Business Case

INDOOROOPILLY ROUNDABOUT UPGRADE

CITY PROJECTS OFFICE

BRISBANE INFRASTRUCTURE

Document Change History

Document Control Sheet

Contact for enquiries and proposed changes. If you have any questions regarding this document or if you have a suggestion for improvements, please contact:

Project Manager _____

Revision History

Revision	Author	Issue Purpose	Date
1		Draft for review	14/04/2020
2		Further refinement to preferred option	16/10/20
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Sponsor:

Name:			
Title:	Executive Manager – City Projects Officer		
Signature:		**Date:**	16/10/2020

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1 EXECUTIVE SUMMARY

1.1 BACKGROUND

The Indooroopilly Roundabout (Moggill Road-Coonan Street intersection) is a junction of two major arterial roads in the suburb of Indooroopilly, in the inner south west of Brisbane.

The current intersection configuration is a large roundabout, with signalised control of the Moggill Road (east) leg. There are uncontrolled accesses from adjacent commercial properties, such as Indooroopilly Central, to and from the roundabout.

The roundabout provides direct access to a commercial development located in the centre of the roundabout, with driveways on the eastern and northern circulating sides. There is no controlled facility for pedestrians to cross Moggill Road at this location.

The intersection caters for a high volume of traffic movements related to the nearby Indooroopilly Shopping Centre. Bus movements through the intersection are also significant.

The area contains major commercial/retail precincts with residential land uses. In addition, Indooroopilly is defined as a Principal regional activity centre and is a key focal point for employment and services. Figure 1. and 1.2 shows the intersection within the broader urban context.

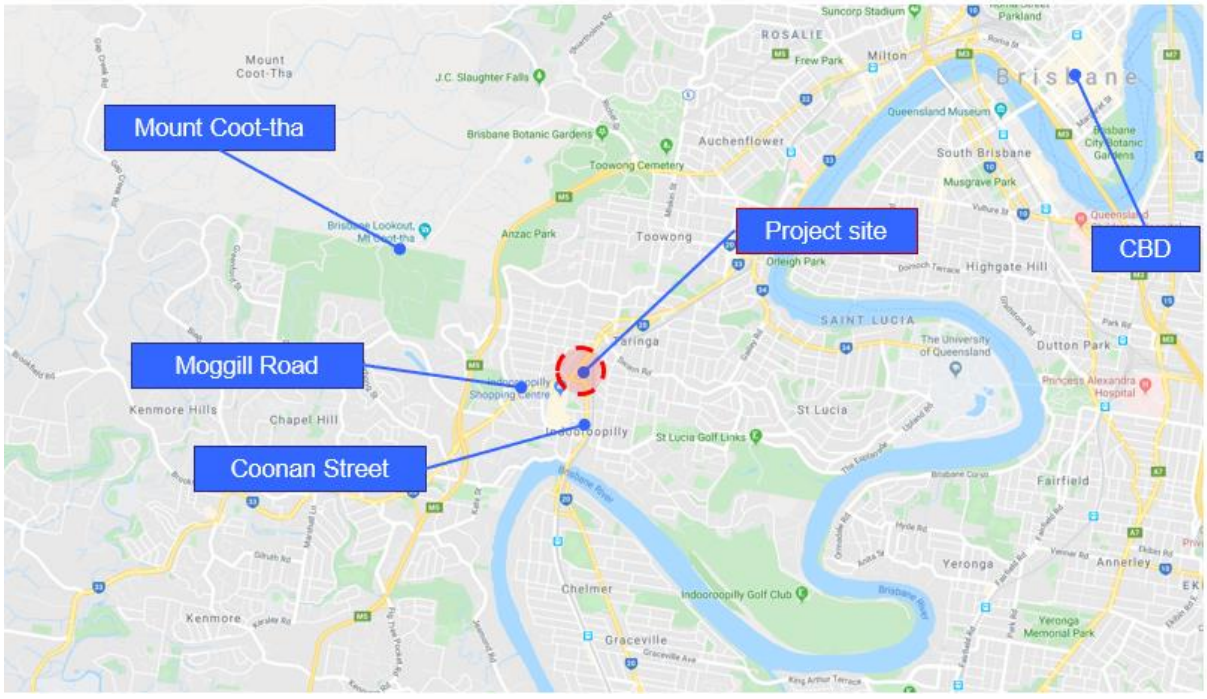


Figure 1.1: Greater Brisbane Project context

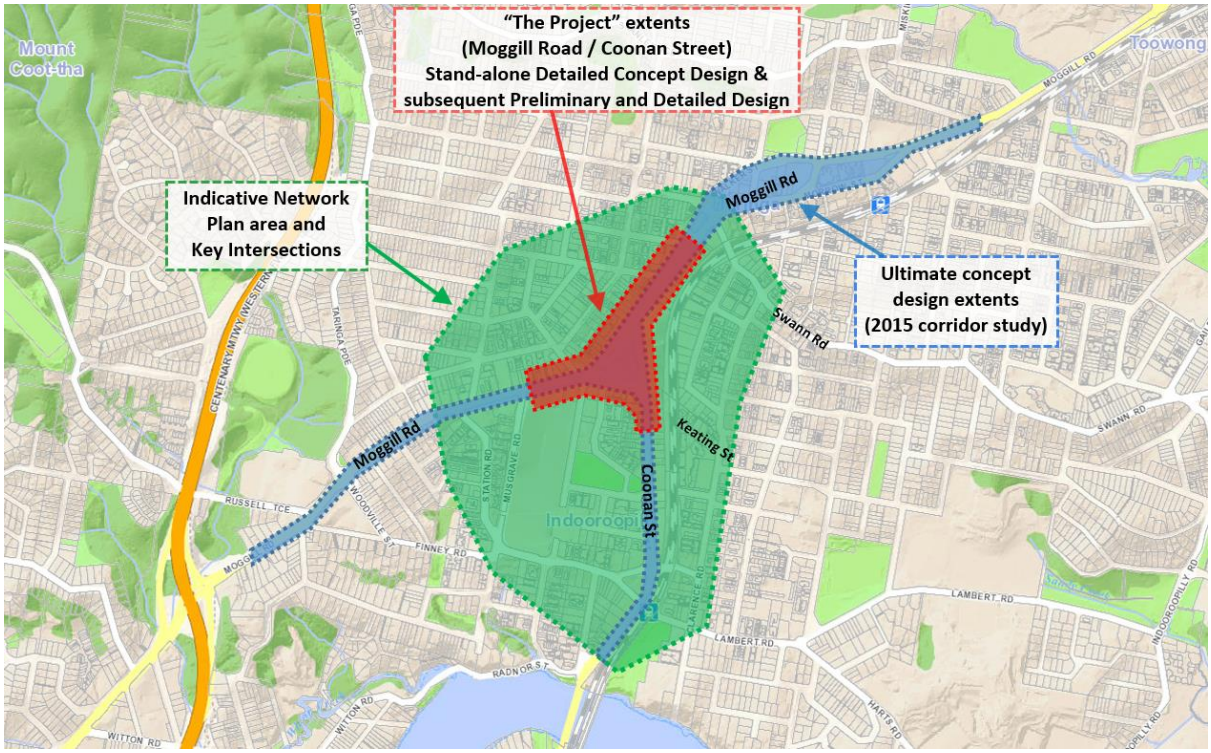


Figure 1.2: Project context

Modelling results indicate that the intersection was operating at capacity in 2018 in both the AM and PM peak hour periods with the performance worsening by 2031. The increase in the vehicle volumes through the intersection from 2018 through to 2031 is more significant in the PM peak. In the AM peak the vehicle volumes are quite similar when comparing 2018 to 2031, which is attributable to the diversion of traffic from Moggill Road inbound onto the Centenary Highway inbound in the AM peak period.

Key drivers for the project are:

- The intersection currently experiences significant congestion during morning and evening peak periods. It is expected that this congestion will increase over time as the surrounding commercial and residential land uses grow in size and density, increasing local transport pressures and needs.
- The Moggill Road corridor is a key multi-modal route (for cars, buses, freight, pedestrians and cycling) between the western and south-western suburbs to local destinations such as the Indooroopilly Shopping Centre, Toowong and the Brisbane Central Business District (CBD), as well as cross-city destinations. Coonan Street also links south-western suburbs to these key local destinations and Moggill Road. Continued background traffic growth along both corridors, combined with the increased densification of the surrounding area will also contribute to increased congestion at the intersection.
- A Road Safety Audit (RSA) conducted at the intersection identified a number of "High" risk safety issues, particularly in relation to horizontal geometry and pedestrian movements that need to be addressed to minimise risks to road users.

1.2 PREVIOUS STUDIES

Council completed the Moggill Road and Coonan Street Corridors Feasibility Study Report in 2015.

The Vision Statement developed for the study area was,

"The Moggill Road and Coonan Street corridors will continue to provide critical Brisbane multi-modal transport network roles of connecting the western and south-western suburbs with Toowong, the central business district, the University of Queensland and the broader Brisbane area. They will also efficiently support the growth in commercial activities and increasing intensity of residential development in the area."

The study concluded that the ultimate form of the Moggill Road corridor should be six lanes between Waverley Road and Western Freeway, narrowing down to five lanes from Waverley Road east to Taringa, and that Coonan Street should be four lanes narrowing down to two lanes prior to the Walter Taylor Bridge. The study also recommended that the Moggill Road and Coonan Street intersection should be upgraded to a signalised T-intersection.

1.3 URGENCY

The Moggill Road and Coonan Street intersection is currently experiencing a high number of safety issues as well as traffic congestion, especially in the PM peak period. This results in significant travel time delays and unreliable travel times.

Failure to resolve the project need within the short-term is likely to:

- increase traffic congestion over time as the local surrounding commercial and residential land uses grow in size and density, increasing local transport pressures and needs.
- not address the issue of continued background traffic growth along both corridors, which will also contribute to increased congestion at the intersection.
- result in no improvement to the number of "high" risk safety issues at the intersection as identified in the road safety audit.
- continued safety risk, as the intersection has a high crash history with 32 recorded incidents between 2013 and 2018, 10 resulting in hospitalisation and 17 requiring medical treatment and 5 minor injuries. (There were 12 further incidents between 2018 and 2020 including 3 hospitalizations, 5 medical treatment and 4 minor injuries).
- not address and encourage active transport opportunities

1.4 PROJECT OBJECTIVES

The Moggill Road and Coonan Street intersection upgrade project objectives are to:

- improve safety for all modes of traffic
- reduce traffic congestion
- increase capacity to accommodate existing and future traffic demands
- improve the reliability of travel times for all modes of traffic
- Enhancing livability - Better journey experience

  - Urban street place making — to better integrate road space with adjacent land use and activity and improve the public realm.
  - Place-making transport —develop a strong sense of place with the delivery and upgrade of transport
- minimise property impacts
- maximise environmental and sustainability opportunities.
- improve active transport opportunities

1.5 BENEFITS

Implementing the preferred option will:

- improve safety by grade separation of the Moggill Road and Coonan Street intersection.
- reduce traffic delays and congestion at the Moggill Road and Coonan Street intersection, for general traffic and buses.
- enhance the ability for Moggill Road and Coonan Street to fulfil their roles as key arterial roads in the west Brisbane network through reduced travel times and crashes.
- create an opportunity to provide a distinctive entry to the Indooroopilly Precinct in the unused intersection green space.
- provide better pedestrian accessibility to public and active transport options
- minimise impacts on private residential and commercial property
- minimise impacts on the broader transport network in the area
- provide development opportunities for unused spaces around the intersection
- provide cycle facilities
- provide a new pedestrian crossing facility across Moggill Road, which is on the Coonan Street overpass.

1.6 RECOMMENDATIONS

On the basis of a benefit-cost ratio of 2.08 for the project, and additional non-monetary benefits associated with reducing community and property impacts, it is recommended that the project should proceed with Option 16g which is the preferred option.

The allocated budget cost for this project is $126.2M.

2 DOCUMENT PURPOSE

The Business Case provides justification for the undertaking of the project, based on the costs (of development and implementation) against the anticipated benefits to be gained, and offset by any associated risks.

It demonstrates the strategic value of the project through its alignment to corporate strategies, Budget Program objectives, or Lord Mayoral directives. It provides an appraisal of the investment, based on a qualitative and quantitative assessment, that enables the Project Sponsor to determine whether the project will provide sufficient value for the investment and therefore is viable to proceed.

This project will follow PM^2: Council's Project Management Methodology defined in Figure 2.1.

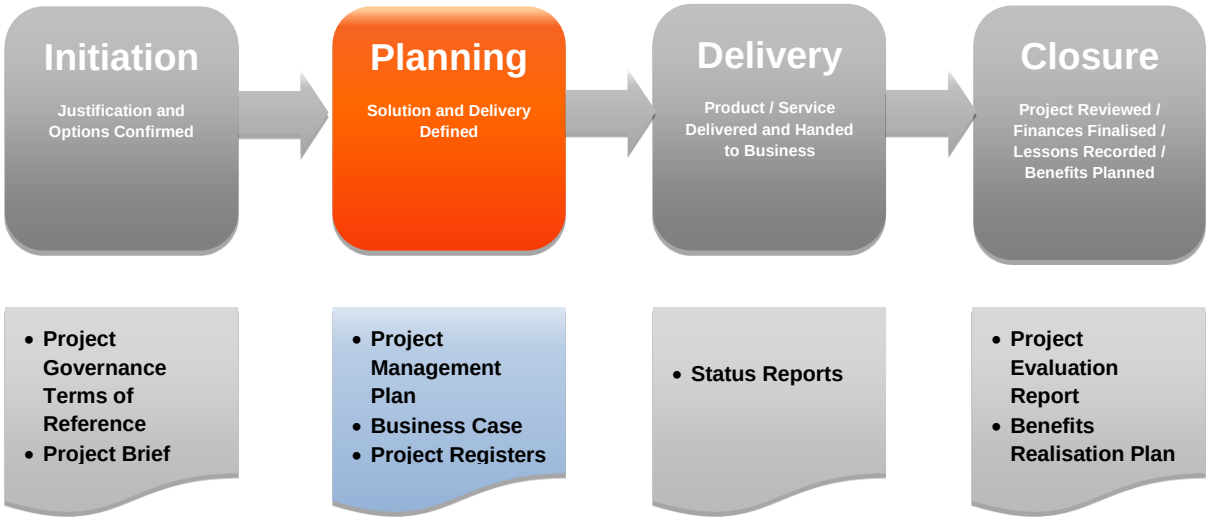


Figure 2.1: Council's project management methodology

3 BACKGROUND

3.1 BACKGROUND

3.1.1 Introduction

The Moggill Road and Coonan Street corridors are major multi-modal transport routes connecting to, and through the inner and outer western/south-western suburbs and the Brisbane CBD. Both Moggill Road and Coonan Street are classed as arterial roads within Council's road hierarchy.

The existing Moggill Road corridor is a key arterial link for commuting trips and provides an access function to the three inner western urban centres of Indooroopilly, Taringa and Toowong. The route currently caters for a large number of bus movements however their operation and efficiency is constrained during peak periods. Moggill Road is a State-controlled road from the Centenary Motorway westwards, with the motorway also State-controlled. Coonan Street links south-western suburbs to key local destinations and Moggill Road.

The Moggill Road and Coonan Street corridors border dense commercial, retail and residential surroundings, including the Indooroopilly Principal Regional Activity Centre. Forecast density growth is expected to lead to an increase in local transport needs. The corridors are spatially constrained by adjacent properties and for access provisions due to rolling terrain / topography, which poses a major challenge to its development.

Keating Street, which intersects with Coonan Street approximately 50 metres south of the Moggill Road and Coonan Street intersection, is classed as a neighbourhood access street in Council's road hierarchy.

There have been 32 recorded crashes in the vicinity of the Moggill Road and Coonan Street intersection in the last five years (July 2013 to June 2018), with 10 crashes resulting in people being hospitalised and a further 17 crashes resulting in injuries requiring treatment by medical officers and 5 resulting in minor injuries. These include three crashes at the Coonan Street and Keating Street intersection which resulted in hospitalisations. (There were 12 further incidents between 2018 and 2020 including 3 hospitalizations, 5 medical treatment and 4 minor injuries).

Moggill Road and Coonan Street currently experience significant congestion during commuter and shopping peak hours through the key locations of Indooroopilly and Taringa. It is expected that this congestion will increase due to growth in traffic within both corridors. The existing two-way traffic volumes at the Moggill Road and Coonan Street intersection are approximately:

- Moggill Road (north leg) – 47,000 vehicles per day (vpd)
- Moggill Road (west leg) – 38,000 vpd
- Coonan Street (south leg) – 25,000 vpd

This equates to approximately 55,000 vpd travelling through the Moggill Road and Coonan Street intersection.

The 2015 corridor feasibility study showed that the Moggill Road and Coonan Street intersection is a key capacity constraint and source of travel time delay within the corridor. The upgrading of this intersection will offer significant benefits.

There are minimal facilities for active transport facilities at this location.

3.1.2 Project Location

The Moggill Road and Coonan Street intersection is located to the southwest of Brisbane City approximately 8km from the CBD. The area around the intersection is bound, approximately, by the Brisbane River to the south, Clarence Road to the east, Taringa Parade to the west and Stanley Terrace to the north. The area contains major commercial/retail precincts with residential land uses. In addition, Indooroopilly is defined as a Principal Regional Activity Centre and is a key focal point for employment and services.

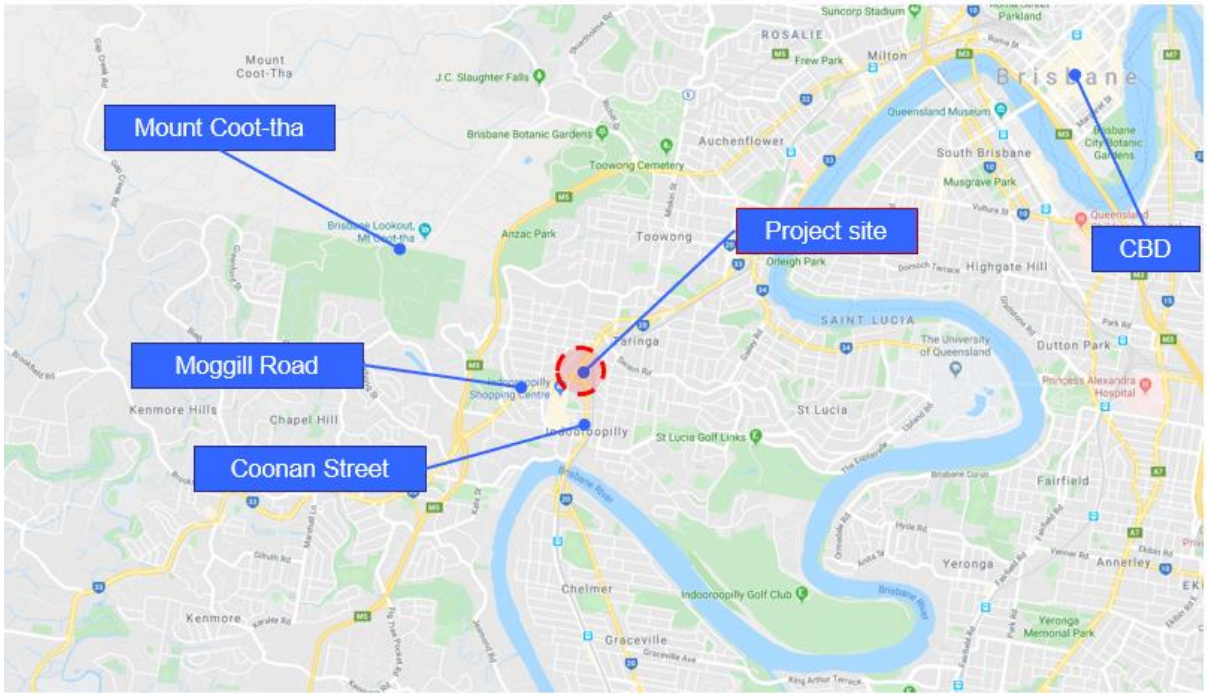


Figure 3.1: Project location greater Brisbane

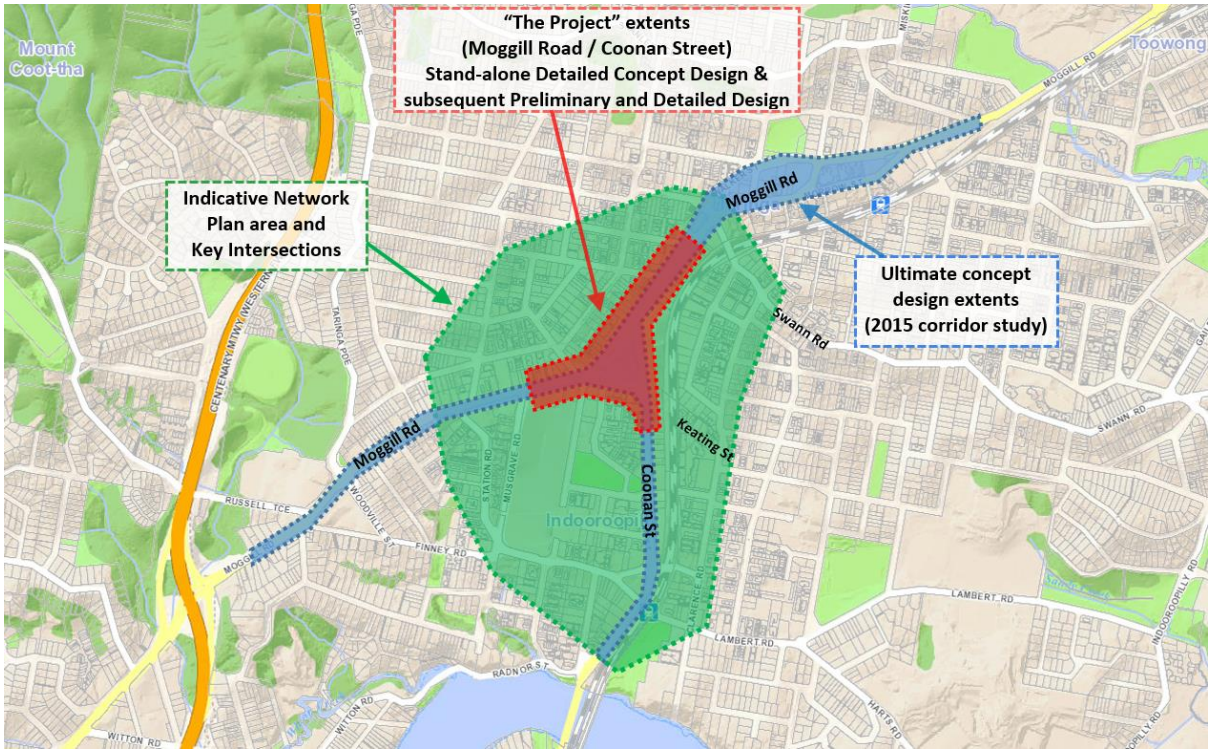


Figure 3.2: Project location

3.2 CURRENT SITUATION

The existing Moggill Road and Coonan Street intersection is a large roundabout with signalised control of the Moggill Road (east) leg. Figure 3.33 shows an aerial view of the current intersection.

Figure 3.3 Indooroopilly Roundabout intersection

Currently there are uncontrolled accesses from adjacent commercial properties. The roundabout also provides direct access to a commercial development in the centre of the roundabout with driveways on the eastern and northern circulating sides. The alignment is generally flat with level access to the road. There is no controlled facility for pedestrians to cross at this location.

The intersection caters for high traffic volumes and experiences significant congestion in peak hour periods. Congestion is anticipated to increase significantly, as surrounding commercial and residential land uses grow in size and density, increasing local transport pressures and needs. Major queue lengths are experienced on approaches to the intersection resulting in delays for all road users and congestion through adjacent intersections

3.2.1 Existing Road network

The Brisbane City Plan 2014 includes a road hierarchy for the City which describes the function of the road network based on the type of trips carried in each corridor. Key roads within the study area include Moggill Road, Coonan Street, Station Road, Musgrave Road, Clarence Road and Swann Road.

The key roads together with their function are discussed in Table 3.1 below.

Road Corridor	Section	Current Hierarchy Status	Road Network Role
Moggill Road	Swann Road to Centenary Motorway	Arterial	Functions as an Arterial Route and provides a main connection between the western and south-western suburbs, to local destinations such as the Indooroopilly Shopping Centre, Toowong and the Brisbane CBD as well as cross-city destinations
Coonan Street	Moggill Road to Walter Taylor Bridge	Arterial	Functions as an Arterial Route and provides a link between the south-western suburbs and key local destinations as well as Moggill Road
Musgrave Road	Moggill Road to Station Road	District	Functions as a District Route and provides access to key local destinations such as the Indooroopilly Shopping Centre and Station Road.
Station Road	Moggill Road to Coonan Street	District	Functions as a District Route and provides access to key local destinations and Coonan Street.
Swann Road	Moggill Road to Gailey Road	Suburban	Functions as a Suburban Route and provides a major east-west connection between St Lucia/University of Queensland and Moggill Road.
Westminster Road	Clarence Road to Coonan Street	Suburban	Functions as a Suburban Route and is the continuation of the Suburban Route along Lambert Road and Clarence Road which provides a major east-west connection between St Lucia/University of Queensland and Coonan Street.
Clarence Road	Westminster Road to Lambert Road	Suburban	Functions as a Suburban Route and is the continuation of the Suburban Route along Lambert Road.
	Swann Road to Westminster Road	Neighbourhood	Provides access to the residential areas along and to the west of the corridor.
Keating Street	Clarence Road to Coonan Street	Neighbourhood	Provides access to the land uses along the road and provides a link between Clarence Road and Coonan Street.
Allwood Street	Clarence Road to Coonan Street	Neighbourhood	Provides access to the land uses along the road and provides a link between Clarence Road and Coonan Street.

Table 3.1 Existing road network

3.2.2 2015 Moggill Road and Coonan Street Corridor Feasibility Study

The 2015 corridor feasibility study showed that the Moggill Road and Coonan Street intersection is a key capacity constraint and source of travel time delay within the corridor. It was considered that upgrading this intersection would offer significant benefits and represent a logical staging initiative for the ultimate upgrade of Moggill Road and Coonan Street corridors.

3.2.3 Site Visit 2018 – intersection and broader transport impacts

A site visit was completed in June 2018 and key observations, opportunities and constraints were identified for the intersection and the broader transport network in the local area around the intersection. These are detailed in Appendix B.

The site visit identified a number of potential opportunities for consideration in the development of upgrade options for the Moggill Road and Coonan Street intersection and in developing options for improvements to the broader transport network.

Moggill Road and Coonan Street intersection

The key considerations identified for the Moggill Road and Coonan Street intersection are as follows:

- The location of an option for a T-intersection, between Moggill Road and Coonan Street, is not fixed to the alignment developed as part of the previous planning study in 2015.
- Options for the grade separation of traffic movements at the intersection should not be discounted. However, option development should be undertaken taking into consideration the amenity of the residential properties on the northern/western side of Moggill Road.
- In terms of active transport provision Moggill Road is designated as a Principle Cycle Route, therefore provision for cycle facilities at the intersection, either via an on-road or off-road facility, should be investigated as part of this study.

3.2.4 Public transport

Train Services

The existing rail service through Indooroopilly Station provides a direct service inbound to the Brisbane CBD and outbound to Ipswich and Springfield. The frequency of train services running through the study area is summarised in Table 3.2 below.

Services	Route Type	AM Peak Frequency (approx) (6.00-9.00am)	Off Peak Frequency (approx) (9.00am-3.00pm)	PM Peak Frequency (approx) (3.00-6.00pm)
City to Ipswich / Rosewood	AM peak - all stops PM peak – mix of all stops and express services	30mins	30mins	15mins
City to Springfield	AM & PM - all stops	30mins	30mins	15mins
Ipswich / Rosewood to City	AM & PM peak – mix of all stops and express services	12mins	30mins	25mins
Springfield to City	AM & PM - all stops	15mins	30mins	30mins

Table 3.2 Existing weekday rail service frequency

As indicated in the above table the rail service frequency in the peak direction is 12-15 minutes. The high frequency rail and bus services mean that the study area is well serviced by public transport. There are currently no park 'n' ride facilities at Indooroopilly Rail Station, however observations during a site visit indicated that passengers may be using adjoining local streets (such as Keating Street) for the purposes of park 'n' ride.

Bus Routes

There is a total of 29 bus routes travelling along Moggill Road with a mixture of full length or partial corridor services. The Indooroopilly Bus Interchange is located to the southwest of the proposed intersection upgrade at the Indooroopilly Shopping Centre. An overview of the bus routes using the Moggill Road corridor is shown in Figure 3.4 below. The bus services running through the Moggill Road and Coonan Street intersection are shown in Figure 3.5 below.

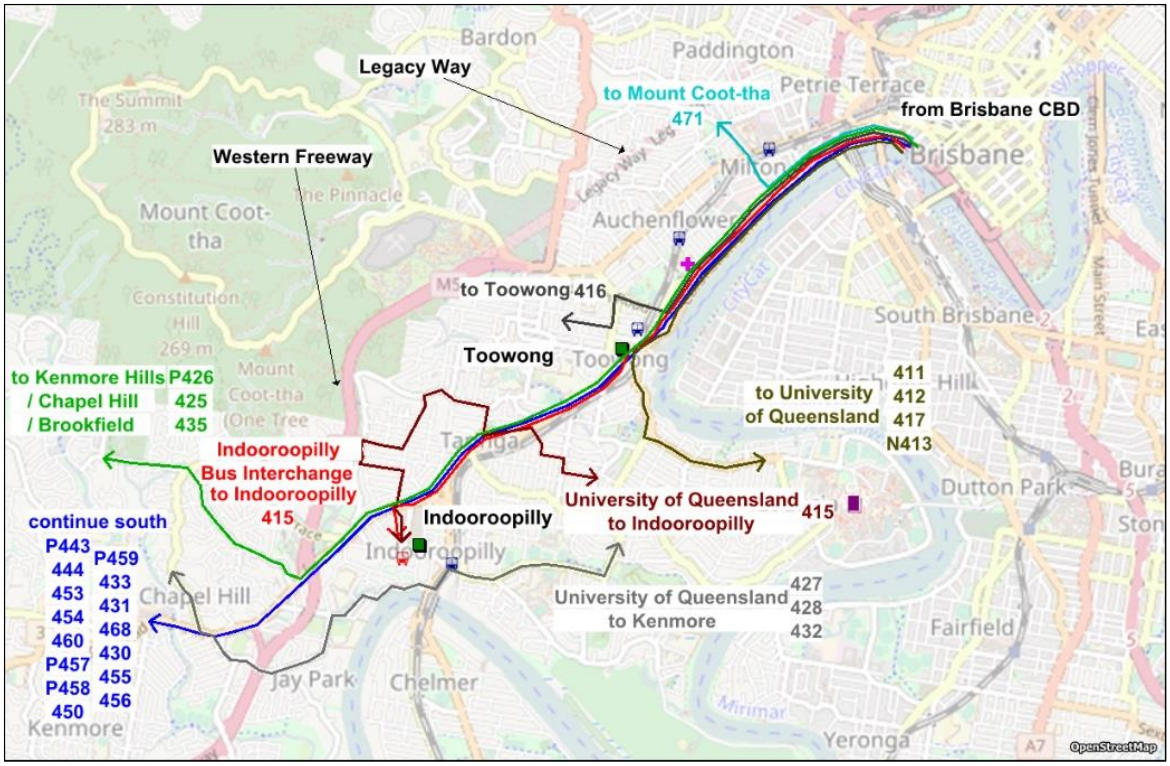


Figure 3.4 Moggill Road Corridor Bus Routes Overview

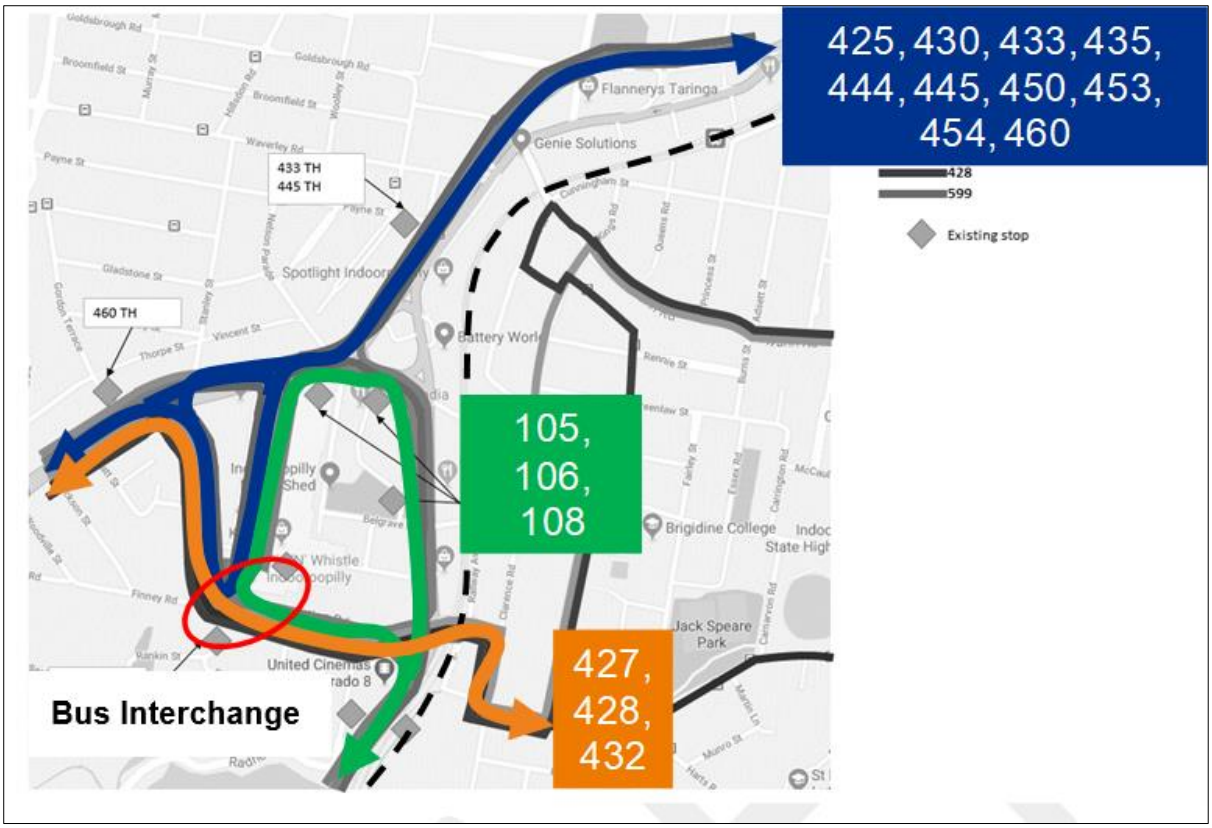


Figure 3.5 Moggill Road and Coonan Street Intersection Bus Routes Overview

3.2.5 Active Transport

Pedestrian and cycle access is a key part of any transport network as it provides the ability to promote activity to/from the key activity centres such as Indooroopilly Shopping Centre as well as reduce the travel demand associated with private vehicle travel.

The Moggill Road and Coonan Street intersection (Indooroopilly Roundabout) is considered a barrier to pedestrian movements and current cyclist volumes at this location are extremely low. The exceptionally constrained environment and cost of additional land required is considered a significant constraint to the provision of on-road cycling facilities at the intersection (roundabout) and along the Moggill Road corridor.

Existing Cycle Network

The existing bicycle network for the study area and surrounds is illustrated in Figure 3.66. To the west of the Moggill Road-Coonan Street intersection is the Centenary Cycleway and to the southeast of the intersection there is the connection into Lambert Road from the Jack Pesch Bridge crossing of the Brisbane River.

In addition to the existing network shown in Figure 3.6, the Indooroopilly Riverwalk (construction commenced in early 2020 with completion anticipated mid 2021) will connect Witton Road and Twigg Street to Foxton Street and Radnor Street, south of the study area as shown in Figure 3.77.

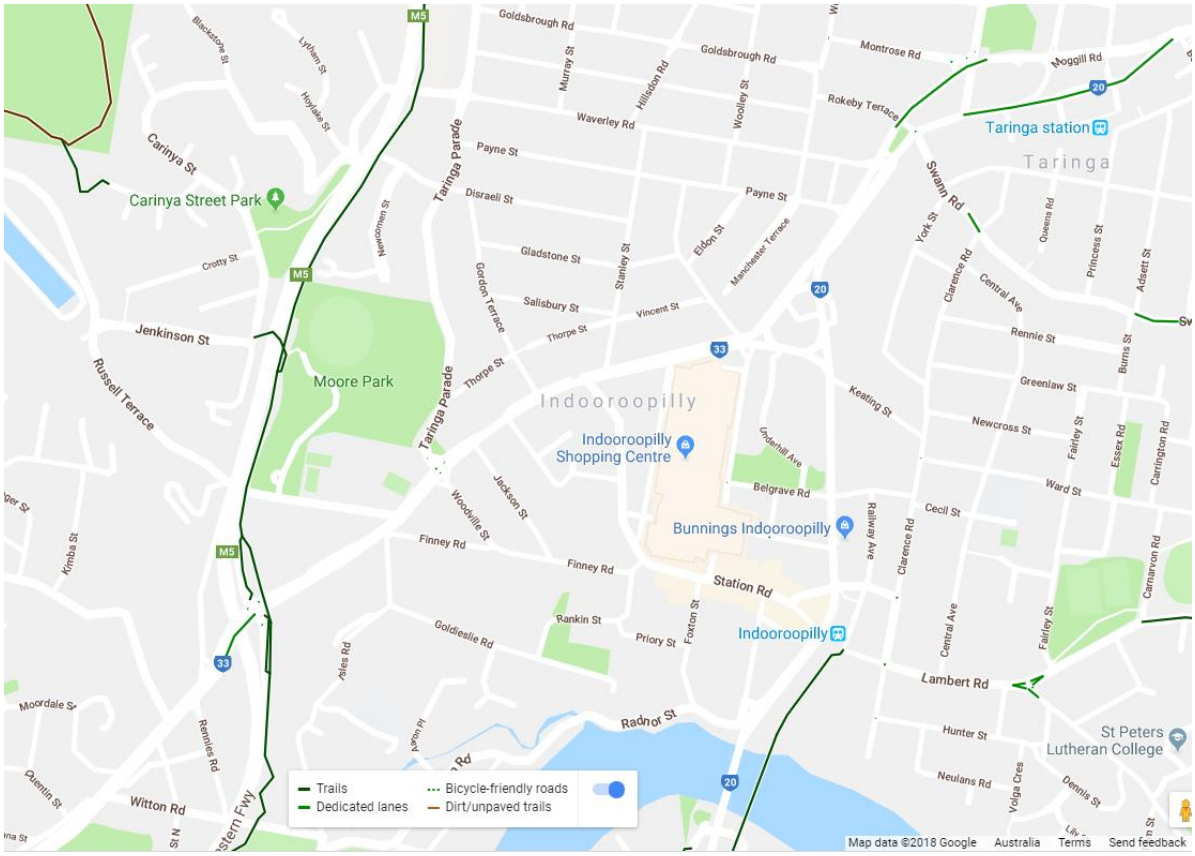


Figure 3.6 Existing Bicycle Network

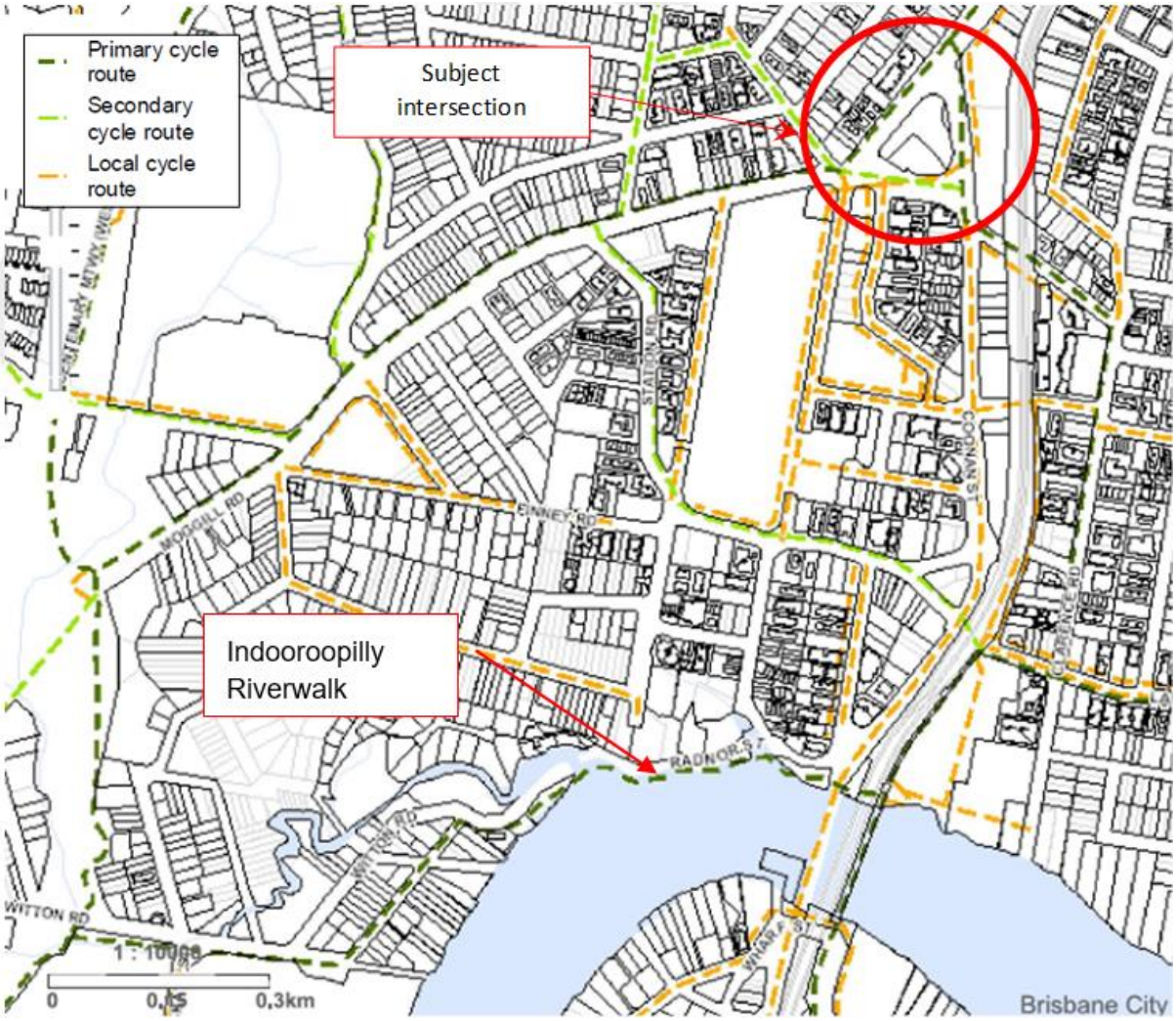


Figure 3.7 Bicycle Network Overlays[1]

Walking facilities

The City Plan streetscape designations intend for Moggill Road and Coonan Street to provide a pedestrian focus with active uses. Both Moggill Road and Coonan Street are identified as subtropical boulevards to achieve the City Plan outcomes resulting from appropriate verge widths and increased shade.

At the local level there were several issues identified in the Road Safety Audit related to pedestrian movements at the Moggill Road and Coonan Street intersection. The key issue identified was the absence of adequate facilities to accommodate pedestrian desire lines between residential catchments and the high generating attractors (such as Indooroopilly Shopping Centre and Indooroopilly Central). Currently pedestrians cross at mid-block locations where they use splitter islands and medians as refuge points. Pedestrians travelling to the existing car dealership cross mid-block between the roundabout island and Indooroopilly Central, indicating a desire line that is not currently catered for at the intersection.

[1] *BCC City Plan Map (2014)*

3.2.6 Land use

Council owns the land within the roundabout island, which is currently leased to a car dealership.

After upgrading of the intersection, the unused existing road reserve and the excess land within the Indooroopilly roundabout present an opportunity for redevelopment and landscape / public realm improvements.

There are significant commercial land uses in the area including Indooroopilly Shopping Centre and the Indooroopilly Central retail sites which were recognised as likely to have significant costs and risks, in terms of business disruption during upgrade works, if partial land acquisition was required.

The Moggill Road to Musgrave Road flyover (which provides segregated right turn access to Musgrave Road and to the Indooroopilly Shopping Centre rooftop car park) limits available width for road widening. However, its removal/replacement would cause substantial business and road network disruption.

There are separated service roads on both the north and south side of Moggill Road to the east of the roundabout, which provide sole accesses to frontage properties.

The existing land uses in the area surrounding the Moggill Road and Coonan Street roundabout are shown in Figure 3.88. The existing land uses comprise a mix of detached dwellings, low-medium density residential and retail/commercial situated east and open space.

The Indooroopilly Shopping Centre is a prominent land use within the area and the recent redevelopment has placed a greater emphasis on Stamford Road in terms of access.

Figure 3.8 Existing Land Uses

3.2.7 Freight

Neither Moggill Road nor Coonan Street are designated as primary freight routes or primary freight accesses under the Brisbane City Plan 2014. Currently freight vehicles represent around 2.5% of the total vehicles using the intersection.

3.2.8 Traffic Characteristics

Mode Shares

Journey to work (JTW) travel mode summary data for the study area obtained from the 2016 Census data published by the Australia Bureau of Statistics (ABS) is summarised in Table 3.3 below.

Mode of transport	FROM Indooroopilly	TO Indooroopilly	FROM whole of BCC
Motor vehicle	52.7%	63.47%	51.8%
Public transport	21.8%	12.90%	18.8%
Active transport	8.02%	4.83%	10.9%

Source: ABS Data (2016)

Table 3.3 2016 Census Travel Mode Summary - Indooroopilly Journey to Work Trips

The data in Table 3.3 indicates that:

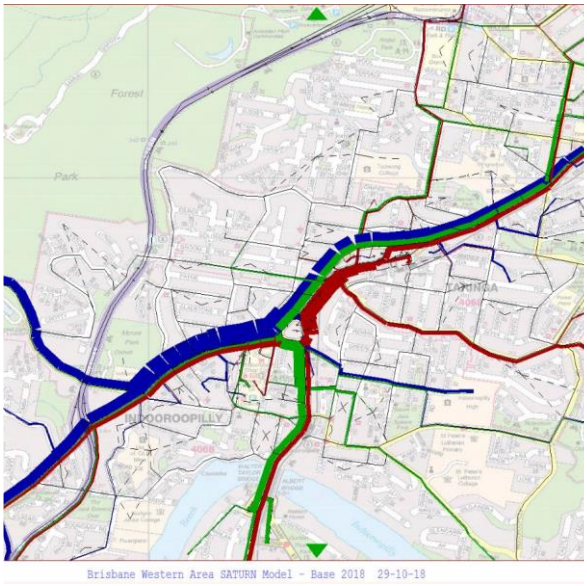
- The motor vehicle has the highest mode share for work-based trips both to and from the study area. The motor vehicle mode share for work-based trips to Indooroopilly is 12% higher than the BCC area average for all journey to work trips.
- The active and public mode shares are higher for the journey to work trips from the study area when compared to the mode shares for trips to the study area.

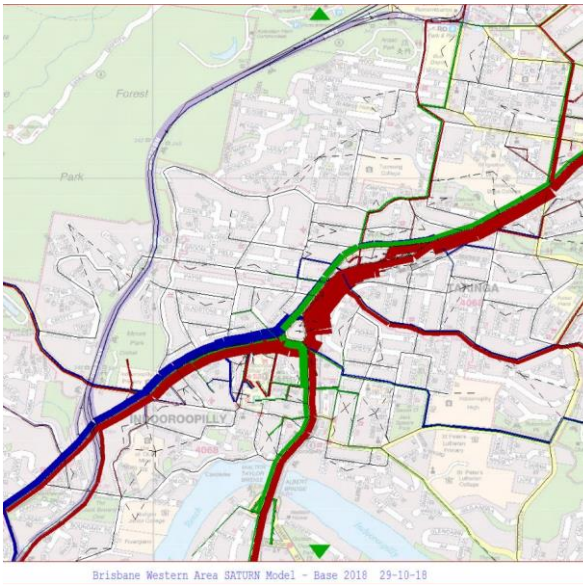
The above highlights that whilst the Indooroopilly area is well serviced by public transport in the form of bus and rail services, the motor vehicle is still by far the dominant mode of travel. It also highlights that Moggill Road and Coonan Street have a dual function of catering for through traffic as well as providing a local access function for journey to work trips into the study area.

The active and public transport mode shares suggest that network connectivity from outside the study area may be impacting on the uptake of these travel modes for travel into Indooroopilly.

Travel Patterns

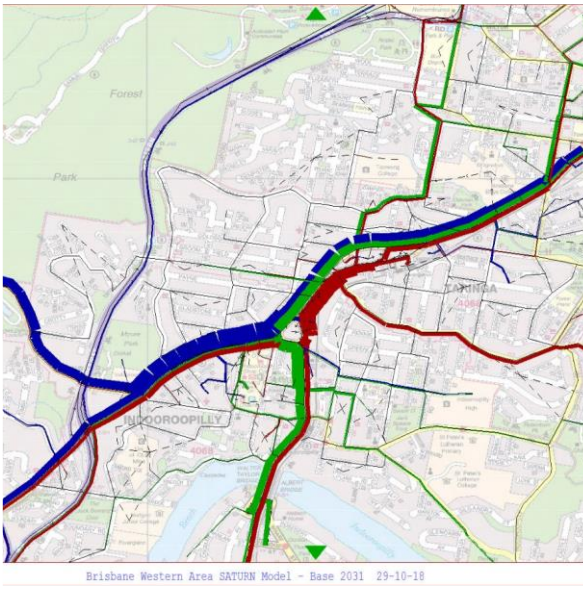
The peak hour travel patterns for traffic travelling through the Moggill Road and Coonan Street intersection was assessed via undertaking select link analysis of the intersection approaches in the study's Brisbane Western Area Saturn Model (BWASM) based network model. The select link plots for the 2018 and 2031 AM and PM peak hour are shown in Figure 3.9 and Figure 3.1010 below respectively. The plots demonstrate that the roundabout serves the dual function of providing access to the local catchments as well as functioning as an arterial route for longer distance travel. The local catchments include the residential and educational uses in eastern Indooroopilly, the retail centre to the south-west and the significant draw from St Lucia via Swann Road. In addition, the plots demonstrate the low flows between Coonan Street and Moggill Road west with Station Road being a more attractive option for this traffic.

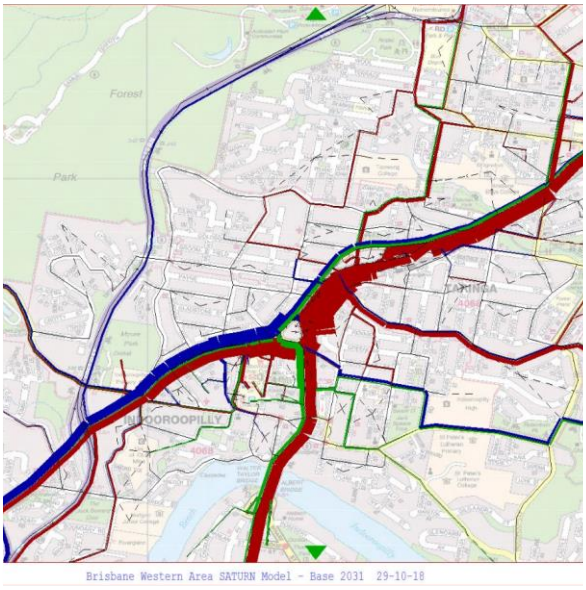




AM Peak PM Peak

Figure 3.9 Moggill Road and Coonan Street Roundabout - Select Link Analysis Plots (2018 Base Model)





AM Peak PM Peak

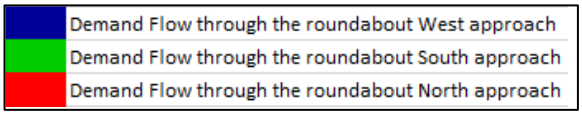


Figure 3.10 Moggill Road and Coonan Street Roundabout - Select Link Analysis Plots (2031 Base Model)

Existing traffic volumes

Traffic volume data was extracted from a number of different sources with a focus on recent intersection turning movement counts undertaken during the month of August 2017. The traffic surveys indicated that the morning peak hour for the study area occurs from 7:45- 8:45 am and the evening peak hour from 4:45-5:45 pm.

Daily Vehicle Volumes

The existing two-way traffic volumes at the Moggill Road and Coonan Street intersection are approximately:

- Moggill Road (north leg) – 47,000 vehicles per day (vpd)
- Moggill Road (west leg) – 38,000 vpd
- Coonan Street (south leg) – 25,000 vpd

This equates to approximately 55,000 vpd travelling through the Moggill Road and Coonan Street intersection.

Moggill Road and Coonan Street Intersection

A comparison of the previous (2015) and latest (2017) turning movement volumes at the Moggill Road and Coonan Street intersection is shown in Figure 3.2 for the AM peak, PM peak and 12-hour totals.

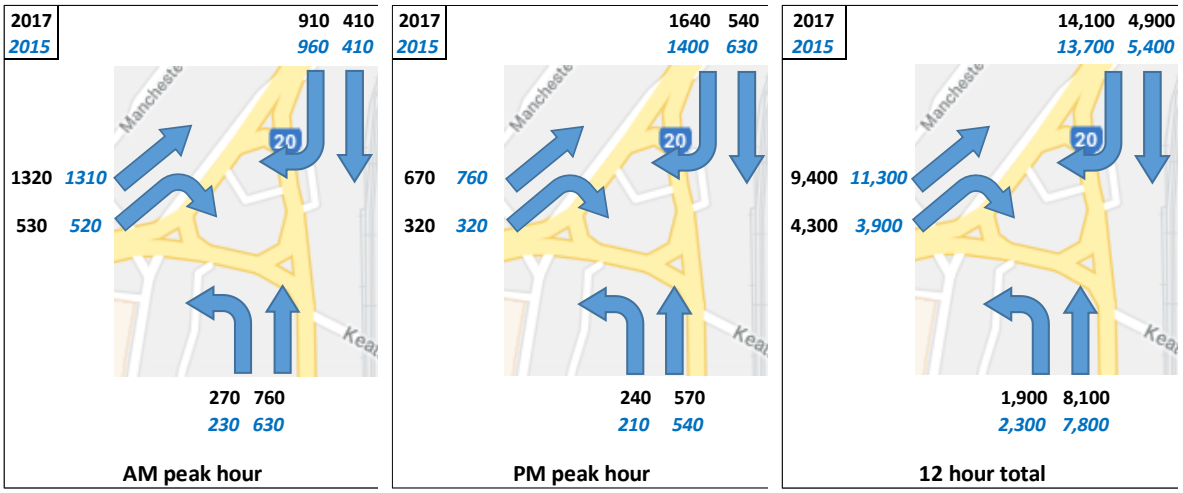


Figure 3.2 Moggill Road and Coonan Street Intersection Traffic Count Summary

The overall intersection volumes are 3% higher in the AM and PM peak hours in 2017 when compared with the 2015 survey volumes. The 12-hour volumes are 4% lower with the volumes on the western approach having fallen the most. This can be attributed to the opening of Legacy Way with the volumes for the Moggill Road inbound movement having fallen by more than 10%.

Forecast traffic volumes and Intersection performance

Scenario Description	AM Peak			PM Peak		
	Total Volumes	Maximum V/C	Average Delay (s)	Total Volumes	Maximum V/C	Average Delay (s)
2018 Base	4,193	0.88	10	3,823	0.93	11
2031 Base	4,205	1.00	20	4,514	1.04	28

Table 3.4 2018 and 2031 Base Networks – Moggill Road and Coonan Street Intersection Performance Results

Network modelling results (refer Table 3.4) indicate that the intersection is currently operating at capacity in 2018 in both the AM and PM peak hour periods with the performance worsening by 2031. The increase in the vehicle volumes through the intersection from 2018 through to 2031 is more significant in the PM peak. In the AM peak the vehicle volumes are quite similar which is attributable to the diversion of traffic from Moggill Road inbound onto the Centenary Highway inbound in the AM peak period.

3.2.9 Safety Characteristics

There have been 32 recorded crashes in the vicinity of the Moggill Road and Coonan Street intersection in the last five years (July 2013 to June 2018), with 10 crashes resulting in people being hospitalised, a further 17 crashes resulting in injuries requiring treatment by medical officers and 5 resulting in minor injuries. These included three crashes at the Coonan Street and Keating Street intersection during the same period.

As part of Councils investigation of future needs for the study area a Road Safety Audit (RSA) was undertaken to identify existing deficiencies at the Moggill Road and Coonan Street intersection which may compromise user safety, and which need to be addressed in ongoing phases of the study. The RSA was undertaken by Council's Transport Planning Strategy Branch of Brisbane Infrastructure in December 2017 for the extents shown in Figure 3.3 below.

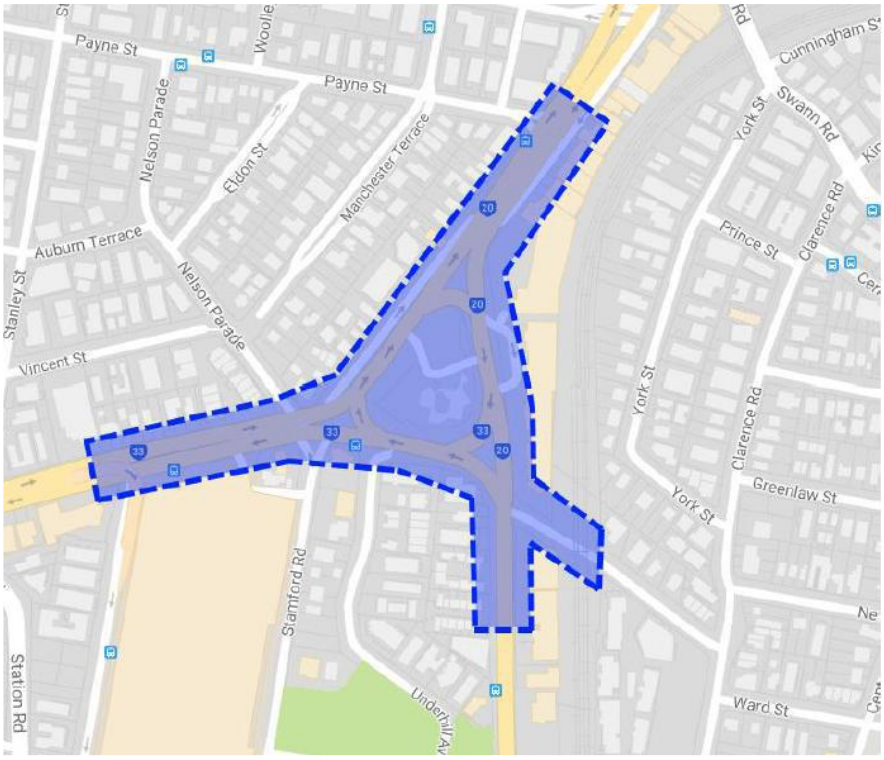


Figure 3.3 Road Safety Audit Extents

It is important to note that the mid-block section of the southbound service road (on the northern leg) and the Musgrave Road overpass were out of the scope of this RSA.

The RSA identified many safety issues and for the purposes of this report only the “High” risk safety issues identified have been summarised. A detailed summary of the “High” risk safety issues together with the possible mitigation measures is contained in Table 3.5 below.

Issue Number	Location	Risk Description	Illustration	Possible Solution
1	Eastern side of roundabout – Coonan Street	Numerous pedestrians (typically associated with the car dealership) were observed crossing mid-block between the roundabout island and Indooroopilly Central. Pedestrians crossing can be exposed to oncoming traffic, often travelling at high speeds.		Consider providing formal pedestrian crossing facilities at the northern approach signals. These may need to be supported with frangible pedestrian fencing behind kerb on the island.
2	Eastern side of roundabout	Horizontal curves around the central island (south eastern and south western corners) are too small to accommodate vehicles travelling at the posted speed limit (i.e. vehicles must slow down when navigating the intersection). Approaching motorists may not correctly interpret a suitable travel speed to travel around the curves and may leave the intended travel path at high speed. This could result in crashes with other vehicles, or hazards in the roadside. This is particularly the case at the south eastern corner, where the curve is combined with a horizontal downgrade.		Consider providing high friction pavement treatments through the horizontal curves at the central island.

3	North and south of roundabout.	There is an absence of adequate facilities to accommodate pedestrian desire lines between residential catchments and high generating attractors. As above, numerous pedestrians were observed crossing at mid-block locations. The absence of facilities encourages pedestrians to cross at locations that are not anticipated by motorists. Given the high traffic volumes that utilize the subject roads, this increases risk of crashes.		Consider providing facilities to accommodate pedestrian desire lines
4	Keating Street and Coonan Street	Right turns out of Keating Street were observed being undertaken under high-risk circumstances during the afternoon peak period. Sight distance looking north can be restricted by vehicles entering the left turn lane (for Keating Street). This reduces the visible gap in traffic for motorists turning out of Keating Street and increases the risk of right turns being undertaken with insufficient time to avoid opposing vehicles on Coonan Street. Additionally, with the grade of the road requiring hill starts and the acceptable gaps in traffic being hard to identify during peak periods on Coonan Street there is a risk that motorists will accept higher risks to turn right.		Consider banning right turns out of Keating Street (at a minimum during peak traffic periods)

5	Coonan Street leg of roundabout	Vegetation restricts mutual sight distance at the Coonan Street leg of the intersection. The restricted sight distance can create uncertainty around the size of gaps in traffic. This may cause motorists to undertake high risk manoeuvres when entering the intersection and expose them to incoming traffic. Conversely, through motorists may not have sufficient time to react to hazards and stop for a vehicle entering the intersection. There is a risk of vehicle crashes.		Consider removing or trimming the vegetation on this part of the centre of the island
6	The western side of the roundabout	A wooden power pole is located less than a metre from the carriageway in a potential run off area on the outside of a tight horizontal curve. There is a risk of a high severity injury if the pole is struck by an errant vehicle.		Consider relocating the pole. In the interim, consider installing a raptor crash cushion and increasing delineation of the hazard with retroreflective tape.

7	Moggill Road approaches to intersection	Moggill Road was observed to be operating at or near capacity in the outbound direction during afternoon peak, giving minimal opportunity for motorists to enter from side approaches. A number of vehicles were obsered undertaking high-risk maneouvres to enter Moggill Road. Excessive queuing and delay causes motorists to accept shorter gaps in the traffic stream. This increases likelihood of intersection crashes occuring.		Consider signalisation of the Moggill Road and Coonan Street intersection.
8	Eastbound approach of roundabout	Eastbound approach to Coonan Street is a downhill segment that connects to large horizontal curve allowing for fast travel speeds. Motorists travelling at speed on this approach are likely to focus on navigating the curve or observing traffic on Moggill Road. Risk of intersection crashes involving opposing vehicles and rear end crashes. It should be noted that there is a history of these types of crashes (eight crashes: two rear ends and six intersection crashes)		Consider options that will slow vehicles on this approach, e.g. providing geometric deflection for the eastbound approach. Signalisation would remove conflicts by providing time separation.

9	Service road parallel to Moggill Road	Some of the service road guardrail supports have rusted through and no longer have any foundation in the soil. Guardrail unlikely to deflect errant vehicles away from the adjacent drop off to Moggill Road.		Consider replacing guardrail installation
10	Moggill Road	The northbound service road joins to Moggill Road at a low entry angle, give-way arrangement. This requires motorists entering Moggill Road to either look behind their shoulder or in side mirrors to identify gaps in traffic. Identifying safe gaps in the approaching traffic stream from this angle can be difficult as approaching vehicles may be in motorists blind spots. Additionally, the vertical crest restricts sight distance to approaching traffic and reduces gap acceptance time for motorists entering Moggill Road. This can result in high risk manoeuvres to enter the main traffic stream. There is an increased risk of intersection crashes.		Consider installing devices to assist motorists with identifying gaps in traffic i.e. mirrors. Consider modifying line marking arrangements to place the point of merge further downstream from the crest curve so that mutual sight distance is improved.

11	Payne Street and Moggill Road.	Sight distance between pedestrians crossing Payne Street (south to north) and vehicles turning into Payne is resricted by a fence. Restricted sight distance reduces the time for motorists to react to potential hazardous situations with crossing pedestrians at this location.		Consider relocating pedestrian crossing and kerb ramp. Consider investigating if physical treatments can improve sight distance between pedestrian and vehicles on Moggill Road, and slow entry speed of left turning vehicles i.e. an island build out off the kerb ramp.

Table 3.5 Locations identified with High Risk Safety Issues

3.3 PROJECT NEED

The project is proposed for the following reasons:

- The intersection currently experiences significant congestion during morning and evening peak periods. It is expected that this congestion will increase over time as the surrounding commercial and residential land uses grow in size and density, increasing local transport pressures and needs.
- The Moggill Road corridor is a key multi-modal route (for cars, buses, freight, pedestrians and cycling) between the western and south-western suburbs to local destinations such as the Indooroopilly Shopping Centre, Toowong and the Brisbane CBD as well as cross-city destinations. Coonan Street also links south-western suburbs to the key local destinations and Moggill Road. Continued background traffic growth along both corridors, combined with the increased densification of the surrounding area will also contribute to increased congestion at the intersection.
- A Road Safety Audit conducted at the intersection identified a number of “High” risk safety issues, particularly in relation to horizontal geometry and pedestrian movements that need to be addressed to minimise risks to road users. This is reflected in the 32 crashes at the Moggill Road and Coonan Street intersection and three crashes at the Coonan Street and Keating Street intersection that have been recorded in the five-year period from July 2013 to June 2018.
- Absence of active transport opportunities at the intersection where the are residential areas, shopping centre and major public transport hubs

3.4 URGENCY

The Moggill Road and Coonan Street intersection is currently experiencing significant congestion issues resulting in travel time delays, unreliable travel times and safety issues.

Failure to resolve the project need within the short-term is likely to:

- increase traffic congestion over time as the local surrounding commercial and residential land uses grow in size and density, increasing local transport pressures and needs.
- not address the issue of continued background traffic growth along both corridors, which will also contribute to increased congestion at the intersection.
- result in no improvement to the number of “high” risk safety issues at the intersection as identified in the road safety audit.
- continued safety risk, as the intersection has a high crash history with 32 recorded incidents between 2013 and 2018, 10 resulting in hospitalisation and 17 requiring medical treatment and 5 minor injuries. (There were 12 further incidents between 2018 and 2020 including 3 hospitalizations, 5 medical treatment and 4 minor injuries).
- not address and encourage active transport opportunities

4 STRATEGIC ALIGNMENT

Undertaking this project would align with the following strategic plans and objectives.

4.1 STRATEGIC OBJECTIVES

4.1.1 Brisbane Vision 2031[2]

Brisbane Vision 2031 is Council's long-term community plan for the city. It details the aspirations for our city's future and outlines ideas for achieving this vision.

Council's vision[3] states that in 2031 Brisbane will be an accessible city for everyone. Residents, workers, students, visitors and business people will be able to move easily throughout the city.

4.1.2 City Plan 2014[4]

The policy intent of the City Plan 2014[5] is represented in five key themes. Amongst these is "Brisbane's highly effective transport and infrastructure". Several strategic objectives support this theme. The most relevant to this project include:

- Transport networks provide efficient and reliable travel options for:
  - workers to access jobs
  - residents and visitors to access services
  - business and industry to operate effectively and productively
- The transport network delivers people to where they want to go
- Safe, accessible transport options meet the needs of users

Road, public transport and active transport networks will provide safe, efficient, fast and reliable travel options throughout the city. These networks will help deliver economic benefits to Brisbane and support our growing community and changing economy.

The City Plan complements other initiatives by Brisbane City Council to ensure Brisbane takes advantage of future economic opportunities and delivers the goals of the Brisbane Vision.

4.1.3 Neighbourhood Plan 2018

The intersection and local area fall within the Indooroopilly Centre Neighbourhood Plan area as shown in Figure 4.1 below.

[2] *https://www.brisbane.qld.gov.au/about-council/governance-strategy/vision-strategy/brisbane-vision#docs, sourced 10 Feb 2019*

[3] *(Brisbane City Council, 2013)*

[4] Brisbane City Council, 2014. Brisbane City Plan 2014 (ePlan), Brisbane: Brisbane City Council, sourced 10 Feb 2019.

[5] *http://eplan.brisbane.qld.gov.au/, sourced 14 Jan 2019*

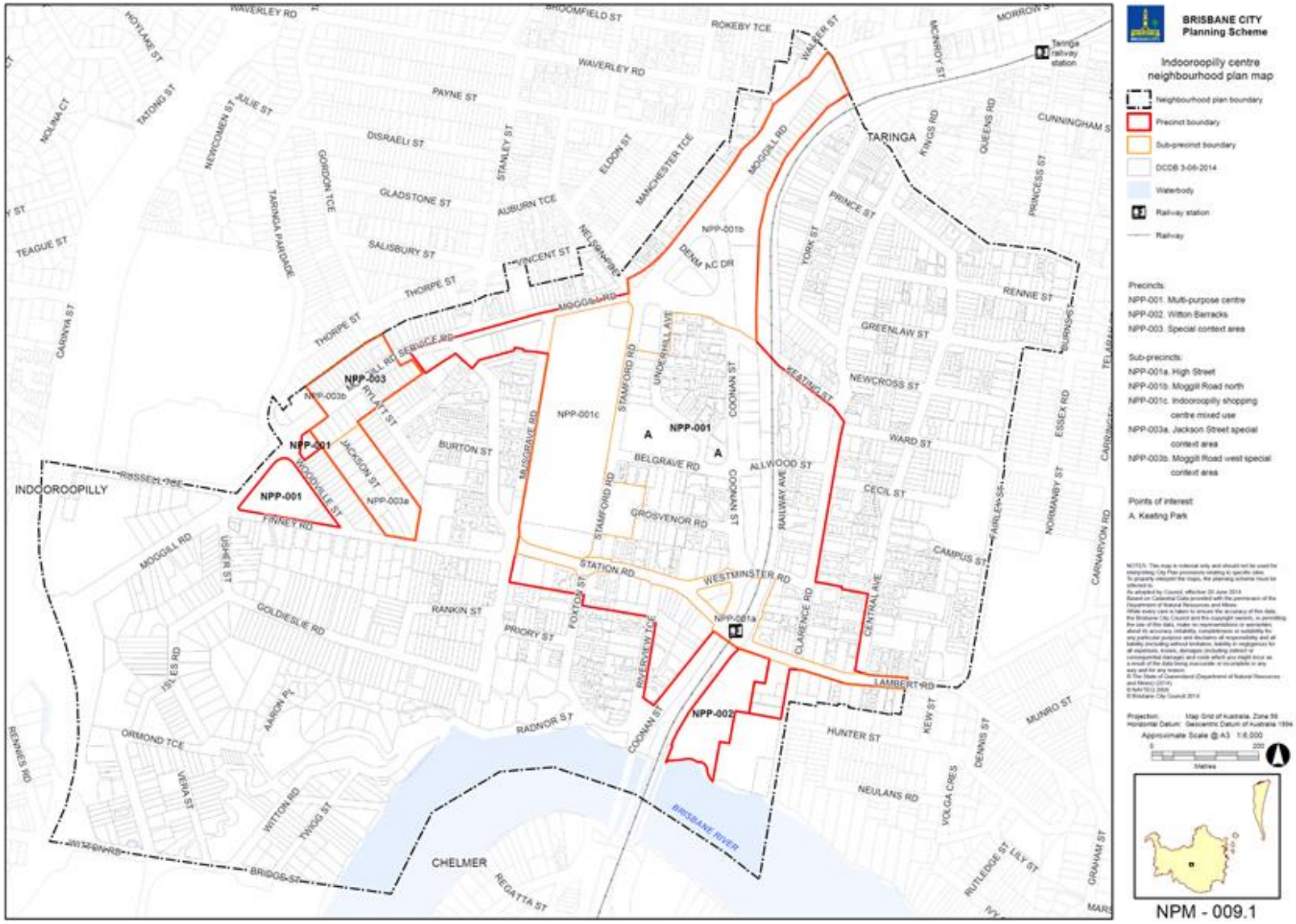


Figure 4.1 Indooroopilly Centre Neighbourhood Plan Map

The Moggill Road and Coonan Street intersection is located within the Moggill Road north sub-precinct (NPP-001b) of the Multi-purpose centre precinct (NPP-001). The overall development outcomes for the Indooroopilly centre neighbourhood plan area, specific to the Moggill Road north sub-precinct (NPP-001b) are as follows:

- Transforms it to create a distinctive entry to the Indooroopilly centre through redevelopment and strategic transport infrastructure
- Comprises a mix of employment uses, with retail and commercial activities on ground storey and offices above. Residential development is not supported due to the amenity impacts associated with existing and proposed transport infrastructure
- Transforms the junction of Coonan Street and Moggill Road in accordance with Figure 4.2 below. The long-term future widening of Moggill Road will also trigger land dedication as part of any redevelopment in this sub-precinct.

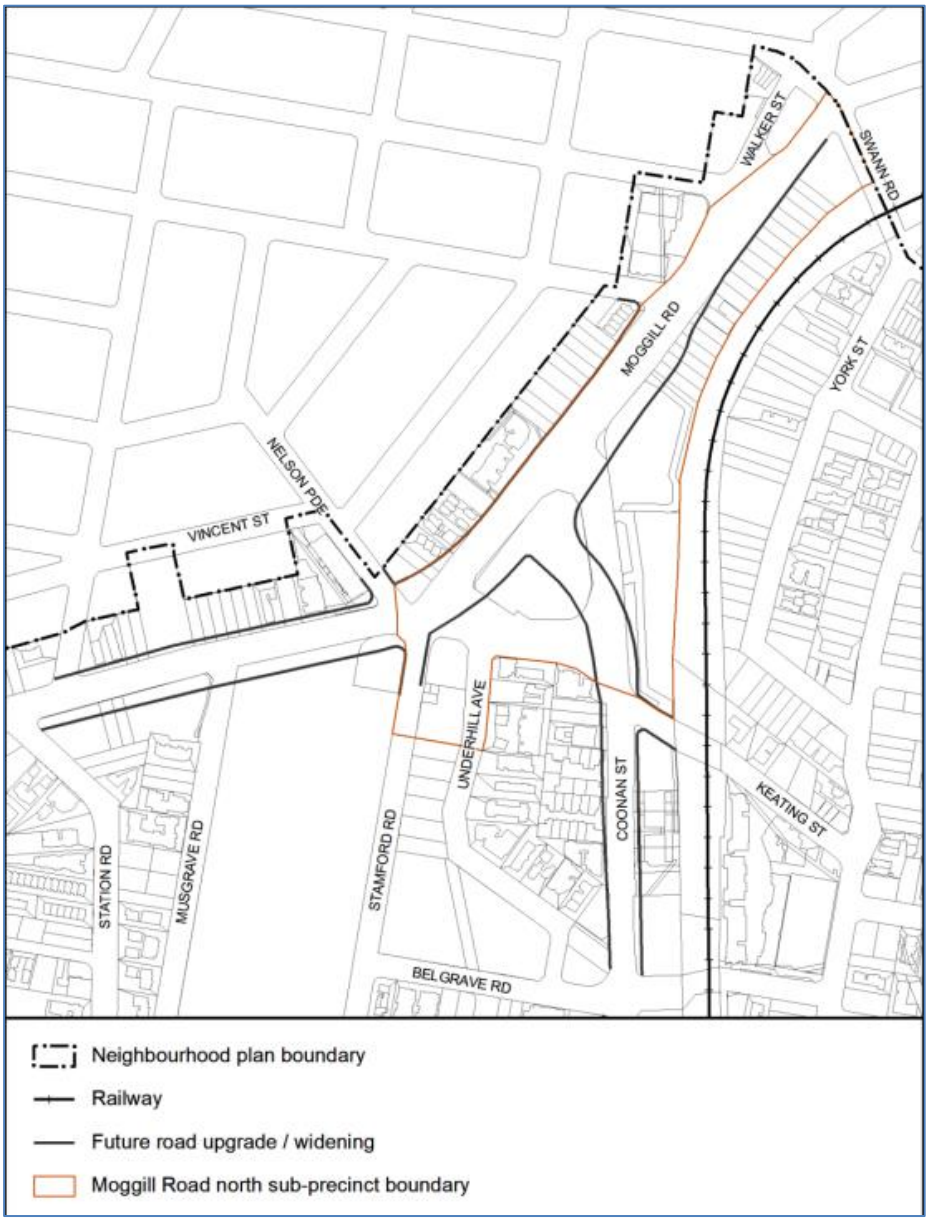


Figure 4.2 Movement – Moggill Road north and Coonan Street north

4.2 STRATEGIC TRANSPORT PLANNING CONTEXT

4.2.1 Transport Plan for Brisbane

The *Transport Plan for Brisbane*[6] identifies a number of transport directions that will support a balanced approach to transport network decision making. The transport directions that this project will help to achieve are listed in below in Table 4.1.

Number	Transport Direction
Integrated land use and transport	
55	Planning and delivery of transport will be consistent with and support the intents of *ShapingSEQ* and City Plan.
56	Develop high-quality public and active transport services to and within the CBD, inner city and Principal Regional Activity Centres.
57	Integrate walking and cycling infrastructure to support convenient active travel to and within activity centres including connections to the wider transport networks.
58	Coordinate and sequence the planning and delivery of transport infrastructure and services to maximise community and industry outcomes.
60	Plan for high levels of connection with public and active transport for significant developments including major public facilities, universities, hospitals, schools and sporting venues.
Well planned, designed and managed networks	
62	Plan, design and develop transport corridors taking into account the balanced demands for active, public, freight and car-based transport movements.
63	Evaluate network deficiencies and implement sustainable short, medium and long-term network upgrades to maintain connected and efficient transport networks.
64	Manage transport congestion across all transport networks to provide for more sustainable transport options.
67	Continually review transport design standards to provide high-value, safe, sustainable and fit-for-purpose infrastructure.
68	Investigate and implement opportunities to improve active and public transport movements across transport barriers including new strategic 'green bridge' crossings of the Brisbane River.
Safe transport networks	
75	Support and implement transport network safety upgrade programs and projects.
77	Investigate, plan and implement transport safety improvement programs in the CBD, residential neighbourhoods, school zones and high pedestrian activity areas.

Table 4.1 Transport Directions in Transport Plan for Brisbane

4.2.2 Brisbane Active Transport Strategy 2012 - 2026

The Brisbane Active Transport Strategy 2012-2026[7] sets out Council's strategies to create a high quality, connected, accessible pathway network which will attract people of all ages to walk and cycle. Encouraging active transport is part of council's balanced approach to

[6] Brisbane City Council, 2018. Transport Plan for Brisbane – Strategic Directions, Brisbane: Brisbane City Council, sourced 10 Feb 2019.
[7] *https://www.brisbane.qld.gov.au/sites/default/files/active_transport_strategy_2012-2026.pdf, sourced 10 Feb 2019*

reducing Brisbane's traffic congestion and is a great way for residents to stay active and healthy. The intersection upgrade aligns with the objectives of the Brisbane Active Transport Strategy through improving safety and accessibility at the intersection which may encourage active transport in the area.

4.2.3 South East Queensland Draft Regional Transport Plans 2018

The purpose of each Regional Transport Plan is to set out regional transport priorities and actions for developing the transport system in a way that supports regional goals for the community, economy and environment.

The SEQ Regional Transport Plans adopt the goals of ShapingSEQ, which are to Grow, Prosper, Connect, Sustain and Live.

The Metropolitan Regional Transport Plan includes the Brisbane, Ipswich and Redland local government areas. Table 4.2 below lists the plan actions relevant to this project, and the surrounding areas.

Goal	Action	Plan Reference
Grow	**Bus station and stop upgrade planning** Undertake planning for bus station and stop upgrades for the Metropolitan region to improve network performance and connectivity at activity centres and interchange locations. Early priorities include Capalaba bus interchange upgrade, Chermside bus station upgrade, Indooroopilly bus interchange upgrade and South Bank bus station platform upgrade.	A3.06
	Kenmore to Brisbane bus priority planning Undertake investigations to improve public transport access along the Moggill Road corridor.	A3.23
Prosper	**Dutton Park to Indooroopilly public transport planning** Investigate opportunities for a trunk public transport connection from Dutton Park, connecting through the University of Queensland to Indooroopilly.	A3.31
	Moggill Pocket sub-arterial corridor planning Progress planning of the Moggill Pocket sub-arterial corridor to inform preservation and investment decisions consistent with the development of the western Brisbane transport network in relation to active, passenger and freight traffic.	A3.51

Table 4.2 Relevant draft Metropolitan Regional Transport Plan actions

4.2.4 South East Queensland Principal Cycle Network Plan

The South East Queensland Principal Cycle Network Plan provides a vision for the principal cycle network in the region to support, guide, and inform practitioners involved in the planning and delivering the region's principal cycling infrastructure. The plan identifies a number of principal cycle routes within the study area including along Moggill Road, Coonan

Street, Lambert Road and Swann Road corridors. This project will improve the safety and accessibility for cyclists along Moggill Road and Coonan Street.

4.3 PROJECT OBJECTIVES

The Moggill Road and Coonan Street intersection upgrade project objectives are to:

- improve safety for all modes of traffic
- reduce traffic congestion
- increase capacity to accommodate existing and future traffic demands
- improve the reliability of travel times for all modes of traffic
- Enhancing livability - Better journey experience
  - Urban street place making — to better integrate road space with adjacent land use and activity and improve the public realm.
  - Place-making transport —develop a strong sense of place with the delivery and upgrade of transport
- minimise property impacts
- maximise environmental and sustainability opportunities.
- improve active transport opportunities

4.4 RELATED PROJECTS

A number of committed projects to be delivered over the next five years are important in the context of this project as they may have an impact on the broader transport network outcomes over the medium to long term and therefore need to be considered with respect to the future transport strategy for Brisbane.

Projects with the potential to impact on the transport outcomes for the study area include:

- Active Transport
  - Indooroopilly Bikeway – potential links to Coonan Street and ultimately Moggill Road corridor
- Public Transport
  - Brisbane Metro – may increase the importance of Moggill Road bus services in providing trunk feeder services
  - Cross River Rail – may increase the importance of Indooroopilly rail station and other inner-city rail stations for bus-rail interchange
- Road Transport
  - intersection upgrades for the Coonan Street and Westminster Road intersection and the Coonan Street and Allwood Street intersection – facilitate easier traffic movements along Coonan Street
  - Ipswich Motorway (Rocklea to Darra) and Centenary Highway Bridge duplication – potentially eases traffic congestion along Moggill Road.

5 BENEFITS AND OUTCOMES

5.1 OPTIONS DEVELOPMENT

The option development process, shown in Figure 5.1, included four stages to arrive at the preferred option:

Stage 1 - Local Transport Network Plan and local network solutions

Stage 2 – Initial options identified (long list)

Stage 3 – Options filtering (SWOT assessment to determine initial short list)

Stage 4 – Multi-Criteria Analysis (MCA) and Rapid Benefits and Costs Ratio (BCR) assessment.

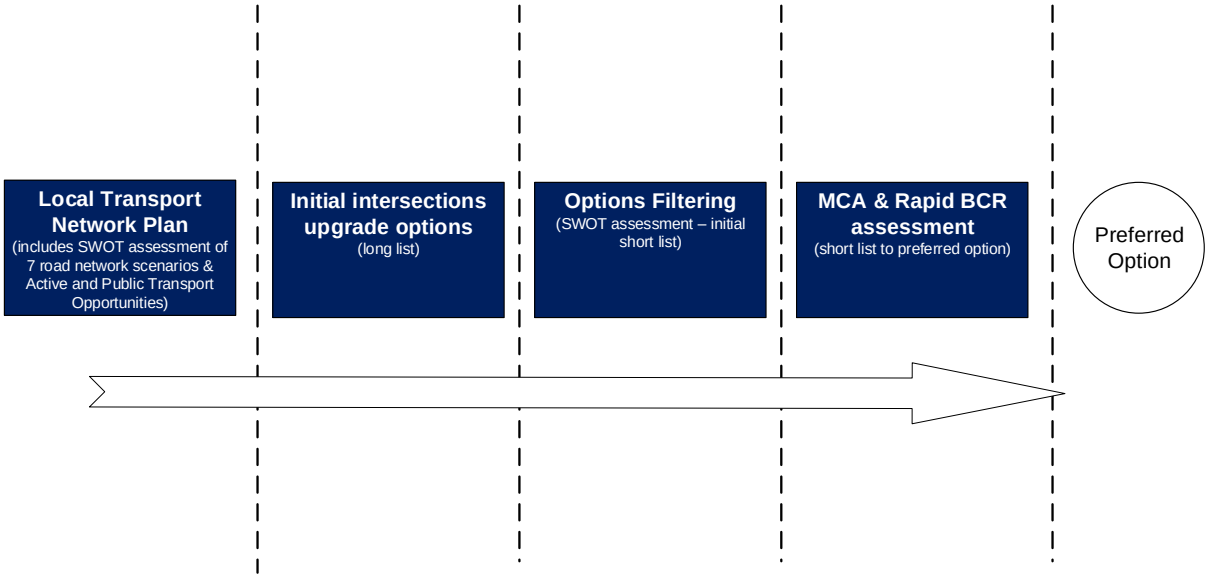


Figure 5.1 Option development process

5.1.1 SWOT Assessment methodology

An assessment methodology, which was developed collaboratively was used as a tool to rank transport network scenarios and the initial intersection upgrade options identified. The methodology included five disciplines and 11 criteria and is shown in Table 5.1 below.

Discipline	Criteria
Land use	(i) Community and land use impacts (ii) Property impacts (iii) Property access impacts (iv) Development potential of residual land (v) Adjacent catchment access impacts
Traffic and active transport	(i) Impacts on traffic operational performance (ii) Impacts on active transport
Public transport	(i) Supports future bus interchange
Public Utility Plant (PUP)	(i) Impacts on PUP
Construction / Implementation	(i) Capital costs (ii) Constructability

Table 5.1 Assessment Methodology

Scoring for the assessment methodology was also developed and agreed and is shown in Table 5.2 below.

Legend		Comment
Good	3	Project has (i) limited impact on the item or (ii) high compliance with the desired criterion
Medium	2	Project has (i) some or moderate impacts on the item or (ii) medium compliance with the desired criterion.
Poor	1	Project has (i) significant impacts on the item or (iii) low compliance with the desired criterion.

Table 5.2 Ranking Methodology

5.1.2 Local Transport Network Plan and local network solutions

The Local Transport Network Plan considers the overall transport task in the study area with a view to identifying network options, which may potentially alleviate pressure on the Moggill Road and Coonan Street intersection and provide broader network benefits.

The Local Transport Network Plan and detailed concept design will inform the subsequent design stage.

In addition to investigating road network options, the Local Transport Network Plan also investigated opportunities for improvements to the active and public transport networks in the study area.

Local network solutions

A range of road network scenarios were identified and modelled using the study's network model based on the Brisbane Western Area Saturn Model (BWASM). A SWOT analysis was completed where each scenario was scored (quantitative and qualitative) against criteria based on its "relative impact" on each discipline.

The conclusion from the network scenarios assessment was no specific road network scenario solution stood out as providing strong benefits to the broader transport network i.e. a preferred road network plan could not be identified.

The recommendations for the active transport network were:

- Provision for appropriate cycle facilities to link with the Indooroopilly Town Centre along
    - Nelson Parade
    - Finney Road-Russell Terrace corridors.
    - Foxton Street.
- Preservation of adequate corridor width at the Moggill Road and Coonan Street intersection to provide for a cycle facility commensurate with that required for a Principal/Primary Cycle Route. This could take the form of either an on-road or off-road facility.

The recommendations for the public transport network were:

- The potential for the future provision of a bus interchange at the Moggill Road and Coonan Street intersection be given consideration in the design of the intersection upgrade solution, however it should not preclude infrastructure solutions from being implemented that do not necessarily support a future bus interchange.
- The feasibility of bus stops on Westminster Road and the enhancement of the Indooroopilly State School bus stops be discussed with TransLink and further investigations be undertaken to confirm whether this can be progressed to an Options Analysis and Business Case.
- The potential to enhance the person carrying capacity of the Moggill Road and Coonan Street intersection either by prioritising bus progression and/or lane configuration/designation be considered in the design of the intersection upgrade if there is adequate spare capacity and it is demonstrated that such a facility would generate network benefits.

5.1.3 Initial intersection upgrade options (long list)

A long list of potential Moggill Road and Coonan Street intersection improvement options were identified, and concept drawings were developed for each of these options, which are listed in the Table 5.3 below and shown in ***Appendix A***

Option	Option description
1	Signalised intersections using existing roadway.
2.1	Amended Reference Design - Impact to residential property.
2.2	Major signalised intersection upgrade (Keating Street unsignalized) - Impact to commercial property.
3	Coonan Street Overpass northbound landing outside.
4	Coonan Street Overpass northbound landing inside.
5	Moggill Road inbound overpass
6	Moggill Road outbound overpass
7	Amended reference design - Intersection north
8	Amended reference design - Intersection south
9	Moggill to Coonan priority - Intersection north
10	Moggill to Coonan priority - Intersection south
11	Signalised Roundabout
12	Moggill Road elevated both directions
13	Existing intersections signalised
14	Moggill Road elevated outbound
15a	Moggill Road short elevated structure option - Interim arrangement
15b	Moggill Road short elevated structure option - Ultimate arrangement

Table 5.3 Initial Moggill Road and Coonan Street Intersection Upgrade Options

An initial assessment of the intersection improvement options was undertaken. Table 5.4 summarises the results of this assessment.

Option	Name	Description	Comment
1	Signalised Intersections Maximising use of the Existing Roadway	Provision for signalised intersections at the three existing junction points and maximises the use of the existing road carriageway. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Low cost solution that maximises use of the existing road carriageways with limited property impacts
2.1	Amended Reference Design - Impact to Residential Property	At-grade signalised T-intersection with three through traffic lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and three right turn lanes from Coonan Street into Moggill Road. Road widening is on the northern/western side of Moggill Road. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Amended reference design that has no commercial property impacts, however there are significant impacts on residential properties.
2.2	Reference Design - Impact to Commercial Property	At-grade signalised T-intersection with three through traffic lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and three right turn lanes from Coonan Street into Moggill Road. Road widening is on the southern/eastern side of Moggill Road. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Option impacts on retail properties at Indooroopilly Shopping Centre and Indooroopilly Central.
3	Coonan Street Overpass into Moggill Road Northbound - Landing Outside	Signalised Moggill Road and Coonan Street intersection with three northbound and southbound through traffic lanes on Moggill Road and two northbound and southbound traffic lanes on Coonan Street. Coonan Street right turn movement into Moggill Road is grade-separated via a two lane overpass landing on the outside of the Moggill Road northbound carriageway. The Coonan Street and Keating Street intersection is also signalised.	No impacts to commercial properties, however there are significant impacts on residential properties. Introduces weaving issues downstream. The geometry of the overpass structure (i.e. on a curve) will make this option difficult to construct.
4	Coonan Street Overpass into Moggill Road Northbound - Landing Inside	Signalised Moggill Road and Coonan Street intersection with three northbound and southbound through traffic lanes on Moggill Road and two northbound and southbound traffic lanes on Coonan Street. Coonan Street right turn movement into Moggill Road is grade-separated via a two lane overpass landing on the inside of the Moggill Road northbound carriageway. The Coonan Street and Keating Street intersection is also signalised.	This option results in an Inside lane merge which is undesirable.
5	Moggill Road Inbound Overpass	Signalised Moggill Road and Coonan Street intersection with three outbound through traffic lanes on Moggill Road, two right turn lanes from Moggill Road into Coonan Street and two left turn and right turn lanes from Coonan Street into Moggill Road. Provision is included for a two-lane overpass for the Moggill Road inbound traffic movements. The Coonan Street and Keating Street intersection is also signalised.	Good potential for traffic operational improvements and limited impact on existing commercial property uses and access
6	Moggill Road Outbound Overpass	Signalised Moggill Road and Coonan Street intersection with three inbound through traffic lanes on Moggill Road, two right turn lanes from Moggill Road into Coonan Street and three right turn lanes and one left turn lane from Coonan Street into Moggill Road. Provision is included for a two-lane overpass for the Moggill Road outbound traffic movements. The Coonan Street and Keating Street intersection is also signalised.	Good potential for traffic operational improvements on Moggill Road outbound, particularly in the PM peak. However, this option impacts on access into Indooroopilly Shopping Centre from Moggill Road outbound.
7	Amended Reference Design - Intersection Footprint Shifted North	At-grade signalised T-intersection with three through traffic lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and three right turn lanes from Coonan Street into Moggill Road. The intersection footprint has been shifted to the northern end of the land parcel currently occupied by the car yard. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Potential for geometry issues to be encountered on the Coonan Street approach to/from Moggill Road.

Option	Name	Description	Comment
8	Amended Reference Design - Intersection Footprint Shifted South	At-grade signalised T-intersection with three through traffic lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and three right turn lanes from Coonan Street into Moggill Road. The intersection footprint has been shifted to the southern end of the land parcel currently occupied by the car yard. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Amended reference design that has no commercial property impacts however there are potential geometric issues for the Coonan Street approach to Moggill Road. Option to proceed based on moderate construction cost.
9	Altered Priority (Moggill Road to Coonan Street Priority Movements) - Intersection Footprint Shifted North	At-grade signalised T-intersection with the priority of the intersection altered such that the movements between Moggill Road and Coonan Street are the through movements. Provision for three stand-up lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and two left turn and through traffic lanes from Coonan Street into Moggill Road. The intersection footprint has been shifted to the northern end of the land parcel currently occupied by the car yard. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Option does not cater for the major through traffic movements along Moggill Road, therefore providing limited benefits in terms of traffic operational improvements.
10	Altered Priority (Moggill Road to Coonan Street Priority Movements) - Intersection Footprint Shifted South	At-grade signalised T-intersection with the priority of the intersection altered such that the movements between Moggill Road and Coonan Street are the through movements. Provision for three stand-up lanes on the Moggill Road approaches, double right turn from Moggill Road into Coonan Street and two left turn and through traffic lanes from Coonan Street into Moggill Road. The intersection footprint has been shifted to the southern end of the land parcel currently occupied by the car yard. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Option does not cater for the major through traffic movements along Moggill Road, therefore providing limited benefits in terms of traffic operational improvements.
11	Signalised Roundabout	Signalised roundabout with three lanes in each direction on the Moggill Road approaches, three circulating lanes on the roundabout and two lanes in each direction on Coonan Street. The centre island diameter has been reduced. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Roundabout geometry does not cater for the major through traffic movements along Moggill Road, therefore reducing the through traffic carrying capacity of the intersection and providing limited benefits in terms of operational improvements
12	Moggill Road Overpass in Both Directions	Moggill Road overpass with two lanes in each direction. Signalised intersection for the Moggill Road and Coonan Street intersection turning movements. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Significant impacts on residential properties. Direct access into Indooroopilly Shopping Centre from Moggill Road outbound will be removed. In addition, this option impacts the Musgrave Road overpass.
13	Existing Intersections Signalised	Signalisation of the existing Moggill Road and Coonan Street intersections. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Likely to provide no long term benefits in terms of traffic operational improvements.
14	Moggill Road Elevated Outbound - BCC's July 2018 Option	Moggill Road two lane outbound overpass. Converts Moggill Road and Coonan Street roundabout approach legs to two signalised T-intersections.	Good potential for traffic operational improvements and limited impact on existing commercial property uses and access

Option	Name	Description	Comment
15a	Stage 1 - Moggill Road Short Elevated Structure Option - Interim Arrangement	Short two-lane overpass for Moggill Road outbound and a two-lane underpass for the Coonan Street right turn movement into Moggill Road. Signalisation of the Moggill Road and Coonan Street northern intersection and the Moggill Road inbound and Coonan Street right turn interface. This option also includes provision for the signalisation of the Coonan Street and Keating Street intersection.	Good potential for traffic operational improvements and limited impact on existing commercial property uses and access Stageable solution from Option 1.
15b	Stage 2 - Moggill Road Short Elevated Structure Option - Ultimate Arrangement	Short two-lane overpass for Moggill Road in both the inbound and outbound directions and a two-lane underpass for the Coonan Street right turn movement into Moggill Road. Signalisation of the Moggill Road and Coonan Street northern intersection.	Option 15b is the second stage of Option 15a and is therefore dependent on the outcomes of the assessment of Option15a. Therefore, this option has not been assessed separately.

Table 5.4 Summary of long list of intersection upgrade options

5.1.4 Options shortlisting process

The project working group went through a robust iterative process to arrive at a short list of options. Initially the six options below were chosen for further assessment. See ***Appendix A*** for layouts of each option.

- Options 1 - Signalised intersections
    - Maximises use of the existing roadway carriageway with limited property impacts
- Option 2.1 – Amended Reference Design
    - Good potential for traffic operational improvements due to capacity expansion and traffic signals
    - No commercial property impacts with impacts to residential property
- Option 5 – Moggill Road inbound overpass
    - Good potential for traffic operational improvements (free flow on Moggill Road inbound)
    - Limited impact on commercial property and access
- Option 8 – Amended Reference Design (intersection footprint shifted south)
    - Good potential for traffic operational improvements due to capacity expansion and traffic signals
    - No commercial property impacts and reduced property impact overall
    - Opportunities to expand commercial development
- Option 14 - Moggill Road outbound overpass
    - Good potential for traffic operational improvements (free flow on Moggill Road outbound)
    - Minor property impacts overall
- Option 15a – Moggill Road short elevated structure option
    - Good potential for traffic operational improvements (free flow on Moggill Road outbound)
    - Limited impacts on commercial property and access

Option 13 was later included as part of the short list of options as a “Do Minimum” option to undergo more detailed assessment.

5.1.5 Development of additional options and sub options

Further refinement of the options resulted in additional options being considered:

- Option 2.1a - Signalised T-intersection upgrade with four through traffic lanes on Moggill Road. This option was included to assess a reduced intersection footprint by maintaining four through traffic lanes on Moggill Road (Option 2.1 was six through traffic lanes).

A further grade separated option was identified of which a number of variants were analysed

- Option 16 - Moggill Road traffic running uninterrupted and a Coonan Street overpass joining Moggill Road at a new signalised T-intersection. This option was included to

assess an alternative layout that grade separated the movements between Coonan Street and Moggill Road inbound whilst maintaining uninterrupted flow along Moggill Road inbound and outbound.

5.1.6 Multi-Criteria Analysis

A multi-criteria analysis (MCA) tool was used to rank the short listed options. Criterion for the MCA were developed collaboratively, and the short listed intersection improvement options assessed.

The MCA criteria were developed based on the nominated project objectives plus value for money. The sub-objectives were developed to capture the intent of the overarching criteria/objective. The scoring mechanism was based on allocating scores of 3, 2 and 1 as follows:

- **3** for meets or exceeds objective
- **2** for partially meets objective
- **1** for does not meet the objective

Moderation and sensitivity testing formed part of the MCA analysis process.

Weightings were set based on the relative importance placed on each objective. Weightings for each of the criteria were developed and iteratively moderated and sensitivity tested based on the relative importance placed on each objective. Moderation and sensitivity testing included different combinations of the weightings and refined sub-objectives. Table 5.5 below shows the overarching MCA criteria.

#	Criteria	Sub criteria
1.	Improve safety for all modes of traffic	Improves intersection geometry by reducing or eliminating non-standard curves or sight distance issues
		Reduces or eliminates vehicle / pedestrian conflicts
		Improves active transport opportunities
		Minimises the impact on bus stops
2.	Reduce traffic congestion	Improves network performance in terms of average vehicle speed for all traffic
		Improves network performance in terms of average vehicle speed for buses
3.	Increase capacity to accommodate existing and future traffic demands	Provides sufficient traffic capacity

#	Criteria	Sub criteria
4.	Improve the reliability of travel times for all modes of traffic	Improved corridor travel times for Moggill Road traffic movements for all traffic
		Improved corridor travel times for Moggill Road / Coonan Street traffic movements for all traffic
		Improved travel times for buses in the project area
5.	Ensure the built form and environment for the intersection is commensurate with its importance in the road network	Community impacts
		Compatibility with proposed/potential infrastructure improvements such as the Centenary Motorway Bridge upgrade
6.	Minimise property impacts	Minimises the impact on commercial properties and potential for business disruption costs
		Minimises the impacts on residential properties
7.	Maximise environmental and sustainability opportunities	Improves access to community facilities
		Considers environmental values and impacts on potential environmentally sensitive sites.
		Impacts on flooding/drainage
		Creates opportunity for a distinctive entry to the Indooroopilly centre
8.	Value for money	Minimises CAPEX investment required
		Minimises OPEX investment required
		Provides for ease of construction

Table 5.5 Overarching MCA Criteria

For short listed intersection improvement options:

- Designs were developed
- Detailed traffic modelling was completed using SIDRA and SATURN
- Technical investigations/assessments were completed including:
    - Preliminary environmental assessment
    - Geotechnical assessment

- Hydraulic assessment
- Structures assessment
- Pavement design
- Landscape assessment
- High level costings

Outcomes from the traffic modelling process and technical investigations were used to inform the MCA.

5.1.7 Final Multi-Criteria Analysis (MCA)

A final MCA assessment was completed on the following options:

- Option 2.1 - Major Signalised Intersection Upgrade (impact to residential property & Keating Street unsignalised)
- Option 2.2 - Major Signalised Intersection Upgrade (impact to commercial property & Keating Street unsignalised)
- Option 5a - Moggill Road inbound overpass (Keating Street signalised)
- Option 13a - Do Minimum Option (Keating Street signalised)
- Option 2.1a - Signalised Intersection Upgrade (4-lanes on Moggill Road & Keating Street unsignalised)
- Option 16c - Coonan Street overpass (Keating Street unsignalised)

Option 16c was ranked the highest in the final MCA assessment, followed by options 2.1a and 2.2.

The project working group decided that further quantitative analysis should be completed on these options to support the extensive qualitative process. This would be completed using a rapid cost benefits ratio (BCR) assessment.

The group also decided to assess the variants of Option 16c, options 16d and 16e, through this process also.

See ***Appendix A*** for layouts of each option

5.1.8 Rapid Benefit Cost Ratio (BCR) assessment

The rapid BCR assessment involved the assessment of the benefits for existing users, which included savings in vehicle operating costs and travel time costs, against the costs of the project. Table 5.6 lists the short-listed options assessed using SIDRA intersection analysis software.

Option	Option description
2.1a	Signalised intersection upgrade (Keating Street unsignalised)
2.2	Major signalised intersection upgrade (Keating Street unsignalised) - Impact to commercial property.
16c	Moggill Road traffic running uninterrupted and a Coonan Street overpass (Keating Street unsignalised)

Option	Option description
16d	Moggill Road traffic running uninterrupted and a Coonan Street overpass (Keating Street unsignalised), with access into Stamford Road closed from Moggill Road westbound, allowing a merge lane to be provided for the left turn from Coonan Street. The left turn movement out of Stamford Road would remain open
16e	Moggill Road traffic running uninterrupted below a Coonan Street overpass (Keating Street unsignalized), with a signalised intersection where Moggill Road westbound traffic meets a double left turn from Coonan Street.

Table 5.6 Short listed options assessed through a Rapid BCR assessment

Options 16 c, d and e all returned rapid BCRs above 1.

5.1.9 Initial Economic Assessment

Prior to community consultation a benefit cost analysis (BCA) was used as the quantitative tool to complete additional economic assessment to confirm the outcomes of the above analysis for a grade separated option (Option 16d) and an at grade option (Option 2.1a). The economic analysis accrues benefits over a 30-year appraisal period between 2022 and 2051, using a discount rate of 7% and Category 2 cost estimates. The Category 2 cost estimates represent a higher level construction cost estimate and do not incorporate a probabilistic approach to risk to produce a risk adjusted estimate. However, this level of estimate is appropriate for this stage of the project.

Option 16d has a BCR of 1.9 and Option 2.1a has a BCR of 0.7, based on the attributes shown in Following public consultation, refinements were made to the selected preferred option to

improve access to Stamford Road, resulting in Option 16f. This option also improved the westbound merge onto Moggill Road.

Further refinement of the design resulted in the preferred Option 16g. A summary of the selection of the preferred design option is shown in the below table. below.

Parameter	Option 16d ($M)	Option 2.1a ($M)
Benefits		
• Travel time savings	108.72	28.64
• Vehicle operating savings	38.11	9.76
• Emission savings	1.01	0.09
• Crash savings	15.28	15.28
• Residual value	1.38	1.34
Total benefits	**164.49**	**55.12**
Cost		
CAPEX	88.87	78.35
OPEX	0.32	0.05

Parameter	Option 16d ($M)	Option 2.1a ($M)
Total Costs	**89.19**	**78.41**
Net Present Value (NPV)	**75.3**	**-23.29**

Table 5.7 Additional economic assessment

Based on the options development process and the additional economic assessment, the project working group considered that Option 16d ranked the highest in terms of meeting (or exceeding) the assessment criteria and objectives.

5.1.10 Further Options Refinement

Following public consultation, refinements were made to the selected preferred option to improve access to Stamford Road, resulting in Option 16f. This option also improved the westbound merge onto Moggill Road.

Further refinement of the design resulted in the preferred Option 16g. A summary of the selection of the preferred design option is shown in the below table.

Option Number	Option	Summary	Release Date
2.1a (referred to as Option A during community consultation period)	Signalised intersection upgrade	Design not selected after community consultation	September 2019
16d (referred to as Option B during the community consultation period)	Coonan Street overpass	Design selected after community consultation	September 2019
16e	Coonan Street overpass	Design refinement after further site investigations	N/A
16f	Coonan Street overpass	Further design refinement after community feedback included improving Stamford Road access	December 2019
16g (referred to as preferred option)	Coonan Street overpass	Further refinement of design	October 2020

Table 5.8 Further Options Refinement

5.2 PROJECT BENEFITS

Implementing the preferred option will:

- improve the capacity of the intersection through:

  - reduced traffic delays and congestion at the Moggill Road and Coonan Street intersection, for general traffic and buses.
  - enhanced ability for Moggill Road and Coonan Street to be able to fulfil their roles as key arterial roads in the west Brisbane network through reduced travel times and crashes.
- improve the safety of the intersection by:
  - provision of grade separation of the Moggill Road and Coonan Street intersection.
  - provision of a pedestrian and active transport crossing facility across Moggill Road, which is on the Coonan Street overpass.
  - provision of dedicated road space for cycle lanes.
- improve the efficiency of the intersection through:
  - minimised impacts on private residential and commercial property
  - minimised impacts on the broader transport network in the area
  - provision of development opportunities for unused spaces around the intersection
  - the opportunity to provide a distinctive entry to the Indooroopilly Precinct in the unused intersection green space.

5.3 PROJECT IMPACTS

Compared to the other options for the project, the preferred option has less impact on the broader transport network in the area. The following impacts will be managed during project delivery:

- acquisition or partial resumption of residential properties along Moggill Road.
- restricted access to and from Keating Street - left in left out access only. No right turn from Coonan Street to Keating Street. Northbound traffic will be required to turn onto Coonan Street at the intersection of Allwood and Coonan Street or travel further north along Clarence Street and Swann Road to enter Coonan Street at the Rokeby Terrace and Coonan Street intersection.
- changed access to Indooroopilly Central Shopping Complex outlets:
  - potentially relocated access/egress points – separate access and egress points will be provided and will be relocated to the south along Coonan Street.
  - right turn access from Coonan Street will be available via the relocated access point.
- increased traffic along Moggill Road service road fronting existing residential properties
- Nelson Parade will be turned into a pedestrian/cyclist road
- Payne Street will be left out only
- removal of vegetation, including trees
- relocation of bus stops
- typical construction impacts including traffic control, pedestrian and cyclists impacts, and noise and dust disturbances to adjacent land uses
- disruption to public utility services
- potential impacts to businesses operating along or on the corridor
- impacts visual amenity with the addition of the bridge structure.

5.4 SCOPE OF PROJECT

The scope of works based on the preferred Option 16g, shown in Figure 5.2 below, is as follows:

- replace the existing Moggill Road and Coonan Street roundabout with grade separated movements for Coonan Street. This will comprise an overpass of Moggill Road to the signalised intersection of Moggill Road Service Road and Coonan Street
- Moggill Road through traffic will be free flowing through the intersection area
- Moggill Road will have on road cycle lanes and shared paths
- a new bridge over Moggill Road inclusive of a pedestrian path
- construction of retaining walls at the intersection site
- landscaped areas in the intersection area
- upgraded pedestrian paths throughout the intersection area
- new traffic islands at impacted local streets
- provision of new bus stops on selected sections
- reduction in opposed traffic movements
- pedestrian traffic signals across Coonan Street near the entrance to the adjacent commercial / retail area.

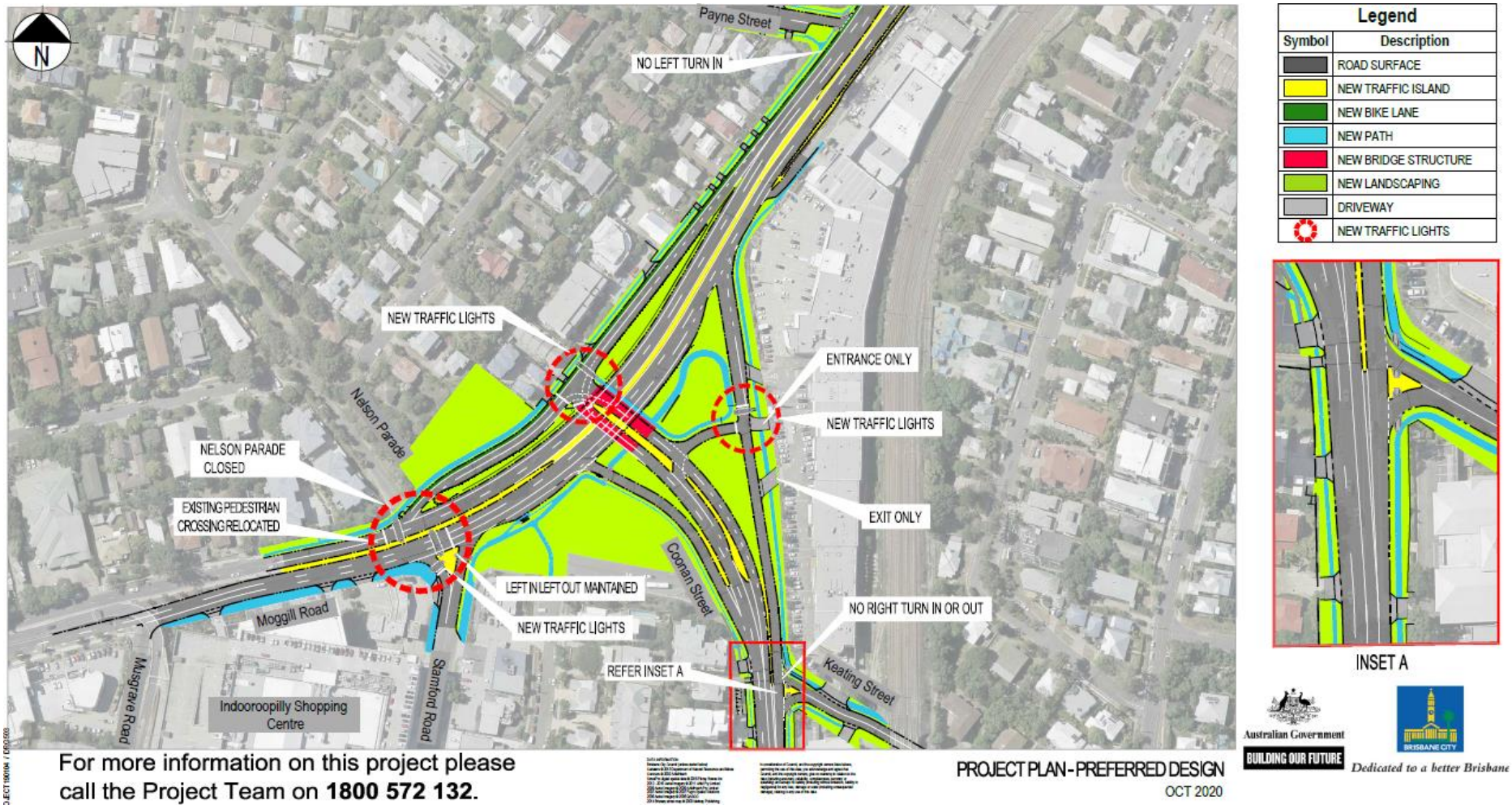


Figure 5.2 Preferred Option 16g Project Scope

6 COSTS

Table 6.1 below, shows the cost summary for the project.

Current funding		Current cost estimates	
Capital		Capital	$77,849,714
Expense		Expense	-
Ongoing costs (life of asset)		Ongoing costs (life of asset)	$995,000
Subtotal		***Subtotal***	$78,844,714
Revenue		Revenue	-
Net total		***Net total***	-
Contingency funding		Contingency funding	$31,096,576
Cost escalation		Cost escalation	$12,050,067
SUBTOTAL		**SUBTOTAL**	$121,991,357
Project Risk		Project Risk	$4,201,643
TOTAL		**TOTAL**	$126,193,000

Table 6.1 Cost Summary (undiscounted)

*Numbers may not add exactly due to rounding. No ongoing costs are expected to be incurred until after FY2022/23.

Project Budget*				
Financial Year	2020/21	2021/22	2022/23	2023/24
Budget	$4,668,000	$29,367,000	$44,908,000	$47,250,000
Accumulative		$34,035,000	$78,943,000	$126,193,000

Table 6.2 Project Budget

*Budget Book – Program 1 Transport for Brisbane – Program 2 – 2020 - 2021

The Australian Federal Government and the Brisbane City Council are expected to fund the Capital Expenditure for this project. This Business Case document will form a critical part of considerations by BCC to determine funding toward the works.

Note that estimated total costs should not be confused with the P90 and P50 costs shown elsewhere in this document, including Table 5-7 Additional economic assessment, Table 10-1 Economic analysis Net Present Value summary and Table 10-2 Sensitivity analysis.

7 TIMING

The proposed timings for the project are detailed in Table 7.1. Timings for detailed design, land acquisition and construction are subject to funding approval.

The proposed timings are based on the current concept phase of the project. Procurement strategies and construction staging options will be investigated during the detailed design phase with the key objective of driving project efficiencies and value for money for Council.

Key activity / milestone	Start date	End date
Finalisation of concept design	Mid 2019	Mid 2020
Finalisation of business case	Mid 2019	Late 2020
Initial stakeholder consultation	Mid 2019	Late 2019
Detailed planning, design and consultation	Mid 2019	Early 2021
Land acquisition	Late 2020	Late 2021
Engage with tenderers	Mid 2021	Late 2021
Award contracts	Late 2021	Late 2021
Public utility plan relocations and early/demolition works	Mid 2021	Late 2021
Road and civil construction	Late 2021	Early 2024

Table 7.1 Proposed Timings

8 COMMUNITY CONSULTATION

Brisbane City Council commenced engagement with the community for the proposed upgrade of the Moggill Road and Coonan Street intersection at Indooroopilly in September 2019.

Council released two design options to replace the existing roundabout with a signalised intersection. The design options were nominated as Option A, which represented design Option 2.1, and Option B, representing design Option 16d. These options were presented in a project newsletter, and distributed to 19,047 residents in Indooroopilly, Taringa, Chelmer, Graceville, Sherwood and Corinda.

Two community information sessions were held at Indooroopilly Shopping Centre on Saturday 14, and Thursday 19 September 2019. The sessions provided an opportunity for community members to ask questions and provide feedback about the designs, view artist impressions and take away copies of the project newsletter.

In total, 336 community members attended the information sessions; 183 at the first session, and 153 at the second. Most attendees understood the need for the project, and agreed the current roundabout is unsafe and cannot support growing transport demands. An executive summary of the community consultation is included in Appendix C, Community Consultation Executive Summary.

Feedback indicated a strong preference for Option B (design option 16d), to replace the roundabout with an overpass for Coonan Street traffic, allowing Moggill Road to travel uninterrupted.

Consultation with local business identified significant concerns about traffic congestion with the planned exclusion of left turn traffic into closure of Stamford Road from Moggill Road. RACQ provided feedback including comments regarding a potential conflict between left turn traffic from Coonan Street to Moggill Road with bicycles on the Moggill Road bike lane.

As a result of the community consultation, design Option 16d was amended to incorporate the left turn into Stamford Road, as Option 16f (Enhanced Option B). It provided a service road for traffic from Moggill Road which intersects with left turn traffic from Coonan Street and allows a left turn for traffic into Stamford Road. Further, it mitigates conflict between bicycles on Moggill Road and left turning traffic at the Coonan Street.

Following subsequent community consultation, further refinements were made to Option 16f resulting in the preferred Option 16g. These refinements eased concerns that were raised surrounding entry and exit into Stamford Road.

Feedback also identified community concern over local traffic access particularly for residents to the north and the west of the existing intersection. The scope of works may be extended to allow for Network Local Traffic Management devices for streets on the western side of Moggill Road. Concerns were also raised over the performance of existing signalised intersections on Coonan Street at Allwood Street and Belgrave Road and at Westminster Road. Additional design works are to be undertaken to investigate possible improvements to these existing signalised intersections.

Community feedback identified concerns over access to the Indooroopilly Central, a shopping centre between the existing roundabout and the adjacent rail corridor. Consultation with the

centre management resolved to consider opportunities to retain the existing access points in similar locations.

Queries from bicycle user group BUGS in relation to cycle facilities, particularly connectivity between the intersection and the proposed Indooroopilly Bikeway Connection at the Lambert Road primary bikeway confirmed Councils approach to including these investigation works as part of this project.

Other feedback included a focused campaign to upgrade the river crossing at the Walter Taylor Bridge. However, these works are beyond the scope of this project.

9 RISKS

Key extreme and high residual risks are documented in Table 9.1 below.

#	Residual risk rating	Risk detail	Risk Mitigation	Risk owner
1.	High	Extensive hard rock.	Undertake geotechnical investigations to determine excavatability.	Designer
2.	High	Financial risk from business disturbance impact on the Indooroopilly Precinct.	Consider constructability to avoid impact on Indooroopilly Precinct operation.	BCC
3.	High	Detailed design/flood modelling requiring an increase in capacity of cross drainage structures for the Sandy Creek catchments.	Undertake flooding analysis and design of augmentation to the system.	BCC / Designer
4.	Extreme	Slow economic growth may lead to redevelopment not occurring in line with the timing of the project.	Consider opportunities to bring forward works including land acquisition.	BCC
5.	High	If project is undertaken in separated stages the costs, difficulty and impact of construction will increase.	Make consideration of impacts on cost and program if delivered in additional stages.	Designer
6.	High	Increased congestion by the time of construction and traffic switches, particularly around Moggill Road and Coonan Street will impact construction duration and costs.	Undertake traffic analysis of construction staging to review the intersection performance in further design phases.	Designer
7.	High	Community objections.	Early consultation and clear messages regarding community benefits - through Council standard communications protocols.	BCC
8.	High	Additional property acquisitions required.	Further assess full and partial resumption in next design stages.	BCC
9.	High	If required for land repurposing, approval and compensation for reduction in road reserve area by State Government.	Ongoing consultation with State Government to be undertaken.	BCC

10.	High	Crash risk for pedestrians during construction work.	Traffic control to be fully activated on site during construction; signage for pedestrian crossings to be erected to avoid confusion.	BCC

Table 9.1 Key extreme and high residual risks

The project team will develop appropriate risk management strategies, plans and a risk register with actions developed to identify and address project risks. The strategy / plans will be "live documents" that will be regularly updated to ensure that '*so far as is reasonably practicable'* (SFAIRP) risks including new / emerging risks are identified and managed appropriately with opportunities developed to minimise the cost and impacts of the project.

10 OPPORTUNITIES

A number of active and public transport opportunities were identified through the development of the Local Transport Network Plan. The opportunities and proposed recommendation are listed in Table 10.1 below.

	Opportunity	Proposed recommendation	Opportunity owner
Active transport			
1.	Provision of local cycle links to/from the Indooroopilly Town Centre via Nelson Parade in the north, Finney Road and Russell Terrace in the west and Foxton Street in the south. The connection via Foxton Street also provides the opportunity to connect with Stage 1 of the Indooroopilly Bikeway.	Provision for appropriate cycle facilities to link with the Indooroopilly Town Centre along Nelson Parade, Finney Road-Russell Terrace corridors and Foxton Street.	BCC
2.	Identification of alternative routes for the Primary Cycle Route connection from the Jack Pesch Bridge to Moggill Road via Coonan Street and the rail corridor.		
3.	Opportunity to incorporate a bicycle facility at the Moggill Road-Coonan Street intersection that is fit for purpose as a Primary Cycle Route (as designated by the Brisbane City Plan 2014) and Principal Cycle Route (as designated by the *South East Queensland Principal Cycle Network Plan*).	Preservation of adequate corridor width at the Moggill Road and Coonan Street intersection to provide for a cycle facility commensurate with that required for a Principal/Primary Cycle Route. This could take the form of either an on-road or off-road facility.	BCC
Public Transport			
1.	Provision for bus stops on Westminster Road in the immediate vicinity of the Indooroopilly Rail Station to allow for a more seamless transition between buses servicing the University of Queensland and the rail services.	The feasibility of bus stops on Westminster Road and the enhancement of the Indooroopilly State School bus stops be discussed with TransLink and further investigations be undertaken to confirm whether this can be progressed to an Options Analysis and Business Case.	BCC
2.	Potential to enhance the person carrying capacity of the Moggill Road and Coonan Street intersection by prioritising bus progression including through signal arrangements and/or lane configuration/designation.	The potential to enhance the person carrying capacity of the Moggill Road and Coonan Street intersection either by prioritising bus progression and/or lane configuration/designation be considered in the design of the intersection upgrade if there is adequate spare capacity and it is demonstrated that such a	BCC

		facility would generate network benefits.	
3.	Potential to enhance the Indooroopilly State School bus stops and promote an interchange between City bound buses and buses bound for the University of Queensland.	The potential for the future provision of a bus interchange at the Moggill Road and Coonan Street intersection be given consideration in the design of the intersection upgrade solution, however it should not preclude infrastructure solutions from being implemented that do not necessarily support a future bus interchange.	BCC

Table 10.1 Identified opportunities and proposed recommendations

11 INVESTMENT APPRAISAL

Road user and wider benefits for the grade separated option (Option 16g) and at grade option (Option 2.1a) were analysed as part of the development of this Business Case.

11.1 ROAD USER BENEFITS

11.1.1 Option 16g (grade separated)

Traffic assessment using SIDRA shows introducing Option 16g reduces the 2031 morning peak period delay on the Coonan Street northbound approach at the Moggill Road and Coonan Street intersection to 18 seconds for the right turn movement (at the new traffic signals) and 7 seconds for the left turn movement, compared to a theoretical forecast delay of approximately two and half minutes without intervention. The corresponding 95th percentile queue length reduces from 124m to 98m. During the evening peak period in 2031, the Moggill Road westbound approach delay reduces from approximately three minutes to 0 seconds delay (due to the westbound through traffic movement being grade separated), with a corresponding reduction in the theoretical 95th percentile queue length from 1.43 km to 0m. In addition, there are benefits to the Coonan Street traffic movements in the evening peak period with the delays to the movements from Coonan Street reduced from almost 3 minutes to 11 seconds.

Buses will experience the same travel time savings as general traffic, due to the grade separation of the Coonan Street traffic movements.

This option will also the reduce the risk of crashes occurring at the Moggill Road-Coonan Street intersection by the reduction in opposed traffic movements at the intersection.

11.1.1 Option 2.1a (at grade)

Traffic assessment using SIDRA shows introducing Option 2.1a improves several of the traffic conditions at the intersection but not to the extent provided by Option 16g.

For example, in the 2031 morning peak period, delays are reduced on the Coonan Street northbound approach at the Moggill Road and Coonan Street intersection but not as significantly as for Option 16g. This is similar in the evening peak period in 2031, along Moggill Road westbound. Also, significant queuing is still expected (590m).

11.2 WIDER BENEFITS

11.2.1 Option 16g (grade separated)

The at grade option has merit, however a grade separated option provides greater benefits in terms of reducing travel time delays and crash frequency, resulting in improved effectiveness of the overall inner western Brisbane arterial network.

Upgrading the Moggill Road and Coonan Street intersection via grade separating the major traffic movements will enable traffic to use the higher order road network more efficiently. Both the Moggill Road and Coonan Street corridors are classed as a Local Road of Regional Significance (LRRS) by the Queensland Government, and as such, the upgrade of this intersection is expected to facilitate wider economic and population growth. The following benefits will also be realised:

- alignment with the transport principles set out in the *Transport Plan for Brisbane – Strategic Directions*
- simplified traffic movements along the Moggill Road corridor
- improved reliability and operation for buses using the Moggill Road corridor
- safer cross corridor links for pedestrians and cyclists
- provision for cyclists along Moggill Road in accordance with the Principle Cycle Network Plan facilitates links to the wider cycle network
- improved cross corridor active transport links between the adjacent residential catchment and the Principle Regional Activity Centre of Indooroopilly reduces dependence on the private vehicle for shorter distance trips, which supports better health outcomes for the broader community.

11.2.2 Option 2.1a (at grade)

Option 2.1a aligns with the transport principles set out in the Transport Plan for Brisbane and provides the following benefits compared to grade separation:

- lower capital costs
- simplified traffic movements through the intersection
- simplified construction
- reduced disruption overall to the Indooroopilly Precinct
- safer cross corridor links for pedestrians and cyclists
- provision for cyclists along Moggill Road in accordance with the Principle Cycle Network Plan facilitates links to the wider cycle network
- service road access maintained for residential properties on the northern side of Moggill Road.

Whilst this option provides some benefits, they do not outweigh the costs, as shown in economic comparison of Options 16g and 2.1a.

11.3 PREFERRED OPTION ECONOMIC ANALYSIS

A benefit cost analysis (BCA) was used as the quantitative tool for evaluating the merit of this Project.

11.3.1 Core economic analysis

The core economic analysis accrues benefits over a 30 year appraisal period between 2022 and 2051, using a discount rate of 7% and P50 cost estimates. Detailed cost estimates, known as Category 3 estimates, which incorporate a probabilistic approach to risk to produce a risk adjusted estimate were used in the analysis.

The analysis shows the preferred Option 16g has a Net Present Value (NPV) of $69.22M and a benefit-cost ratio of 2.08 based on construction costs. Table 11.1 presents the economic appraisal results for Option 16g.

Parameter	($M)	
Total benefits ($M)	**133.57**	
Cost		
CAPEX (P50)	64.35	

Parameter	($M)	
OPEX	0.30	
Total Costs	**64.35**	
NPV	**69.22**	
BCR	**2.08**	

Table 11.1 Economic analysis Net Present Value summary

The economic analysis indicates that the preferred option for the project, Option 16g, is economically viable, as the BCR suggests that for every dollar invested, the preferred option will generate a benefit of 2.08.

11.3.1 Sensitivity analysis

Sensitivity tests were undertaken to understand the range of possible outcomes given the uncertainty that is inherent in the economic analysis. Three sensitivities were tested:

- P90 Category 3 cost estimates
- a lower discount rate (4%)
- a higher discount rate (10%)
- P90 costs and a higher discount rate (10%).

The results of the sensitivity analysis are provided in Table 11.2 below.

Category	BCR	NPV
Core economic analysis	**2.08**	**$69.22M**
P50 costs and a discount rate of 4%	**2.95**	**$140.82M**
P50 costs and a discount rate of 10%	**1.54**	**$31.20M**
P90 costs and a discount rate of 7%	**1.99**	**$66.60**
P90 costs and a discount rate of 4%	**2.84**	**$138.19M**
P90 costs and a discount rate of 10%	**1.48**	**$28.69M**

Table 11.2 Sensitivity analysis

The sensitivity analysis shows that the BCR for the preferred option, Option 16g, remains well above 1, for all sensitivities, including for the worst case, which assumed P90 costs and a higher discount rate of 10%.

11.4 RECOMMENDATION

On the basis of a benefit-cost ratio of 2.08 for the project and additional non-monetary benefits associated with reducing community and property impacts, it is recommended that the project should proceed with Option 16g which is the preferred option.

Option 16g replaces the existing Moggill Road and Coonan Street roundabout with grade separated movements for Coonan Street. This will comprise an overpass of Moggill Road to the signalised intersection of Moggill Road Service Road and Coonan Street.

On the basis of a balance between costs, benefits and impacts, Option 16g is recommended as the preferred option.

12 REFERENCES

Brisbane City Council, 2013. *Brisbane Vision 2031,* Brisbane: Brisbane City Council.

Brisbane City Council, 2014. *Brisbane City Plan 2014 (ePlan),* Brisbane: Brisbane City Council.

Department of Transport and Main Roads, 2016. *Principal Cycle Network Plan South East Queensland,* Brisbane: State of Queensland.

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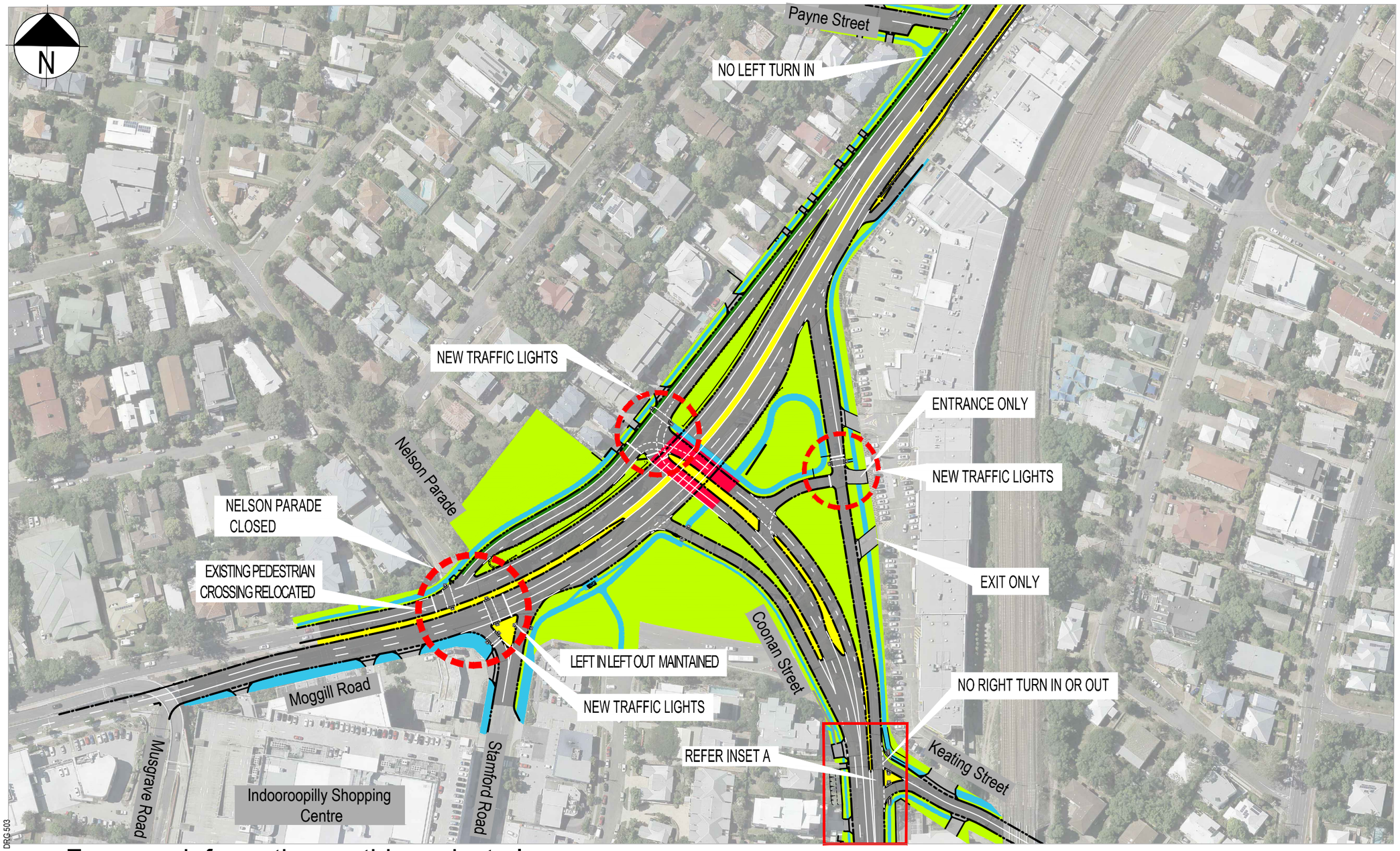
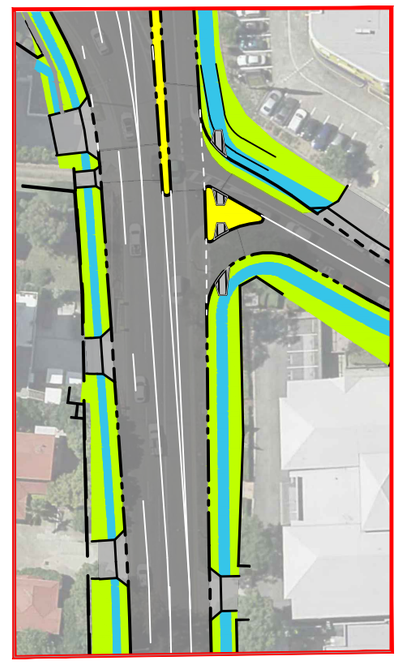
INDOOROOPILLY ROUNDABOUT UPGRADE PROJECT



Legend	
Symbol	**Description**
	ROAD SURFACE
	NEW TRAFFIC ISLAND
	NEW BIKE LANE
	NEW PATH
	NEW BRIDGE STRUCTURE
	NEW LANDSCAPING
	DRIVEWAY
	NEW TRAFFIC LIGHTS



INSET A

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PROJECT PLAN - PREFERRED DESIGN
OCT 2020

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N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

DOUBLE LEFT TURN

SIGNALISED INTERSECTION

WIDENING FOR 2 x NB LANES

SIGNALISED INTERSECTION

WIDENING FOR 2 x LANES WB

WIDENING FOR 2 x LANES NB

LEFT IN ONLY

WIDENING FOR 2 x EB LANES

DOUBLE LEFT TURN ONLY (NO RIGHT TURN)

SIGNALISED INTERSECTIONS

LEFT IN LEFT OUT

DOUBLE LEFT TURNS

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
KEATING STREET
MUSGRAVE ROAD
COONAN STREET

LEGEND

- 1 LANE
- 1 AUX LANE
- 2 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Signalised intersections using existing roadway

Long List Option 1

.\BCC_Logo.jpg

SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
KEATING STREET
MUSGRAVE ROAD
COONAN STREET

3 LANES TO 2 LANES
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
2 LANES TO 3 LANES
DOUBLE RIGHT TURN
SIGNALISED INTERSECTION
WIDENING FOR 3 x NB LANES
WIDENING FOR 3 x SB LANES AND 1 x LEFT TURN LANE
TRIPLE RIGHT TURN NB
LEFT IN LEFT OUT
2 LANES TO 3 LANES
DOUBLE LEFT TURN WB
LEFT IN LEFT OUT
3 LANES TO 2 LANES
SIGNALISED INTERSECTION
WIDENING FOR 2 x SB LANES
WIDENING FOR 2 x NB LANES

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Amended Reference Design - Impact to residential property

Long List Option 2.1

.\BCC_Logo.jpg

SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

AUBURN TERRACE
ELDON STREET
NELSON PARADE
MANCHESTER TERRACE
VINCENT STREET
MOGGILL ROAD
MUSGRAVE ROAD
STAMFORD ROAD
UNDERHILL AVENUE
COONAN STREET
RAILWAY
YORK STREET
CLARENCE ROAD
KEATING STREET
IPSWICH / SPRINGFIELD

INDOOROOPILLY SHOPPING CENTRE
KEATING PARK
AUDI INDOOROOPILLY
EXISTING SHOPPING COMPLEX
EXISTING SHOPPING COMPLEX
EXISTING SHOPPING COMPLEX

For continuation refer inset
Existing Service Road and retaining wall to be maintained
Existing driveway to be maintained
Left-in Left-out only

1 0025
2 0025

PAYNE STREET
MOGGILL ROAD
INSET

Notes

1. Property requirements shown on this drawing are based on digital cadastral data base (DCDB) and concept planning. The requirements are indicative only.

Legend

- Pavement
- Concrete Traffic island/median
- Concrete Footpath
- Retaining Wall
- Existing property boundary
- Area required for full resumption
- Area required for partial resumption
- Principal cycle route

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection Upgrade Design

Option 2.1a Layout Plan

March 2019

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N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
MUSGRAVE ROAD
YORK STREET
KEATING STREET
COONAN STREET

3 LANES TO 2 LANES
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
2 LANES TO 3 LANES
IMPACT TO COMMERCIAL PROPERTY AND PILED RETAINING WALL ON SERVICE ROAD
MAINTAINED SERVICE ROAD
SIGNALISED INTERSECTION
DOUBLE RIGHT TURN
WIDENING FOR 3 x NB LANES
WIDENING FOR 3 x SB LANES AND 1 x LEFT TURN LANE
TRIPLE RIGHT TURN NB
LEFT IN LEFT OUT
2 LANES TO 3 LANES
SIGNALISED INTERSECTION
DOUBLE LEFT TURN WB
LEFT IN LEFT OUT
3 LANES TO 2 LANES
IMPACT TO INDOOROOPILLY SHOPPING CENTRE AND SERVICE STATION
WIDENING FOR 2 x SB LANES
WIDENING FOR 2 x NB LANES

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Amended Reference Design - Impact to commercail property

Long List Option 2.2

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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
MUSGRAVE ROAD
COONAN STREET
KEATING STREET

2 LANES TO 1 LANES
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
3 LANES TO 2 LANES
DOUBLE RIGHT TURN
2 LANES TO 3 LANES
WIDENING FOR 3 x NB LANES
WIDENING FOR 3 x SB LANES AND 1 x LEFT TURN LANE
SINGLE RIGHT TURN ELEVATED NB
LEFT IN LEFT OUT
2 LANES TO 3 LANES
DOUBLE LANE LEFT TURN SB
SIGNALISED INTERSECTION
LEFT IN LEFT OUT
3 LANES TO 2 LANES
WIDENING FOR 2 x SB LANES
WIDENING FOR 2 x NB LANES

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 WAY ROAD
- 1 LANE ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Coonan Street Overpass NB landing outside

Long List Option 3

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue	
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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
2 LANES TO 1 LANES
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
3 LANES TO 2 LANES
2 LANES TO 3 LANES
DOUBLE RIGHT TURN
WIDENING FOR 3 x NB LANES
NELSON PARADE
VINCENT STREET
WIDENING FOR 3 x SB LANES AND 1 x LEFT TURN LANE
DOUBLE RIGHT TURN ELEVATED NB
COONAN STREET
LEFT IN LEFT OUT
2 LANES TO 3 LANES
MOGGILL ROAD
LEFT IN LEFT OUT
STAMFORD ROAD
DOUBLE LEFT TURN WB
UNDERHILL AVENUE
3 LANES TO 2 LANES
MUSGRAVE ROAD
SIGNALISED INTERSECTION
YORK STREET
WIDENING FOR 2 x SB LANES
KEATING STREET
COONAN STREET
WIDENING FOR 2 x NB LANES

ROKEBY TERRACE
3 LANES TO 2 LANES
WAVERLEY ROAD
MOGGILL ROAD

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 WAY ROAD
- 2 LANES ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Coonan Street Overpass NB landing intside

Long List Option

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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET
PRIORITY 2 LANES ON MOGGILL ROAD
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
2 LANES TO 1 LANE
2 LANES TO 3 LANES
DOUBLE RIGHT TURN
ELEVATED 2 LANE STRUCTURE NB
WIDENING FOR 3 x SB LANES AND 1 x LEFT TURN LANE
LEFT IN ONLY
DOUBLE RIGHT TURN NB
AT GRADE EXIT LANE TO COONAN
LEFT IN LEFT OUT
DOUBLE LEFT TURN WB
SIGNALISED INTERSECTION
3 LANES TO 2 LANES
WIDENING FOR 2 x SB LANES
WIDENING FOR 2 x NB LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
STAMFORD ROAD
UNDERHILL AVENUE
MUSGRAVE ROAD
YORK STREET
KEATING STREET
ROKEBY TERRACE
WAVERLEY ROAD

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 LANES ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Moggill Road Inbound overpass

Long List Option 5

.\BCC_Logo.jpg

SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

PAYNE STREET

MOGGILL ROAD

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

ELDON STREET

3 LANES TO 2 LANES

PRINCE STREET

DOUBLE RIGHT TURN

2 LANES SB

ELEVATED 2 LANE STRUCTURE SB

NELSON PARADE

VINCENT STREET

COONAN STREET

SINGLE LEFT TURN LANE

TRIPLE RIGHT TURN NB

LEFT IN ONLY

2 LANES TO 3 LANES

TO MUSGRAVE
AD OVERPASS

MOGGILL ROAD

AT GRADE LEFT OUT

STAMFORD ROAD

SINGLE LEFT TURN WB

SIGNALISED INTERSECTION

YORK STREET

SINGLE ELEVATED RAMP DOWN TO STAMFORD ROAD

ANES TO 2 LANES

MUSGRAVE ROAD

UNDERHILL AVENUE

WIDENING FOR 2 x SB LANES

COONAN STREET

KEATING STREET

WIDENING FOR 2 x NB LANES

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 LANES ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative

Date:

Moggill Road/Coonan Street Intersection
Moggill Road outbound overpass

Long List Option 6

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
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SCALE 1:1000 (A1)

0 20 40 60 80 100m

20 10

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N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

3 LANES TO 2 LANES

SIGNALISED INTERSECTION

2 LANES TO 3 LANES

DOUBLE RIGHT TURN

SHORT AUX LANE

TRIPLE RIGHT TURN NB

WIDENING FOR 3 x NB LANES

DOUBLE LEFT TURN WB

WIDENING FOR 3 x LANES WB

LEFT IN ONLY

2 LANES TO 3 LANES

LEFT IN LEFT OUT

3 LANES TO 2 LANES

SIGNALISED INTERSECTION

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
MUSGRAVE ROAD
COONAN STREET
KEATING STREET

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative

Date:

Moggill Road/Coonan Street Intersection
Amended reference design - Intersection north

Long List Option 7

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Horizontal Scale: (Before Reduction)						

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SCALE 1:1000 (A1)

0 20 40 60 80 100m

20 10

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N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
EXTEND SERVICE ROAD THOUGH TO PAYNE STREET
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
PRINCE STREET
3 LANES TO 2 LANES
2 LANES TO 3 LANES
DOUBLE RIGHT TURN
SIGNALISED INTERSECTION
WIDENING FOR 3 x NB LANES
COONAN STREET
VINCENT STREET
NELSON PARADE
LEFT IN ONLY
WIDENING FOR 3 x LANES WB
TRIPLE RIGHT TURN NB
2 LANES TO 3 LANES
MOGGILL ROAD
LEFT IN LEFT OUT
STAMFORD ROAD
UNDERHILL AVENUE
SIGNALISED INTERSECTION
YORK STREET
3 LANES TO 2 LANES
DOUBLE LEFT TURN WB
WIDENING FOR 2 x SB LANES
MUSGRAVE ROAD
COONAN STREET
KEATING STREET
WIDENING FOR 2 x NB LANES

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Amended reference design - Intersection south

Long List Option

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Contour Interval:		Reference No.		Scale	Orig. Size
Horizontal Scale: (Before Reduction)		Axxxxxx-xx/xx		1:1000	A1

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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

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N

PAYNE STREET
2 LANES TO 3 LANES
EXTEND SERVICE ROAD
THOUGH TO PAYNE STREET
ELDON STREET
MAINTAIN EXISTING SERVICE ROAD
AND RETAINING WALL
PRINCE STREET
SIGNALISED INTERSECTION
SINGLE LANE EXIT
TO 2 LANES AT SIGNALS
TRIPLE LEFT TURN NB
WIDENING FOR
3 x NB LANES
TRIPLE RIGHT TURN WB
SIGNALISED INTERSECTION
VINCENT STREET
NELSON PARADE
LEFT IN LEFT OUT
2 LANES TO 3 LANES
COONAN STREET
TRAPPED LEFT LANE
DOUBLE LEFT TURN WB
MOGGILL ROAD
SIGNALISED INTERSECTION
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
LEFT IN LEFT OUT
3 LANES TO 2 LANES
MUSGRAVE ROAD
WIDENING FOR 2 x SB LANES
COONAN STREET
KEATING STREET
WIDENING FOR 2 x NB LANES

ROKEBY TERRACE
WAVERLEY ROAD
3 LANES TO 2 LANES
MOGGILL ROAD
2 LANES TO 3 LANES

LEGEND
1 LANE
AUX LANE
2 LANES
3 LANES
PROPERTY IMPACT

CONCEPT APPROVED
Client Representative
Date:

Moggill Road/Coonan Street Intersection
Moggill to Coonan priority - Intersection north

Long List Option 9

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
Survey/Filename:					
Contour Interval:		Reference No.		Scale	Orig. Size
Horizontal Scale: (Before Reduction)		Axxxxxx-xx/xx		1:1000	A1

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SCALE 1:1000 (A1)

0 20 40 60 80 100m
20 10

July 2018

Drawing Number / Sheet: IH150700 / 0015
Issue: P1

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N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

3 LANES TO 2 LANES

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

2 LANES SB

LEFT OUT TO SERVICE ROAD ONLY

LEFT IN ONLY

EXIT TO SERVICE ROAD

2 LANES TO 3 LANES

TRIPLE LEFT TURN NB

TRIPLE RIGHT TURN WB

SIGNALISED INTERSECTIONS

LEFT IN LEFT OUT

3 LANES TO 2 LANES

WIDENING FOR DOUBLE LEFT TURN

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
MUSGRAVE ROAD
YORK STREET
KEATING STREET
COONAN STREET

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Moggill to Coonan priority - Intersection south

Long List Option 10

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
Survey/Filename:					
Contour Interval:					
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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

July 2018

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Drawing Number / Sheet: IH150700 / 0016 Issue: P1

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Brisbane QLD Australia
JACOBS DOCUMENT No.
IH150700-0000-CR-SKT-0017

N

EXTEND SERVICE ROAD
THOUGH TO PAYNE STREET

3 LANES TO 2 LANES

MAINTAIN EXISTING SERVICE ROAD
AND RETAINING WALL

2 LANES TO 3 LANES

SIGNALISED LEGS
TO ROUNDABOUT

WIDENING FOR
3 x NB LANES

2 LANES TO 3 LANES

LEFT IN LEFT OUT

3 x LANES ROUNDABOUT
USING EXISTING CARRIAGEWAY
OUTER FORMATION EXTENTS

SIGNALISED INTERSECTION

3 LANES TO 2 LANES

LEFT IN LEFT OUT

ROUNDABOUT BYPASS

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
MUSGRAVE ROAD
KEATING STREET
COONAN STREET

LEGEND
- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection Signalised Roundabout

Long List Option 11

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
Survey/Filename:					
Contour Interval:					
Horizontal Scale: (Before Reduction)		Reference No. Axxxxxx-xx/xx		Scale 1:1000	Orig. Size A1

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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

July 2018

Drawing Number / Sheet: IH150700 / 0017
Issue: P1

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IH150700-0000-CR-SKT-001

N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

2 LANES TO 1 LANE

DOUBLE RIGHT TURN

AT GRADE EXIT LANE TO COONAN ST

ELEVATED 2 LANE STRUCTURE NB

ELEVATED 2 LANE STRUCTURE WB

LEFT IN ONLY

DOUBLE RIGHT TURN NB

AT GRADE EXIT LANE TO COONAN

IMPACT TO MUSGRAVE ROAD OVERPASS

SIGNALISED INTERSECTION

SINGLE LEFT TURN WB

SINGLE ELEVATED RAMP DOWN TO STAMFORD ROAD

SERVICE ROAD

AT GRADE LEFT OUT

3 LANES TO 2 LANES

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

3 LANES TO 2 LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
MUSGRAVE ROAD
STAMFORD ROAD
UNDERHILL AVENUE
COONAN STREET
YORK STREET
KEATING STREET
ROKEBY TERRACE
WAVERLEY ROAD
MOGGILL ROAD

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 LANES ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Moggill Road elevated both directions

Long List Option 12

.\BCC_Logo.jpg

SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

July 2018

Horizontal Datum: / Vertical Datum: / Survey/Filename: / Contour Interval:	Survey Information	Design	Drawn: B.Annakin	Checked	Authorised for Issue
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				Drawing Number / Sheet: IH150700 / 001	Issue: P1

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N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
PRINCE STREET
VINCENT STREET
NELSON PARADE
SIGNALISED INTERSECTION
COONAN STREET
SIGNALISED INTERSECTION
SIGNALISED INTERSECTION
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
YORK STREET
MUSGRAVE ROAD
COONAN STREET
KEATING STREET

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CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Existing intersections signalised

Long List Option 13

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue	
Vertical Datum:			B.Annakin			
Survey/Filename:						
Contour Interval:						
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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

July 2018

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Drawing Number / Sheet: IH150700 / 0019

Issue: P1

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IH150700-0000-CR-SKT-0020

N

PAYNE STREET
MOGGILL ROAD
ELDON STREET
MAINTAIN EXISTING SERVICE ROAD
MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL
PRINCE STREET
SINGLE LANE LEFT TO COONAN
ELEVATED SINGLE LANE ON RAMP
ELEVATED 2 LANE STRUCTURE WB
COONAN STREET
SIGNALISED INTERSECTION
VINCENT STREET
NELSON PARADE
LEFT IN LEFT OUT
WB MERGE
MATCH EXISTING SB LANE
SIGNALISED INTERSECTION
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
LEFT IN LEFT OUT
YORK STREET
SERVICE ROAD, TRAPPED LEFT TO MUSGRAVE ROAD
MUSGRAVE ROAD
KEATING STREET
COONAN STREET

LEGEND
- 1 LANE
- 2 LANES
- 2 LANES ELEVATED
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection
Moggill Road elevated outbound - Council's July 201 option

Long List Option 1

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
Survey/Filename:					
Contour Interval:					
Horizontal Scale: (Before Reduction)		Reference No. Axxxxxx-xx/xx	Scale 1:1000	Orig. Size A1	

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SCALE 1:1000 (A1) 0 20 40 60 80 100m (20 10)

July 2018

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Drawing Number / Sheet: IH150700 / 0020

Issue: P1

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Brisbane QLD Australia

JACOBS DOCUMENT No.
IH150700-0000-CR-SKT-0021

N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

PAYNE STREET

MOGGILL ROAD

ELDON STREET

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

3 LANES TO 2 LANES

PRINCE STREET

DOUBLE LEFT TURN SB

SIGNALISED INTERSECTION

SIGNALISED INTERSECTION

WIDENING FOR 2 x LANES NB

NELSON PARADE

VINCENT STREET

DOUBLE RIGHT TURN SB

LEFT IN ONLY

UNDERPASS STRUCTURE

WIDENING FOR 2 x LANES WB

DOUBLE RIGHT TURN NB

SINGLE LANE GIVE WAY

SIGNALISED INTERSECTION

MOGGILL RO

MERGE TAPER

LEFT IN LEFT OUT

STAMFORD ROAD

UNDERHILL AVENUE

SINGLE LEFT TURN WB

TRAPPED LEFT TO STAMFORD ROAD

WIDENING FOR 2 x SB LANES

YORK STREET

MUSGRAVE ROAD

COONAN STREET

KEATING STREET

WIDENING FOR 2 x NB LANES

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 LANE UNDERPASS
- 2 LANE OVERPASS
- PROPERTY IMPACT

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CONCEPT APPROVED

Client Representative

Date:

Moggill Road/Coonan Street Intersection
Long List Option 15a - STAGE 1
Moggill Road short elevated structure option - Interim arrangement

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
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Horizontal Scale: (Before Reduction)		Axxxxxx-xx/xx		1:1000	A1

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SCALE 1:1000 (A1)

0 20 40 60 80 100m

20 10

July 2018

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Drawing Number / Sheet	Issue
IH150700 / 0021	P1

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LOCATION: C:\users\jtaylor\appdata\local\projectwise\jacobs_anz_#pw02177471\IH150700-0000-CR-SKT-0021.dwg

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JACOBS DOCUMENT No.
IH150700-0000-CR-SKT-0022

N

EXTEND SERVICE ROAD THOUGH TO PAYNE STREET

2 LANES TO 1 LANE

MAINTAIN EXISTING SERVICE ROAD AND RETAINING WALL

DOUBLE LEFT TURN SB

SIGNALISED DOUBLE RIGHT TURN ONLY. NB MOGGILL FREE FLOWING

DOUBLE RIGHT TURN SB

WIDENING FOR 2 x LANES NB

WIDENING FOR 2 x LANES WB

UNDERPASS STRUCTURE

DOUBLE RIGHT TURN NB

SINGLE LANE GIVE WAY

LEFT IN ONLY

SIGNALISED INTERSECTION

MERGE TAPER

LEFT IN LEFT OUT

DOUBLE LEFT TURN WB

TRAPPED LEFT TO STAMFORD ROAD

WIDENING FOR 2 x SB LANES

WIDENING FOR 2 x NB LANES

3 LANES TO 2 LANES

PAYNE STREET
MOGGILL ROAD
ELDON STREET
VINCENT STREET
NELSON PARADE
COONAN STREET
MOGGILL ROAD
STAMFORD ROAD
UNDERHILL AVENUE
MUSGRAVE ROAD
YORK STREET
KEATING STREET
COONAN STREET
ROKEBY TERRACE
WAVERLEY ROAD
MOGGILL ROAD

LEGEND

- 1 LANE
- AUX LANE
- 2 LANES
- 3 LANES
- 2 LANE UNDERPASS
- 2 LANE OVERPASS
- PROPERTY IMPACT

CONCEPT APPROVED

Client Representative Date:

Moggill Road/Coonan Street Intersection — Long List Option 15b - STAGE 2

Moggill Road short elevated structure option - Ultimate arrangement

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:			B.Annakin		
Survey/Filename:					
Contour Interval:		Reference No.		Scale	Orig. Size
Horizontal Scale: (Before Reduction)		Axxxxxx-xx/xx		1:1000	A1

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July 2018

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Drawing Number / Sheet: IH150700 / 0022

Issue: P1

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IH150700-1000-CR-SKT-0031

N

AUBURN TERRACE
ELDON STREET
NELSON PARADE
MANCHESTER TERRACE
VINCENT STREET
MOGGILL ROAD
MUSGRAVE ROAD
STAMFORD ROAD
UNDERHILL AVENUE
COONAN STREET
RAILWAY
IPSWICH / SPRINGFIELD
KEATING PARK

INDOOROOPILLY SHOPPING CENTRE

AUDI INDOOROOPILLY

EXISTING SHOPPING COMPLEX

EXISTING SHOPPING COMPLEX

EXISTING SHOPPING COMPLEX

For continuation refer inset

Existing Service Road and retaining wall to be maintained

Left-in Left-out only

Left-in Left-out only

Weave / merge lane not included in traffic modelling

1 0032

2 0032

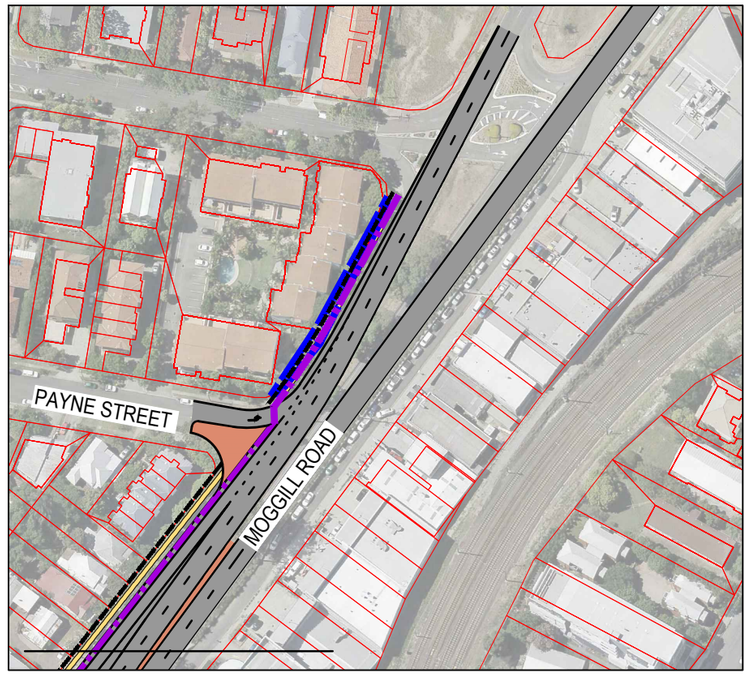
3 0032

Notes

1. Property requirements shown on this drawing are based on digital cadastral data base (DCDB) and concept planning. The requirements are indicative only.
2. This design will require a number of design exceptions to be approved.

Legend

- Pavement
- Bridge Structure
- Concrete Traffic island/median
- Grassed Traffic island/median
- Concrete Footpath
- Retaining Wall
- Existing property boundary
- Area required for full resumption
- Area required for partial resumption
- Principal cycle route



INSET

CONCEPT APPROVED

Client Representative

Date:

Moggill Road/Coonan Street Intersection Upgrade Design

Option 16c Layout Plan

March 2019

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:		BCC	K.Woods	P.Pears	
Survey/Filename:					
Contour Interval:					
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Drawing Number / Sheet: IH150700 / SKT-0031

Issue: P2

Dedicated to a better Brisbane

DATE: 14/03/2019 4:07:53 PM, LOGIN NAME: WOODS, KYLIE-MARIE
LOCATION: C:\users\kwoods\appdata\local\projectwise\jacobs_anz_ap\d0217747\IH150700-1000-CR-SKT-0031.dwg

JACOBS
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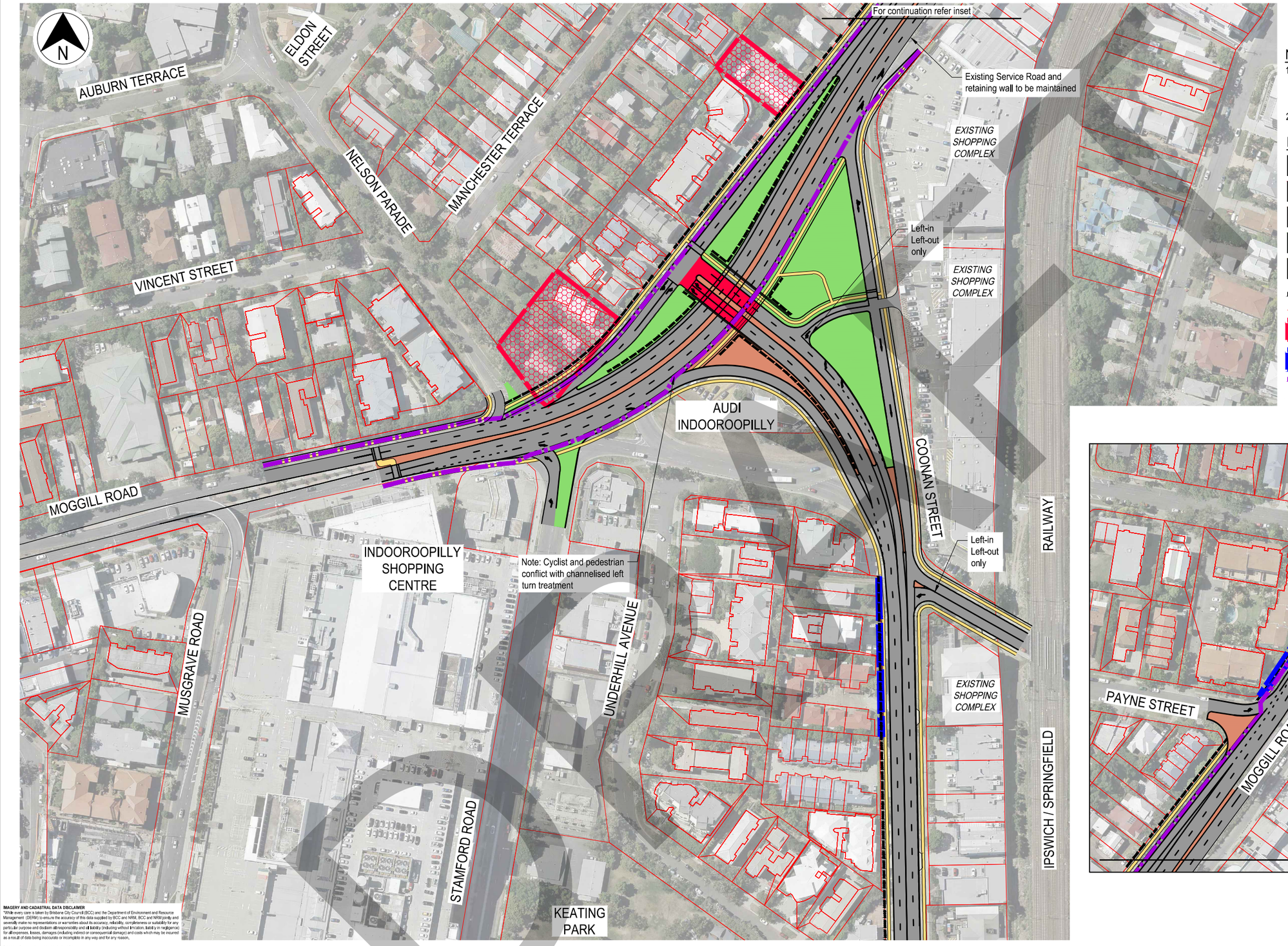
JACOBS DOCUMENT No.
IH150700-1000-CR-SKT-0033

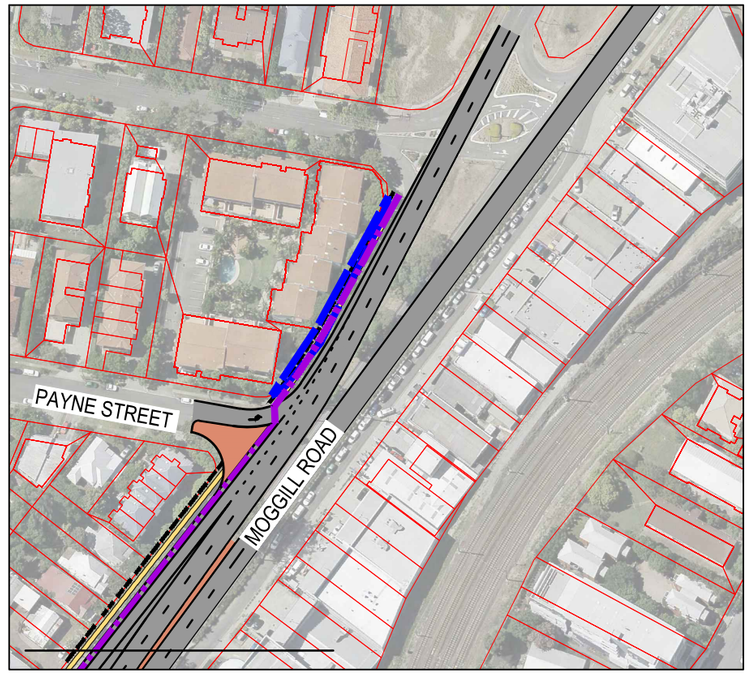


Notes

1. Property requirements shown on this drawing are based on digital cadastral data base (DCDB) and concept planning. The requirements are indicative only.
2. This design will require a number of design exceptions to be approved.

Legend

- Pavement
- Bridge Structure
- Concrete Traffic island/median
- Grassed Traffic island/median
- Concrete Footpath
- Retaining Wall
- Existing property boundary
- Area required for full resumption
- Area required for partial resumption
- Principal cycle route



INSET

CONCEPT APPROVED

Client Representative

Date:

Moggill Road/Coonan Street Intersection Upgrade Design

Option 16d Layout Plan

July 2019

Horizontal Datum:	Survey Information	Design	Drawn	Checked	Authorised for Issue
Vertical Datum:		BCC	K.Woods	P.Pears	
Survey/Filename:					
Contour Interval:		Reference No.		Scale	Orig. Size
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Drawing Number / Sheet: IH150700 / SKT-0033
Issue: P1

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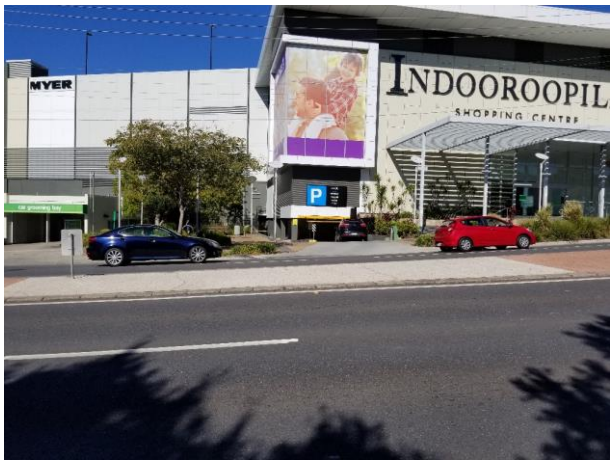
LOCATION: C:\users\kwoods\appdata\local\projectwise\ipaccess_anz_ie\d0217747\IH150700-1000-CR-SKT-0033.dwg

13 APPENDIX A – PREFERRED OPTION LAYOUT PLAN AND INVESTIGATED OPTIONS

14 APPENDIX B – MOGGILL ROAD AND COONAN STREET INTERSECTION ASSESSMENT – JUNE 2018

A site visit was completed in June 2018 and key observations and constraints identified for the intersection are detailed in Table 14.1 below.

Location & issue type (observation or constraint)	Illustration
Location: Indooroopilly Shopping Centre entrance, Coonan Street Constraint: This entrance has been renovated since the previous 2015 study, which proposed a small land take from the shopping centre along this frontage. This is unlikely to be amenable for the option development and should be avoided. The 2017 TMR bus station study also considers further bus stop development along this frontage.	
Location: Walker Street Constraint: The proposed 5 lane Walker Street cross section has been publicly endorsed by Council and affected property owners have been notified of the impact. Therefore, the boundaries in this area are fixed and cannot be altered any further. The extent to which adjacent property owners have been notified of future property boundaries needs to be checked. In conjunction with this is the design requirement to tie in with the existing Moggill Road and Coonan Street corridors, either side of the new intersection, as quickly as possible	Illustration not required.
Location: Moggill Road and Musgrave Road intersection Constraint: Council advised that the left turn into Musgrave Road queues back and impacts the Moggill Road and Coonan Street roundabout in the PM peak. This is attributable to the traffic generated by the shopping centre access. Opportunities to improve this access could potentially be investigated as part of the network plan to minimise the impacts on the Moggill Road and Coonan Street intersection.	Illustration not required.

Location & issue type (observation or constraint)	Illustration
Location: Commercial properties on eastern side of the Moggill Road and Coonan Street intersection Constraint: Access to these properties is to be maintained. The topography is such that there is a level difference between the existing road corridor and the existing on-site car park as shown right.	
Location: Residential properties on western side of the Moggill Road and Coonan Street intersection Constraint: Access to these properties is to be maintained. The topography is such that there is a level difference between the existing road corridor and the existing residential properties as shown right.	
Location: Moggill Road (BP Service Station as shown right) and Coonan Street (Battery World) Observation: There is the potential to encounter contaminated land in the immediate vicinity of both corridors due to existing adjacent uses. This may extend the timelines and costs associated with the project due to the need for remediation works.	

Location & issue type (observation or constraint)	Illustration
Location: Moggill Road and Coonan Street intersection and approaches Observation: Lack of pedestrian crossing facilities, particularly for Coonan Street with the nearest signalised pedestrian crossing located at the intersection with Allwood Street. The existing intersection configuration is a significant barrier to pedestrian movement between local land uses.	
Location: Moggill Road and Coonan Street intersection Observation: As identified in the road safety audit report the existing horizontal geometry is quite tight and sight distance is restricted in some instances. In addition, potential wayfinding issues at the intersection were illustrated during the site visit with a vehicle stopping in the nose of the diverge shown right which created a dangerous situation for them to get back onto the road and disturbance for approaching vehicles.	
Location: Moggill Road north of the intersection with Coonan Street Constraint: The existing service road is located much lower than the Moggill Road corridor. The significant level difference makes the service road a constraint in the event that access to the properties is to be maintained.	

Location & issue type (observation or constraint)	Illustration
Location: Nelson Parade and Moggill Road intersection Constraint: This intersection provides access into the large residential catchment on the northern side of Moggill Road, including the only right turn entry between Taringa Parade and Waverley Road. Incorporation of on-street bus stops in this area (as per the 2017 TMR study) will need to carefully consider impacts on local accessibility. The previous concept design option removed this right turn movement. Hence, opportunities for improving access to this catchment may need to be investigated in this current study as part of the development of the broader network plan.	

Table 14.1 Moggill Road and Coonan Street intersection - key observations and constraints

The key observations and constraints identified for the broader transport network in the local area around the Moggill Road and Coonan Street intersection are detailed in Table 14.2 below.

Location & issue type (observation or constraint)	Illustration
Location: Broader network generally Observation: There is significant presence of on-street car parking on the local road network around the Moggill Road and Coonan Street intersection including along Keating Street (as shown right), Clarence Road and Underhill Avenue. The presence of the on-street parking can potentially inhibit smooth two-way traffic flow and must be considered when investigating opportunities to reduce traffic on the study intersection. It appears that parking is related to local employment, as well as medium density residential demands.	

Location & issue type (observation or constraint)	Illustration
Location: Keating Street and Allwood Street Constraint: The rail overpasses in these streets restrict the ability to provide additional road capacity due to the narrowing of the road corridor at the bridge abutments. In addition, the underpass in Allwood Street has a low clearance (2.8m) making this crossing unusable by buses and large commercial vehicles and therefore unsuitable as a relieving route. The clearance on the Keating Street is 4.3m, which would allow bus use.	
Location: Musgrave Road overpass Constraint: The existing structure limits corridor options on Moggill Road and intersection configurations at Musgrave Road, Station Road and Stanley Street. However, the existing overpass is likely to be sub-standard in relation to current design standards. Therefore, any option that required replacement of the existing overpass may mean that the new structure would require a larger footprint.	
Location: Indooroopilly Shopping Centre car parks Constraint: The shopping centre car parks accessed via Stamford Road and Musgrave Road have no internal linkage. Therefore, any network option that deleted the existing Musgrave Road overpass could not simply replace its function with a right turn into Stamford Road, but would have widespread effects including increased use of Station Road by shopping centre traffic and broader impacts on general traffic and public transport operations.	Illustration not required.

Location & issue type (observation or constraint)	Illustration
Location: Clarence Road Constraint: The vertical geometry along Clarence Road (a District road in the draft road hierarchy) has relatively steep grades, particularly the section immediately south of Swann Road to Keating Street, therefore reducing its suitability to carry increased volumes of traffic. It was noted that Clarence Road carries district traffic between Taringa and Swann Road and south-eastern Indooroopilly, so it has a minor traffic carrying function beyond other residential streets, although it is not intended to carry longer distance trips.	
Location: Swann Road and Clarence Road intersection Constraint: The vertical geometry on the Swann Road east approach to this intersection is such that the available sight distance is restricted. Therefore, diverting higher volumes of traffic through this intersection and along Clarence Road may require safety improvements, for example signalisation.	Illustration not required.

Table 14.2 Broader transport network - key observations and constraints

15 APPENDIX C – COMMUNITY CONSULTATION EXECUTIVE SUMMARY

Brisbane City Council has identified the Moggill Road and Coonan Street intersection at Indooroopilly as a location for a future upgrade to improve safety and reduce congestion.

In September 2019, Council released two design options to replace the existing roundabout with a signalised intersection. The design options were presented in a project newsletter, and distributed to 19,047 residents in Indooroopilly, Taringa, Chelmer, Graceville, Sherwood and Corinda.

Two community information sessions were held at Indooroopilly Shopping Centre on Saturday 14, and Thursday 19 September 2019. The sessions provided an opportunity for community members to ask questions and provide feedback about the designs, view artist impressions and take home copies of the project newsletter.

In total, 336 community members attended the information sessions; 183 at the first session, and 153 at the second. Most attendees understood the need for the project, and agreed the current roundabout is unsafe and cannot support growing transport demands. Figure 15.1 below summarises the key activities completed during consultation.

Figure 15.1 Consultation activities

Feedback indicated a strong preference for option B, which would see the roundabout replaced with an overpass for Coonan Street traffic, allowing Moggill Road to travel uninterrupted.

Local Indooroopilly residents, and residents from neighbouring suburbs, Taringa and Chelmer, contributed the most feedback during consultation. Table 15.1 below summarises the key areas of interest from local residents.

Table 15.1 Key interest areas from local residents

Location	Topics of interest
Indooroopilly and Taringa	Pedestrian connectivity
	Increased traffic on local streets
	Access changes for streets close to the intersection, and potential property value impacts
Chelmer, Sherwood and Graceville	Safety for road users at merge points
	Priority for inbound Coonan Street traffic accessing Moggill Road
	Relieving congestion on Walter Taylor Bridge
	Active transport

All suburbs including Chapel Hill and Kenmore	Providing alternate design suggestions
	Rationale behind the options chosen
	Project cost and construction timeframes