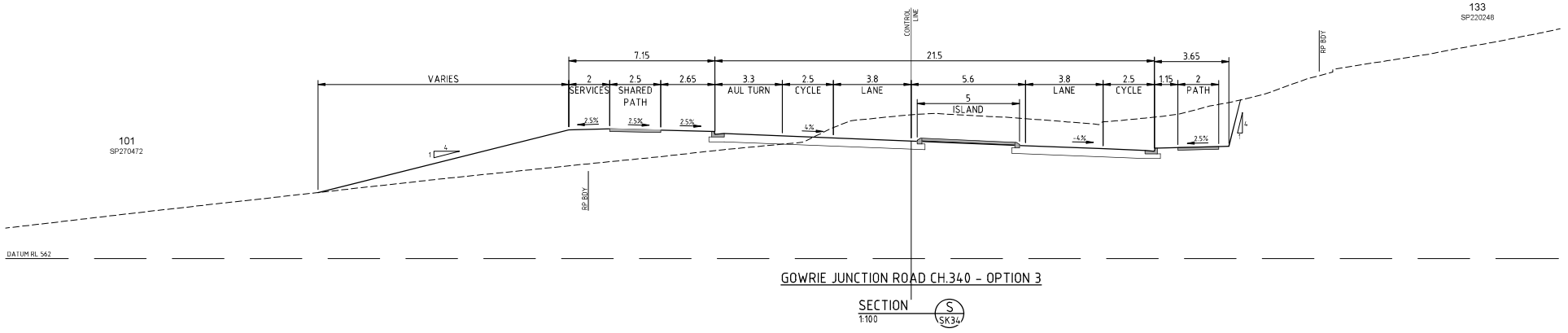
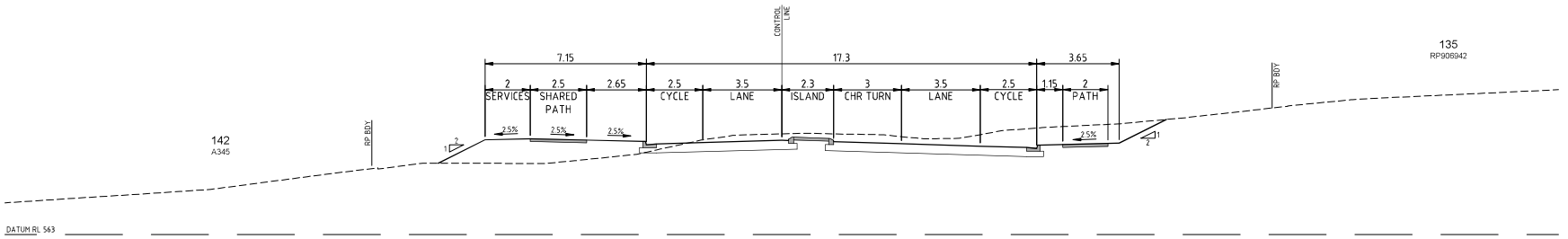


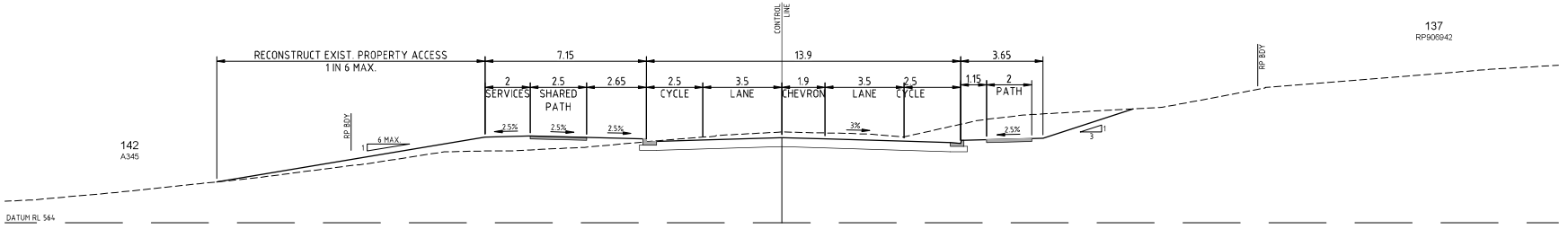

GOWRIE JUNCTION ROAD CH.340 - OPTION 3

SECTION S
1:100 SK34




GOWRIE JUNCTION ROAD CH.480 - OPTION 3

SECTION T
1:100 SK34




GOWRIE JUNCTION ROAD CH.554 - OPTION 3

SECTION U
1:100 SK34

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SCALE 1:100 (A1)
SCALE 1:200 (A3)

CONCEPT
NOT FOR CONSTRUCTION

| REV. | DATE | DRAWN | APP'D | DRAWING REVISION |
|---|---|---|---|---|
| C | 03/05/22 | BE | BL | ISSUED FOR REPORT |
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DRAWN: B ENRIGHT | CHECKED: B LUSK | ENGINEER: | SURVEYOR: DOWNES GROUP
DESIGNED: B ENRIGHT | HORIZ. DATUM: GDA2020 | VERT. DATUM: AHD DERIVED

TITLE: GOWRIE JUNCTION ROAD INTERSECTION
CONCEPT DESIGN OPTION 3
ROAD CROSS SECTIONS - SHEET 1 OF 2

| SHEET | SCALE | JOB No | SHEET No | REVISION |
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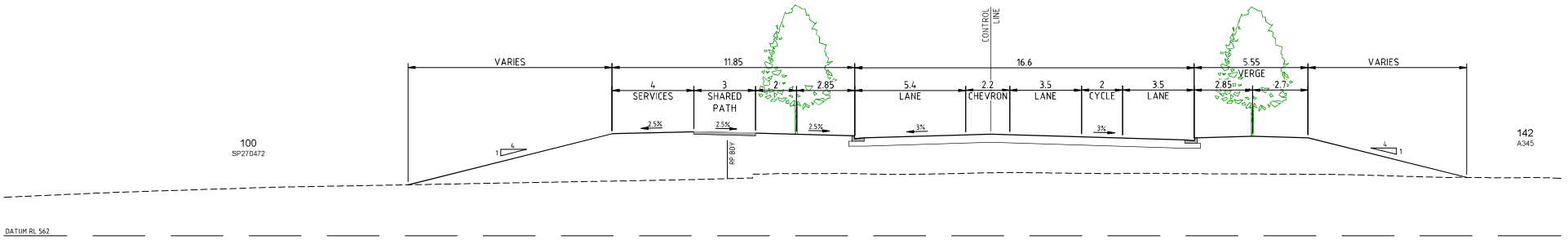
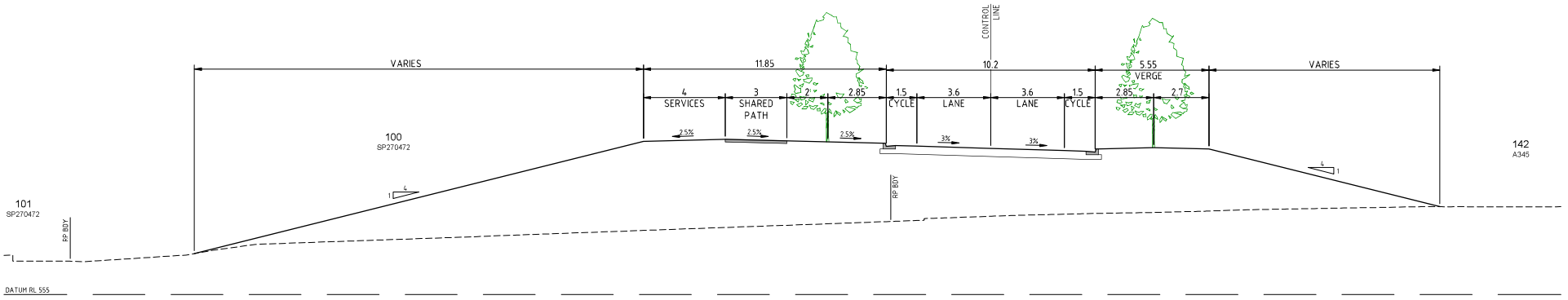



## TRSP ACCESS ROAD CH.35 - OPTION 3

SECTION V
1:100 SK35




## TRSP ACCESS ROAD CH.105 - OPTION 3

SECTION W
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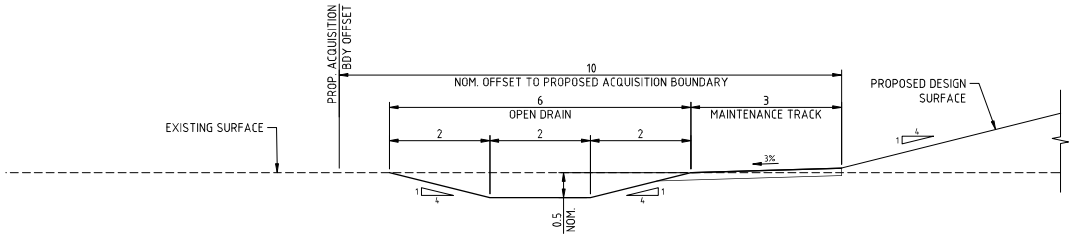


TYPICAL SECTION
TOE OF EMBANKMENT TREATMENT
SCALE 1:50

0 1 2 3 4m
SCALE 1:100 (A1)
SCALE 1:200 (A3)

CONCEPT
NOT FOR CONSTRUCTION

| REV. | DATE | DRAWN | APP'D | DRAWING REVISION |
|---|---|---|---|---|
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DRAWN: B ENRIGHT | CHECKED: B LUSK | ENGINEER: | SURVEYOR: DOWNES GROUP
DESIGNED: B ENRIGHT | HORIZ. DATUM: GDA2020 | VERT. DATUM: AHD DERIVED

TITLE: GOWRIE JUNCTION ROAD INTERSECTION
CONCEPT DESIGN OPTION 3
ROAD CROSS SECTIONS - SHEET 2 OF 2

| SHEET | SCALE | JOB No | SHEET No | REVISION |
|---|---|---|---|---|
| A1 | AS SHOWN | GS579-24 | SK35 | C |

HARRISON INFRASTRUCTURE GROUP

# Traffic Impact Assessment

**Toowoomba Region Sports Precinct**

**Business Case**

**Toowoomba Regional Council**

*March 2021*

## Document control sheet

If you have any questions regarding this document, please contact:

**Contact** Mike Harris
**Title** Director, Harrison Infrastructure Group
**Phone** (07) 4639 4188
**Project No.** P10494

**Version history**

| Version No. | Date | Changed By | Details |
|---|---|---|---|
| 1.0 | 22/05/2020 | Caroline Smith & Chris Wright | Initial Draft – Peer Review Mike Harris |
| 2.0 | 06/10/2020 | Caroline Smith & Chris Wright | Draft – revised staging Peer Review Mike Harris |
| 3.0 | 30/03/2021 | Caroline Smith & Chris Wright | Final Client Issue |
| | | | |

| Final Report | |
|---|---|
| Chris Wright<br>RPEQ# 19663 |  |

**Reference Material**

In preparing this report, reference has been made to the following:

- Guide to Traffic Impact Assessment, Transport and Main Roads, 2018
- Road Planning and Design Manual - 2nd Edition, Transport and Main Roads, 2017
- Queensland Manual of Uniform Traffic Control Devices, Transport and Main Roads, 2018
- Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, Austroads, 2017
- Queensland Streets, Institute of Municipal Engineering Australia - Queensland Division, 1993
- Guide to Traffic Generating Developments - Version 2.2, Roads and Maritime Services, 2002
- Guide to Traffic Generating Developments - TDT 2013 04a Updated Traffic Surveys, Roads and Maritime Services, 2013
- AS 2890.1 - Parking Facilities Part 1: Off-Street Car Parking, Standards Australia, 2004
- AS 2890.2 - Parking Facilities Part 2: Off-Street Commercial Vehicle Facilities, Standards Australia, 2018
- AS 2890.6 - Parking Facilities Part 6: Off-Street Parking for People with Disabilities, Standards Australia, 2009
- AS 1742 - Manual of Uniform Traffic Control Devices, Standards Australia, 2019
- SIDRA Intersection 8.0, SIDRA Solutions

## TABLE OF CONTENTS

# 1 INTRODUCTION

## 1.1 Background and General Description

The Harrison Infrastructure Group Pty Ltd (HIG) has been engaged by Otium Planning Group on behalf of Toowoomba Regional Council (TRC) to undertake a Traffic Impact Assessment (TIA) for the proposed Toowoomba Region Sports Precinct. The Toowoomba Region Sports Precinct is intended to cater for current and anticipated demand for sporting facilities throughout Toowoomba. The facility will be a staged development, with the first seven stages to be constructed between 2023 and 2030 (refer to Table 1-1). A future potential Stage 8 has been included to support a master planning approach to design, however these facilities are subject to future confirmation of demand and will be developed post 2030. The TIA therefore only assesses the impacts of Stage 1 to 7 of the development, and the future Stage 8 is beyond the scope of the investigation.

The development will consist of the following, also shown in Figure 1-1:

- Baseball/Softball precinct with two baseball diamonds, two softball diamonds, and clubhouse.
- Archery range.
- Shooting Range with Skeet Range.
- Clubhouse shared between the archery and shooting range.
- Indoor shooting range.
- Walking trails.
- Cricket nets.
- Premier oval field.
- Premier rectangular field.
- 14 rectangular fields with 3 clubhouses.
- 3 oval fields with clubhouse. 2 additional ovals are available by utilising multiple rectangular field areas as shown in the plans in Appendix A.
- A future stage with indoor centre, aquatics centre, hard courts, athletics track and field, and adventure park.

Refer to Appendix A for plans of the proposed development. Note that the plans include future development in Stage 8 not included as part of this application or considered for this TIA.

The staging of the proposed development is detailed in Table 1-1. A staging plan is also included in Appendix A.

**Table 1-1: Staging of the Sports Park**

| Stage | Estimated Year of Completion | Included in Stage |
|---|---|---|
| 1 | 2023 | - Soccer fields, clubhouse, and parking.<br>- Shooting club and archery remain at current location, including existing access on to Toowoomba Connection Road. |
| 2 | 2024 | - Construction of access on to Toowoomba Connection Road.<br>- Relocation of shooting club and archery.<br>- Indoor range and clubhouse. |
| 3 | 2025 | - Ovals, practice nets, clubhouse parking |
| 4 | 2026 | - Baseball and softball diamonds<br>- Rugby fields<br>- Shared fields<br>- Clubhouses and parking |
| 5 | 2027 | - Soccer fields, clubhouse, and parking |
| 6 | 2029 | - Premier hub (Stage 1 building)<br>- Premier oval<br>- Premier rectangular field<br>- Parking<br>- Playground north of playing fields |
| 7 | 2030 | - District park and facilities including parking and access |
| 8 | Beyond the planning horizon, and not assessed as part of this TIA. | - Indoor centre, aquatic centre, hardcourts, adventure park, additional parking, athletics track and field. |

Further discussion of the development characteristics is included in Section 3 Traffic Generation and Distribution.

**Figure 1-1 Excerpt from plans of the proposed Toowoomba Region Sports Precinct (Greenedge Design, 2020)**

## 1.2 Objective

The objective of this study is to evaluate the traffic operational impacts on the adjacent road network. The report details the estimated traffic generated by the proposal and the impact of additional movements on several surrounding streets, roads, and intersections. The proposed development layout is reviewed briefly, and comment is provided on the layout of the proposed connections onto the existing road network.

# 2 EXISTING CONDITIONS

## 2.1 Development Site

The proposed development site encompasses the following lots:

- Lot 24 on SP214746
- Lot 276 on SP268921
- Lots 110-111 on SP272107
- Lot 112-117 on A345
- Lots 118-119 on SP203198
- Lot 100 on SP270472, and;
- Lot 114 on SP285263

The site is currently primarily used for grazing, and is the site of the Toowoomba Clay Target Club, Toowoomba Company of Archers, and the Sporting Shooters Association, which share a site at the south-western corner of the site (refer to Figure 2-1). This access will be relocated as part of this development.

The site has frontage on to Gowrie Junction Road and the Toowoomba Connection Road, and an existing left-in/left-out access on to Toowoomba Connection Road, which will be relocated as part of this development. The development will gain access on to the existing road network via a left-in/left-out access on to the Toowoomba Connection Road, slightly east of the existing access, in addition to an all-movements access on to Gowrie Junction Road.

## 2.2 Background Traffic Growth

Toowoomba Connection Road:

- The growth rates adopted for this study was based on the Department of Transport and Main Roads (DTMR) study 'Traffic Growth Projections for the Surat Basin 2011'. Using Option 3A, compound growth rates in this section of the Toowoomba Connection Road (previously the Warrego Highway) were adopted as follows:
    - 2019 to 2021 – 4.6% compound growth
    - 2021 to 2025 – 3.3% compound growth
    - 2025 to design horizon – 2.8% compound growth
- Over the design horizon these rates are equivalent to approximately 4% linear growth. In recent years, the Toowoomba-Connection Road and Warrego Highway in the vicinity of this development have experienced negative traffic growth, however long term we expect a growth of 4% linear in this area is not unreasonable.

Gowrie Junction Road:

- Schedule 3 of the TRC Planning Scheme identifies expected population growth in Wilsonton and Gowrie across this assessment period as 0.6% and 1.7% respectively.
- In order to provide a conservative assessment of growth, and account for potential increase in traffic on Gowrie Junction Road associated with the Toowoomba Second Range Crossing, a linear growth rate of 2.5% has been adopted for the road and for movements to and from the road.

## 2.3 Existing Road Network

### 2.3.1 General

The locality of the proposed development site is shown in Figure 2-1. The major components of the surrounding road network that may be impacted by the development include the following streets, roads, and intersections. Outside of these immediate intersections the numbers of additional trips on the network associated with the development are diluted and therefore their impact is expected to be minimal.

- Gowrie Junction Road
- Toowoomba Connection Road, also known as Bridge Street, and;
- Gowrie Junction Road/Bridge Street intersection.

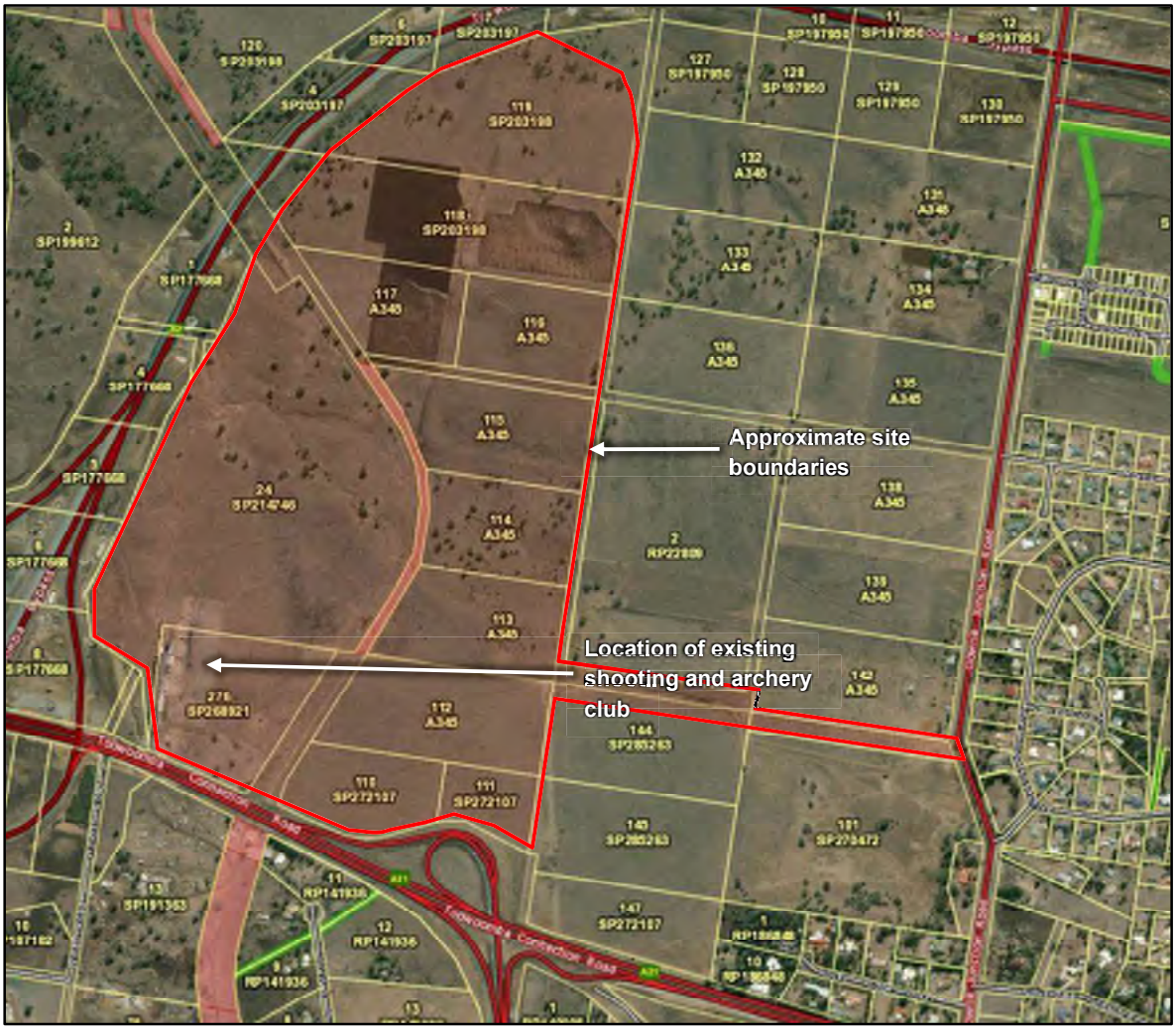


**Figure 2-1 Site locality (www.qldglobe.qld.gov.au, 2020)**

### 2.3.2 Gowrie Junction Road

Gowrie Junction Road is a local government-controlled road with the following properties in the vicinity of the development:

- A two lane sealed road with 7m seal and centreline marking.
- The road is generally not lit, aside from at intersections.
- The road generally has no shoulders, and has table drains in some sections.
- The road is on a downhill grade from Bridge Street to Gowrie Junction.
- The road has a posted speed of 60km/h north of Bridge Street to 80m north of the proposed development access on to Gowrie Junction Road, where the speed limit increases to 80km/h.
- Gowrie Junction Road is designated a sub-arterial road in the Toowoomba Regional Planning Scheme. The planning scheme nominates a 15m sealed pavement with kerb and channel for urban sub-arterial roads, including two 3.5m wide traffic lanes, 1.5m wide cycle lanes either side and 2.5m wide parking lanes

either side. For rural sub-arterial roads, the planning scheme nominates a 9m sealed pavement.

- In this case, the route does not require on-street parking, however the road is part of the TRC Principal Cycle Network.
- Therefore, a 12m wide distributor standard pavement with two 3.5m wide parking lanes and a shared 2.5m wide bike/breakdown lane is considered appropriate.
- TRC undertook a tube count on Gowrie Junction Road south of the Cotswold Hills Drive intersection (count TC181912239, identified as 'btw Cotswold Hills Dr and width change') in 2018 (refer to count data in Appendix B). The count recorded average daily volumes of 4,336vpd.
- Based on the growth rates discussed in Section 2.2, Gowrie Junction Road is expected to cater for 6,721vpd at the design horizon of the development, 2040. This is outside the capacity of the existing 7m wide cross-section, and these volumes would be in the capacity of the 12m distributor standard cross-section discussed above.
- Saturday is expected to be the peak day for the development, and it is noted that 2040 Saturday volumes are expected to be 5,566vpd compared to the existing 3,591vpd recorded in the 2018 TRC tube count.

### 2.3.3 Bridge Street (Toowoomba Connection Road)

Bridge Street (also known as Toowoomba Connection Road) is a state controlled road with the following properties in the vicinity of the development:

- Bridge Street is state controlled road section 315.
- DTMR permanent count site data was obtained for site 38586 on the Toowoomba Connection Road 100m east of the gun club entrance (through distance 26.81). The site recorded 11,423vpd in 2019 with 17% heavy vehicles.
- Based on the growth rates discussed in Section 2.2, traffic volumes at this location are expected to increase to 22,525vpd by the design horizon of the development (2040).
- TRC engaged Austraffic to undertake a traffic count at the Gowrie Junction Road/Bridge Street intersection in 2019. In the peak periods, the volumes to the east of the intersection in both peaks is 50% higher than to the west of the intersection. Therefore, it is assumed that the highway will cater for 33,788vpd to the east of the Gowrie Junction Road intersection in 2040.
- These volumes both east and west of Gowrie Junction Road are within the capacity of the existing four-lane cross-section.
- No upgrades are warranted to Bridge Street under background traffic within the design horizon of the development.

### 2.3.4 Gowrie Junction Road/Bridge Street intersection

The Gowrie Junction Road/Bridge Street intersection is signalised intersection with the following properties:

- The intersection was upgraded in 2016 from a sign controlled intersection to the current signalised layout.
- Bridge Street is a four-lane divided road at the intersection. Both the minor legs are two lane roads.
- There are left turn treatments on each leg:
    - A high entry angle slip lane on Charlton Pinch Road 40m long,
    - A high entry angle slip lane on the eastern Bridge Street leg 115m long,
    - A high entry angle slip lane on the western Bridge Street leg 117m long, and
    - A continuous left turn lane on the Gowrie Junction Road leg 415m long from diverge taper to merge taper on Bridge Street. Approximately 85m is on the Gowrie Junction Road approach (refer to figure 2-3).
- There are right turn treatments on each leg:
    - A channelised right turn lane on the western Bridge Street approach, 150m long.
    - A channelised right turn lane on the eastern Bridge Street approach, 275m long.

  The lengths above are measured to the point where the lane taper reaches 2m width.
- The current phasing currently has no filtering on Bridge Street, and a single filtered phase on the minor Charlton Pinch and Gowrie Junction Road legs.
- The posted speed at the intersection is 90km/h on Bridge Street, and 60km/h on the minor legs.
- The intersection is lit.
- There are no pedestrian crossings at the intersection.
- Crash history data at the intersection was obtained from QldGlobe. No crashes have been recorded at the intersection in the last five years, noting that the intersection was upgraded to its current signalised layout in 2016.
- Austraffic undertook an intersection count at the intersection on Tuesday 26 November 2019 for TRC. The intersection count is included in Appendix C.
- Streams data for the intersection was also obtained from DTMR, included in Appendix B.
- The intersection was modelled in SIDRA for 2030 traffic volumes using the growth rates discussed in Section 2.2. The results indicate the intersection will operate acceptably in 2030 under background traffic conditions, with degree of saturation 0.305 in the AM peak, and 0.531 in the PM peak, and minor queues. SIDRA results are included in Appendix F.


**Figure 2-3: Aerial photography of the Gowrie Junction Road/Bridge Street intersection (www.nearmap.com, 2020)**