



Gold Coast Highway (Burleigh Heads to Tugun) Multi-Modal Corridor Study

Transport and Main Roads

Route Strategy Report

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6 May 2021

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Executive Summary

About the study

The Department of Transport and Main Roads (TMR) has undertaken a Multi-Modal Corridor Study between Burleigh Heads and Tugun to review all previous planning and develop an updated transport strategy for this corridor. The study considered all transport modes including walking, cycling, private vehicles and public transport to determine the preferred function of the Gold Coast Highway for the next 20 years and beyond.

Considerations

Government planning goals

Planning for the future of the transport network is critical to achieving local (Gold Coast City Transport Strategy 2031), regional (the Queensland Government's ShapingSEQ Regional Plan and Regional Transport Plan) and national (the Australian Government's Smart Cities Plan) planning targets and policies. Current land use and transport planning policy is focused on creating more sustainable and liveable communities by consolidating land uses within existing urban areas (reducing urban sprawl) in particular around activity centres and high capacity public transport nodes.

Of these, Shaping SEQ is the most recent and pre-eminent state planning instrument of relevance to the Gold Coast Highway corridor. Shaping SEQ is a statutory regional plan for the South East Queensland (SEQ) region given effect by the Planning Act 2016 and provides a framework to manage growth, change, land use and development across the region. It sets a 50-year vision for the region, as well as setting out goals, elements and directions. It provides clear direction for the future planning of the Gold Coast Highway corridor by setting the expectation for a light rail extension south to the Gold Coast Airport and Coolangatta. This is intended to support the growth and development of jobs (through Regional Economic Clusters) as well as encourage urban consolidation to meet regional population growth projections.

Existing planning

TMR has been protecting the Gold Coast Highway corridor over time for future upgrades through setbacks on new development. Setbacks are the distance between the kerb and the building. They are intended to be wide enough to accommodate a future corridor that allows for pedestrian paths, landscaping, traffic lanes and light rail.

This study has investigated whether the existing planning will be adequate to accommodate the objectives of ShapingSEQ and the Gold Coast City Transport Strategy 2031 while balancing other considerations including current and future transport demands and the benefits and capacity gained from the fully funded M1 (Varsity Lakes to Tugun) upgrade.

Study findings and opportunities

The study found the Gold Coast Highway from Burleigh Heads to Tugun could be transformed into a high amenity community focused boulevard with priority given to walking, cycling and a world class light rail system that enhances the liveability and character of the southern coastal suburbs.

Light Rail

Shaping SEQ identifies the strategic need for Light Rail from Broadbeach South to Coolangatta via Burleigh Heads and the Gold Coast Airport. This was initially assessed in the Gold Coast Southern and Central Area Transport Strategy (GCSCATS) 2012. The GCSCATS assessed the specific transport benefits of Light Rail on the Gold Coast Highway relative to the 'Do Minimum' which includes frequent bus services. Light Rail between Broadbeach South and Coolangatta was shown to increase daily public transport trips by 22% relative to buses and 12% compared to LRT to Burleigh Heads only. As such, light rail between Broadbeach South and Coolangatta via Burleigh Heads and Gold Coast Airport became one of the critical 2031 network components recommended in the study. Therefore, based on ShapingSEQ and GCSCATS, Light rail between Broadbeach



South and Coolangatta was confirmed as a key component of this Route Strategy to ensure it can be accommodated in future road corridor planning.

Various configuration options were assessed for light rail including segregated at grade (on ground in its own lanes like Stage 1 through Broadbeach), shared running (on ground in lanes shared with other traffic), grade separated (elevated or underground) as well as single and dual tracks. Overall, the segregated double track at-grade option was deemed most appropriate as it was consistent with the look and feel and functionality of stages 1, 2 and the planned future extension to Burleigh Heads. It also delivers appropriate speed, reliability and capacity, at a reasonable cost and level of impact, provided that other transport functions are considered and designed sensitively.

Light Rail on the Gold Coast Highway

The study investigated several alternate routes parallel to the Gold Coast Highway and concluded a future southern extension of the light rail should follow the existing highway alignment. This would allow the light rail to service important cultural and urban attractors including the Burleigh Heads village centre, Palm Beach village centre, Currumbin Wildlife Sanctuary, Southern Cross University, the beaches and importantly the Gold Coast Airport.

The Gold Coast Highway route was found to be the fastest and most direct of the corridors investigated. It also has the greatest potential for mode shift to public transport as it is close to where people already live, follows the alignment of existing frequent trunk bus routes (700/ 777), as well as providing the potential to transform the Gold Coast Highway into the Gold Coast Boulevard through careful design and treatment.

Providing a light rail extension down the Gold Coast Highway also means the heavy rail corridor adjacent to the M1 will remain protected for a future extension of the Gold Coast line passenger railway which is intended to fulfil a longer distance regional transport function.

Buses

Buses currently play a very important role in the movement of people along and beyond the Gold Coast Highway corridor to a wide range of destinations. Consistent with the approach adopted in the previous stages of the light rail, some bus routes will be shortened or replaced (such as the current route 700 and 777 along the Gold Coast Highway), while other services would be maintained and potentially enhanced to offer better connectivity overall. The Study has identified the need for buses to continue to connect communities to the west of the Gold Coast Highway to key centres and interchanges with Light Rail. Connections between bus and light rail will be designed to be safe, convenient and accessible. Further work between TMR, TransLink and City of Gold Coast will confirm the design of transport interchanges and the network of services that use them to align with their future planning.

Property Impacts

TMR has approved planning for the Gold Coast Highway through Palm Beach and has been protecting the corridor for future upgrades (including conditioning setbacks as part of the development process). The study has confirmed the current planning is generally adequate for future requirements, however it will need further refinement in isolated locations as the level of design becomes more detailed.

Information relating to specific property impacts has been removed from this report; however, the information removed has no bearings on the outcome of this report.

Traffic Analysis

A detailed traffic analysis process was undertaken to determine the number of traffic lanes, intersection configuration and performance of the Gold Coast Highway now and into the future. The analysis confirmed that the nearby M1 (Varsity Lakes to Tugun) upgrade will perform a critical transport function on the southern Gold Coast providing the opportunity to:



- Accommodate a significant increase in vehicle demands including both local demands on service roads and regional demands on the motorway itself; and
- improve local connections to the M1 and service roads including a new connection between the M1 and Nineteenth Avenue

This significant increase in capacity will provide through traffic with a viable alternative, reducing demand on the Gold Coast Highway. This provides an opportunity to redesign the Gold Coast Highway as a more multi-modal and pedestrian friendly corridor. Through careful analysis of travel demands and traffic movements throughout the wider southern Gold Coast network, this study has identified the opportunity for some sections of the Gold Coast Highway in parts of Palm Beach and Currumbin to be reduced from four to two through lanes, without detrimental impacts on travel time and network capacity. This will involve the rationalisation of movements at some intersections including the relocation of some right turns to ensure that traffic flow and property access is maintained. This will be further explored through consultation with the local community.

Future Opportunities

The study has identified the following opportunities that could be considered in future upgrade projects:

Improved Palm Beach Avenue precinct

There is the potential to provide alternatives for through traffic so the intersection of Palm Beach Avenue, Gold Coast Highway and Cypress Avenue can be transformed into a pedestrian friendly precinct with the opportunity for street front dining, shopping and urban renewal

Improved Connectivity to the M1

A new road connection between Nineteenth Avenue in northern Palm Beach and the M1 and its new service roads, which will be delivered through the M1 (Varsity Lakes to Tugun) Upgrade, significantly improves accessibility to and from Palm Beach, reducing reliance on Palm Beach Avenue for access to and from the motorway.

Active Transport

There is the opportunity to provide new dedicated bridge crossings for pedestrians and cyclists across Tallebudgera and Currumbin Creeks improving the safety and comfort of active travel options.

Oceanway

There is the opportunity to develop a beachfront Oceanway path along the full length of Palm Beach to provide a high standard cycling and walking facility catering for both recreation and transport related active travel.

Toolona Street

Associated projects could improve the safety and efficiency of the Gold Coast Highway and Toolona Street intersection by providing alternative access points and reducing the number of movements.

Burleigh Head National Park

The proposed design preserves the existing Burleigh Head National Park and improves access to the southern entrance via active travel, light rail, bus and car.

Connectivity to Burleigh Ridge Park

In order to help protect wildlife and to improve active transport and bushwalking connectivity between Burleigh Head National Park and Burleigh Ridge Park, a land bridge could be provided, protecting biodiversity by reconnecting ecological corridors.



1. Introduction

1.1 Purpose and scope of this Route Strategy

The principal purpose of this Route Strategy for the Gold Coast Highway (GCH) (Burleigh Heads to Tugun) is to:

- develop a strategy taking account of the needs and preferred function of all modes of transport including integration and interfacing requirements over a 20-year planning horizon
- develop options that satisfy these needs and functional outcomes
- identify land requirements to protect the corridor
- rank the developed options (Multi-Criteria Assessment)
- recommend the preferred option
- develop Link Planning Layouts which highlight the property required to deliver the preferred long term road layout concept

This Route Strategy is ultimately intended to support the designation of the land requirements associated with Planned Upgrade/s of this State Transport Corridor as Category C Protected Planning in accordance with the Department of Transport and Main Roads Approved Planning Policy, October 2017. Information relating to specific property impacts has been removed from this report; however, the information removed has no bearings on the outcome of this report.

1.2 Project extent

The extent for this Route Strategy is the Gold Coast Highway between Burleigh Connection Road, Burleigh Heads in the north to Boyd Street, Tugun in the south. The corridor is approximate 9km in length. A wider study area, which extends to the M1 in the west, has been considered in the evaluation of wider network options and solutions. A map of the study area is provided in Figure 1-1.

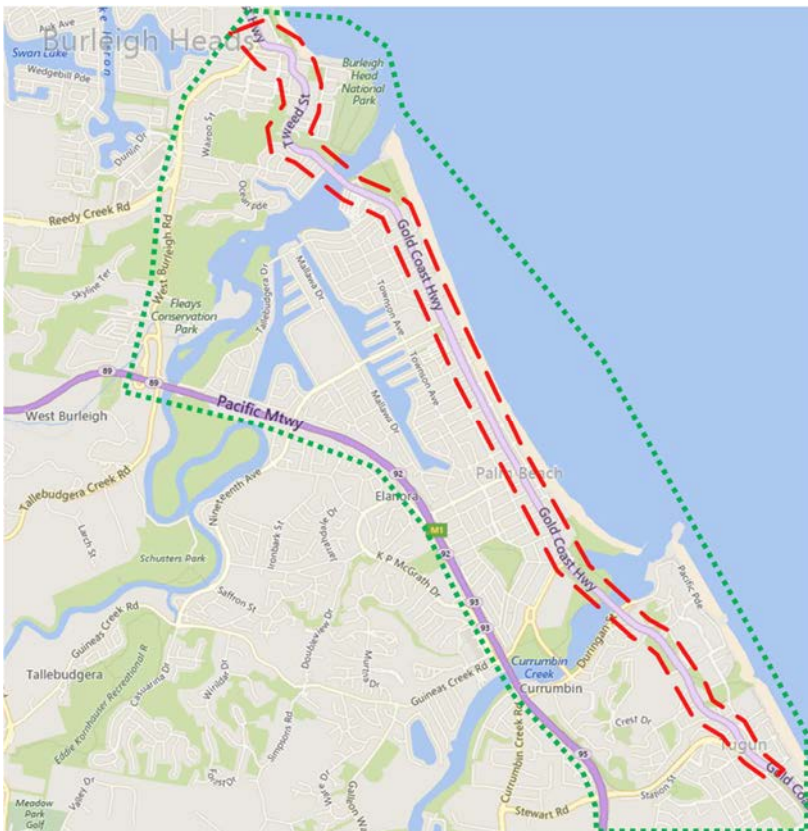


Figure 1-1: Study Area



1.3 Structure of this document

Section 1 (this section): Introduction

Section 2: Planning Context

Section 3: Current Situation

Section 4: Route Planning Pressures

Section 5: Route objectives

Section 6: Strategic priorities

Section 7: Option selection and refinement

Section 8: Investment requirements



2. Planning context

This chapter provides an overview of the policies and strategies relevant to the Gold Coast Highway (Burleigh Heads to Tugun) corridor.

2.1 Overview of strategic planning frameworks

A range of strategic plans and policies exist at the State, Regional and Local levels which provide relevant guidance to the development of a future vision for the Gold Coast Highway corridor. These key plans and strategies are identified in Figure 2-1 and are discussed in the subsequent sections of this report.



Figure 2-1: Framework of strategic policies and strategies

2.2 Queensland Government goals and objectives

The Queensland Government has six objectives for the community as shown in Figure 2-2. The three key objectives considered relevant to this project include:

- **Creating jobs in a strong economy**
 - Create jobs.
 - Increase private sector investment.
 - Engage more young Queenslanders in education training or work.
- **Protect the Great Barrier Reef**
 - Reduce Queensland's contribution to climate change.



- Improve water quality.
- **Keep Queenslanders Healthy**
 - Increase the number of Queenslanders with a healthy body weight.
 - Reduce suicides.



Figure 2-2: Queensland Government Community Objectives¹

These high level objectives are intended to be delivered upon through the various land use and transport plans as discussed later in this chapter.

¹ <https://www.ourfuture.qld.gov.au>



2.3 Transport Coordination Plan 2017-2027²

The development of a Transport Coordination Plan is a requirement of the *Transport Planning and Coordination Act 1994*. The intent of the Act is to achieve overall transport effectiveness and efficiency through strategic planning and management of transport resources.

The Transport Coordination Plan is intended to contribute to the Act's objectives and provides the overarching framework for strategic planning and management of transport in Queensland.

The Transport Coordination Plan 2017-2027 identifies a vision for transport in Queensland, as well as three goals and five objectives to help achieve the vision. The objectives articulate the government's expectations of what the transport system will provide for Queenslanders over the next 10 years. The plan includes key indicators and criteria to guide the successful delivery of these objectives. This plan is shown below in Figure 2.3.

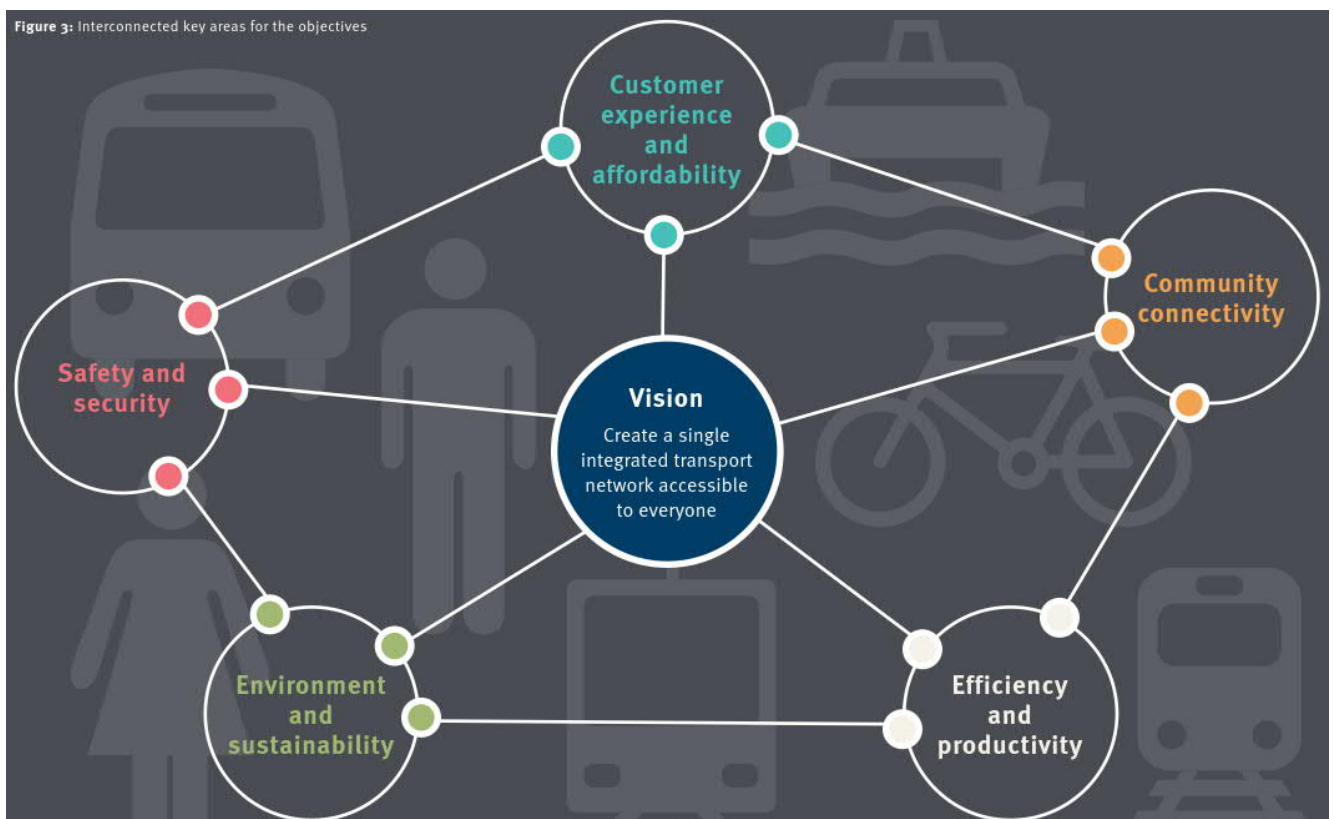


Figure 2-3: Transport Coordination Plan Vision and Objectives

The vision, goals and objectives are elaborated in Table 2-1 and reiterate the State governments' intention to deliver on the high level whole of government objectives through planning for and investment of the transport system. Of particular relevance to the GCH corridor are the aspirations for a transport system that safely meets the needs of everybody (irrespective of age or ability) and to do so in a way which contributes to a cleaner, healthier more liveable environment.

² Department of Transport and Main Roads (Oct 2017) <https://www.tmr.qld.gov.au/About-us/Corporate-information/Publications/Transport-Coordination-Plan>

Table 2-1: TMR Transport Coordination Plan vision, goals and objectives

VISION				
Create a single integrated transport network accessible to everyone				
GOALS				
Efficient and reliable transport	Integrated transport		Safe and secure transport	
OBJECTIVES				
<i>Customer experience and affordability</i> Transport meets the needs of all Queenslanders, now and into the future	<i>Community connectivity</i> Transport connects communities to employment and vital services	<i>Efficiency and productivity</i> Transport facilitates the efficient movement of people and freight to grow Queensland's economy	<i>Safety and security</i> Transport is safe and secure for customers and goods	<i>Environment and sustainability</i> Transport contributes to a cleaner, healthier and more liveable environment and is resilient to Queensland's weather extremes

2.4 TMR Strategic Plan 2019-2023³

The TMR Strategic Plan is intended to guide the department's investment and planning decisions in a way that meets government objectives and supports the Transport Coordination Plan. TMR's vision for the transport network and its departmental objectives are outlined in Table 2-2.

Table 2-2: TMR Strategic Plan vision, objectives and strategies

VISION and PURPOSE	
Creating a single integrated transport network accessible to everyone	
OBJECTIVES	STRATEGIES
<i>Accessible</i>	<ul style="list-style-type: none"> Support Queensland communities through inclusive connections Facilitate solutions to improve accessibility and customer experience Build collaborative networks to strengthen knowledge and information flow across TMR Deliver more effective outcomes through a diverse and inclusive workforce
<i>Safe</i>	<ul style="list-style-type: none"> Enable the safe introduction of new technologies and services onto the network Prioritise safety in all the work we do Design, operate and maintain a secure, safe, and resilient transport system
<i>Responsive</i>	<ul style="list-style-type: none"> Enable adaptive solutions that respond to emerging transport technologies, customer expectations and government priorities Provide easy-to-use services Provide continuous learning opportunities to support an innovative and future-ready workforce
<i>Efficient</i>	<ul style="list-style-type: none"> Effectively utilise assets to deliver the best network outcome Work more effectively with stakeholders to create benefits for our customers Ensure best value-for-money approach to delivery Leverage technology, data and information to enhance network and organisational performance
<i>Sustainable</i>	<ul style="list-style-type: none"> Encourage active and shared transport modes Enhance network resilience to minimise the impacts of climate change and incidents Prioritise planning and investment decisions that enhance benefits realisation Support low and zero emission transport technologies, modes and materials

³ Transport and Main Roads (February 2020) <https://www.tmr.qld.gov.au/About-us/Corporate-information/Publications/Strategic-plan>

Of relevance to the Gold Coast Highway corridor are the objectives around safety, sustainability and accessibility, ensuring that the transport network evolves including through the greater promotion of active and shared (including public) transport modes.

2.5 Shaping SEQ⁴

Shaping SEQ is the most recent and pre-eminent state planning instrument of relevance to the GCH corridor. Shaping SEQ is a statutory regional plan for the South East Queensland (SEQ) region given effect by the *Planning Act 2016* and provides a framework to manage growth, land use and development across the region. It sets a 50-year vision for the region, as well as setting out goals, elements, and directions, as outlined in Table 2-3.

Table 2-3 – Shaping SEQ Vision, Goals, Elements and Strategies

VISION				
<i>In 50 years, SEQ will be recognised globally as a unique subtropical region where people love to live, learn, work, invest and visit.</i>				
GOALS				
GROW <i>Sustainably accommodating a growing population</i>	PROSER <i>A globally competitive economic powerhouse</i>	CONNECT <i>Moving people, products & information efficiently</i>	SUSTAIN <i>Promoting ecological and social sustainability</i>	LIVE <i>Living in better designed communities</i>
ELEMENTS				
<ul style="list-style-type: none"> 1. Efficient land use 2. Focussing on higher residential density in areas with good access to PT, jobs and services 3. New communities support consolidated urban settlement 4. Housing diversity meets changing needs 5. Growing rural towns and villages 	<ul style="list-style-type: none"> 1. High performing outward focussed (export) economy 2. Regional Economic Clusters 3. Regional activity centres network 4. Knowledge and technology precincts 5. Major enterprise and industrial areas 6. Tourism 7. Special Uses 8. Rural prosperity 	<ul style="list-style-type: none"> 1. An efficient movement system 2. Active transport favoured 3. Integrated land use and transport Infrastructure 4. Prioritised infrastructure investment 5. Regional infrastructure networks 6. Digital infrastructure 	<ul style="list-style-type: none"> 1. Aboriginal and Torres Strait Islander people engaged 2. Biodiversity protected 3. Koala habitat maintained 4. Regional landscapes managed sustainably 5. Water sensitive communities 6. Natural economic resources managed sustainably 7. Health and well-being enhanced 8. Fairness/ equity 9. Climate change effects managed 10. Safe, hazard resilient communities 11. Affordable living 	<ul style="list-style-type: none"> 1. Valuing good design 2. Working with weather 3. Inspiration from local character 4. Working with natural systems 5. Creating legible and connected streets and spaces 6. Opportunities for adaptation and change 7. The power of place making to enhance local identity

⁴ <https://dilgpprd.blob.core.windows.net/general/shapingseq.pdf>



DIRECTIONS (relevant to Gold Coast Highway corridor)				
Growth by consolidation	Regional Economic Clusters	Key regional infrastructure	Protect and nurture	Great places
<p>Focusing density in and around appropriate locations along urban corridors, including the future passenger transport corridor between Broadbeach and Coolangatta, including proposed key stations.</p> <p>By 2041, these places will be more compact, mixed-use, connected and active, and provide improved urban amenity.</p>	<p>Southern gateway (GC airport/ Coolangatta) is an emerging REC supporting health and tertiary education, manufacturing (focused on aviation) and tourism clusters</p> <p>Extending the light rail to Coolangatta will accelerate economic activity in this cluster</p>	<p>Delivering a network of high-frequency PT connections as part of the strategic public transport system to 2041, including extending the light rail from Broadbeach to Coolangatta which will support increased residential densities and employment growth, increase public transport accessibility and efficiency, and connect the Southport– Broadbeach REC with Southern Gateway REC</p>	<p>Protect and nurture the regional biodiversity network and manage regional landscapes</p> <p>Traditional Owners will be engaged to ensure their cultural knowledge and connection to land and sea Country is included in planning.</p>	<p>Developing and promoting great places will support the sub-region's liveability, prosperity, sense of identity and community. Current and evolving great places identified by the City of Gold Coast in the Southern sub-region include:</p> <p>James Street Burleigh Heads is a traditional main street village centre</p>

Shaping SEQ, as outlined above, provides clear direction for the future planning of the Gold Coast Highway corridor by setting the expectation for a light rail extension south to Gold Coast Airport and Coolangatta. This is intended to support the growth and development of jobs (through Regional Economic Clusters) as well as encourage urban consolidation to meet regional growth projections.



2.6 City of Gold Coast Corporate Plan⁵

The City of Gold Coast (CoGC) *Corporate Plan 2022* sets the vision “Inspired by Lifestyle. Driven By Opportunity” for the city. The vision is underpinned by 3 themes, being Place, Prosperity and People as illustrated in Figure 2-4.

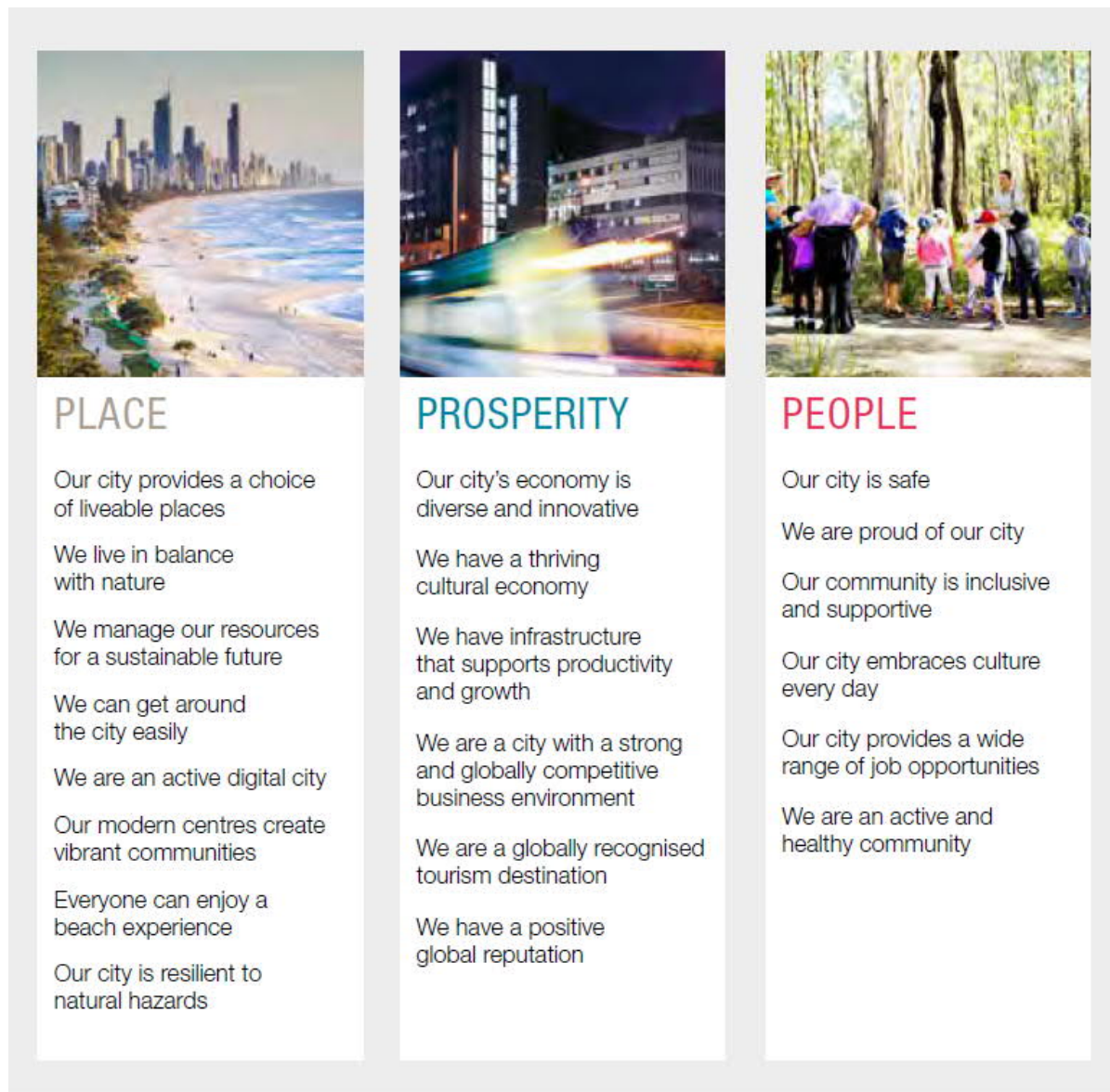


Figure 2-4: City of Gold Coast Vision and Themes (source: City of Gold Coast Corporate Plan, 2018)

The Corporate Plan is intended to drive the activities of the council, including land use and transport planning and investment decisions. The plan includes clear aspirations around liveability and sustainability, as well as a diverse and productive economy.

⁵ <https://www.goldcoast.qld.gov.au/council/corporate-plan-609.html>



2.7 City of Gold Coast City Plan (Planning Scheme)⁶

Gold Coast City Plan (Planning Scheme) supports the City of Gold Coast Vision, setting out the City's intention for future development. The Planning Scheme seeks to advance state and regional strategies, including state planning policies, through more detailed local responses.

2.7.1 Strategic Framework

Within the planning scheme, the Strategic Framework sets the policy direction for the City and has a planning horizon of 2031. As the major element of the City Plan, it is intended to help protect and enhance the Gold Coast's lifestyle by ensuring appropriate and sustainable development for the life of the Planning Scheme. The strategic framework is comprised of the Strategic Intent ("World Class City") supported by six city shaping themes that help guide future growth and manage change as illustrated in Figure 2-5.



Figure 2-5 Gold Coast City Plan Strategic Framework (source: City of Gold Coast City Plan, 2016)

⁶ <https://www.goldcoast.qld.gov.au/planning-and-building/city-plan-2015-19859.html>



The Strategic intent represents a major shift from development on the city's fringe to redevelopment of urban centres and key inner-city neighbourhoods in order to achieve an orderly and economically efficient settlement pattern and ensure existing non-urban areas are protected. As part of this, some urban areas will be renewed and transformed in part due to investment in transport infrastructure, while other urban areas will be protected to maintain their existing appearance and amenity, or business function.

The plan illustrates the emphasis on urban consolidation further, noting that the Gold Coast *will transform into a highly connected, compact city with a focus on vibrant centres, specialist precincts and connecting high frequency public transport corridors*, see to Figure 2-6.



Figure 2-6: Emphasis on consolidation within the existing urban footprint (Source; City of Gold Coast City Plan, 2016)

2.7.2 Local planning (Gold Coast Highway Corridor)

Development within the study corridor is guided by the provisions set out in the current Planning Scheme. The following sections provide an overview of the planning provisions of relevance to the project corridor. These are the pre-existing land use controls already in effect within the study corridor and are not influenced by or changed as a result of any potential future light rail investment.

2.7.2.1 Zones

The key zones of relevance to the project corridor are described in Table 2-4.

Table 2-4 Gold Coast Highway Corridor zoning

Domain	Purpose	Key Relevant Elements
Medium Density Residential	The purpose of the medium density residential domain code is to provide for a range and mix of dwelling types including single-dwelling houses and multiple-dwellings supported by community uses and small-scale services and facilities that cater for local residents.	Medium density residential is the primary domain along the Gold Coast Highway corridor through Burleigh Heads and Palm Beach. With stipulated maximum building heights of 29m either side of the Gold Coast Highway through Palm Beach, there is opportunity for uplift in development densities within this area.
Low Density Residential	The purpose of the low density residential domain code is to provide for dwelling houses, supported by community uses and small-scale services and facilities that cater for local residents.	Along the project corridor, low-density residential is primarily situated west of Cypress Terrace through Palm Beach and throughout Currumbin. Generally, the density intent of this domain has been achieved.
Open Space	The purpose of the open space domain code is to provide for local, district, and regional scale parks	Areas of open space are associated are primarily situated around the Tallebudgera Creek and Currumbin Creek, including the Gold Coast Recreation Centre, the Tallebudgera



	<p>that serve the recreational needs of a wide range of residents and visitors.</p> <p>Where required to meet community needs, development may include shelters, amenity facilities, picnic tables and playgrounds and infrastructure to support safe access and essential management.</p>	<p>Creek Tourist Park, Currumbin Pirate Park. Outside these areas, small areas of open space, in the form of local parks, are situated throughout the corridor.</p> <p>Although not designated as open space, the beach would provide land use support to this domain. However, its capacity to accommodate community needs development and infrastructure is limited.</p>
Centre	<p>The purpose of the centre domain code is to provide for a mix of uses and activities. These uses include, but are not limited to, business, retail, professional, administrative, community, entertainment, cultural and residential activities.</p> <p>Centres are found at a variety of scales based on their location and surrounding activities.</p>	<p>The largest area of Centre zoning occurs between Eighth Avenue and Fourth Avenue and spans five blocks. These contain small retail outlets, medical, takeaway food and restaurants. There is a smaller section of Centre zoning to the north at Twenty Third Avenue that contains food outlets. The purpose of the Centre domain code is to provide for a mix of uses and activities. These uses include, but are not limited to, business, retail, professional, administrative, community, entertainment, cultural and residential activities.</p>
Conservation	<p>The purpose of the conservation domain code is to provide for the protection, restoration and management of areas identified as supporting significant biological diversity and ecological integrity. There are opportunities to improve linkages between conservation areas.</p>	<p>There are large areas with zoned conservation such as Burleigh Ridge Park and Burleigh Head National Park. These are separated by the Gold Coast Highway Conservation and open space is also located at Rockview Public Park, Tarrabora Reserve and Beree-Badalla Reserve.</p> <p>As the purpose of this zone includes providing for protection of these areas, development within them should be avoided, where possible.</p>
Major Tourism	<p>The purpose of the major tourism domain code is to provide for larger scale integrated tourist localities or facilities located in urban, rural, environmental or coastal areas.</p> <p>Development provides for a mix of uses including tourist facilities, tourist attractions, short-term accommodation, retail, business, education, industrial, community purpose, recreation and open space that support the needs of tourists and visitors. Permanent residential accommodation for management and employed personnel may be appropriate.</p>	<p>Currumbin Wildlife Sanctuary, located either side of the Gold Coast Highway in Currumbin, is designated as Major tourism and is a wildlife park precinct.</p>

2.7.2.2 Light Rail Urban Renewal Area

The Planning Scheme provides a “Light Rail Urban Renewal Area” overlay code for the light rail corridor north of Mermaid Beach. The purpose of this overlay code is to enable development that provides for high quality urban environments that optimise the pedestrian environment and accessibility to light rail services and economic development opportunities.

This overlay code supports light rail as a potential catalyst for transforming the city into a highly-connected, compact city with vibrant centres, specialist precincts and urban renewal corridors that will efficiently use land and offer an interesting and unique street life. The Planning Scheme notes that not all areas within this overlay will accommodate high-rise buildings and that a more diverse and varied urban form is sought as illustrated in Figure 2-7.



Figure 2-7: Potential land use outcomes along the light rail corridor (source: City of Gold Coast City Plan, 2016)

However this overlay does not cover the Burleigh Heads to Tugun section of the Gold Coast Highway (i.e. the study corridor). While the corridor is identified as an “Investigation for Light Rail Urban Renewal” area under the Planning Scheme’s strategic framework any future change to planning provisions within the corridor in response to higher capacity public transport provision would be the subject of separate investigation and consultation by the City of Gold Coast, at a later date.

2.7.2.3 Land Use Opportunity

Zoning designations already adopted and in effect along the length of the study corridor are relatively consistent, reflecting the Planning Scheme’s strategic intent to provide for infill development at locations that are well-served by public transport, services and infrastructure. Consistent along the length of the corridor is the presence of medium density residential either side of the GCH, highlighting the intent to increase densities around this major transport corridor.

Overall, as detached dwellings are still a prominent land use within the study corridor, there is opportunity for further uplift in development intensity, particularly within the medium density residential domain. Other zoning designations, such as the open space, conservation and community facilities, are not intended to provide for infill development and would present limited future development opportunities or provide an increase in public transport demand.

2.7.2.4 City Plan updates

CoGC is proposing updates to the Planning Scheme (Major Update 2 & 3). The updates include a reduction in building height from 29m to 16-17m, between Seventeenth Avenue and Laceys Lane in Palm Beach, see Figure 2-8.

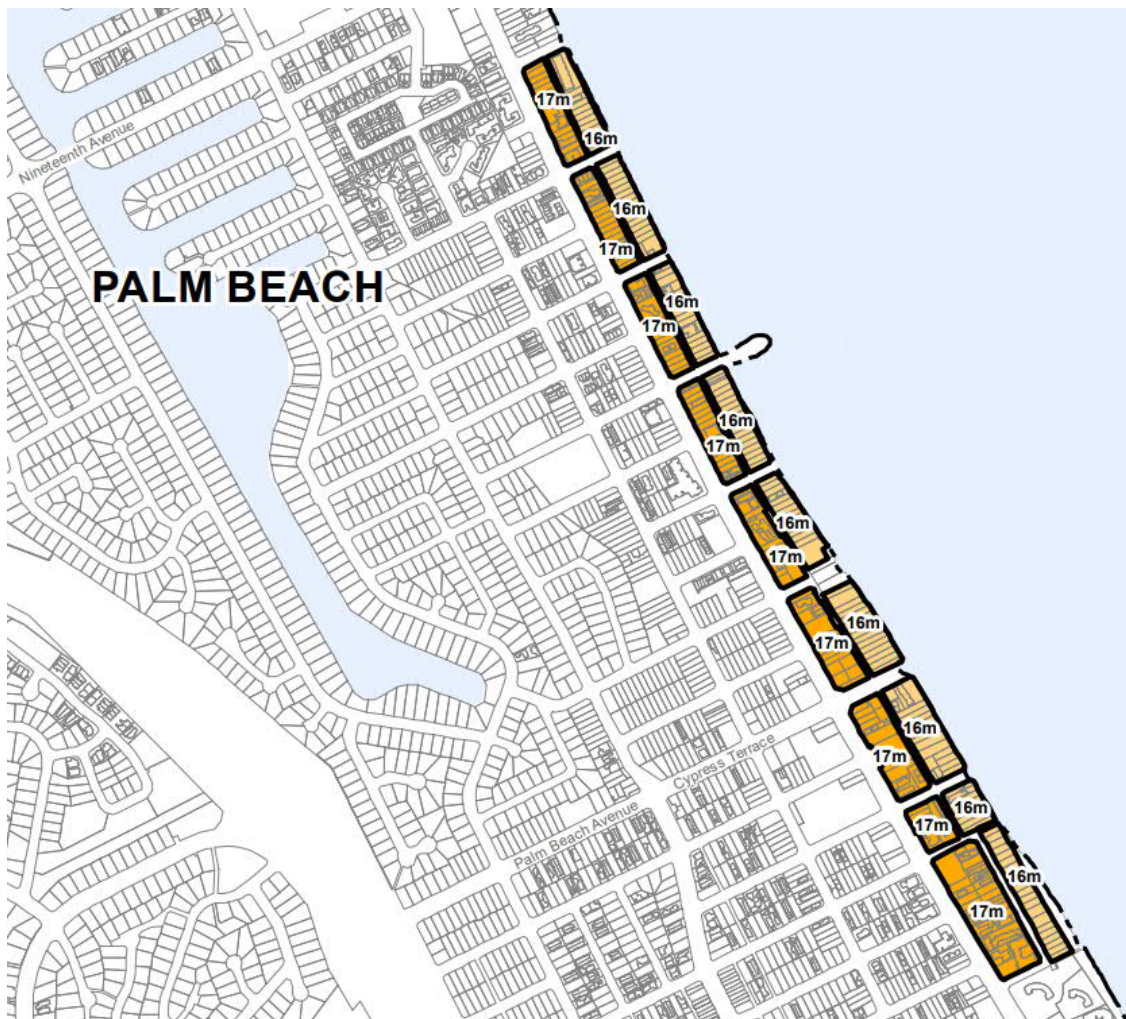


Figure 2-8: Proposed building height changes (source: City of Gold Coast, City Plan Update, 2020)

Residential densities remain unchanged except for the addition of 4 lots on the corner of the Gold Coast Highway and Seventh Avenue to RD6 up to 300 bedrooms per net hectare (1bed/33m²) on the Residential density overlay map, see Figure 2-9.

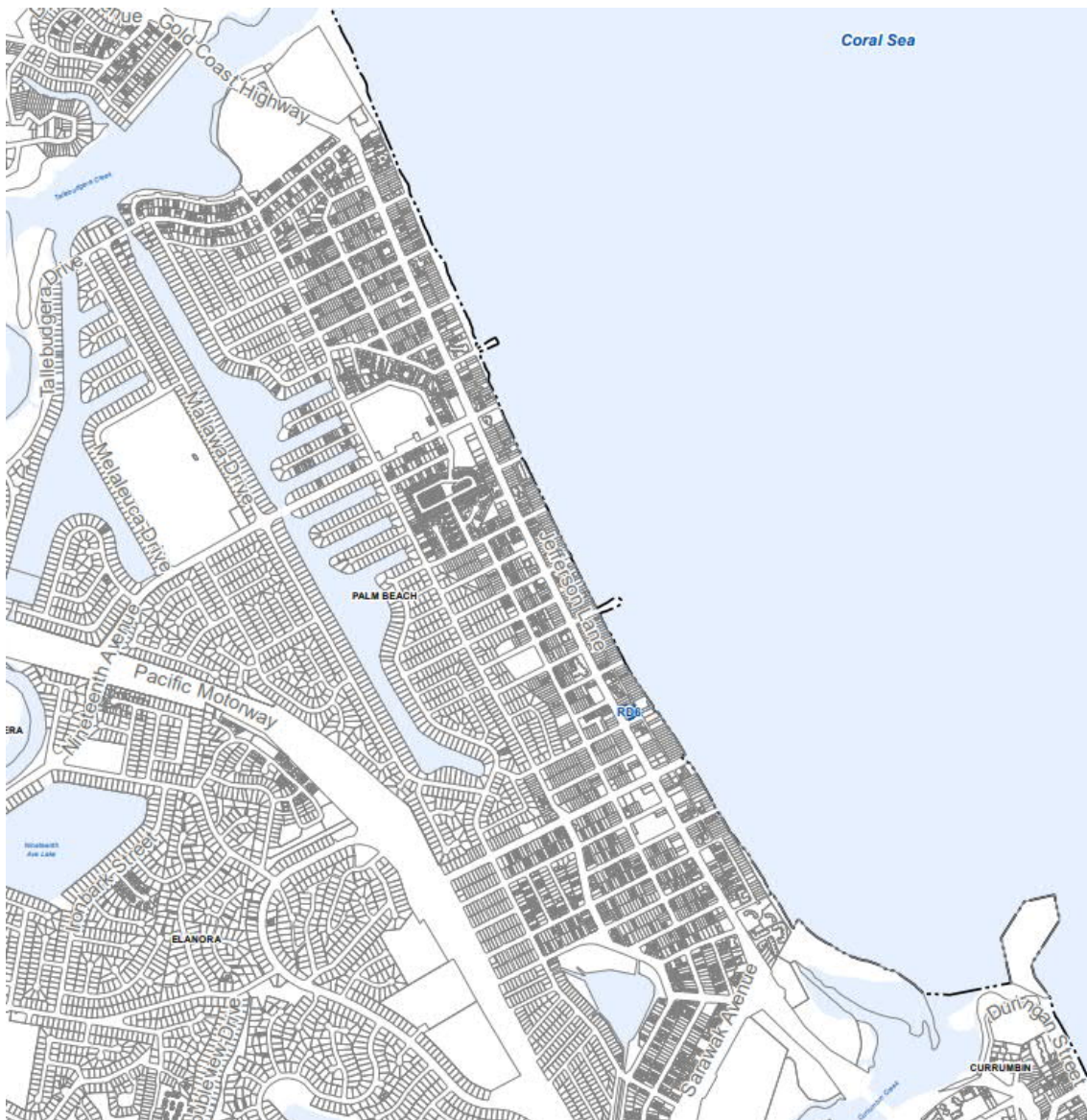


Figure 2-9: Proposed residential density changes (source: City of Gold Coast City Plan Update, 2020)

2.8 Regional Transport Plan for South East Queensland (draft)

This draft Regional Transport Plan for South East Queensland has four outcomes areas, linked to the Regional Plan outcomes areas, namely Grow, Prosper, Live and Sustain. Under each of these four outcome areas are a series of transport objectives and specific directions as outlined in Table 2-5.

Table 2-5: SEQ RTP objectives and directions

Priority 1: Grow	Priority 2: Prosper	Priority 3: Sustain	Priority 4: Live
Transport objectives			
1.1 Shape sustainable growth in consolidation areas 1.2 Reliable, efficient and sustainable travel options in expansion areas 1.3 Safe and efficient movement in rural communities	2.1 Efficient and reliable movement of goods and services 2.2 A reliable and high-frequency public transport network 2.3 Accurate and informed transport decision-making	3.1 Transport system resilience 3.2 Safe, accessible and convenient active transport options 3.3 A sustainable transport system	4.1 Walkable communities and activity centres connected by sustainable transport 4.2 Safe, fair and equitable travel options for all
Actions relevant to the Burleigh Heads to Tugun corridor			
<ul style="list-style-type: none"> Urban consolidation and high-quality design, particularly in and around activity centres and along existing and planned public transport corridors 	<ul style="list-style-type: none"> Improved freight routes Increased public transport connecting activity centres Improving data accuracy and usage through smart infrastructure, real-time data and artificial intelligence 	<ul style="list-style-type: none"> Infrastructure is improved and built to minimise the impacts of flooding and incidents, Network and incident management is improved to minimise impacts of closures and disruptions. Prioritisation of active transport Provision of electric vehicle infrastructure Infrastructure and services that minimise impacts on scenic landscapes, and significant ecological areas 	<ul style="list-style-type: none"> Safe walking and cycling is prioritised within local neighbourhoods and activity centres Transport choice is improved via options appropriate for the demand and land use, including community and school transport Personalised transport such as demand-responsive transit and ride share

2.9 Gold Coast City Transport Strategy 2031⁷

The Gold Coast City Transport Strategy guides transport policy and investment decisions. Its vision is for *smart growth, a connected city and sustainable travel choices*. The strategy is underpinned by six objectives which seek to expand and deliver on the vision. These are:

- Integrated transport and land use
- Car parking managed sustainably and economically
- Public transport improved (to provide an attractive alternative)
- Safe and attractive active transport networks
- Roads and freight – efficient and safe
- Travel behaviour change to reduce car dependency

Details of proposed actions relative to each of the five objectives (also referred to as outcome areas) are tabulated in Table 2-6. Specific actions of relevance to the Gold Coast Highway corridor are highlighted in blue text.

Table 2-6: Relevant actions by key outcome area

Integrated transport and land use	
Theme 3: Prioritise future urban development as ‘transit-oriented development’ in centres and along public transport corridors	
3.1	Undertake corridor planning studies for each high-frequency public transport corridor , including Broadbeach to Coolangatta.
3.2	Zone land within activity centres and along high-frequency public transport corridors to support transit-oriented development, facilitating more intense and diverse development , where appropriate.
Signature projects	
Signature Project 1: Protect the coastal strip between Southport and Coolangatta	
<ul style="list-style-type: none"> • The coastal strip between Burleigh Heads and Coolangatta is the subject of town planning provisions which allow intensive residential and tourist development and supporting commercial services. • The relatively small part of the city’s land area that provides access to our prized coastal strip for all Gold Coast residents and tourists must be protected. • Although there will be safety improvements and the elimination of choke points, major roads will generally not be expanded in the coastal transit precinct. Investment priority will be given to public and active transport modes. 	
Public transport network	
Theme 8: Work with the State Government to progressively deliver a city-wide, integrated, high-frequency public transport network, consisting of light rail, heavy rail and rapid bus	
8.2	Work in cooperation with TMR, the private sector and the Commonwealth Government to plan and deliver the Gold Coast light rail network in stages , as identified in this strategy.
8.8	Establish and upgrade public transport interchanges at key transport stations as identified in this strategy to provide convenient transfers between local buses and high-frequency transport services (heavy rail, light rail and bus).
Theme 11: Integrate requirements to support public transport within other policy areas	
11.2	Support land use initiatives that locate high-demand activities close to high-quality public transport services , and facilitate public transport interchanges that are integrated into the urban landscape .

⁷ <https://www.goldcoast.qld.gov.au/documents/bf/GC-transport-strategy-2031.pdf>



11.3 In new communities, develop road networks that can accommodate bus routes and develop complementary **urban design that creates boulevards along rapid bus routes**.

11.4 Implement road network initiatives including bus priority at congestion points, **high-quality passenger waiting environments** in road reserves, and **convenient pedestrian crossings** near stops and stations.

Active transport network

Theme 12: Develop a connected and accessible active transport network

12.3 Continue to progressively complete the **coastal cycle and pedestrian routes**.

12.5 Deliver **green bridges** and other active transport links across waterways, motorways and railways.

12.7 Implement **pedestrian priority zones** within Burleigh Heads.

Theme 15: Improve safety, standards and personal security

15.1 Develop and implement specific design standards that provide a **safe, accessible, high-quality cycling and walking infrastructure**.

Signature projects

Signature Project 3: Implement **'community boulevards'** and pedestrian priority zones in key locations

- Council will develop or reinforce community boulevards **progressively along the coastal strip** to give **priority to pedestrians, bike riders and public transport**.
- The boulevards will be designed to cater for only **low volumes of cars**.

Road and freight network

Theme 19: Make the most of existing infrastructure and promote greater use of public transport and active transport

19.1 Plan key links to **accommodate future light rail**, as identified in this strategy.

19.3 Provide for **cycling on key routes** as per Council's cycle network delivery program.

Theme 20: Improve the legibility of the Gold Coast road network so motorists take preferred traffic routes and avoid unnecessary trips through activity centres, strip shopping areas and beachside areas

20.1 **Rename and renumber roads** to help the **community better understand the nature of the road** and the type of trips that should be made on them. **Priorities for renaming include the Gold Coast Highway**.

20.2 Interface with land development guidelines to ensure **road types match the needs of the adjacent land development**.

Proposed road changes and additions

Gold Coast Highway

- Council will work with State Government to make the **Gold Coast Highway a 'community boulevard'** in conjunction with the delivery of the light rail. The corridor will change to give priority to public transport, pedestrians and bike riders and would be renamed as **'Gold Coast Boulevard'** to send the right message to motorists – that is, the road is primarily a public and active transport corridor.
- Where necessary, **bypass roads** will be provided to ensure appropriate capacity for cars.

Changing travel behaviour

Theme 23: Expand Council's Active Travel initiatives, targeting schools, workplaces and communities.

23.4 Align **travel behaviour and change initiatives** with the provision of new transport infrastructure and services, targeting trips to schools, universities and workplaces.



2.10 Principal Cycle Network Plan and Addendum

2.10.1 Principal Cycle Network SEQ⁸

The Gold Coast Highway is identified within the SEQ Principal Cycle Network Plan (PCNP) as a principal cycle route or corridor. Principal routes are indicative and intended to guide further planning and design to determine the precise route and design of cycle facilities. The PCNP sets an expectation for the inclusion of high-quality cycle infrastructure in or near the Gold Coast Highway corridor refer Figure 2-10.



Figure 2-10: Extract of Principal Cycle Network Plan (PCNP) for SEQ (Source: TMR, 2016)

⁸ <https://www.tmr.qld.gov.au/Travel-and-transport/Cycling/Principal-Cycle-Network-Plans>



2.10.2 Priority Route Maps (PCNP addendum)

The Priority Route Maps are an addendum to the PCNP, they identify the delivery priority that state and local government have assigned to principal routes in each local government area. Priority A items are intended to be the focus of delivery within the next 10 years. Priority B in 10 to 15 years. Priority C and D are 15 years plus.

For this route strategy the PCNP addendum identifies the following, see Figure 2-11

- The Gold Coast Highway trunk cycle corridor in its entirety is Priority A.
- A parallel western cycle route along Mallawa Drive through Palm Beach is also Priority A.
- Sections of the coastal path (also known as the Oceanway by CoGC) through Palm Beach are Priority B.
- Through Currumbin and Tugun both the Gold Coast Highway corridor and the Coastal Corridor are Priority A.

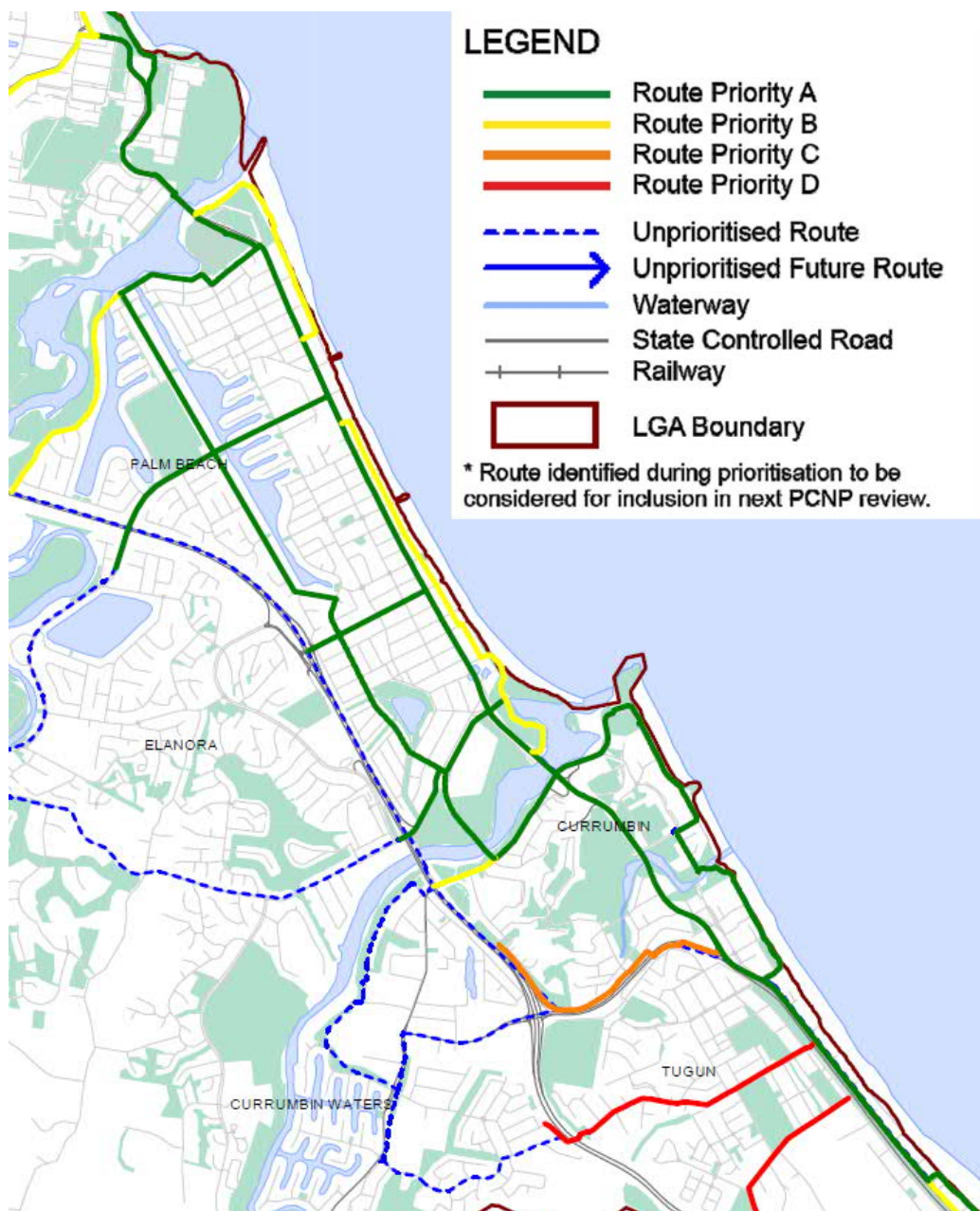


Figure 2-11: Extract from PCNP Addendum - Priority Route Map for southern Gold Coast (source, TMR, 2017)

2.11 Gold Coast Southern and Central Area Transport Strategy (GCSCATS) 2012

The Department of Transport and Main Roads (DTMR) initiated the Gold Coast Southern and Central Area Transport Study (GCSCATS) in recognition of the need to provide a more sustainable and integrated transport system for the Gold Coast.

This area strategy is of direct relevance to this route strategy as it defines the preferred transport elements for the wider southern Gold Coast. Specific actions and outcomes recommended in GCSCATS preferred network (refer Figure 2-12) which inform this Gold Coast Highway Route Strategy include:

- Light rail from Broadbeach to Burleigh Heads, Gold Coast Airport and Coolangatta CBD centred on the most contestable public transport markets whilst providing inter-regional connections to passenger rail.
- The high patronage capacities offered by light rail, when connected to the major centres along the coastal corridor, are likely to provide a variety of benefits including encouraging land use intensification.
- Bus lanes on Burleigh Connection Road provide a strategic public transport link between the passenger rail and future TOD at Varsity Station with the coast precinct and intermediate shopping centres along the corridor.
- Passenger rail extended to Elanora with connections to the light rail provides linkages to the southern Gold Coast, Gold Coast Airport and Coolangatta, without duplicating functions/infrastructure.
- Comprehensive pedestrian and cycle networks providing access to light rail stations.
- Cycle facilities are to be provided along key spines at the same time as the public transport upgrades are provided.
- The Pacific Motorway upgraded to 6 lanes from Worongary to Tugun by 2031, and 8 lanes between Worongary and Varsity Lakes beyond 2031. The timing of motorway upgrades should be coordinated with improved public transport services and supporting arterial road networks to support more efficient use of the transport system and encourage further use of sustainable transport modes.
- Safety and operational efficiency improvements will be required across the arterial road network. These improvements should be prioritised on safety warrants and potential to facilitate public transport and safe cycle outcomes.
- Introducing a “public transport precinct” land use planning overlay which influences parking supply and pricing in areas supported by light rail.

GCSCATS assessed the specific transport benefits on Light Rail on the Gold Coast Highway relative to a Do Minimum of continued frequent bus services. As outlined in Table 2-7, Light Rail between Broadbeach and Coolangatta (Link Test 9) was shown to increase daily public transport trips by 22% (from almost 221,000 to around 270,000) relative to the do minimum and 12% compared to LRT to Burleigh Heads only (241,000 to around 270,000). As such, light rail between Broadbeach and Coolangatta via Burleigh Heads and Gold Coast Airport became one of the critical 2031 network components. Furthermore, the staging assessment reinforced the importance of light rail in the Gold Coast Highway recommending an initial southern extension of LRT between Broadbeach and Burleigh Heads by 2021.

Table 2-7: Extract from GCSCATS modelling results summary

Scenario	PT mode share	PT trips	Daily VKT
2031 Do Minimum	5.9%	220,617	29,911,326
2031 Link-Test 2 – Light Rail Broadbeach to Burleigh Heads	6.4%	241,054	21,795,791
2031 Link-Test 9 – Light Rail Broadbeach to Coolangatta	7.2%	269,668	21,724,841

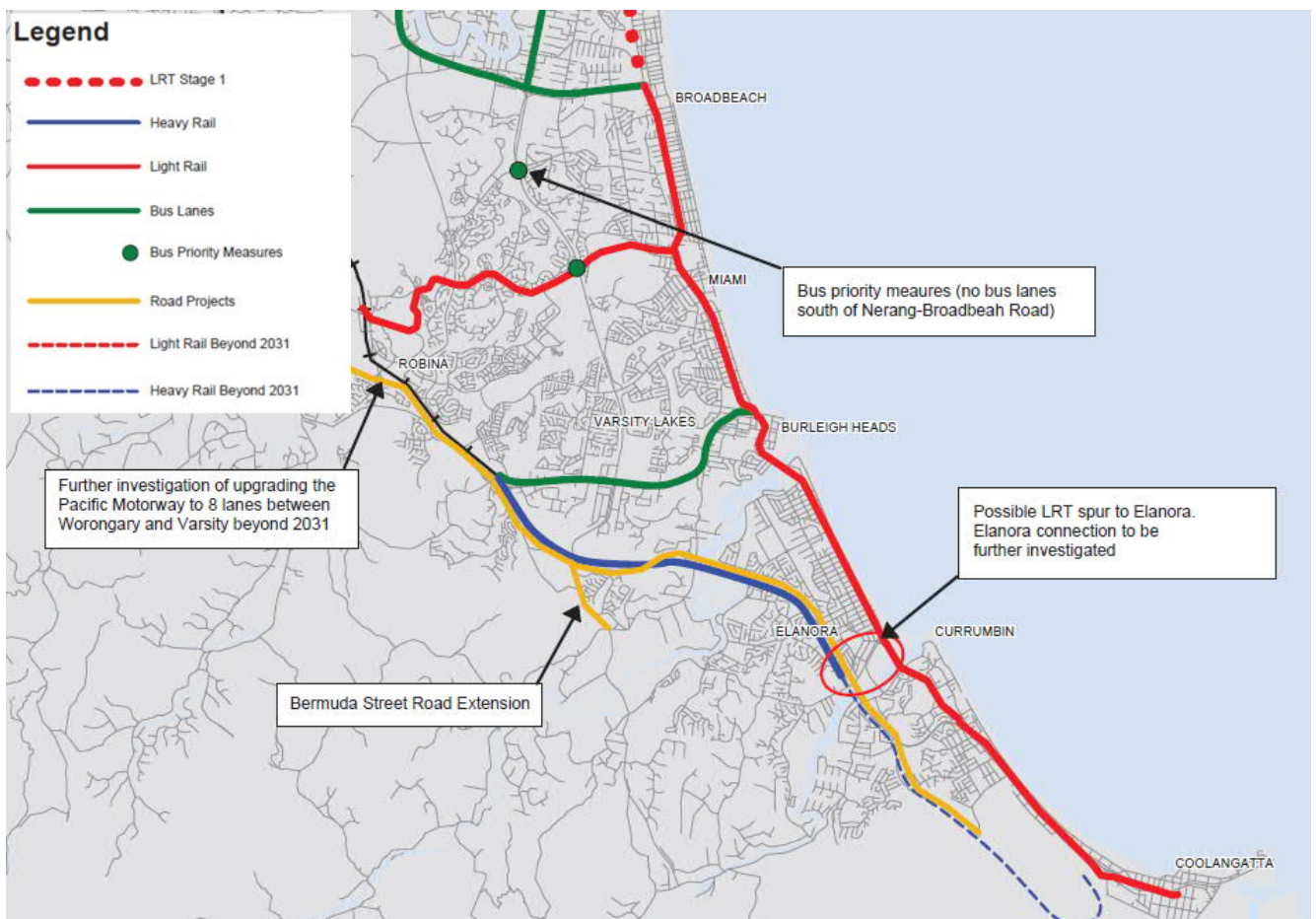


Figure 2-12: Extract from GCSCATS preferred 2031 strategy



2.12 Strategic directions for the Gold Coast Highway corridor

Several overarching themes emerge from the above documents and are illustrated in Figure 2-13 :



Figure 2-13: Recurring strategic themes

Specific directions and changes that are recommended through these documents include:

- Light rail between Broadbeach and Coolangatta is a key assumption and therefore will need to be accommodated in any road corridor planning.
- Upgraded high quality (principal) cycle facilities are expected to be provided as a priority (within the next 10 years) – this includes facilities on both the Gold Coast Highway itself and on parallel routes east and west of the highway through Palm Beach.
- Planning should seek to reduce the attractiveness of the use of private vehicles and the impact of through traffic on the Gold Coast Highway with aspirations for more of a “Boulevard” feel to deliver reduced severance between the western and eastern sides of the highway. Through traffic should be encouraged to use parallel routes.
- Land use changes along the corridor are both expected and required to meet housing targets and protect greenspaces outside the current urban footprint. However, development and density should not be homogenous and should protect and enhance the character of the southern Gold Coast villages and centres.

A more detailed assessment of the opportunities and constraints within the corridor, including feedback from stakeholders is captured in the following section.

3. Current situation

3.1 Current road environment

Key details on the current road environment are contained in Table 3-1.

Table 3-1: General road details

Category	Details
Divided road	Yes
Surface type	Asphalt
Number of lanes	Generally, 4 through lanes (2 northbound and 2 southbound) plus turning lanes
Lane widths	Variable between 3.1m and 3.5m
Speed environment	Variable – between 50km/h (Burleigh Heads) and 80 km/h (Tugun) with the majority of the corridor 60 to 70 km/h
Shoulder width	Generally, between 0m and 3.0m but varies up to 7m in areas Between Tallebudgera Creek and Thrower Drive, width is typically 2.5m to 3.0m Thrower Drive to Currumbin Creek - 0.0m to 2.0m typically not sealed Currumbin Creek to Wagawn Street - 0.0m to 3.5m Wagawn Street to Stewart Road - 4.0m to 7.0m Stewart Road to Boyd Street - 0.0m to 2.5m
Median width and type	Between Brake St and Tallebudgera Creek - 2.0m to 4m. Tallebudgera Creek to Thrower Drive - 2.0m to 4.5m Currumbin Creek to Wagawn Street - 2.0m to 3.0m Wagawn Street to Stewart Road - 1.0m to 2.5m Stewart Road to Boyd Street - 2.0m to 7.0m
Auxiliary lane details	All auxiliary right turn lanes from GCH are single lanes Auxiliary left turn lanes from GCH at most signalised intersections including approaches to Tallebudgera Dr, Seventh Ave, Palm Beach Ave, Thrower Dr, Tomewin St, Stewart Rd, Toolona St
Floodway details	Two major creek systems cross the corridor, namely Currumbin Creek and Tallebudgera Creek as well as a minor creek system/ overland flow at Tomewin Street
Terran type	Hilly in 2 sections (Burleigh Hill and Currumbin Hill), otherwise flat.

3.2 Existing cross section

At Burleigh Heads, the width of the existing road corridor is between 33m and 64m. South of Tallebudgera Drive, the existing Gold Coast Highway is largely a 30m wide corridor through Palm Beach. At Tugun, the corridor varies significantly between a formed corridor as low as 22m (pinch-point of carriageway between retaining walls in the vicinity of Kropp Lane) and up to 115m south of Toolona Street (including both Coolangatta Rd and Golden Four Drive service roads).

Through the constrained, urban section of Palm Beach, the existing Gold Coast Highway corridor is largely a 30m wide corridor, comprised of the following typical road features:

- 3.75m verge widths (including 1.5m concrete footpaths, wider in some locations)
- 2.5m parking lane
- 3.3m through lanes



- 4.4m median - At intersections, the median is used to accommodate right turn pockets

The typical mid-block cross section is illustrated in Figure 3-1.

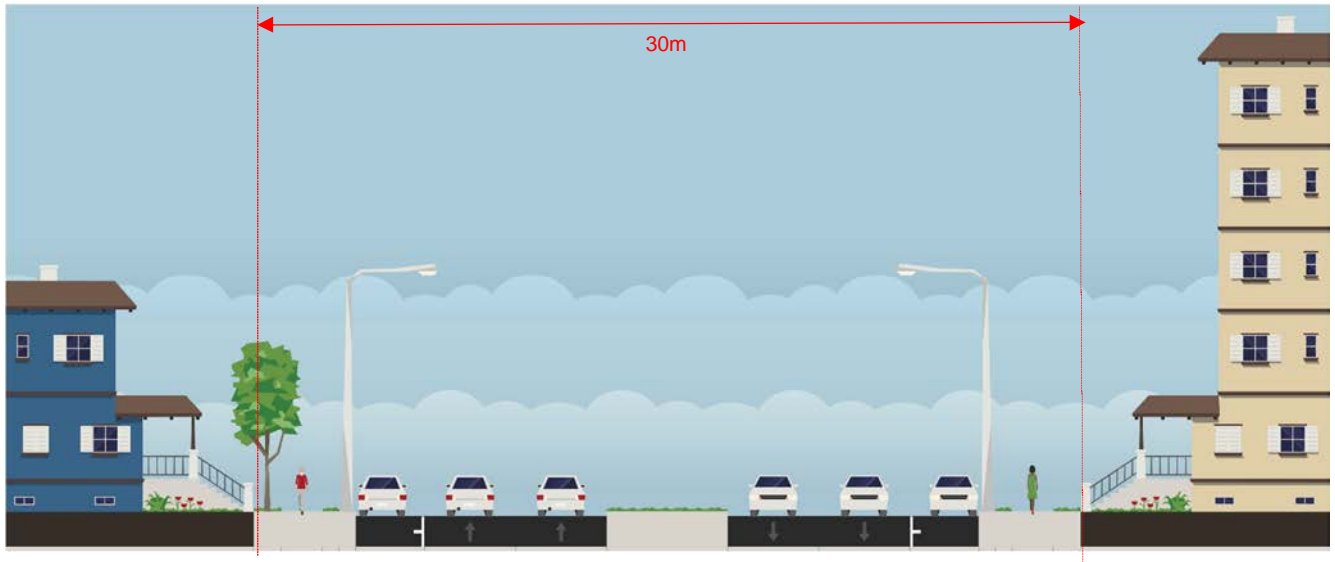


Figure 3-1: Existing 30m Gold Coast Highway corridor at Palm Beach (approximate)

3.3 Traffic and transport

3.3.1 Function

The study area is physically constrained by the Pacific Ocean to the east and the hinterland to the west. Within this part of the city of Gold Coast, the Gold Coast Highway and the M1 (Pacific Motorway) are the primary transport links. The Gold Coast Highway between Burleigh Heads and Tugun performs a key north-south arterial road function while the M1 to the west provides a regional north-south motorway function.

The Gold Coast Highway is connected to the M1 via four east-west roads, namely Burleigh Connection Road (northern end of the corridor), Palm Beach Avenue, Thrower Drive (limited connections to/ from the motorway) and Tugun - Currumbin Road (Stewart Road).

The Gold Coast Highway is a multi-modal corridor carrying general traffic, high frequency bus services as well as pedestrians and cyclists. Each of these modes is described further below.

3.3.2 Traffic

In 2016 the Gold Coast Highway carried between 21,000 and 35,000 vehicles per weekday (AWDT) between Burleigh Connection Road, Burleigh Heads and Stewart Road, Tugun with around 21,000 vehicles across Currumbin Creek and 35,000 vehicles across Tallebudgera Creek.

In the AM peak two-hour period, between 60 and 76% of two-way traffic volumes on the Gold Coast Highway are travelling in the northbound direction, while in the PM peak two-hour period, between 50 and 64% of two-way traffic volumes on the Gold Coast Highway are travelling in the southbound direction. Overall, two-way traffic volumes in the PM period are 33 to 60% higher than the AM peak period at equivalent locations.

Table 3-2: 2016 traffic volumes (Source GCSTM-MM)

Gold Coast Highway	AM NB	AM SB	AM 2-way	PM NB	PM SB	PM 2-way
Currumbin Creek	800	500	1300	900	900	1800
N of Palm Beach Ave	900	600	1500	1000	1400	2400
Tallebudgera Creek	1900	600	2700	1300	2300	3600

Travel time analysis using Bluetooth undertaken for TMR shows relatively stable travel times between the surveyed travel points, Christine Avenue and Stewart Road. In the AM peak northbound (peak direction) between 7:30 and 8:30 travel times ranged from around 13 to 15 minutes. In the PM peak southbound (peak direction) between 16:30 and 17:30 ranged from around 12 to 13 minutes. Generally southbound traffic is given greater green time than northbound due to less conflicting right turn movements which is reflected in faster travel times even in the busier PM peak.

3.3.3 Public transport

The Gold Coast Highway, within the study area, is well served by public transport with three high frequency bus routes, namely routes 700, 765 and 777 and another trunk route, 760.

- Route 700 travels between Tweed Heads and Broadbeach South (tram terminus) up to 8 times an hour (every 7.5 minutes) with stops approximately every 300m.
- Route 777 operates every 15 minutes between Gold Coast airport and Broadbeach South serving only stops at Palm Beach Ave, Nineteenth Ave, Twenty Seventh Ave and Burleigh Heads within the study corridor.
- Route 765 travels between The Pines shopping centre and Varsity Lakes via the Gold Coast Highway and Christine Avenue operating every 15 minutes.
- Another major trunk route, the 760, currently operates every half hour between Gold Coast Airport and Varsity Lakes via Elanora (The Pines) and the M1.

These four key services are supported by a range of local bus routes which generally operate hourly. The route structure is illustrated in Figure 3-2 while the overlapping weekday peak frequency of the four key routes illustrated in Figure 3-3. This diagram shows that between Burleigh Heads and Thrower Drive (Palm Beach) there are up to 16 buses per hour and the corridor well serviced by public transport.

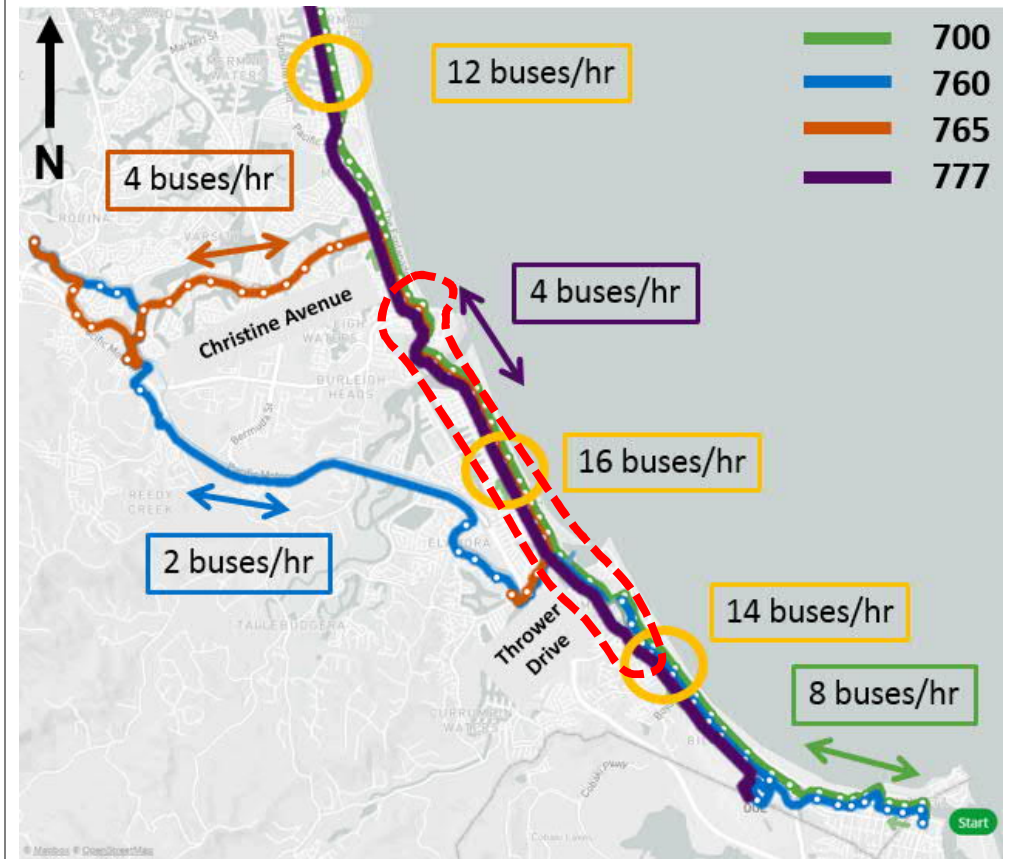
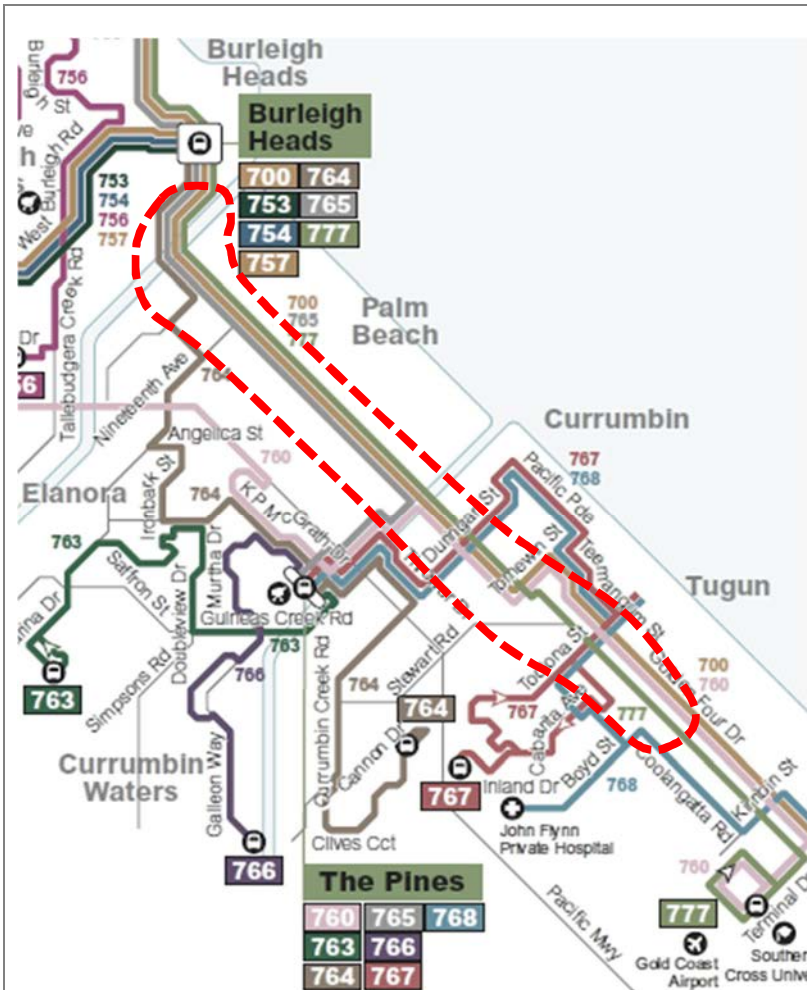


Figure 3-2: Extract of TransLink Gold Coast route map

Figure 3-3 : Current frequency of bus services from Miami to Coolangatta

At a route level, Route 700 is the busiest route along the corridor in both the northbound and southbound directions as well as during the week and on weekends. Most routes experience between 20% to 40% less boardings on the weekends compared to weekdays. The 777 has a smaller reduction in patronage on weekends, with only 2% less in the northbound direction and 9% less in the southbound direction in comparison to weekdays. This is likely due to it performing a more tourist related function, distributing passengers between the airport and central Gold Coast. Figure 3-4 shows the boardings and alightings for all four key bus routes south of Burleigh Heads.

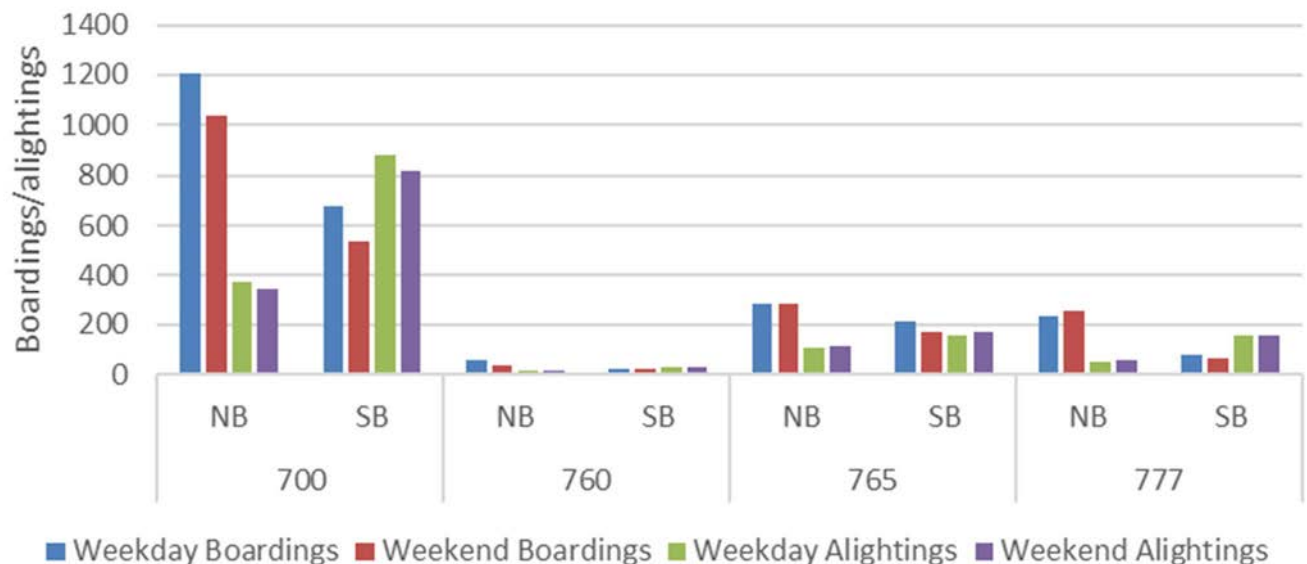


Figure 3-4 Number of boardings and alightings per route across the study area

An analysis of bus stop boardings and alightings was undertaken to understand average weekday and weekend boardings and alightings at key bus stops between Tugun and Burleigh Heads. This was based on ticket data from 26 February to 25 March 2018 and revealed that:

- The Palm Beach bus stops (at Palm Beach Avenue) are amongst the most highly utilised along the southern Gold Coast Highway corridor in both directions, with a large number of boardings and alightings to/from the north, both on weekdays and weekends highlighting the importance of access to lifestyle and community destinations.
- The Currumbin Wildlife Sanctuary bus stops are similarly well utilised with slightly higher stop activity on weekends.
- Low bus stop activity at “Tweed Street” (Burleigh Heads) and “Currumbin Hill” indicating potential to remove or consolidate stops in these areas.
- Lower levels of bus stop activity at some intermediate bus stops (between centres and major attractors) such as around Tenth Ave and Fifteenth Ave indicating some potential to remove or consolidate stops in these areas.

3.3.4 Active transport

The Gold Coast Highway caters for a diverse range of active transport users and trip purposes including local and through cycle trips as well as pedestrian activity both along and across the corridor.

Footpaths are provided for pedestrians along both sides of the Gold Coast highway except between Thrower Drive and Tomewin Street, Currumbin and between Winders Ave and Wagawn Street,

Tugun. South of Toolona Street Tugun, pedestrian facilities are provided on the parallel side roads (Golden Four Drive and Coolangatta Road) rather than on the side of the highway itself.

The two major creek crossings are key connections in the active transport network. Current provision on these bridges include:

- Tallebudgera Creek: 2.0m wide shared path on the eastern and western sides
- Currumbin Creek: 1.8m wide shared path on the eastern side only.

Pedestrian crossing facilities are located relatively frequently (generally between 200 and 800m) and primarily consist of at-grade signals. Figure 3-6 (overleaf) illustrates the type of crossing facility and the distances between them. There are notably long distances between crossing facilities at both Currumbin Hill (in the south) and Burleigh Hill (in the north) where there is limited frontage activity or connecting streets.

Figure 3-5 below illustrates the usage of the signalised pedestrian crossing facilities. This shows that Seventh Avenue, Palm Beach is the most heavily utilised, followed by the nearby Palm Beach Avenue crossing. Toolona Street (Tugun) and Goodwin Terrace (Burleigh Heads) are also highly utilised.

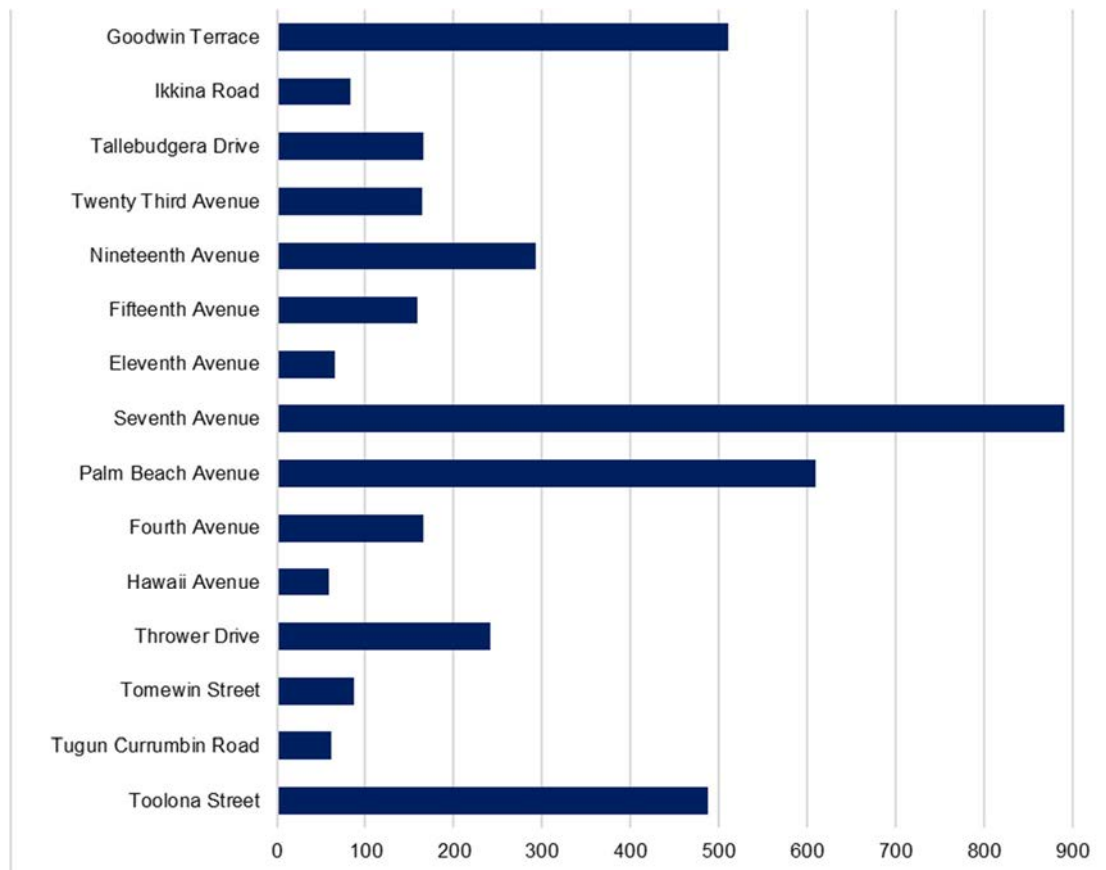
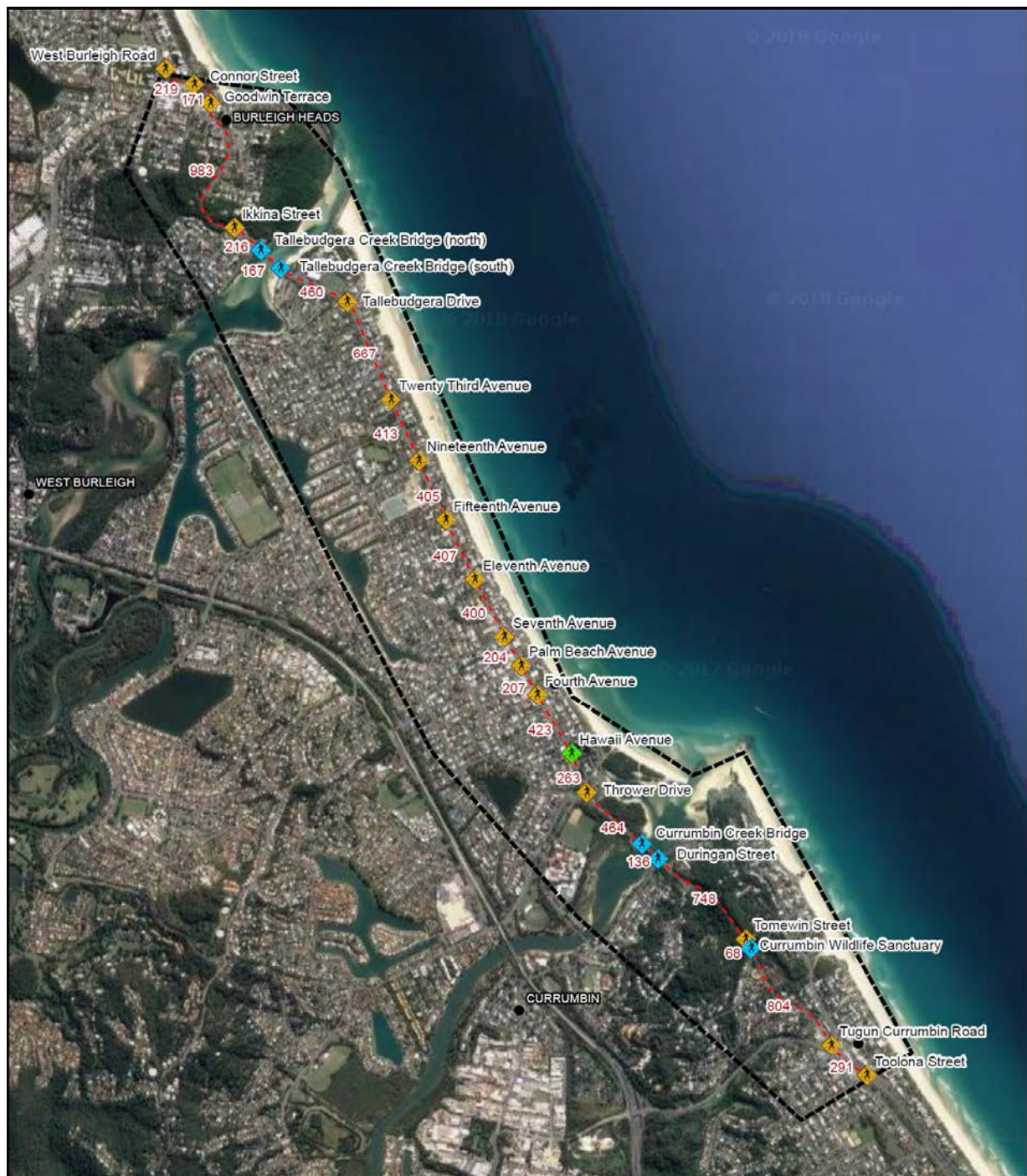


Figure 3-5: Average daily pedestrian call demand for crossing of Gold Coast Highway



LEGEND

Type of pedestrian crossing

signalised intersection

signalised pedestrian crossing

underpass

Distance between crossings (metres)

Study Area



Figure 3-6: Pedestrian crossing facilities

3.4 Land use

The study area is characterised by a diverse range of land uses, from low density residential to commercial and retail. Key features of the study area including notable community features and nodes of activity are illustrated in Figure 3-7.

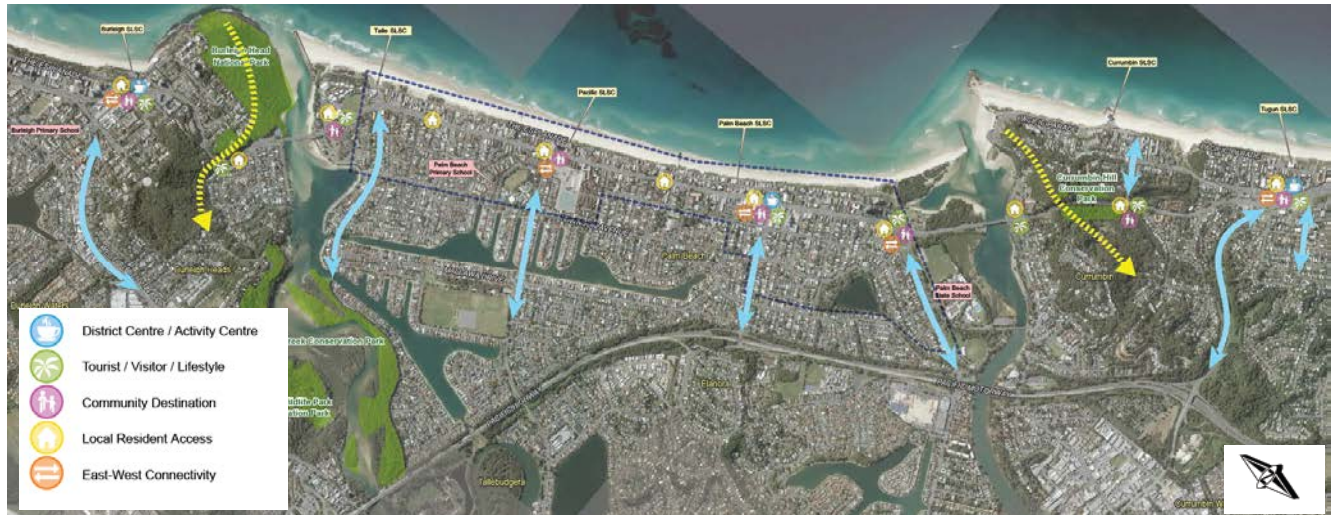


Figure 3-7: Key study area land use features

At the local level, City of Gold Coast zoning designations already in effect along the length of the study corridor are relatively consistent, reflecting the Planning Scheme's strategic intent to provide for infill development at locations that are well-served by public transport, services and infrastructure. Consistent along the length of the corridor is the presence of medium density residential zoning either side of the Gold Coast Highway, shown on Figure 3-8 highlighting the intent to increase densities around this existing major frequent public transport corridor, irrespective of light rail.

Other prominent zoning designations, as shown on Figure 3-8, along the study corridor include:

- low density residential to the west of the medium density residential zoning designation
- areas of open space and conservation around Tallebudgera Creek and Currumbin Creek
- small areas of Neighbourhood Centre that front on to the Gold Coast Highway at Burleigh Heads, Palm Beach and Tugun
- community facilities typically associated with education facilities
- special purpose zoned land associated with the Gold Coast Airport.

While uplift has begun to be realised along the corridor with the establishment of multi-dwelling developments, detached dwellings are still the prominent land use. As such, there is further opportunity for development uplift along the corridor, particularly within the existing medium density residential zone along the Gold Coast Highway. This medium density development zoning area extends approximately 100m east from the Gold Coast Highway to the beachfront and approximately 370m west to Townson Avenue.

The adopted Planning Scheme building height overlay provides direction on the maximum building heights typically allowed within the medium density zone and the neighbourhood centre zone.

Within Burleigh Heads, the maximum building heights to be achieved within the medium density residential zone are a mix of 29m (8 storeys) and 15 metres (4 storeys). The maximum height within the Neighbourhood Centre situated either side of James Street is set at 20 metres (5-6 storeys).

Within Palm Beach, with the exception of an area near to Palm Beach Primary School, the current Planning Scheme provides for development up to 29 metres primarily from the eastern edge of Cypress Terrace to the beachfront, either side of the Gold Coast Highway, shown on Figure 3-9. At other medium density residential locations throughout Palm Beach, the maximum building heights set are a mix of 9 metres or 15 metres (around 3-4 storeys).

The Neighbourhood Centre zone at Palm Beach sets a maximum building height of 39 metres (eight storeys). As this area currently typically contains a mix of one and two storey developments, this area presents the greatest opportunity along the corridor for an intensification of the land uses consistent with the current CityPlan.

Within Currumbin and Tugun, maximum development heights within the medium density residential zone and the Tugun Neighbourhood Centre are limited primarily to two or three storeys, with some residential areas allowing for up to 23 metres (6 storeys) to the east of the Gold Coast Highway, south of Dune Street.

West of Townson Avenue, the prominent zoning designation is low-density residential which is consistent with the existing land use within this area. The opportunity for development uplift within this area would only be possible with development that is inconsistent with the current development intent of the CityPlan.

Other zoning designations, such as the open space, conservation and community facilities, are not intended to provide for infill development and would present very limited future development opportunities nor would they provide an increase in public transport demand.

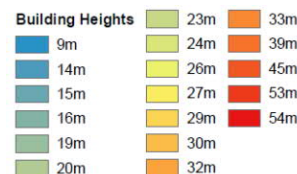
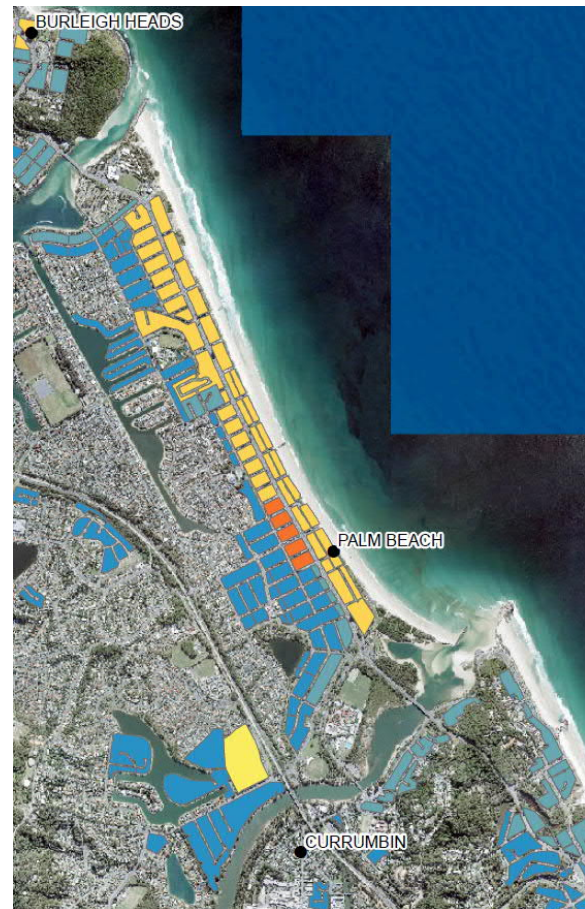
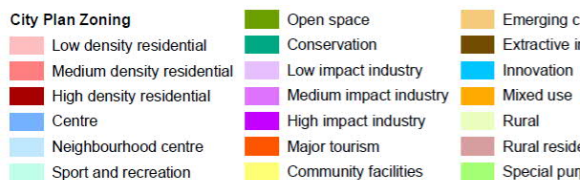


Figure 3-8: Current City Plan zonings
(source; City of Gold Coast City Plan, 2016)

Figure 3-9: Current permissible building heights⁹
(source; City of Gold Coast City Plan, 2016)

3.5 Environmental and cultural heritage

The environmental areas in the study area have been identified through a review of the Environmental Significance – Biodiversity, Environmental Significance – Vegetation Management and the Environmental Significance – Wetlands and Watercourses Overlays available under the Planning Scheme and the Department of State Development, Manufacturing, Industry and Planning (DSDMIP) State Planning Policy and Development Assessment. These overlays provide detail on biodiversity areas, waterway and wetland areas and areas for vegetation management consideration and also reflect the Matters of State Environmental Significance. These areas are shown on Figure 3-10.

Large areas of Protected Areas, Regulated Vegetation and Hinterland to Coast Critical Corridor, shown on Figure 3-10, are located within and surrounding Burleigh Head National Park and Currumbin Hill Conservation Park. Both Tallebudgera Creek and Currumbin Creek are identified as

⁹ Note proposed reductions in some maximum building heights as identified in section 2.7.2.4

Major Watercourses. The main channel and the northern banks of Currumbin Creek are also identified as State Significant Wetlands and State Significant Aquatic Systems.



LEGEND

- | | |
|---|---------------------------------|
| MSES - High ecological value waters (wetland) | MSES - Protected area - estates |
| MSES - 'High Ecological Significance' wetlands | Substantial remnants |
| MSES - Regulated vegetation - category B endangered or of concern | Vegetation management |
| | General priority vegetation |
| | Medium priority vegetation |
| | High priority vegetation |

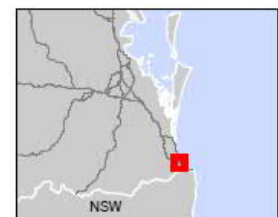


Figure 3-10: Ecological Values

The corridor contains a number of cultural heritage features, which have been highlighted in a desktop Cultural Heritage Assessment by TMR¹⁰. The key outcome is the significance of the northern part of the study corridor with numerous “story place”, shell middens, fish traps and artefact sites on or along Tallebudgera Creek and within the Burleigh Head National Park as identified in Figure 3-11. The Cultural Heritage Assessment notes *“The social / cultural significance of Burleigh Headland and its surrounds cannot be overstated. The sheer number of registered tangible and intangible cultural heritage sites in this area attest to this significance.”*

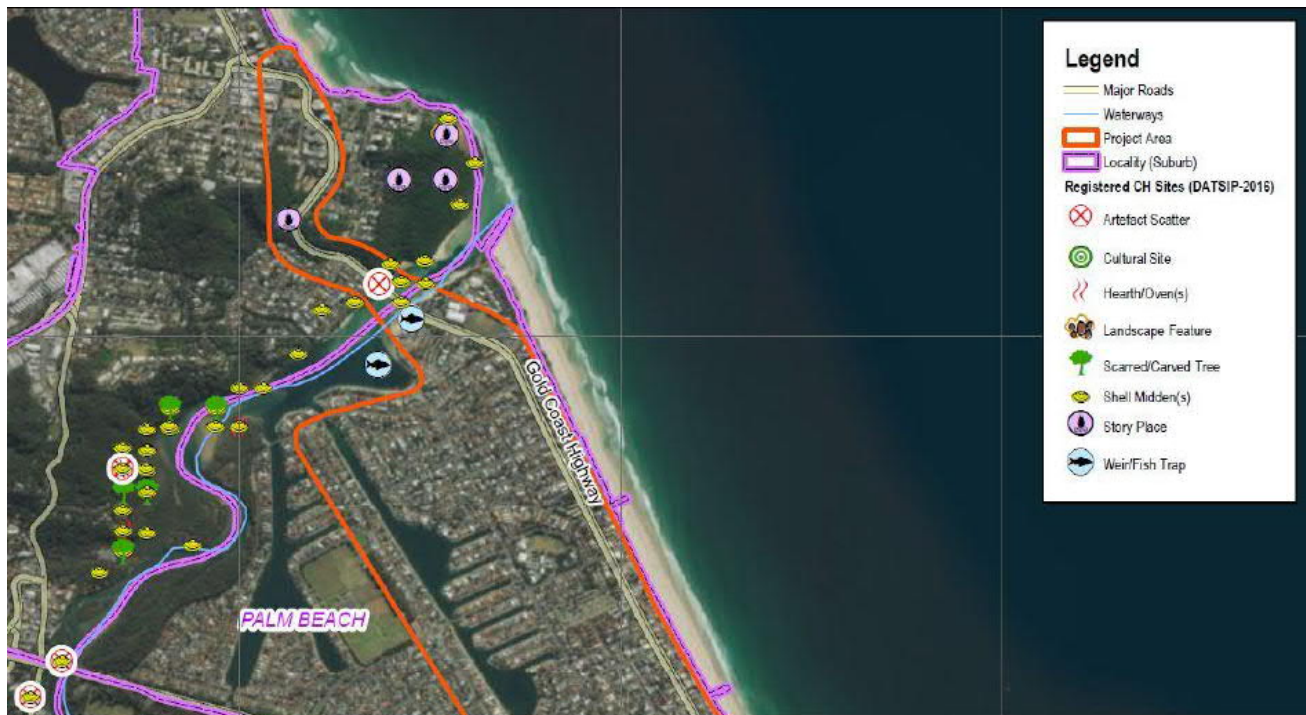


Figure 3-11: Extract of registered cultural heritage sites map (source: Jabree, 2017)

3.6 Public Utility Plant (PUP)

The identification of PUP assets within the project study area was determined from data provided by TMR. This data included utility layout plans and labels in DWG format from Dial Before You Dig (DBYD).

The following utilities listed below were found to have assets within the core study corridor:

- **Electricity.** Electrical utilities were divided primarily into two categories: Overhead electrification and underground electrification. Overhead electrification is predominantly located within the eastern verge between Tallebudgera Creek and Currumbin Creek, and runs parallel to the Gold Coast Highway. Connections also spur perpendicular from this eastern verge across the highway to service the western side. Underground electrification is less consistent and generally runs sporadically parallel along both verges of the highway and at road intersections.
- **Water.** Water utilities are generally D100 or D150 in size and are located within both the eastern and western verges along the Gold Coast highway. Occasional perpendicular crossings occur throughout the entire alignment, though are more common between Tallebudgera Creek and Currumbin Creek.
- **Gas.** A 1100D gas pipe runs parallel to the Gold Coast Highway in the eastern verge for the majority of the alignment, with perpendicular crossings to the western verge occurring very

¹⁰ Jabree, 2017



occasionally. A localised deviation occurs between Tomewin Street and Wagawn Street, where the gas pipe temporarily switches to the western verge, before crossing perpendicularly and continuing back into the eastern verge.

- **Sewer.** Data supplied for the existing sewer network indicated sporadic placements between the eastern and western verges along the Gold Coast Highway.
- **Communications/Optical Fibre.** Communication and Fibre Optic service providers were identified as being owned by Telstra, Optus and Nextgen. The majority of the alignment contained these services in both the eastern and western verges, with occasional perpendicular crossings and centre of road running. After crossing into the southern side of the Currumbin Creek, services were more commonly found in the eastern verge. A Telstra exchange is located on the eastern side of the Gold Coast Highway, immediately north of Wagawn Street, Tugun. This exchange is elevated above the existing highway and was considered a major physical constraint when considering alignment design options.

3.7 Geotechnical

A desktop geotechnical assessment was undertaken. Issues identified within this assessment include:

- **Slope stability.** There is potential for slope instability by the way of unconsolidated colluvium within sections Ch.6950 - Ch. 7250, Ch. 13330 - Ch. 13630, and Ch. 14040 - Ch. 14130 and alluvium within Ch. 12560 - Ch. 13330 as well as surficial slips of the loose soils may cause damage to pavements and structures in the area. Any cutting, foundations, or fill embankments in these areas should consider the potential for loose and unconsolidated material.
- **Soft ground.** Soft compressible soils are anticipated at locations underlain by alluvium, colluvium, man-made deposits, and unconsolidated sediments. These soils are likely to cause settlement and risk the integrity of pavements, embankments, and foundations. Deep foundations may be required at the creek crossings and ground improvement may be required along the alignment of new pavement and below shallow foundations and slabs.
- **Rippability and workability.** Cuttings and foundation excavations within Dcf underlain areas (Ch. 6950 - Ch. 7750) are likely to encounter difficult excavation due to the presence of shallow rock identified by the surface geology. Cuttings and foundation excavation within sediment underlain areas are not anticipated to encounter difficult excavation.
- **Acid sulfate soils.** Potential acid sulfate soils have been identified at Ch. 7600 - Ch. 9700, Ch. 11900 - Ch. 12420, and Ch. 13250 - Ch. 13600 of the general alignment. Any disturbance involving excavation, drainage, or water table lowering can pose significant risk to both the environment and design elements involved in the proposed development. These risks may include acidification of groundwater, damage to building foundations, and environmental pollution. This risk may be lessened by implementing a management scheme that minimises disturbance of the soils (limit earthworks, suspended buildings, etc.) and includes treatment of soil that does become disturbed.
- **Contaminated/ disturbed land.** A review of the available geological map resources indicates the presence of man-made deposits generally associated with land-fill or mining (tailings, dumps and rehabilitated areas) within Ch. 8100 - Ch. 8600. This should be further investigated from an environmental perspective in further design stages, taking consideration of the type of deposit, potential contamination/ environmental hazard associated with the development, prevention, and management plans.
- **Shallow groundwater.** Relatively shallow groundwater, identified from historical groundwater bores, is anticipated particularly within Ch. 8100 to Ch. 12400. However, previous investigations within these chainages did not encounter water within the target depths. Further investigation will be required to confirm or disconfirm any areas of shallow groundwater that may impact on the pavement design. Foundations and excavations may encounter water, which would require appropriate drainage and/or lining to prevent contact during and/or post construction.

3.8 Hydraulic and bridge requirements

An assessment of existing hydraulic conditions was undertaken using the City of Gold Coast (CoGC) models for Currumbin and Tallebudgera Creeks (Currumbin MIKE FLOOD v2016 and Tallebudgera MIKE Flood v2016).

A map showing the 1% AEP flood levels was then produced to identify areas of land with flooding and inundation potential and the presence of overland flow paths (refer Figure 3-12).

Areas potentially susceptible to flooding are primarily located west of the Gold Coast Highway and around Tallebudgera Creek and Currumbin Creek.

The 1% AEP flood level is a critical design level for any new infrastructure within the corridor including new road or Light Rail Transit (LRT) facilities as per AS5100.1. However, any new active transport only facility could be designed to achieve a 2% AEP level of immunity.

As well as flood immunity, any new bridge structures would need to be designed to avoid afflux impacts to upstream environments and private property. The primary means identified to minimise afflux is to ensure any new bridge piers are of a similar size and in a similar location as existing bridge piers.

3.9 Bridge structures

An analysis was undertaken of the condition of the current bridge structures crossing Currumbin Creek and Tallebudgera Creek to determine suitability or otherwise for new LRT infrastructure and vehicles. This analysis concluded that:

- The existing bridge structures are over 40 years old, with the 2014 level 2 inspection reports noting the condition rating of Currumbin Creek and Tallebudgera Creek Southbound as Condition State 3.
- Both the Currumbin Creek bridge and Tallebudgera Creek bridges' superstructures are overstressed and inadequate for light rail traffic loading.
- The design, construction and safety constraints of strengthening/modifying the bridges would likely be unfeasible and uneconomic.

In summary, the existing bridge superstructure and substructure elements would be structurally inadequate for the design loads as stated in AS5100 2017. As such, the design development undertaken for the concept layout options all propose that the existing Tallebudgera and Currumbin Creek bridges remain as road bridges and that new bridge structures are constructed to support the Light Rail over these two creek crossings.

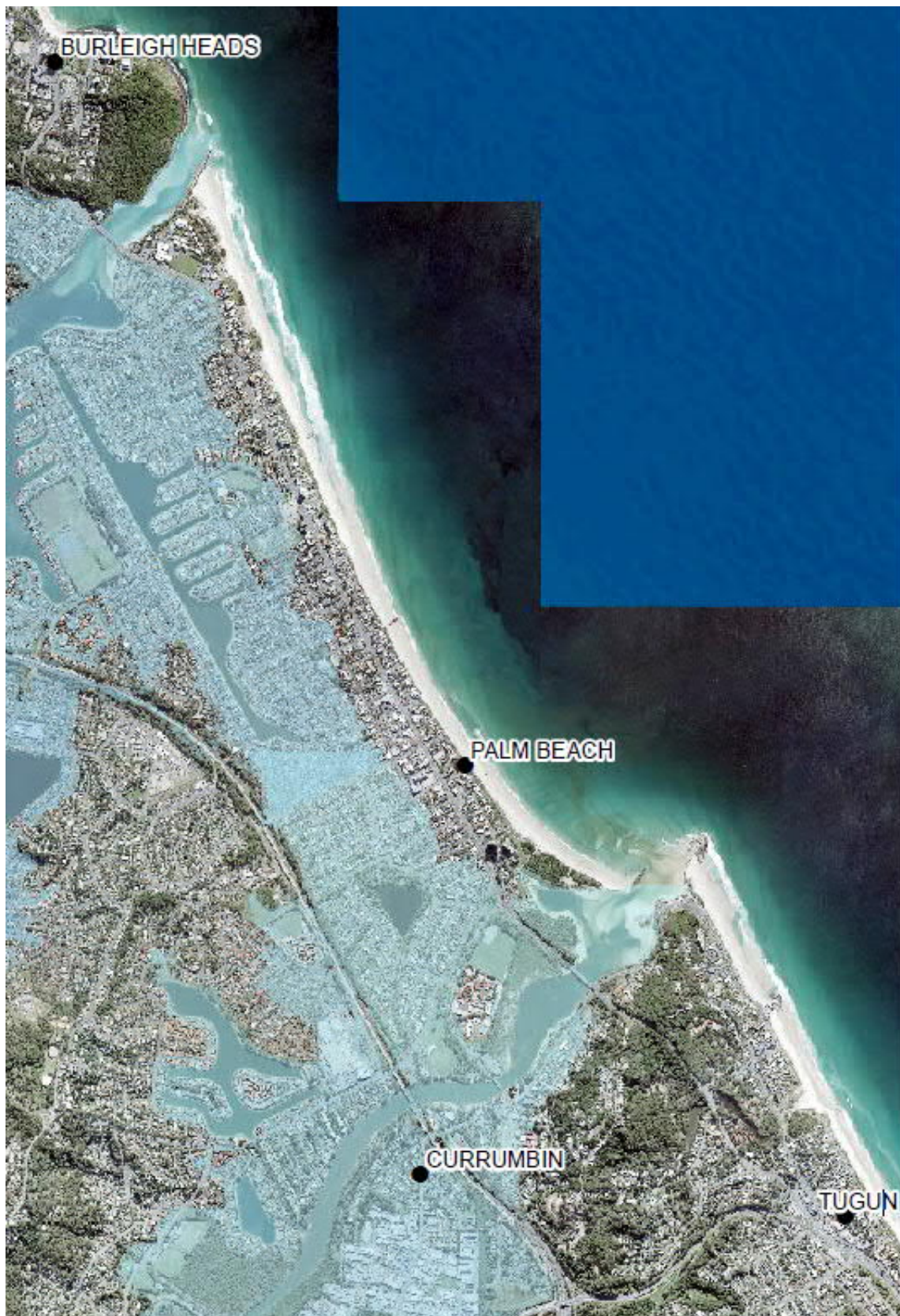


Figure 3-12: 1% AEP flood levels

4. Route planning pressures

4.1 Current development pressure

The Burleigh Heads to Tugun corridor is undergoing a steady transformation with numerous multi-unit and mixed use developments under construction or recently completed. The most significant change is occurring in Palm Beach, between Tallebudgera and Currumbin creeks and east of Cypress Terrace, where existing zoning allows for medium density development with buildings up to 29 metres (typically 8 storeys). Examples of recent development in this area includes:

- 1457 Gold Coast Highway – 6 storey apartment building under construction
- 1422 Gold Coast Highway – 9 storey apartment building under construction
- 1336 Gold Coast Highway – 2 x 12 storey apartment buildings under construction
- 1269 Gold Coast Highway – 7 storey apartment buildings under construction
- 1077 Gold Coast Highway - 9 storey apartment building recently completed
- 1039 Gold Coast Highway – 8 storey apartment building recently completed
- 1013 Gold Coast Highway – 8 storey apartment building recently completed

This scale of change and development presents a significant risk to the transport infrastructure that may need to be accommodated within the corridor and is a critical catalyst for the finalisation of this Route Strategy.

4.2 Future growth

Population projections for Queensland are developed by the Queensland Government Statisticians Office (QGSO) for forecast years including 2041. Council and TMR then allocated these forecasts to specific “zones” to be used for transport model forecasting purposes. For this study the 2041 forecasts for zones illustrated in Figure 4-1 were analysed and aggregated to arrive at study area totals.

This shows that for the 25 year period between 2016 and 2041 the residential population of the study area is projected to rise from 18,200 to 30,200 (a 66% increase). This compares to whole of Gold Coast City growth of 44% over the same period (from 570,000 to 920,000 residents) highlighting the attractiveness of the study corridor for population growth and reinforcing the need to plan for the transport needs of the corridor and wider southern Gold Coast area. These growth figures reflect the assumed changes in population irrespective of Light Rail investment in the corridor.



Figure 4-1 Study area zones



4.3 Wider network changes

The Gold Coast Highway (Burleigh Heads to Tugun) route strategy has been developed in parallel with planning for wider transport network upgrades, in particular capacity and access changes to the M1 (Pacific Motorway) between Varsity Lakes and Tugun. The extent of these works is illustrated in Figure 4-2 while specific changes to motorway access and circulation are illustrated in Figure 4-3. These motorway access changes represent a significant opportunity to the Gold Coast Highway and the Palm Beach centre in particular, as it removes the current reliance on Palm Beach Avenue for east-west traffic movement, with Nineteenth Avenue now able to function as a higher order connection between the coastal corridor and the M1.

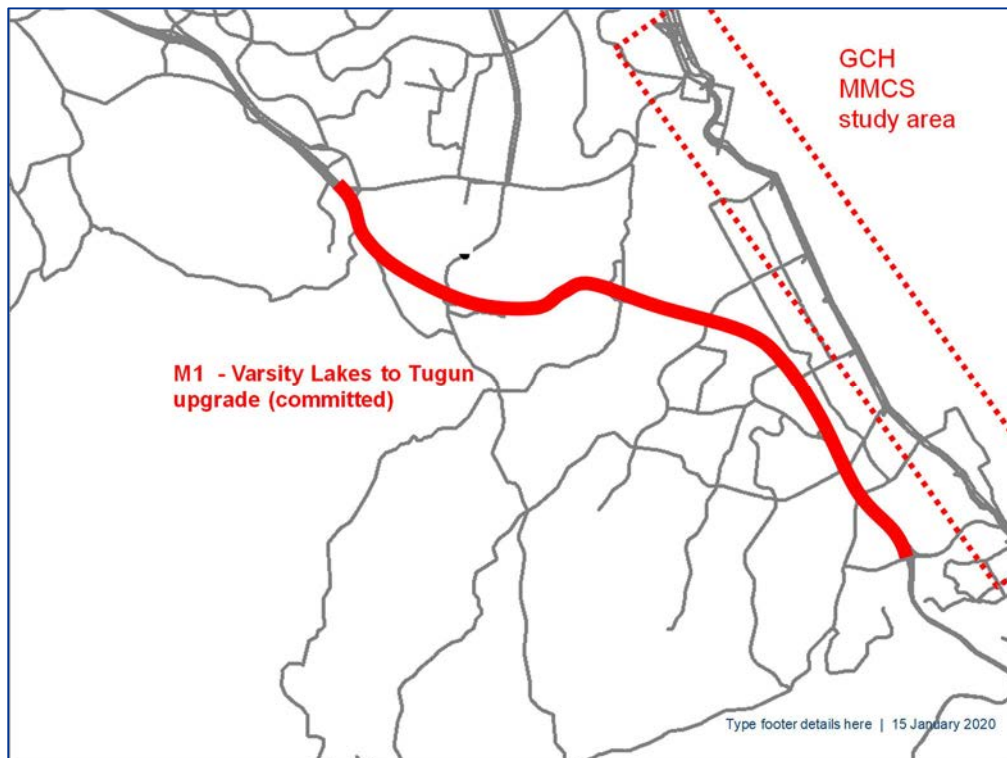


Figure 4-2: M1 Varsity Lakes to Tugun upgrade

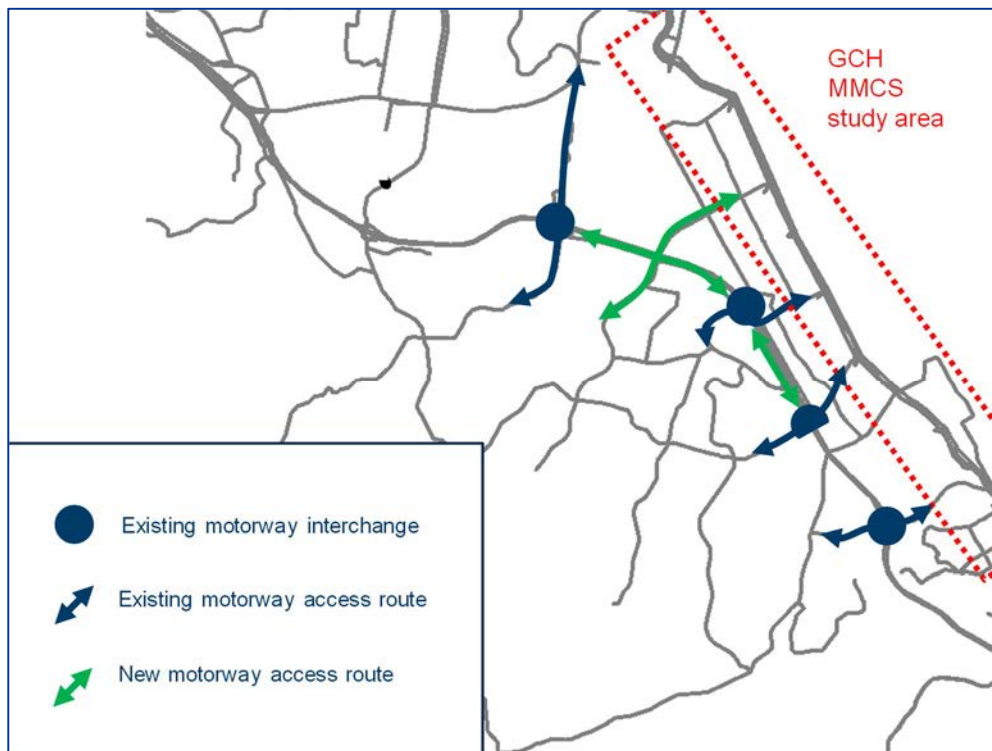


Figure 4-3: M1 access changes

4.4 Growth in transport demand

Analysis of future traffic volumes and passenger movements was undertaken to inform the scale of change and growth in transport demands and the opportunities for mode shift, or route shift to manage significant growth in population.

Between 2016 to 2041 without LRT south of Burleigh Heads:

- Traffic on the Gold Coast Highway (at Tallebudgera Creek) only increases by around 14% (to 39,000 vehicle per day)
- Traffic on the M1 (at Tallebudgera Creek) however grows by over 70% carrying up 7,400 vehicles per hour (southbound in the PM peak) including on the new service road
- This shows that the M1 upgrade (including new service roads) would accommodate the majority of growth in vehicle traffic on the Southern Gold Coast over the 25 year forecast period.

Comparing 2041 without LRT south of Burleigh Heads, to a 2041 scenario with LRT through the study corridor then:

- Public Transport mode share increases with over 30% more passenger trips across Tallebudgera Creek. Just under 2,000 passenger per peak (2 hour) period, peak direction are forecast by 2041 which equates to over 100 passengers per northbound per tram (30% of its capacity) in the morning peak
- This results in a reduction in two-way traffic volumes on the GCH of around 1,000 to 2,000 vehicles per day.

These transport analyses illustrate the potential that enhanced public transport can play in managing the growth in transport demand on the southern Gold Coast and reinforce the need to protect the corridor to allow for Light Rail to be implemented, in some form, at some point in the future.

5. Route objectives (vision)

5.1 Process

The process of distilling plans and strategies for the corridor into a vision that guides future option development and option assessment involved the following key steps:

- An internal workshop was held on Thursday 15th February 2018 with subject matter experts from both contractor (Jacobs) and principal (TMR South Coast) including planning, traffic, environment, cultural heritage and design/ engineering specialists. Participants identified the key opportunities and constraints in the corridor throughout the workshop, and finally developed their quick “8 ideas in 5 minutes” of what they wanted to see happen in the corridor.
- A workshop was then held with the wider Technical Working Group (TWG) on the 26th February 2018 where feedback on and further inputs to the emerging vision themes were sought.

From the internal workshop on the 15th February 2018, a common theme emerged that the future of the corridor is “not just about light rail”. The various aspirations for the corridor from participants were then roughly grouped around themes of Transport, Environment, Development/ Land Use or Identity/ Character as presented in Figure 5-1 Figure 3-1.

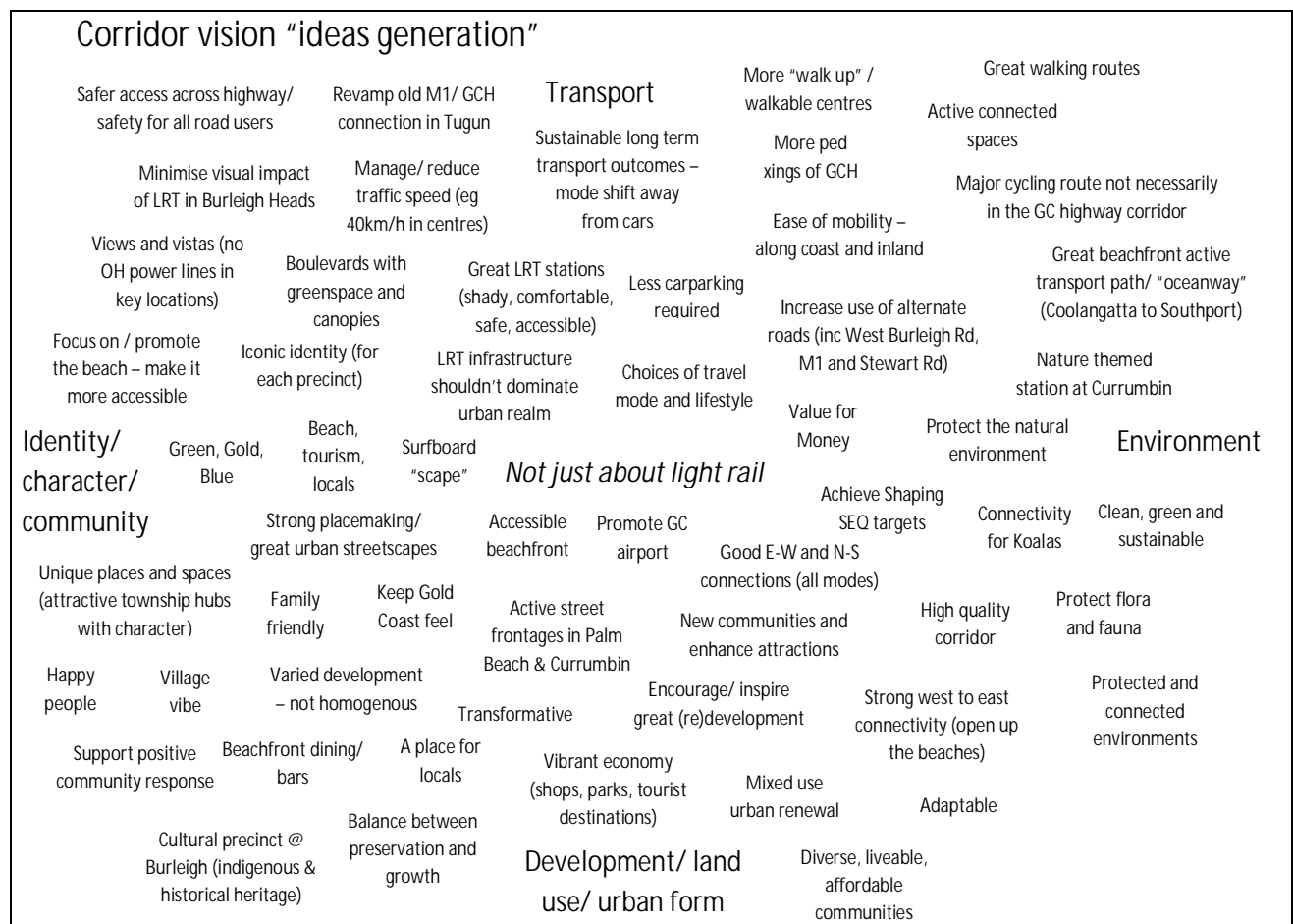


Figure 5-1 Corridor vision and themes

5.2 Stakeholder feedback on the generated vision themes and concepts

At a workshop on 26 February 2018, TWG members were presented the list of vision concepts and themes developed above and asked to highlight their “top 3” on the list, or to add any concepts that they felt were missing.

The following statements received multiple votes and are presented in ranked order of popularity:

- Sustainable long-term transport outcomes – mode shift away from cars (6 votes).
- Good east-west and north-south connections (all modes) (3 votes).
- Diverse, liveable, affordable communities (2 votes).

The following vision themes and concepts received one vote each:

- ✓ Encourage/inspire great (re)development.
- ✓ Balance between preservation and growth.
- ✓ Happy people.
- ✓ Strong place making/ great urban streetscapes.
- ✓ A place for locals.
- ✓ Safer access across highway/ safety for all road users.
- ✓ Great LRT stations (shady, comfortable, safe, accessible).
- ✓ Increase use of alternate roads (including West Burleigh Rd, M1 and Stewart Rd).
- ✓ Active connected spaces.
- ✓ Great beachfront active transport path/ “oceanway” (Coolangatta to Southport).
- ✓ Achieve Shaping SEQ targets.
- ✓ Adaptable.
- ✓ Protect flora and fauna.
- ✓ Strong west to east connectivity (open up the beaches).

Additional ideas and vision themes raised at that meeting included the following

- Ensure corridor form integrates with its function for adjoining local use.
- Transport operates as “one network”.
- Connectivity across the corridor- not providing segregation.
- Traffic and public transport integration.

5.3 Corridor-wide vision

Building on the first workshop and the subsequent stakeholder inputs, the project team developed a proposed overarching vision statement for this project’s study corridor capturing these themes, as follows:

The Gold Coast Highway will transform to become a sustainable sub-tropical Gold Coast Boulevard between Burleigh Heads and Tugun town centres. Residents, tourists and businesses will have attractive alternatives to car travel with high quality footways and bikeways as well as reliable, frequent public transport services. Traffic will be accommodated in a way which creates safer, more liveable communities, while on street parking will be designed to support and enliven commercial activity. Light rail stations will knit together and form a focal point for villages and centres, stimulating

new development and contributing to more vibrant communities. A range of new housing and employment options will develop within comfortable walking distance of stations as the corridor emerges as an even more desirable place to live and work. Local character will be celebrated and enhanced with appropriate and varied density. Environmental, cultural heritage and landscape values along the corridor will be protected.

This vision statement was then broken down into four key objectives as follows, intended to guide the future options generation and assessment process.

Sustainable – sustainability in the environment and transport modes is championed

- The Gold Coast Highway Corridor will become an urban corridor that provides both local residents and tourists multiple ways to embrace modes of transport beyond the car.
- Transport choices are easily found and accessed, and the experience of travelling is safe and comfortable.
- The Gold Coast Highway meets traffic needs, while catering for continued innovations.

Designed for people -the corridor supports the local residents and the tourist experience

- The southern village community hubs will become connected by boulevards to increase people's experiences of liveable communities with strong streetscapes.
- All local residents will have more options to travel across and within the corridor to get to transport stations and the beach on accessible paths and bikeways.

Adaptable – the corridor encourages and allows for flexibility over time

- The corridor will allow for continuous improvement and flexibility of transport linkages over time.
- Opportunities for economic uplift will be supported within the corridor, stimulating job opportunities and housing diversity.

Iconic- the corridor enhances the unique southern Gold Coast

- The natural and cultural heritage will be protected and celebrated, with increased community access and knowledge of the unique environmental assets that exist within the southern corridor.
- A distinct sense of place is achieved.

Within the corridor, the three distinct sections each with their own unique requirements and opportunities will capture and deliver on aspects of the vision in differing ways. The following section provides a summary of the potential for each of the three corridor sections to deliver on the vision.

5.3.1 Burleigh Heads to Tallebudgera Creek (including Tallebudgera Creek bridge)

For the Burleigh Heads/ Tallebudgera section of the corridor, the following opportunities were identified:

- A more cohesive, medium rise, mixed use activity centre, better connected to the beach.
- High quality LRT trunk route on a dedicated right of way passes seamlessly and unobtrusively through the heart of the Burleigh Heads town centre, allowing for convenient access to the centre and between LRT and buses.
- The Burleigh Heads LRT stop becomes a major focal point for the town centre, helping to reduce the visual barrier of the current wide road carriageway.
- A high-quality separated cycleway serves and passes safely and efficiently through the town centre connecting The Esplanade with the National Park and Tallebudgera Creek adhering to an inclusive design philosophy of catering for all ages.

- More people are able to access Burleigh Heads using public and active transport resulting in less impact on the amenity of the centre due to less reliance on cars and car parking.
- The LRT corridor passes next to the Burleigh Head National Park, Jellurgal Cultural Centre and Tallebudgera Creek environments with a 'light touch' respecting the environmental and cultural significance of these places.

5.3.2 Palm Beach

For the Palm Beach section of the corridor, the following opportunities were identified:

- Multiple, medium rise, mixed use activity centres along the Gold Coast Highway, centred around LRT stops with traffic calmed and speeds reduced.
- Local character is enhanced with excellent sub-tropical design of new development, creating interesting and vibrant spaces along the Gold Coast Highway and on side streets.
- High quality rapid transit is on a dedicated right of way helping to reduce the visual barrier of the current "highway". More frequent pedestrian crossings, associated with LRT stops, help to reduce the functional separation between beach and hinterland.
- Enhanced Bus-LRT interchanges (e.g. Palm Beach South) or less formal on street Bus stop/ LRT stop location and design (e.g. Palm Beach north) allows for efficient bus access from the western residential hinterland both to the activity centres along this section and to the LRT itself.
- High quality cycleway on or parallel to the Gold Coast Highway supports greater active transport mode share, caters for a range of cyclists including "commuter" and "recreational" cyclists of all ages.

5.3.3 Currumbin/ Tugun (including Currumbin Creek Bridge)

For the Currumbin Creek and the Tugun section of the corridor, the following opportunities were identified:

- The LRT passes sensitively over Currumbin Creek and through the Currumbin Wildlife Sanctuary area with minimal impacts (noise, visual and ecological).
- Limited further development would occur around a potential Currumbin Wildlife Sanctuary LRT stop with this station responding to and respecting the existing natural landscape features.
- Some minor redevelopment and modest density increases in the Tugun town centre seek to consolidate activity around the LRT station node to create a more cohesive sense of place. Local character is enhanced with excellent sub-tropical design of any new development.
- More vibrant land uses and street activity will be encouraged linking the Tugun town centre and LRT stop with the foreshore and surf club. Simpler, more direct and more comfortable pedestrian access to, through and across the Gold Coast Highway and Golden Four Drive improves pedestrian amenity and safety.
- High quality rapid transit on a dedicated right of way helps to reduce the visual barrier of the highway and will be a catalyst for simplifying the highway/ service road layout knitting together the disparate parts of the Tugun town centre.
- A high quality cycleway separated from cars and pedestrians combined with public transport upgrades helps to bring customers of all ages safely and efficiently to and through the Tugun town centre without the impacts of additional car parking and traffic.

6. Strategic priorities

This chapter documents the analysis of different functional requirements of the corridor and the development of packages of options for assessment and testing.

The options generation and shortlisting process for modal and functional components within the Gold Coast Highway corridor was undertaken at a number of levels, see Figure 6-1.

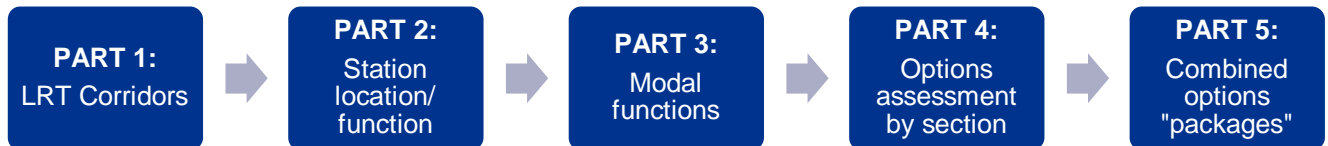


Figure 6-1: Options development and shortlisting flow diagram

6.1 PART 1: LRT Corridor options

This Route Strategy is intended to determine the preferred function and form of the Gold Coast Highway corridor. In order to do this, the assumption that Light Rail would form an integral part of the future transport requirement of the corridor was first reconfirmed.

Opportunities and constraints for the Gold Coast Highway were examined, in comparison to other corridors for Light Rail. This analysis was undertaken in the context of a corridor that serves the transport and land use outcomes identified in strategic planning documents such as Shaping SEQ, which identifies a strategic requirement for Light Rail from Broadbeach South to Coolangatta via Burleigh Heads and the Gold Coast Airport.

A long list of potential LRT corridor options were identified and a Strength, Weaknesses Opportunities and Threats (SWOT) process undertaken.

6.1.1 Long list and SWOT

Based on literature reviews of previous studies and incorporation of feedback from the TWG, eight options for LRT were identified for the long list. These included:

- Option 1: Reedy Creek Road and M1 corridor
- Option 1a: Reedy Creek Road to Varsity Lakes
- Option 2: Gold Coast Highway/ Mallowa Drive/ Gold Coast Highway
- Option 3: Gold Coast Highway/ Townson Ave/ Gold Coast Highway
- Option 4: Gold Coast Highway/ Cypress Terrace/ Gold Coast Highway
- Option 5: Gold Coast Highway (GCH) only
- Option 5a. Gold Coast Highway/ Thrower Drive/ M1
- Option 5b: Gold Coast Highway/ Palm Beach Ave/ M1

For each LRT corridor option, a series of Strengths, Weaknesses, Opportunities and Threats (SWOT) were recorded, resulting in a recommendation for five options to proceed for further assessment.

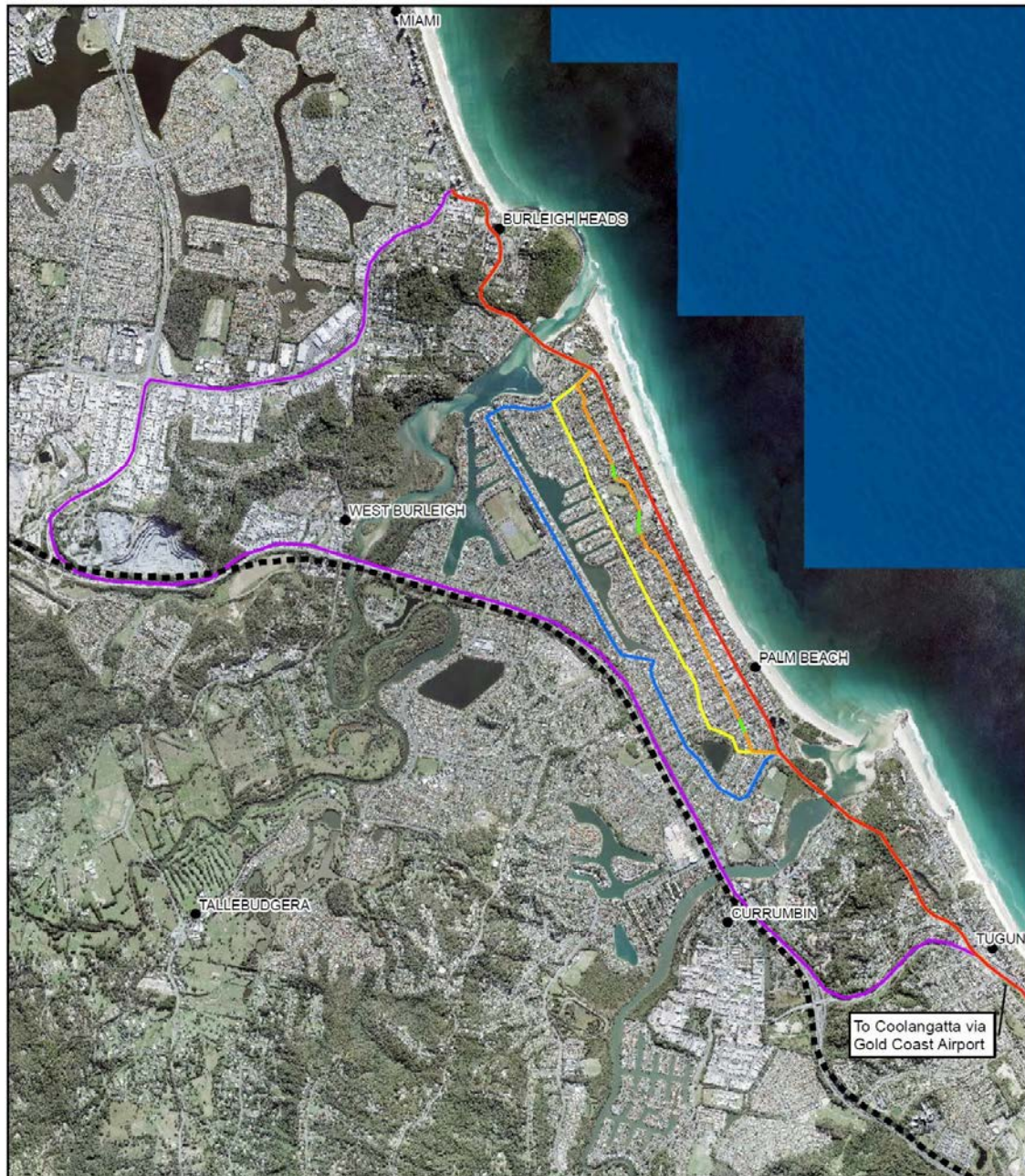
6.1.2 Short list and MCA

The five shortlisted corridors are shown in Figure 6-2 along with indicative station locations and include:

- 1) Reedy Creek Road and M1 corridor (purple)
- 2) Gold Coast Highway/ Mallowa Drive/ Gold Coast Highway (blue)
- 3) Gold Coast Highway/ Townson Ave/ Gold Coast Highway (yellow)

- 4) Gold Coast Highway/ Cypress Terrace/ Gold Coast Highway (orange)
- 5) Gold Coast Highway only (red)

Figure 6-2: Corridor options for LRT to Coolangatta



- LEGEND**
- Corridor Options**
- 1, M1 Pacific Motorway
 - 2, Mallawa Drive
 - 3, Townson Avenue
 - 4, Cypress Terrace
 - 5, Gold Coast Highway
- Outside of existing road reserve
- Future gold coast heavy rail extension



The five potential LRT corridors were then assessed against the themes of Growth, Prosperity, Connectivity, Sustainability and Liveability in Table 6-1 below which identifies the themes, criteria and measures.

Table 6-1: Assessment matrix for LRT corridor option assessment

THEME/ OUTCOME	CRITERIA	MEASURE
GROWTH	Supports preferred urban growth pattern	Aligns with strategic land use plans (Shaping SEQ and City Plan)
	Supports strategic transport plans and policies	Aligns with adopted government or council policies
PROSPERITY	Capital cost	Length of LRT, extent of structures
	Property cost/ impact	Number of properties impacted, type of property impacted (assuming segregated right of way in all cases)
	Operating costs	Travel time for LRT and need for retention of frequent bus services on GCH
CONNECTIVITY	Transport network resilience	Resilience in extreme weather events (e.g. storm/ flooding)
	Public transport patronage	Indicative (high level) LRT journey time
	Cycle network attractiveness - Integration of cyclists	Ability to deliver principal cycle network enhancements
SUSTAINABILITY (Environment/ social)	Natural environment and ecology	Minimise impacts on koalas and other fauna, water habitats and remnant vegetation
	Cultural heritage	Minimising cultural heritage impacts and maximising opportunities
	Sustainability	Sustainable use of resources - construction and operation
	Social impacts and benefits	Social return on investment, community impacts and benefits including connecting social infrastructure, conforming to community expectations
LIVEABILITY	Amenity	Noise and visual impacts
	Safety, health, well being	Ability to improve safety and convenience for pedestrians, cyclists and PT users (barriers to crossings)
	Placemaking and city shaping	Opportunities to support realistic and positive changes in land use and urban form, within walking distance to beach, regenerate GCH

6.1.3 LRT corridor assessment

Growth outcome

Option 5 (Gold Coast Highway) and Option 4 (Cypress) scored highest as they are considered to represent the greatest potential for rapid transit (i.e. LRT) to serve greater development intensity and consolidation, as currently envisaged in the City Plan and ShapingSEQ in the coastal corridor.

Prosperity (affordability) outcome

Overall, Option 5 was identified as likely to have the best capital and operating costs due to the fact that it has the shortest overall length.

Connectivity outcome

This connectivity outcome area has been assessed against three criteria, namely resilience, public transport connectivity, and active transport connectivity:

- Regarding Resilience, flood inundation particularly affects Option 2 and 3, which therefore scored poorly for resilience. Option 1 (M1 corridor) is assumed to be constructed at a similar level to the M1 and therefore above the 1% AEP flood level, while Option 5, located on the fore dunes, is similarly above the nominated flood level. Option 4 is partly within the defined flood event level and as such is considered slightly less resilient.
- Regarding public transport connectivity an analysis of overall journey times for each of the corridor options revealed that Option 5 (via the Gold Coast Highway), had the shortest journey time of between 20 and 24 minutes (allowing for some contingency in the calculated value) which is between 1.4 and 8 minutes faster than other options. As such Option 5 scores highest from overall connectivity and patronage potential.
- Regarding active transport connectivity and attractiveness, Option 1 (M1 corridor) and Option 3 (Townson) were not considered able to contribute meaningfully to improved active transport connectivity, while Option 2 (Mallawa) and Option 5 (Gold Coast highway) could readily deliver cycle upgrades that correlate to existing priority cycle routes. Option 4 (Cypress) was also considered to have significant potential, given that a high quality cycle facility on Cypress Terrace, in lieu of on the Gold Coast Highway (around 120 to 150m east), would still meet the intent of the PCNP.

Sustainability outcome

The sustainability outcome has been assessed against four criteria, namely Natural Environment and Ecology, Cultural Heritage, Sustainability (resource use) and Social Impacts and Benefits.

- Regarding natural environment and ecology, all five options were identified as having potential environment impacts, particularly around the waterway crossings and vegetation areas within and adjacent to Tallebudgera Creek and Currumbin Creek. As such, there were no significant differentiators between the 5 options with regard to the natural environment and ecology.
- Regarding cultural heritage, Option 1 (M1) was identified as having possible impacts on heritage values present within and adjacent to Tallebudgera and Currumbin Creeks with limited real opportunities to enhance existing heritage features. Options 2-5 were identified as having opportunities to enhance the Burleigh Head National Park Jellurgal heritage values heritage values through sensitive design and integration of heritage themes with the infrastructure design, particularly at stations. Overall, there were no significant differentiators between the options with regards to Cultural Heritage.
- Regarding sustainability (resource use) Sustainability was assessed from both a construction and operational perspective. Sustainability of the options during the construction phase was



assessed based on the extent of resources required to construct that alignment option and the amount of waste material likely to be produced. Sustainability in terms of operating phase was determined to be largely a function of distance and operating time – i.e. the longer the journey time, the more energy required to transport passengers. To that end, longer options such as Option 1 and 2 were considered poor while options with moderately higher route distance combined with higher numbers of properties being demolished, i.e. option 3 and 4 were rated as moderate. Option 5, with the shortest route distance (least construction resources) and shortest travel time (least operating resources), scored highest.

- Regarding social impacts and benefits the extent to which the option conformed to community expectations was considered. This was identified as being particularly relevant given the recent petition¹¹ organised by Palm Beach residents identifying significant concerns with the potential impact of Light Rail on the Palm Beach community. As such, those options that included light rail away from existing main transport corridors, but not serving key social infrastructure, namely Option 2 and 3, were considered to be poor. Option 1 was considered moderate as its impact to the community was likely to be low but so too was its perceived benefit to the wider community. Option 4 was also considered to be moderate as it provides benefits regarding connectivity to existing communities (including the Palm Beach activity centre), albeit diverted off the Gold Coast Highway which was considered to introduce community (political/ social) risks due to both potential for direct property impacts and amenity impacts on low-trafficked local roads. Option 4, similar to Options 2 and 3, would also result in more significant changes to local access and circulation compared to Options 1 and 5, which was considered to be a negative. Option 5 was considered best as it more clearly aligns with community expectations around the provision of major transport infrastructure within existing major transport corridors, while directly serving places of community interest including beaches and Surf Life Saving Clubs (SLSC). Lastly this corridor option is similar to “Idea 5 Option A” (at least as far south as Palm Beach Ave), which the City of Gold Coast consulted the community on in late 2015. This option received 70% community support, the highest of a range of southern Gold Coast transport options presented, with only 18% of respondents opposed.

Liveability outcome

The liveability outcome was assessed against four criteria namely Amenity (noise & visual); Safety, health and well being; and Placemaking & City Shaping:

- Regarding Amenity, Option 1 (M1) and 5 (GCH) were considered to have the lowest impact due to being located in an already disturbed environment with Options 2 and 3 having the highest impacts
- Regarding Safety, health and wellbeing, Option 5 was assessed as good due to the potential to improve east-west connectivity across the existing transport barrier of the Gold Coast Highway. Option 1 was considered the worst, due to stations located in largely “pedestrian hostile” motorway type environments with passenger waiting at platforms in a high noise, high emission environment
- Regarding Placemaking, Option 5 was considered good due to the opportunity to reinforce and enhance existing places of activity along the Gold Coast ‘boulevard’ including the Palm Beach activity centre. Option 1 and 2 were considered poor with very little to no opportunity for placemaking.
- Regarding City Shaping, Option 4 and 5 scored highest in this assessment as they best service the highest density areas as per the City Plan and Shaping SEQ. Option 3 was scored as moderate, and Options 1 and 2 rated as poor.

¹¹ <https://www.change.org/p/save-the-southern-gold-coast-from-the-light-rail-and-high-density-high-rises-annastacia-palaszczuk-mp-no-light-rail-to-go-through-burleigh-hill-koala-park-tallebudgera-creek-and-palm-beach>

- Overall, Option 5 was assessed as having the best Place Making, City Shaping and Safety/ Health/ Well-being potential, as well as the equal lowest amenity impacts across the 5 options.

6.1.4 Summary and conclusions

In summary, Option 5 (Gold Coast Highway only) rated highest or equal highest across all Outcome areas and individual criteria and was therefore confirmed as the preferred corridor for light rail.

It should be noted that this recommendation was in the context of proceeding with a route protection investigation for light rail within the Gold Coast Highway corridor. The assessment undertaken should not replace a Preliminary level of analysis which would be required to support an investment decision to construct Light Rail in the future.

However, this decision was required to allow the Route Planning investigation to proceed with investigation of options for how to accommodate light rail within the Gold Coast highway and arrive at a preferred cross section, layout and hence land requirement. This allows for the protection of a suitable road reserve that can be used for light rail, in full or in part, at some point in the future if an investment decision is made to proceed with the construction of a light rail extension south of Burleigh Heads.

6.2 PART 2: Station location and function

During this initial phase of the study, a range of investigations were carried out to confirm potential high level locations for further analysis. Key considerations for stations include the function of the proposed LRT, trip generators and attractors along the route and the required connections to the wider public and active transport network. This resulted in a proposed station location investigation area strategy as illustrated in Figure 6.3.



Figure 6-3: Potential station investigation areas

6.3 PART 3: Modal functional requirements and options

Prior to progressing with a more detailed options analysis within the Gold Coast Highway corridor, it was important to identify the required transport functions that need to be accommodated within the corridor and what form these functions might take. The transport functions to be accommodated include:

- light rail facilities
- general vehicle traffic facilities
- pedestrian facilities
- cyclist facilities.

6.3.1 Light Rail Transit (LRT) – right of way

Due to the constrained nature of the Gold Coast Highway road corridor between Burleigh Heads and Tugun, and through Palm Beach in particular, it is appropriate to compare and assess different LRT right of way configurations, as illustrated in Figure 6-4.

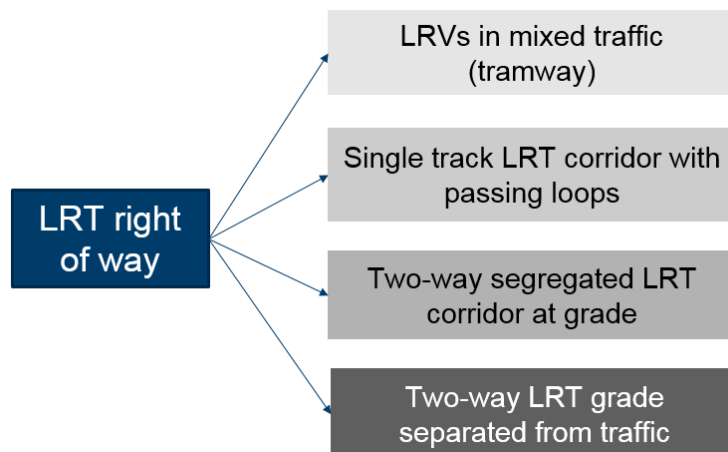


Figure 6-4: LRT right of way configurations

These four configuration options have been assessed against the following criteria:

- Corridor width – the ability of the option to reduce potential property impacts (and additional corridor width requirement).
- Noise and visual amenity – intrusiveness of the option.
- Travel time and reliability.
- Cost (capital).
- Capacity.

Overall, the two-way segregated LRT at-grade option was deemed most appropriate as it was consistent with the look and feel and functionality of stages 1, 2 and future 3a. It also delivers appropriate speed, reliability and capacity, at a reasonable cost and level of property impact, provided that other transport functions are considered and designed sensitively.

6.3.2 LRT stations

LRT station layout was also noted as having a critical impact on the required width of the corridor. As such, the form of each station considers local site conditions, including opportunities and constraints. Stations are intended to respond to primary pedestrian access routes and desire lines, road traffic lane arrangements including turning bays and any critical (high risk) properties or other physical and environmental constraints.

LRT stations on the current Gold Coast Light Rail (GCLR) are typically either island or side platform arrangements with key features and considerations are follows.

- Island platforms include a typical central platform width of 4.8m and an overall formation width of around 12m. Island platforms tend to be used where the LRT is running centrally in the carriageway and they are typically more space effective than side platforms. This provides a larger, safer, single refuge area in the median for both general pedestrians crossing the road as well as passengers accessing LRT platforms.

- Side platform stations have two platforms opposite each other, each are typically 3.6m wide resulting in a total formation width of around 14.4m. This arrangement is typically used where the LRT is “side mounted” or running adjacent to but outside of the road carriageway. This can result in simpler passenger access with a reduced number of pedestrian crossing stages particularly for passengers accessing the station from the adjacent side whereby direct access to the adjoining footpath can be provided. The cost of this arrangement however tends to be slightly higher as it requires additional infrastructure such as canopies and a larger footprint.

The development of detailed cross sectional and station layout options for this corridor have considered the use of both station typologies outlined above in trying to balance station function, safety, accessibility, cost and impacts.

6.3.3 General traffic facilities

Given the strategic aspirations for a reduced dominance of traffic on the Gold Coast Highway as identified in Section 2, a number of options exist for the treatment of general traffic within the corridor as illustrated in Figure 6-5. The development of these traffic options has been undertaken in conjunction with wider traffic analysis including the Varsity Lakes to Tugun section of the M1 corridor, as some options involve traffic distribution to other routes.

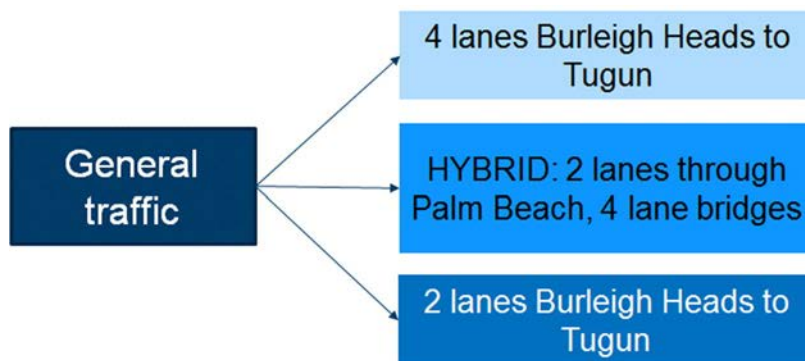


Figure 6-5: General traffic options

A four (4) lane option represents a Business as Usual approach and would retain four through traffic lanes plus auxiliary right turn lanes where these are unaffected. This would be unlikely to result in any significant change in route choice or traffic volumes compared to base case conditions with around 35,000 vehicles per day (AWDT) at Palm Beach North in 2041¹². As such, the specific design of this option will need to consider other means to address the aspirations for reduced traffic impacts, particularly through town centres along the corridor, for example through landscaping/ streetscaping treatments, lane widths, speed reductions, access restrictions and local area traffic management.

A two (2) lane option represents a wholesale change in traffic capacity along the corridor with a significant reduction in traffic along the Gold Coast Highway to around 11,200 vehicles per day AWDT at Palm Beach North in 2041¹³, but with a corresponding increase in traffic on alternative routes including the M1 corridor service roads and local roads. This is likely to require a range of off-corridor mitigation measures to be considered to accommodate displaced demands.

A hybrid option has been identified which maintains four (4) lanes over both Tallebudgera Creek and Currumbin Creek but with traffic capacity reduced to two (2) through lanes through Palm Beach. This option is forecast to result in a reduction in traffic along the Gold Coast Highway to around 18,200 vehicles per day AWDT at Palm Beach North in 2041¹⁴. This option is also expected to require design treatments on the Gold Coast Highway itself where 4 lanes are retained (similar to the first option)

¹² VLC presentation 3 April 2018

¹³ VLC presentation 3 April 2018

¹⁴ VLC presentation 3 April 2018

while some traffic displacement to the M1 corridor may require service road or other motorway mitigation measures (similar to the second option).

All three options were taken forward to the detailed option analysis phase for Multi-Criteria Assessment.

6.3.4 Pedestrian facilities

Within the Gold Coast Highway corridor, pedestrian facilities include both longitudinal facilities (footpaths within verges) and cross corridor facilities (generally at-grade crossings).

The Gold Coast Highway verge widths vary through Burleigh Heads, with some wide sections (over 4m) and some narrow sections (approx. 2m) where the footpath takes up the whole verge. Some road sections do not have a verge (e.g. between Cotton Street and Ikkina Road) but generally have a grade separated footpath on one or both sides of the road.

Through Currumbin, the corridor is generally unconstrained with wide verges, however the verge and footpath are narrow through Currumbin Hill Conservation Park (approx. 1.2m) on the eastern side of the Gold Coast Highway.

Through the most constrained, urbanised parts of corridor in Palm Beach, the verges within the Gold Coast Highway vary between 3.8m and 4.0m which includes a formed footpath width of between 1.2 and 4.0m on each side. These footpath widths vary according to pedestrian and other kerbside demands, the nature of the surrounding land uses, and the presence of alternative paths and connections. For example, in Palm Beach centre, footpaths are generally formed across the full width of the verge to accommodate shopfronts and footpath dining etc. In more residential parts of the corridor, they reduce to as little as 1.2m. Furthermore, between Twenty Third Avenue and Seventeenth Avenue in Palm Beach, where there is no parallel pedestrian facility to the east of the Gold Coast Highway (i.e. Oceanway), the formed footpath has been widened to approximately 2.7m, as all recreational pedestrian and cycle activity must use the Gold Coast Highway itself.

For this study, the proposed verge width will typically be 4.0m to match current typical verge width through Palm Beach, with a minimum of 3.5m where major property constraints exist. A minimum formed footpath width of 2.0m will be assumed outside activity centres.

Current pedestrian crossing facilities are located, on average, approximately every 400m through the urban area of Palm Beach. As a minimum, existing at-grade crossing facilities are to be retained in their current or comparable location, even if they no longer form part of an intersection for traffic. That is, some intersections may be converted to “mid-block” pedestrian crossing facilities due to other constraints on the intersection width and may be used to provide access to LRT stations.

Additional opportunities for new pedestrian facilities will also be explored through the detailed option development phase. This might include opportunities for an additional at grade crossings in the vicinity of Twenty-Seventh Ave and/ or the Tallebudgera Recreation centre in conjunction with potential station locations. Similarly, opportunities for a grade separated crossing facility of the Gold Coast Highway through the cutting at Burleigh Hill will also be explored.

6.3.5 Cycle facilities

Cycle facilities proposed within this multi-modal corridor study, will need to support a diverse range of cycle users, both existing and potential, in order to fulfil the obligations of TMR’s cycle policies and the overarching Queensland Cycle Strategy. As such, a combination of different cycle facility solutions within different corridors will need to be explored.

It is proposed that this study consider principal level cycle facility options located only within the Gold Coast Highway corridor itself or immediately adjacent to it (within a few hundred metres) as illustrated

in green in Figure 6-6. This includes the potential foreshore or Oceanway corridor through Palm Beach, Teemungum Street through Currumbin, and Golden Four Drive through Tugun. Alternative routes further afield from these corridors, as illustrated in orange, while functioning as existing cycle routes, are considered to be secondary or supplementary to the intention of the Gold Coast Highway principal cycle route. This is largely because these routes are more circuitous and would require diversions from the main Gold Coast Highway coastal corridor. In the case of the Tugun to Bilinga Oceanway, this is not considered to be a candidate to accommodate a principal level cycle facility as it has been constructed as a 3.5m shared path.

All of the routes shown in orange however have the potential to form important feeder routes to the principal north-south cycle facility or near the Gold Coast Highway. These, along with additional east-west links, will be critical components in all the “package options” discussed in section 6.4, in order to develop connected and cohesive cycle networks that attract a wide range of users.

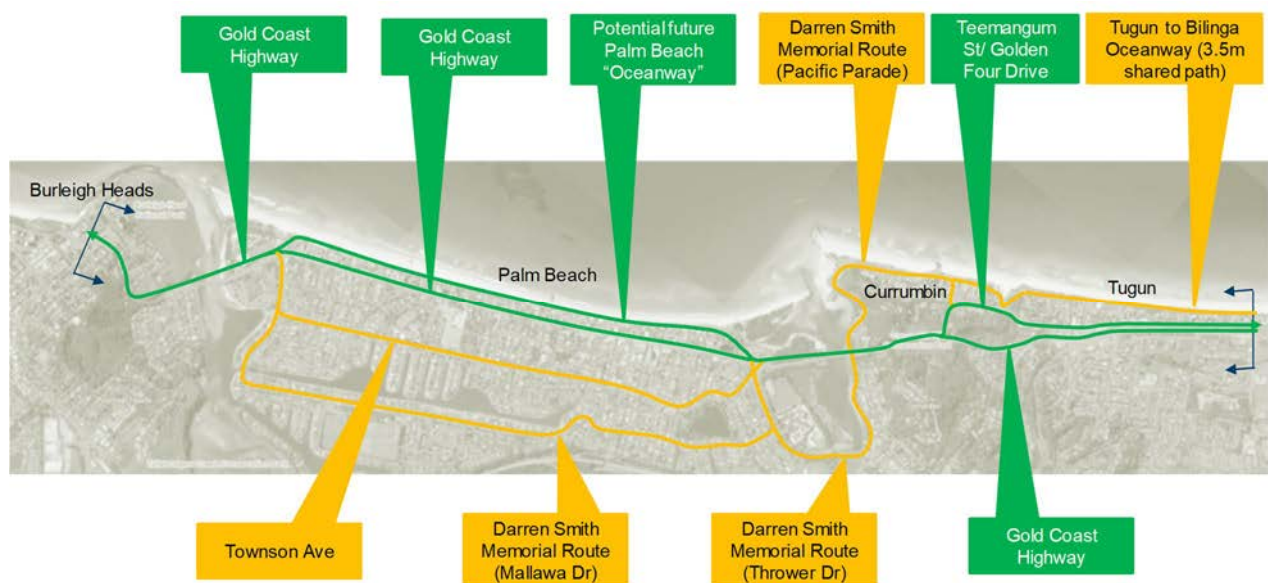


Figure 6-6: Proposed cycle corridors for inclusion of principal cycle facilities (green)

Focusing just on Gold Coast Highway for the purposes of the route strategy, the cycle facility options that will be explored in the development of the detailed packages of options include:

- None – that is, no dedicated facility within the Gold Coast Highway itself but with a “principal level” cycle facility in one of the identified parallel corridors outlined above (in green)
- Basic – that is, painted on-road cycle lanes (generally 1.5 to 1.8m wide)
- Enhanced one way – separated one-way cycle lanes (generally 2.0m wide plus separator)
- Enhanced two way – generally an off carriageway two-way cycle facility on one side of the road typically 3.0m wide plus separator. In areas where low pedestrian volumes are forecast, the facility provided may be a shared path

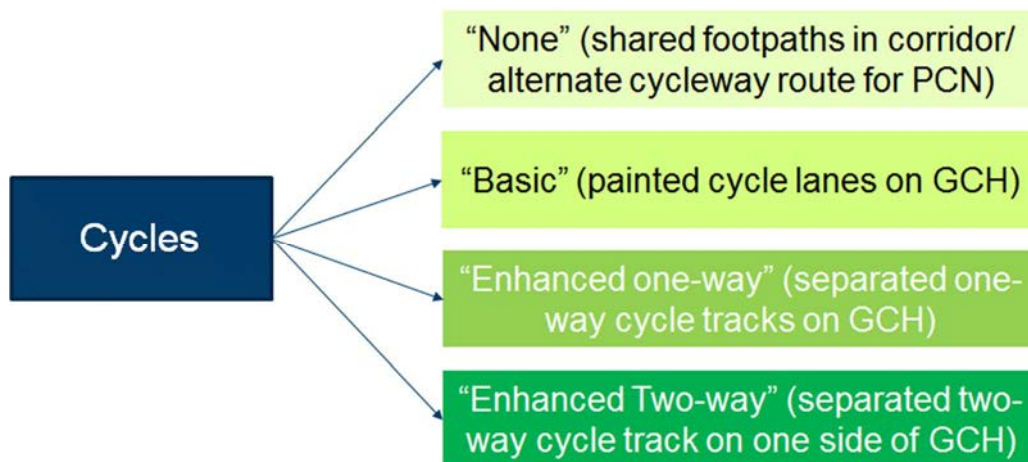


Figure 6-7: Cycle lane options

In the selection of the specific design treatment of a cycle facility within the Gold Coast Highway or a proposed alternate corridor, a range of factors have been considered including:

- Safety – considerations include posted and likely car travel speeds, level of conflict/ friction
- Directness – total travel distances relative to the "most direct route" including the need to deviate to reach an ultimate destination
- Comfort/ attractiveness – level of stress caused by incompatible traffic volumes, speeds or movement, and other factors including views, amenities, shade.
- Cohesion/ connectivity – including how well connected the facility is to other routes, and how cohesive the facility is with other cycle facilities north and south of this corridor.
- Cost/ risk – cost and risks associated with a cycle facility including potential trade-offs between "in-corridor" (i.e. on Gold Coast Highway) versus "out-of-corridor" if significantly lower cost and risk.

6.4 PART 4: Options assessment by mode and section

A range of functional and cross-sectional options were developed for future Gold Coast Highway corridor (inclusive of LRT) by TMR in 2017 followed by a qualitative assessment of impacts and opportunities. This was termed the High Level Option Evaluation (HLOE). This process was presented to the TWG in March 2018, with the TWG asked to review and comment on the outcomes, and/or to develop alternative options or positions on functional requirements in the corridor.

A summary of the previous work, the workshop outcomes and subsequent analysis and recommendations are outlined in the subsequent sections. The viable sub-options identified for further consideration are outlined in Table 6-2.

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Table 6-2: Viable sub options for consideration

Consideration	Options
Number of general vehicle traffic lanes (both directions)	<ul style="list-style-type: none"> • 2 lanes • 4 lanes
Position of light rail (LRV)	<ul style="list-style-type: none"> • Within the road median • To the east or west side of the traffic lanes
Cycle Facility	<ul style="list-style-type: none"> • No provision of cycle facility • Separate cycle facility (cycle track) • On road cycle facility
Corridor Alignment	<ul style="list-style-type: none"> • Centred • East • West

These options were reviewed against the following criteria in the High Level Option Evaluation process:

- Design and safety
- Traffic operations and transport
- Construction
- Social, stakeholder and environment
- Land use integration
- Project Risk

As the Burleigh Heads, Palm Beach and Currumbin/Tugun sections of the Gold Coast Highway have different functions and requirements, each of these sections were assessed separately, as different design solutions may emerge in each of the sections. The sections considered were as follows:

- Section 1: Burleigh Heads to Tallebudgera (including Tallebudgera Creek and bridge)
- Section 2: Palm Beach (extending from south of Tallebudgera Creek to north of Currumbin Creek)
- Section 3: Currumbin/ Tugun (including Currumbin Creek and bridge)

6.4.1 Section 1: Burleigh Heads / Tallebudgera

A review of the findings from the HLOE for Section 1: Burleigh Heads / Tallebudgera is presented in Table 6-3.

Table 6-3: HLOE findings for section 1

Number of general vehicle traffic lanes (both directions)	Position of light rail (LRV)	Cycle Facility	Corridor Alignment
Gold Coast Highway is currently four lanes (both directions) for general vehicle traffic.	Options to provide the light rail in the median is preferable to the provision of light rail to the side	Options that do not provide cycle facilities are rated as generally not meeting project objectives. The	Due to physical constraints, corridor widening to the eastern side is less favourable.

Number of general vehicle traffic lanes (both directions)	Position of light rail (LRV)	Cycle Facility	Corridor Alignment
Both two-lane and four-lane general vehicle traffic lane options are considered viable options at this stage. The option to downgrade the highway from four to two general vehicle lanes will be made if and where there is evidence to support this.	(eastern or western) of general traffic lanes. This is due to the reduced access impacts (both properties and side roads) of having the light rail in the median.	potential to provide cycle facilities on an alternate route or “oceanway” east of the National Park along the foreshore are likely to be high risk and cost prohibitive. Provision of separated and on-road cycle facilities are both rated to have similar benefits.	Corridor widening to the west is preferred.

Following subsequent analysis and stakeholder discussion two options clearly emerged that offered distinctly different land requirements, namely:

- Four general traffic lanes, light rail in median (except at Tallebudgera Creek bridge) with in-corridor segregated bicycle facility. Sub options for specific cycle treatments were carried forward including both two-way (on eastern side) and one way protected/ segregated cycle tracks.
- Two general traffic lanes, light rail in median (except at Tallebudgera Creek) with in-corridor segregated cycle facility. As above both one-way and two-way (on eastern side) cycle options were carried forward.

For both of the above options, LRT alignment options both east and west of the current bridges were considered feasible subject to further assessment.

6.4.2 Section 2: Palm Beach

A review of the findings from the HLOE for Section 2: Palm Beach is presented in Table 6-4.

Table 6-4: HLOE findings for section 2

Number of general vehicle traffic lanes (both directions)	Position of light rail (LRV)	Cycle Facility	Corridor Alignment
Gold Coast Highway is currently four lanes for general vehicle traffic. Both two-lane and four-lane general vehicle traffic lane options are considered viable options at this stage. The option to downgrade the highway from four to two general vehicle lanes will be made if and where	Option to provide the light rail in the median is preferable to the provision of light rail to the side (eastern or western) of general traffic lanes. All options for light rail on the side have been rated as not meeting project objectives due to significant access	Options that do not provide cycle facilities in the Gold Coast Highway Corridor have been considered for this section, as there is potential to provide cycle facilities on an alternate route (“oceanway”). Provision of separated and on-road cycle facilities are both rated	The preferred arrangement is to follow the existing corridor alignment.

Number of general vehicle traffic lanes (both directions)	Position of light rail (LRV)	Cycle Facility	Corridor Alignment
there is evidence to support this.	impacts (both properties and side roads).	to have similar benefits.	

Following subsequent analysis and stakeholder discussion three option combinations emerged that offered distinctly different land requirements, namely:

- Four general traffic lanes, light rail in median with in-corridor cycle facility. Sub options for specific cycle treatments were carried forward including cycle lanes, two-way cycle tracks (on eastern side) and one way protected/ segregated cycle tracks
- Four general traffic lanes, light rail in the median with no in-corridor bicycle facility (cycle facility on adjacent corridor)
- Two general traffic lanes, light rail in median with in-corridor cycle facility. Cycle lanes, one-way cycle tracks and two-way cycle options were carried forward.

6.4.3 Section 3: Currumbin/ Tugun

A review of the findings from the HLOE for Section 3: Currumbin/Tugun are presented in Table 6-5.

Table 6-5: HLOE findings for section 3

Number of general vehicle traffic lanes (both directions)	Position of light rail (LRV)	Cycle Facility	Corridor Alignment
<p>Gold Coast Highway is currently four lanes for general vehicle traffic.</p> <p>Both two-lane and four-lane general vehicle traffic lane options are considered viable options at this stage.</p> <p>The option to downgrade the highway from four to two general vehicle lanes will be made if and where there is evidence to support this.</p>	<p>Options to provide the light rail in the median is preferable to the provision of light rail to the side (eastern or western) of general traffic lanes due to significant access impacts between Tomewin Street and Stewart Road, in particular (i.e., due to frontage properties and side roads).</p>	<p>Options that do not provide cycle facilities have been rated lower than other options.</p> <p>Provision of separated and on-road cycle facilities are both rated to have similar benefits.</p>	<p>The preferred arrangement is to follow the existing corridor alignment.</p>

Due to the different characteristics and functions of the Gold Coast Highway through Currumbin and Tugun, analysis for this section has been undertaken separately for:

- Gold Coast Highway section 3 north (North of Tomewin Street)
- Gold Coast Highway section 3 central (Tomewin Street to Stewart Road)
- Gold Coast Highway section 3 South (south of Stewart Road)

For section 3 (North), options with both two and four general traffic lanes were considered viable at this stage and progressed for assessment of impacts. Hybrid options were also be considered.



- The existing bridge structure at Currumbin Creek cannot accommodate light rail as well as general traffic and active transport. For route protection, a "side mounted" LRT bridge was adopted to maintain flexibility for either median or side in future
- Options that had no cycle facility were rejected due to the lack of a direct alternative corridor. On-road painted cycle lanes may only meet the intent of the State Government's cycle policy if reduced speed boulevard design treatments are considered. Protected cycle track options may be the most suitable for this short section of PCN corridor where no direct parallel route exists. An alternative route could exist along the Currumbin beach front, however the exact cycle facility treatment in this location would depend on the treatments proposed both north and south of this section.
- For both of the above options, LRT alignment options both east and west of the existing Currumbin Creek bridge were considered feasible subject to further assessment.

For section 3 (central) options with both two and four general vehicle traffic lanes were considered viable at this stage and progress for assessment of impacts. Hybrid options should also be considered.

- LRV on either side of the general vehicle lanes is not considered suitable due to conflicts with side roads and driveways.
- Nil in-corridor cycle facility is considered to be acceptable where the alternative is convenient and direct (e.g., Teemangum Street between Tomewin Street and Stewart Road). Design of any off-highway facility must meet "PCN" standards. This is considered to be a legitimate option for both the 4 lane and 2 lane options given the width constraints in this section. Any in corridor cycle facility treatment in this section will depend on the treatments proposed both north and south of this section.

For section 3 (south) two-lane options south of Stewart Road do not meet TMR requirements as an alternate route in the event of Tugun Bypass tunnel closure and would unnecessarily reduce resilience in the strategic road network

- LRT on the eastern side of general vehicle traffic lanes is feasible due to limited accesses/side conflicts. Median is also feasible but the LRV would conflict with right turns at GCH intersections.
- With the posted speed limit of 80km/h south of Stewart Road in Tugun, only a completely segregated cycleway (not on or immediately adjacent to the Gold Coast Highway carriageway) is likely to meet the intent of the State Government's policy and Safe Design considerations. A facility on Golden Four Drive or in "reserve" between Golden Four Drive and Gold Coast Highway will be progressed.

6.5 PART FIVE: Combined option packages

Based on the analysis of the above investigations, four “packages” of options were developed.

These options progressively reduce in scale and land impact from a higher property impact option which includes all modal facilities within the Gold Coast Highway corridor itself (i.e. LRT, traffic, cycle, parking and pedestrian) through to lower property impact options, with different combinations of infrastructure in-corridor versus out-of-corridor.

The options are described in the following table.

Table 6-6: Shortlisted option features

Features	Option 1	Option 2	Option 3	Option 4
LRT	Generally median running separated ROW	Generally median running separated ROW	Generally median running separated ROW	Generally median running separated ROW
Traffic lanes	4 through lanes on GCH	4 through lanes on GCH	4 lanes on GCH except 19 th to Thrower and Duringan to Stewart	2 lanes between Burleigh Heads and Stewart Rd
Intersection changes	Most right turns on/ off GCH removed except at George St, Ikkana St, Tallegudgera Drive, Nineteenth Ave, Palm Beach Ave, Thrower Drive, Duringan Street, Tomewin Street, Millers Drive and Stewart Road and at other locations where adequate alternative local access cannot be provided			
Parking	Parking generally on eastern side of GCH through Palm Beach	No on-street parking	Potential for parking on eastern side of GCH (plus on road bike lanes both ways) OR in-corridor separated cycle tracks	Potential for parking on eastern side of GCH (plus on road bike lanes both ways) OR in-corridor separated cycle tracks
Cycle facilities	In corridor separated cycle track	Parallel corridor cycle track		

7. Option selection and refinement

7.1 MCA Methodology

A Multi Criteria Analysis (MCA) evaluation process was developed to provide a framework so that the four layout options could be assessed against a number of Outcomes, in order to identify the differentiators between each option. This process is consistent with the themes presented in Shaping SEQ, the statutory regional planning framework for South East Queensland. It is also consistent with the high-level options MCA undertaken for Gold Coast Light Rail Stage 3a¹⁵.

The MCA process was designed to identify a preferred option for further design development and impact assessment.

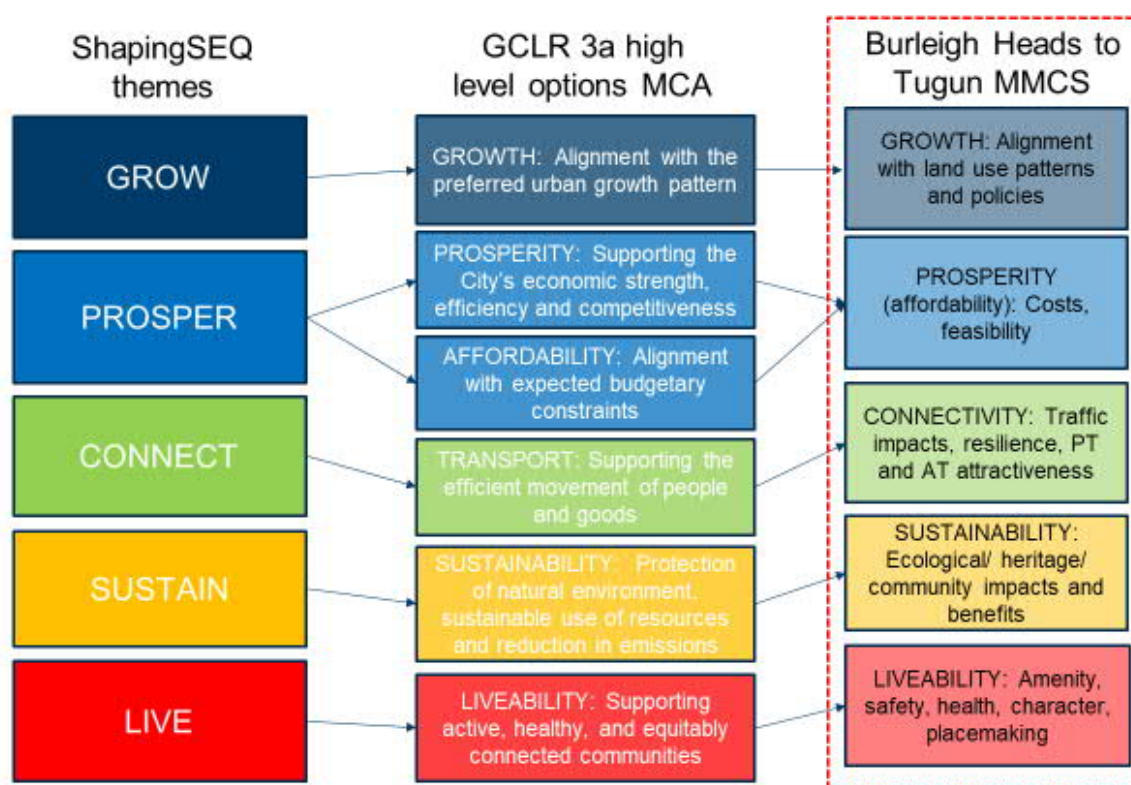


Figure 7-1: MCA development process stages

The criteria that sit beneath the Outcomes were selected on the basis that they needed to closely link to the project's and TMR's key objectives in order to select an option that best meets most, if not all, the functionality and aims of the project. The categories were first developed and presented to the wider TWG for consideration and finalisation.

Following receipt of comments from TMR, a process of refinement of the criteria was undertaken to the categories with a number of amendments applied to develop a final MCA framework.

The final assessment criteria and performance measures are summarised in **Table 7-1**. An assessment of each of the 4 options against these criteria is provided in subsequent sections.

¹⁵ Gold Coast Light Rail Stage 3a Preliminary Business Case, City of Gold Coast 2018

Table 7-1: MCA criteria and performance measures

Outcome	Criteria		Performance measure
GROWTH	1.1	Transport outcomes support urban consolidation	The transport networks (PT, active and road) will function effectively and support capacity for population and employment growth.
	1.2	Surplus land support urban consolidation	Option maximises any surplus land use for urban consolidation (minimises sterilisation of remnant land and maximises useable land)
PROSPERITY (affordability / feasibility)	2.1	Property costs	Cost estimate of potential residential and commercial property impacts
	2.2	Construction cost	Cost estimate of construction costs
	2.3	Construction risks	Minimises geotechnical, hydraulic, PUP, constructability, traffic management risks
CONNECTIVITY (transport)	3.1	Wider network traffic impacts and viability-traffic/network functionality	Wider study area (including M1) road network average speed
	3.2	Localised Impacts of GCH area	GCH microsimulation area average speed, GCH travel times
	3.3	Transport network resilience	Ability of the road network to accommodate a traffic incident or network disruption (measured via average network density)
	3.4	Public transport attractiveness and patronage potential	Increase in public transport use (PT person trips within study area and across key screenline)
	3.5	Quality of cycle network	Quality of facility (compliance with standards including width, layout, level of separation/ safety). Connectivity of facility including cohesion, length, directness
SUSTAINABILITY (environment/ social)	4.1	Enhances koala habitat connectivity	Provides opportunities for enhanced koala habitat and connectivity (supports the provision of fauna management measures).
	4.2	Impacts on areas of identified environmental value, including waterways and vegetation.	Extent of disturbance within areas of identified environmental value.
	4.3	Preserves and enhances cultural heritage	Extent of impacts to identified cultural heritage items/places (Aboriginal or historic). Option maximises opportunities for cultural heritage celebration.
	4.4	Property & community impacts	Option minimises the extent of potential property impacts or impacts to community facilities, services and green spaces.
	4.5	Considers community needs and social values	Option conforms to "user" (including resident) expectations for the corridor re transport function, land impact, etc
LIVEABILITY	5.1	Operational Noise	Traffic volumes on local roads away from GCH (specifically Townson Ave and Mallawa Dr, Tallebudgera)
	5.2	Visual Amenity	Option minimises visual impacts (over and above consistent LRT infrastructure e.g.: width of road carriageway) and maximises visual opportunities - outlooks, vistas etc
	5.3	Increases resident's safety, health and well-being	Maintains or creates improvements to local and through active transport connections and supports safety for users.
	5.4	Enhances local character, centre viability and placemaking	Ability to drive retail and activity centre activation

7.2 Growth outcomes

The Growth outcome was assessed against two criteria, one revolving around the transport capacity to support the planned growth in the City Plan and ShapingSEQ and the other around the potential for any surplus land to stimulate growth and consolidation around an LRT corridor.

- Regarding transport capacity to support the City Plan's existing strategic intent for urban consolidation, Option 1 provides greatest capacity to accommodate growth in all modes - general traffic, PT and active transport.
- Regarding surplus land opportunities, Option 1 leads to significantly greater area of surplus land. While redevelopment of surplus land may take many years to be absorbed by market this option could have significant long term potential for generating uplift by consolidating lots. This would need to consider TMR interface agreements and LRT exclusion zone impacts on development potential.

7.3 Prosperity outcomes

The prosperity outcome was informed by a cost assessment as well as a qualitative assessment on construction risks. Detailed costs estimates have been removed from the report due to commercial sensitivity.

7.4 Connectivity outcomes

The connectivity outcome was principally informed by a detailed quantitative transport modelling and assessment process. Table 7-2 provides a summary of connectivity outcome findings.

Table 7-2: Summary of connectivity outcome findings

	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
3.1	Wider network traffic impacts and viability-traffic/network functionality	<i>Wider study area (inc M1) road network average speed</i>	Best case (same as Opt 2)	Best case (same as Opt 1)	Slight reduction in speed compared to Opt 1 and 2)	Worse than Option 3& notable wider area impacts
3.2	Localised Impacts of GCH traffic	<i>GCH microsim area average speed, GCH travel times</i>	Best case	Base case	Some worsening (moderate)	Worst case
3.3	Transport network resilience	<i>Ability of the road network to accommodate a traffic incident or network disruption (measured via average network density)</i>	. Reasonable reliability/resilience.	. Reasonable reliability/resilience.	Less reliability/resilience.	Significantly less reliable/resilient

	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
3.4	Public transport attractiveness and patronage potential	<i>Increase in public transport use (PT person trips within study area and across key screenlines)</i>	Results in a 30% daily PT patronage uplift across Talle Creek screenline in 2041 (compared to base case)	Results in a 30% daily PT patronage uplift across Talle Creek screenline in 2041 (compared to base case)	Results in a 31% daily PT patronage uplift across Talle Creek screenline in 2041 (compared to base case)	Results in a 31% daily PT patronage uplift across Talle Creek screenline in 2041 (compared to base case)
3.5	Quality of cycle network	<i>Quality/ connectivity of facility including cohesion, length, directness</i>	Provides protected on road bicycle lanes through Palm Beach) and separate 2 way cycleway elsewhere but requires transitions between the 2.	Assume off corridor cycle facility with good level of protection.	Provides a combination of protected on road bicycle lanes and separate 2 way path on the east but has several transitions from one to the other	Provides continuous on road protected bicycle lanes

7.5 Sustainability outcomes

The Sustainability Outcome has been assessed against a range of environmental and social criteria. Table 7-3 provides a summary of sustainability outcome findings.

Table 7-3: Summary of sustainability outcome findings

	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
4.1	Enhances koala habitat connectivity	<i>Provides opportunities for enhanced koala habitat and connectivity (supports the provision of fauna management measures).</i>	Key differentiator- Environmental offsets can be captured in TMR land	Key differentiator- Environmental offsets can be captured in TMR land	Key differentiator- Environmental offsets can be captured in TMR land	Key differentiator- Environmental offsets <u>harder to accommodate</u> within TMR acquired land
4.2	Impacts areas of identified environmental value, including waterways and vegetation.	<i>Extent of disturbance within areas of identified environmental value.</i>	Options 1-3 similar impact on waterways (bridge piers etc) and width of disturbance to vegetation	Options 1-3 similar impact on waterways (bridge piers etc) and width of disturbance to vegetation	Options 1-3 similar impact on waterways (bridge piers etc) and width of disturbance to vegetation	Cumulatively Option 4 has the lowest ecological impact on waterways and vegetation

	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
4.3	Preserves and enhances cultural heritage	<i>Extent of impacts to identified cultural heritage items/places. Option maximises opportunities for cultural heritage celebration.</i>	Not a differentiator	Not a differentiator	Not a differentiator	Not a differentiator
4.4	Property & community impacts	<i>Option minimises the extent of potential for property impacts or impacts to community facilities, services and green spaces.</i>	This option would have short term impacts but also has greatest longer term opportunities for enhanced community facilities	Less opportunity for street scaping outside of station zones due to 4 lanes of traffic within road reserve.	Similar to Option 2 outside of Palm Beach and similar to Option 4 within Palm Beach centre.	High opportunity for street scaping/ boulevard treatments within existing road reserve
4.5	Considers community needs and social values	<i>Option conforms to "user" (inc resident) expectations for the corridor re transport function, land impact, etc</i>	Significant residential impacts as per criteria 2.1. Significant impacts along one entire side of GCH through Palm Beach	Localised property impacts around stations similar to Stage 1. Traffic function not compromised in line with community expectations	Less property than option 2, but more compromised traffic functionality	Significant traffic impacts as per criteria 3.1 which will not conform to community needs/ expectations

7.6 Liveability Outcomes

The liveability outcome was assessed against four criteria including operational noise, visual amenity, safety health and well-being, and local character, centre viability and placemaking. A summary of the findings of this assessment are contained in Table 7-4.

Table 7-4: Summary of liveability outcome findings

	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
5.1	Operational Noise	<i>Traffic volumes on local roads away from GCH (specifically Townson Ave and Mallowa Dr, Talbudgera Dr, Nineteenth Ave, Palm Beach Ave)</i>	Mallowa / Townson would experience a minor increase in traffic relative to 2016 i.e. +1300vpd (to 15,300 vpd in 2041).	Mallowa / Townson would experience a minor increase in traffic relative to 2016 +1300vpd (to 15,300 vpd in 2041).	Mallowa / Townson would experience a noticeable increase in traffic relative to 2016 i.e. +4400vpd (to 18,400 vpd in 2041).	Mallowa / Townson would experience a significant increase in traffic relative to 2016 i



	Criteria	Performance Measure	Option 1	Option 2	Option 3	Option 4
5.2	Visual Amenity	<i>Option minimises visual impacts (over and above consistent LRT infrastructure e.g.: width of road carriageway) and maximises visual opportunities - outlooks, vistas etc</i>	Sudden and dramatic change in visual amenity due to potential for large scale property impacts.	More isolated pockets of potential property impacts. Still opportunities to enhance visual amenity of corridor through "Boulevard treatments	More isolated pockets of potential property impacts. Similar opportunities for improved visual amenity through streetscape upgrades around most stations as Opt 2	More opportunities to enhance vistas due to narrower road corridor. This option could deliver more immediate streetscape improvements and visual amenity benefits.
5.3	Increases resident's safety, health and well-being	<i>Maintains or creates improvements to local and through active transport connections and supports safety for users.</i>	Wider corridor to include parking and cycleway creates a greater barrier for cross movements to/ from beach and likely to encourage higher traffic speeds.	Largely the same cross section as current (except at stations where additional islands and medians provided. Removal of shoulder may reduce speeds relative to existing	Reduced number of traffic lanes for large part of Palm Beach reduces extent of ped conflict and reduces traffic speeds (more friction). Elsewhere, similar to Opt 2	Reduced traffic lanes reduces the extent of ped conflict and reduces traffic speeds (more friction)
5.4	Enhances local character, centre viability and placemaking	<i>Ability to drive retail and activity centre activation Opportunities for infrastructure/ station design to integrate with surrounding values</i>	Wider road corridor = greater traffic volumes and intrusion on centre amenity. Land takes offer new opportunities for integrated urban opportunities longer term	Wider road corridor = greater traffic volumes and intrusion on centre amenity. Opportunities for integrated urban outcomes around stations - similar to Opt 1 in Palm Beach	Narrower corridor width = more traffic calmed and may encourage greater street based activity/ activation. Local character maintained/ less potential for property impacts)	Narrower corridor width = more traffic calmed and may encourage greater street based activity/ activation. Local character maintained/ less potential for property impacts)

7.7 Assessment findings

7.7.1 MCA process

A facilitated MCA workshop was held on Thursday 6 December 2018 at TMR South Coast's offices at Nerang. The workshop was attended by members of the TWG including representatives from:

- TMR South Coast District,
- TMR TransLink Division,
- GCLR Stage 3a project team,
- City of Gold Coast traffic/ transport and planning divisions, and
- Department of State Development Manufacturing, Infrastructure and Planning (DSDMIP).

The MCA involved assigning each option a score as follows:

- -5 – generally this score meant that there was a significant cost or impacts
- 0 – generally this score meant negligible or minor impacts, or the option was mid-way between extremes
- + 5 – generally this score meant that the option deliverable favourable benefits, or was the best outcomes across all options, comparatively.

Option 2 scored highest on a raw score basis with Option 3 scoring second.

Sensitivity testing was then undertaken. Workshop participants were each asked to identify their “Top 5” criteria. These were then used as the basis of a series of four sensitivity tests revolving around the constituent TWG participant's organisation. An additional two test were performance based on equal weighting of criteria and equal waiting of outcome. This resulted in six sensitivity tests. Option 2 scored highest under all tests.

Lastly, workshop participants were asked to undertake a matched pairs assessment in the workshop. Participants were asked to identify which of the two options being compared, was their preferred overall, in order to further validate the results of the MCA. This showed a preference for Option 2 for most participants.

7.7.2 MCA outcomes

The results of the MCA workshop, the sensitivity analyses and matched pairs assessment showed the following outcomes:

- Option 2 (4 lanes, cycleway out of corridor) scored highest overall followed by Option 3 (Hybrid – 2 and 4 lanes) on an unweighted basis.
- Option 1 (4 lane + in corridor cycleway) while scoring second highest on a weighted and matched pairs basis was considered fatally flawed due to the potential for significant property and community impacts.
- Option 4 (2 lanes) scored worst on a weighted/ unweighted and match pairs basis and was considered fatally flawed due to unacceptable traffic impacts.

Between Option 2 and Option 3, despite similar operational outcomes for traffic, Option 2 is likely to have more property impacts compared to Option 3. From a value for money and community impact perspective Option 3 could not be discounted at this stage. As such further design development was carried out on both Option 2 and Option 3 to identify opportunities to reduce potential for property impacts without compromising wider network traffic.

7.8 Further option refinement

The primary objective of this further option development phase was to refine the two short listed options further to improve the traffic performance of Option 3 to be comparative to Option 2, while reducing the potential for property impacts of both options.

7.8.1 Road capacity

Changes in overall road capacity were undertaken largely for Option 3 (now termed Option 3.1). This was based on previous traffic analysis which showed that some two-lane sections of the Gold Coast Highway were forecast to experience higher levels of congestion and delay by 2041. As such three new 4-lane sections were added as follows:

- between Seventh Avenue and Fourth Avenue, Palm Beach
- between Thrower Drive, Palm Beach and Duringan Street, Currumbin
- on the immediate approaches to / departure from Tomewin Street, Currumbin.

Both Option 2 (now 2.1) and Option 3 (now 3.1) were also revised from 6 through lanes to 4 through lanes south of Toolona Street based on forecast traffic levels not warranting 6 lanes of capacity at this location. Nevertheless, the designs for both options preserved the corridor width for 6 lanes at a later date, if required.

A diagram illustrating lane configurations, with changes highlighted red, is provided in Figure 7-2.

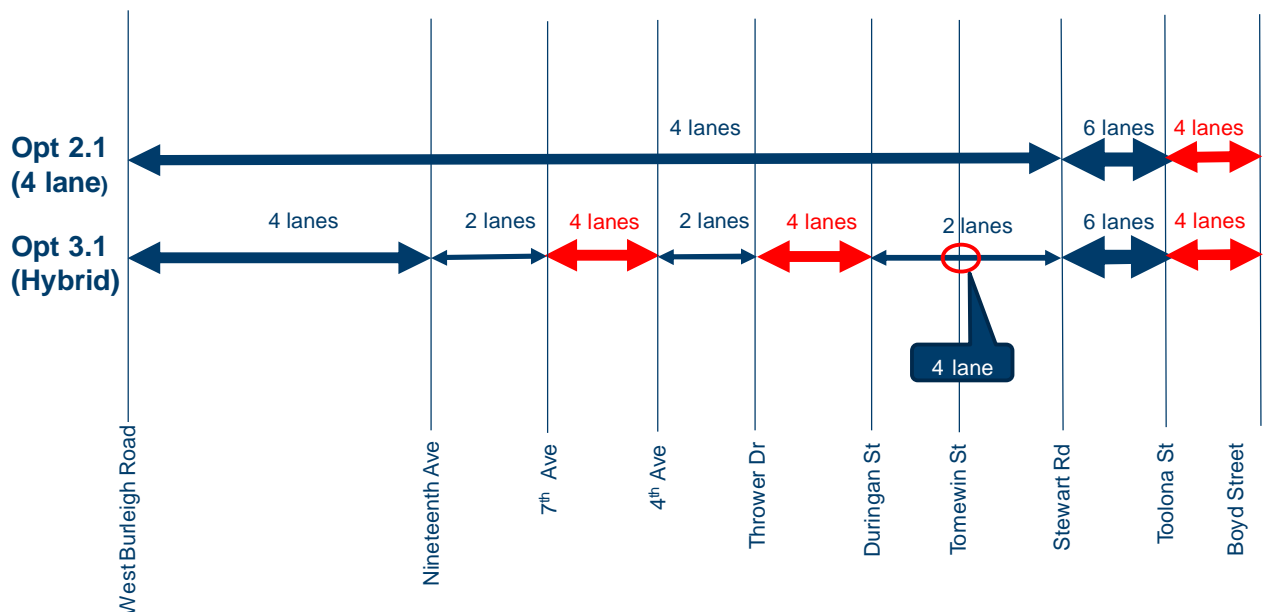


Figure 7-2: Lane configuration diagram

7.8.2 Cycle facility location/ design

Option 2 and 3 previously exhibited different approaches to “principal” level cycle facility design. It was noted by the TWG in the MCA process that Option 3 required numerous transitions between one-way on road cycle facilities and two-way off road cycle facilities which may be less attractive for some users. As such, and in combination with other changes, the principal cycle facility for Option 3 (now Option 3.1) was amended to match Option 2 (now option 2.1). That is with a continuous two-way cycle facility on the eastern side of the Gold Coast Highway carriageways, with the cycle track being

“in corridor” (within the State-Controlled Road reserve) north of Tallebudgera Drive and between Thrower Drive and Tomewin Street. Elsewhere it would be located on parallel corridors are illustrated diagrammatically in Figure 7-3.

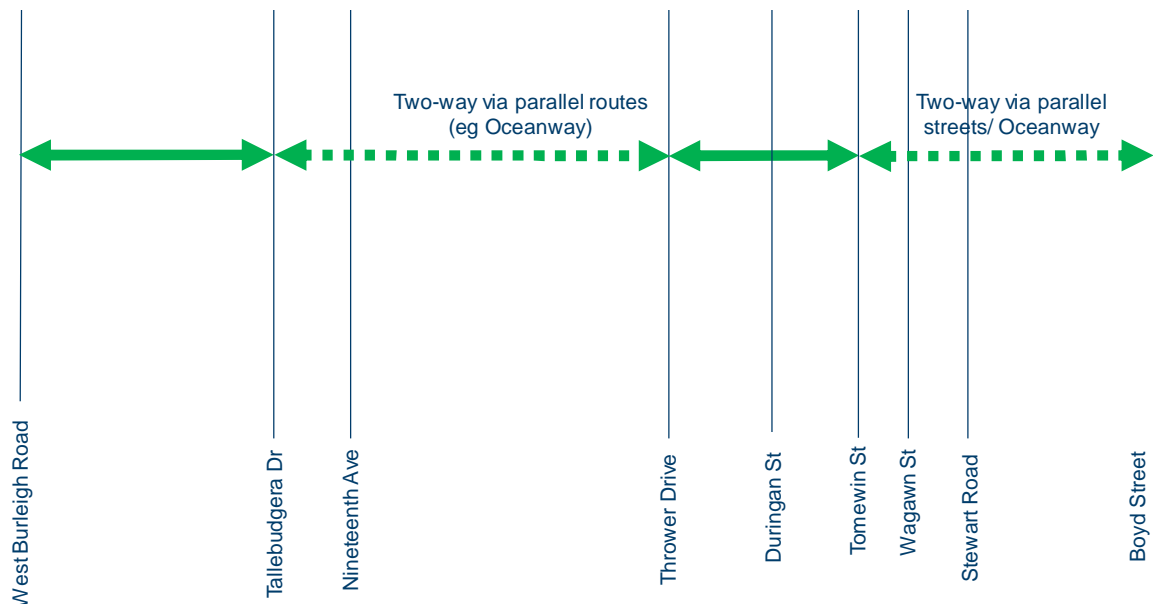


Figure 7-3: Cycle facility diagram

Between Tallebudgera Drive and Thrower Drive, several options have been identified for such an off-corridor cycle facility through Palm Beach as illustrated in Figure 7-4. These route options all aim to keep the off corridor facility as close as practical to the highway, noting that this facility is in lieu of a cycle facility on the highway itself and is in addition to a parallel Principal Cycle Route which has been designated along Mallowa Drive further west.

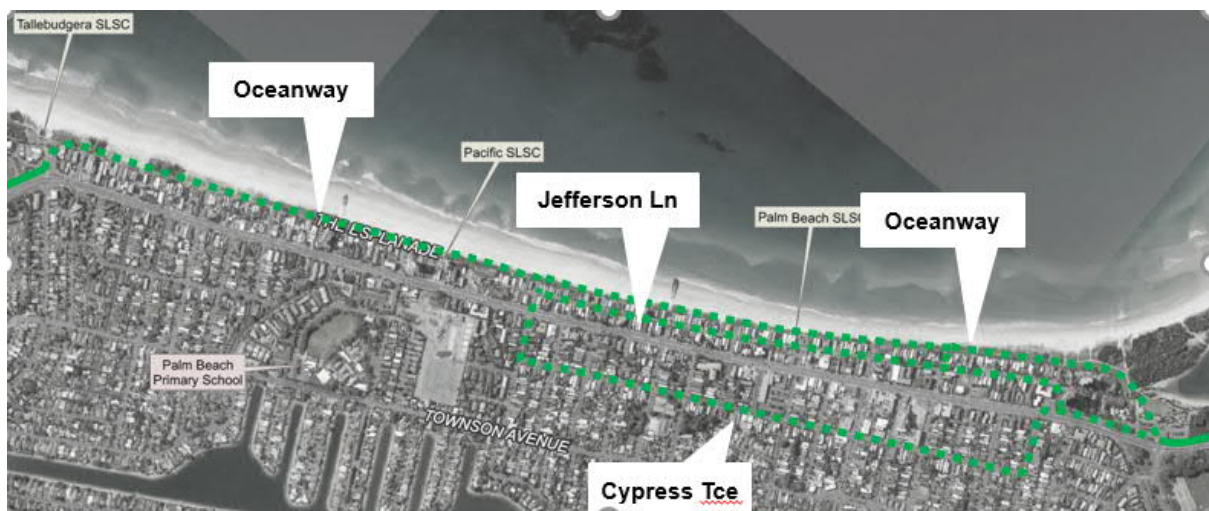


Figure 7-4: Potential cycleway alignment options

These off-corridor cycle route options and potential design features to meet a principal standard could include:



- A full length Oceanway from Tallebudgera Drive to Thrower Drive – preferably as a separated path (refer Figure 7-5), approx. 5-6m wide. However, available space for an Oceanway appears most constrained between Fifteenth Ave and Fourth Avenue.
- Oceanway from Tallebudgera Drive to Fifteenth Ave, Jefferson Lane from Fifteenth Avenue to Fourth Avenue then Oceanway to Thrower Drive. A similar example exists in O’Connell Street, Auckland (Refer Figure 7-6)
- Oceanway from Tallebudgera Drive to Fifteenth Ave, then protected two-way cycleway (Refer Figure 7-7) along Fifteenth Avenue and Cypress Terrace to First Avenue connecting back to the Gold Coast Highway via a signalised mid-block crossing and continuing as a protected two-way cycle facility on the eastern side of the highway to Thrower Drive.



Figure 7-5: Example of a separated pedestrian and cycle path (Bicentennial Bikeway, Brisbane)

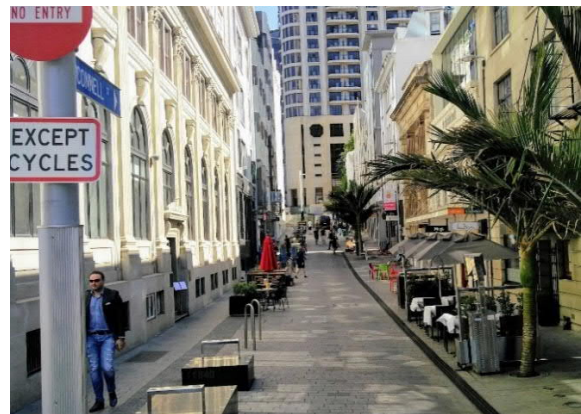


Figure 7-6: Example of a shared space laneway with contraflow cycling (O’Connell Street, Auckland)



Figure 7-7: Example of a two way cycleway with driveways and side road crossings on a residential street (River Esplanade, Mooloolaba)

It is recommended that these three principal cycle facility options are progressed in conjunction with council, in parallel with this Route Strategy for the Gold Coast Highway State Controlled Road corridor.

7.8.3 Public transport (light rail and bus)

There were no fundamental changes to bus and light rail infrastructure assumptions as part of the option refinement process.

7.8.4 Pairwise comparison

Given the previous extensive MCA undertaken for four options, a simpler pairwise comparison framework was developed for this assessment as illustrated below. A TWG workshop was held on 12 April 2019, to undertake agree the outcomes of the pairwise comparison. The Pairwise comparison criteria are shown in Figure 7-8 below.

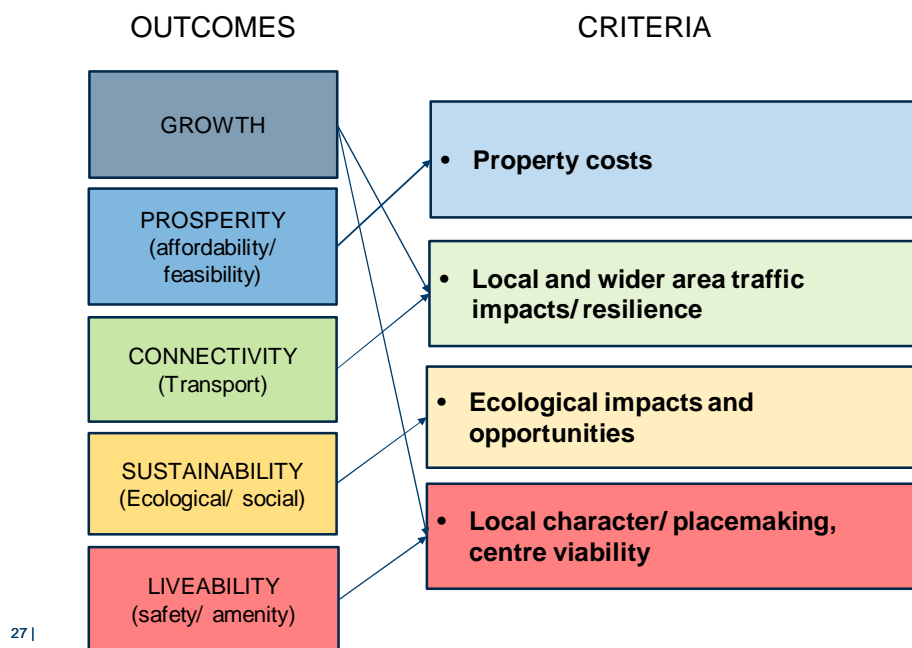


Figure 7-8 Pairwise comparison framework/ criteria

For each criterion participants were asked to compare the two options and assess which is preferred on a one-to-one basis. The summary of the assessment and the workshop outcomes are described below.

Property costs

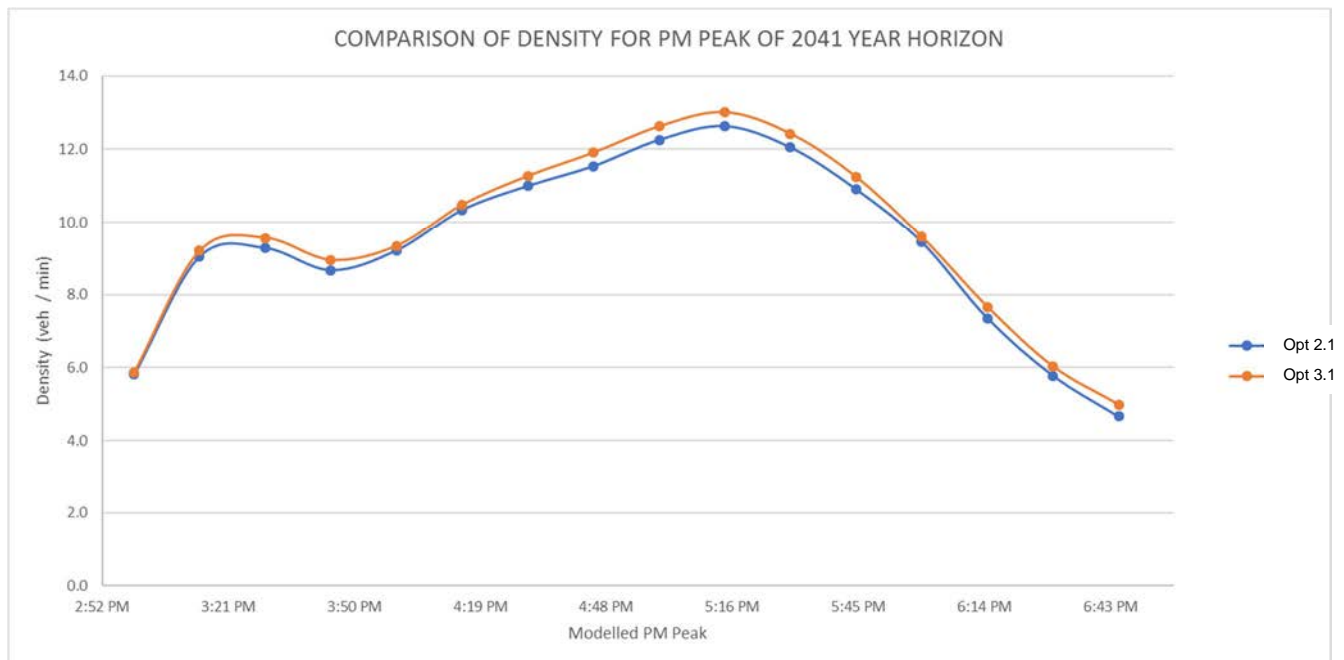
The updated design resulted in less potential for property impacts for each option. Detailed property costs and impacts have been removed from this section due to commercial sensitivity.

For this criterion, Option 3.1 was preferred compared to Option 2.1.

Transport impacts

A detailed traffic assessment process was undertaken to identify the traffic impacts of the options and any differentiators.

These minor differences are further illustrated by the traffic network density plot below. Note that the difference in network density (between options) has reduced from 8% (Option 2 versus Option 3) to 3% (option 2.1 versus 3.1).



On the Gold Coast Highway specifically, travel times and average speeds for general traffic have improved for Option 3.1 (relative to the previous Option 3) such that it is now very similar to the performance of Option 2.1 as illustrated below.

Table 7-5: Travel time changes

GCH	Option 2	Option 2.1	Option 3	Option 3.1
AM Northbound two hour average	12 mins	11 mins (-1)	13 mins	10.7 mins (-2.3)
AM Northbound 15 minute max average	12.7 mins	12 mins (-0.3)	14.8 mins	11.6 mins(-3.2)
PM Southbound two hour average	13.1 mins	11.9 mins (-1.2)	14.6 mins	13.8 mins (-0.8)
PM Southbound 15 minute max average	14.7 mins	12.8 mins (-1.9)	18.4 mins	15.7 mins(-2.7)

There was negligible difference between the two options from a wider traffic impact perspective. However, it noted that due to additional turn restriction introduced as part of Option 3.1, that this option would require more local area traffic management to mitigate localised distribution effects.

Ecological impacts

In terms of ecological impacts, both options were very similar. North of Tallebudgera Creek, through the Burleigh Head National Park, the options are identical. However south of Currumbin Creek, where the alignment passes adjacent to (but not through) the Currumbin Hill Conservation Park, there was additional vegetation clearing likely to be required for Option 2.1 compared to 3.1 due to two additional traffic lanes.

As such Option 3.1 was assessed as being preferred against this criterion.

Local character/ centre viability impacts

The assessment of impacts on local character and centre viability centred on the extent of potential property impacts and potential loss of centre amenity and vitality for an extended period of time during construction. A comparison of the potential property impacts between the two options shows fundamentally different scale of impacts with Option 2.1 likely to result in the potential for more property impacts compared to Option 3.1.

As such, Option 3.1 was identified as preferred against this criterion.

8. Preferred Option

8.1 Minimum requirement for route protection

The preferred option identified above (Option 3.1) was selected through a multi-stage assessment process. This assessment process was heavily influenced by potential property impacts and costs which ultimately resulted in the rejection of Option 1 and 2 (including 2.1), which had a greater footprint. The preferred option, Option 3.1, therefore represents the most feasible short to medium term solution based on current corridor widths and property setbacks. This option is considered to be the minimum footprint required to deliver the functional requirements outlined in this report.

This option is intended to be able to support and help deliver the agreed corridor vision of:

The Gold Coast Highway will transform to become a sustainable sub-tropical Gold Coast Boulevard between Burleigh Heads and Tugun town centres. Residents, tourists and businesses will have attractive alternatives to car travel with high quality footways and bikeways as well as reliable, frequent public transport services. Traffic will be accommodated in a way which creates safer, more liveable communities, while on street parking will be designed to support and enliven commercial activity. Light rail stations will knit together and form a focal point for villages and centres, stimulating new development and contributing to more vibrant communities. A range of new housing and employment options will develop within comfortable walking distance of stations as the corridor emerges as an even more desirable place to live and work. Local character will be celebrated and enhanced with appropriate and varied density. Environmental, cultural heritage and landscape values along the corridor will be protected.



Figure 8-1: Artists Impression of the intersection of Palm Beach Avenue looking east



Figure 8-2: Artists Impression of LRT and active transport bridge over Tallebudgera Creek