ALTITUDE ASPIRE REVISED TRANSPORT ASSESSMENT FOR PREFERRED PROJECT REPORT (PPR)

FOR

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EXECUTIVE SUMMARY

Bitzios Consulting had previously undertaken a transport assessment to address the transport aspects of the Director General's Environmental Assessment Requirements (DGEAR) for Major Project Application No. MP09-0166 known as Altitude Aspire. Following a review of the Major Project Application by relevant stakeholders (i.e. NSW Department of Planning, Tweed Shire Council, NSW Department of Transport, NSW Roads and Maritime Service [RMS]) as well as public submissions, the proposed development has been revised for the Preferred Project submission. This report provides a revised traffic and transport assessment for the Altitude Aspire Preferred Project Report (PPR). Below details how the revised development addresses the Director General's Environmental Assessment Requirements (DGEAR) in regards to transport.

DGEAR 2.4 Proposal provides for the establishment of a suitable neighbourhood character for the area.

The proposed development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive, Market Parade, Parkes Lane and the future planned Broadwater Parkway. The internal road network has been revised based on liaison with Council and designed in accordance with the requirement set out within Section A5 of the Tweed DCP 2008. Specifically, the internal road network has been designed to take into consideration the topography constraints to meet the following objectives:

- *provide acceptable levels of safety, convenience and amenity for all street users and adjacent residents in accordance with the roads hierarchical status;*
- *ensure that each road is conducive to the wider road network with a clear distinction between functional classes of streets;*
- *provides amenity for public transport permeability and connectivity to existing and future services; and*
- *provides a safe and convenient network for pedestrians and cyclists.*

The Road Hierarchy Map as shown within Section 3 of this report demonstrates the proposed developments integration with the surrounding road network and is consistent with Council's adopted DCP for Urban Release Area E.

DGEAR 5.1 Prepare a transport and accessibility impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments.

This Traffic Impact Assessment Report has been developed in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments. See Appendix A for Table 2.1 Checklist.

As Council's has not yet finalised planning and timing for Broadwater Parkway, assessment of the temporary access to Fraser Drive has been undertaken with full development traffic generation to ensure the proposed development can function without the inclusion of Broadwater Parkway. The assessment determined that the temporary site access intersection can cater for full development traffic volumes. In addition, surrounding intersections will not be adversely impacted and continue to perform within capacity as a result of the increased traffic volumes at the temporary site access intersection.

The inclusion of Broadwater Parkway will see the closure of the Fraser Drive intersection, with development traffic redistributed to Broadwater Parkway as per Council's Strategic Network Planning.

DGEAR 5.2 Address how the Proposal is consistent with the objectives and principles of the NSW Government's Integrating Land Use and Transport Policy package and the NSW Planning Guidelines for Walking and Cycling.

The proposed development's pedestrian network has been designed to minimise the topography constraints of the site in order to meet the objectives in accordance with NSW Planning Guidelines for Walking and Cycling as detailed below:

- ***walking and cycling neighbourhood** – Improves walkability and cycleability by providing pathways along site contours and connect to surrounding pathways, public transport routes and nearby local trip attractors such as Tweed Heights Shopping Centre.*
- ***street pattern** – The development's street pattern minimises the impacts of the site's undulating terrain and provides permeability to the existing road network in accordance with Council's adopted*

DCP for Urban Release Area E. The street pattern generally provides a grid layout with a central street that connects to Market Parade, Parkes Lane, Broadwater Parkway and future land releases within Area E to the west.

- ***mixed use neighbourhoods** – The inclusion of the community facility in the centre of the development aims to promote healthy living and recreational activities within walking distance to the entire development.*
- ***connection to local walk and cycle networks** – Footpaths and cycleways within the development integrate to both existing and future planned walk and cycle routes along Fraser Drive and Broadwater Parkway. In addition, connections are provided for future integration of the Area E precinct.*
- ***security and safety** – Footpaths are provided both along residential streets, dedicated pedestrian linkages as well as connecting directly through the development's open space providing visually continuous pathways and avoiding areas of concealment.*
- ***design within road reserve** – Footpaths are provided along all streets within the development. Pedestrian crossings are located are primary desire lines and within clear view of adjacent intersections. Footpaths are provided with disability kerb ramps for all road crossings.*
- ***parks and open space** – Open spaces areas include both circulating pathways as well as direct footpaths that follow desire lines and site contours to promote direct and convenient routes.*

Where applicable, the proposal has been developed by following the objectives within the NSW Governments Integrating Land Use:

- *improving access to housing, jobs and services by walking, cycling and public transport;*
- *increasing the choice of available transport and reducing dependence on cars;*
- *reducing travel demand including the number of trips generated by development;*
- *reduce the distances travelled, especially by car;*
- *supporting the efficient and viable operation of public transport services, and*
- *providing for the efficient movement of freight.*

Section 6 within the report provides details on how the development has been designed or planned to promote the use of alternate travel modes.

DGEAR 5.3 Identify measures to manage travel demand and increase the use of public and non-car transport modes.

The development has provided improvements to the existing level of alternate travel modes for this section of western Banora Point and Terranora. Recent residential, retail and educational development on Fraser Drive has increased the level of accessibility by walk, cycle and public transport. As a result, the development aims to integrate into existing bus services as well as promote the use of future planned road corridors such as Broadwater Parkway. Liaison with Transit Australia Group (TAG), who is responsible for local and school bus route planning, has been undertaken with recommendations designed into the development.

Further details are provided within Section 6 of the report.

***DGEAR 5.4 Outline any proposed cycleways and ensure connectivity with existing cycleways in the area, especially Fraser Drive**.*

The development maximises the available connections to the surrounding cycle routes including direct connections to Fraser Drive, Parkes Lane and the future planned Broadwater Parkway linking to Mahers Lane as detailed within Section 6.3 of the report. .

These connections are in line with key desire lines to cycle routes for leisure, employment/education and sport cyclists and aims to minimise the surrounding topography constraints of the area.

Liaison with Tweed Shire Council was undertaken to ensure connectivity of the site to future proposed cycleways in proximity to the development. This resulted in additional connections to Fraser Drive as well as a revised road network that allows better integration with future land releases as part of Area E to the west.

DGREA 5.5 Identify the likely transport infrastructure and recurrent servicing costs for Government in proceeding with the development.

The development is located approximately 4kms from the state-controlled road network, namely the Pacific Highway at Sextons Hill. Construction of the Sextons Hill Bypass has recently been completed as part of the Federal Governments Nation Building Program and takes into account forecast traffic data for future growth in the Tweed Shire and will provide increased capacity to the state-controlled road network. Traffic generated from the proposed development will be distributed throughout the local road network primarily along Fraser Drive, Leisure Drive and Terranora Road. As such, the level of development traffic reaching the state-controlled road network will be negligible and not result in any additional government infrastructure or increase in servicing or maintenance costs to state roads.

In addition, Kirkwood Road / Pacific Highway southern facing interchange has recently begun construction and is jointly funded by Tweed Shire Council and the (RMS). This upgrade shall include a southbound off-ramp and on-ramp and is expected to reduce the traffic dependence on the southern section of Minjungbal Drive at the Sextons Hill bypass.

Future road network upgrades within proximity to the development include the following:

- *Kirkwood Road / Pacific Motorway interchange upgrade and extension to Fraser Drive;*
- *Fraser Drive upgrade including 4 laning between Broadwater Parkway and Kirkwood Road; and*
- *Terranora Road upgrade between Mahers Lane and Fraser Drive.*

In accordance with the Section 94 Contributions Plan, the proposed development shall pay contributions to road network upgrades (including the above-mentioned planned upgrades) based on the level of trips generated by the development as outlined within Council's Tweed Road Contribution Plan Version 6.

DGEAR 5.6 Potential allocation of bus services to the proposal

The NSW Department of Transport and Infrastructure has indicated that the allocation of future bus services is done so by liaison with the service provider (TAG) and based primarily on a 'current demand' basis.

Liaison with TAG has been undertaken on potential routes through the site as well as potential for existing Bus Route 607 to serve the proposed development following construction of residential lots and production of potential public transport demand over time. TAG have reviewed and accepted the potential bus routes through the development both with and without Brooadwater Parkway.

Timing of allocation of bus services will be prioritised based on development of residential lots over time within Area E.

Refer to Section 6.1 within the report for further details on bus service recommendations for the proposed development.

DGEAR 5.7 Demonstrate that the proposed road layout can achieve a high degree of pedestrian and cycle access, and can support future bus access in accordance with the NSWTI bus planning guidelines, including during Staging

The proposed development has been designed to maximise potential for walk and cycle travel modes through the topography constraints of the site. As such, the proposed development provides permeability to the existing and future planned surrounding road network. Proposed bus stop locations comply with standard bus stop design practices by providing a maximum walking distance of 400 metres between stops and dwellings within the proposed development.

The temporary access to Fraser Drive will provide the primary access point to the development as well as improve the existing walk and cycle accessibility for existing Market Parade residents by creating a more direct link to Fraser Drive and onto the existing bus services at Glen Ayr Drive and school routes on Fraser Drive.

Further details of how the developments have been planned to maximise walk, cycle and public transport accessibility is detailed within Section 6 of the report.

DGEAR 5.8 Demonstrate that the proposed internal road layout maximises connectivity within the development, to the broader Terranora Area E urban release area, and to the surrounding environment.

The development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive, Market Parade, Parkes Lane and the future planned Broadwater Parkway once constructed. In addition, the development provides linkage oportunities for neighbouring developments to connect to the internal road network in line with principles outlined within Council's adopted DCP for Area E.

DGEAR 5.9 Analyse the impacts of an expected increase in traffic on the existing road network surrounding the site, and provide measures to ensure that traffic impacts on the existing and future local road network are minimised. Address how the proposed temporary access to Fraser Drive will affect the amenity of local roads

In accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments, a traffic impact assessment has been undertaken to determine what impacts the development is expected to have on the surrounding road network.

The development is expected to generate 254 peak hour trips. All surrounding intersections for the development perform within capacity within each of the AM and PM peak periods.

The development's temporary access configuration with Fraser Drive will perform within operational capacity with full development (all stages) irrespective of the inclusion of Broadwater Parkway.

The proposed location for the temporary site access intersection to Fraser Drive is the most suitable along the western section of Fraser Drive in regards to meeting Austroad's Standards for Intersections at Grade as well as consideration for adjacent residential driveway crossovers. Assessment of the site access configuration demonstrated that the intersection complies with Austroads standards in regards to approach gradients, intersection spacing, site distances and vehicle acceptance gaps.

The temporary access intersection has been designed to retain equitable access to adjacent driveway crossovers on the eastern side of Fraser Drive. Should the temporary access intersection not be provided onto Fraser Drive, development traffic will be required to use Market Parade and Parkes Lane, which is undesirable because of potential pedestrian safety issues and restricted driver sight lines.

Further details into assessment of traffic impacts are within Sections 4 and 5 of this report.

DGEAR 5.10 Provide an assessment of the feasibility and environmental impacts of the proposed temporary access to Fraser Drive

As mentioned above, the proposed location for the temporary site access intersection to Fraser Drive is the most suitable along the western section of Fraser Drive in regards to meeting Austroad's Standards for Intersections at Grade. Assessment of the site access configuration demonstrated that it will comply with Austroads standards in regards to approach gradients, intersection spacing, site distances and vehicle acceptance gaps. In addition, the proposed temporary access will retain the same level of access currently provided for opposing driveway crossovers on the eastern side of Fraser Drive.

Refer to Section 5 of this report for further information.

1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting had previously been engaged by Newland to undertake a transport assessment to address the transport aspects of the *Director General's Environmental Assessment Requirements* (DGEAR) for Major Project Application No. MP09-0166 known as Altitude Aspire. Following a review of the Major Project Application by relevant stakeholders (i.e. NSW Department of Planning, Tweed Shire Council, NSW Department of Transport, NSW Roads and Maritime Service [RMS]) as well as public submissions, the proposed development has been revised for the Preferred Project submission. This report provides a revised traffic and transport assessment for the Altitude Aspire Preferred Project Report (PPR).

The proposed Altitude Aspire development is to be located in Terranora on the western side of Fraser Drive north of Parkes Lane as shown in Figure 1.1. The subject site is located within Tweed Shire Council's ("Council" hereafter) Terranora Urban Release Area E, specifically the 'Fraser Drive Precinct' as identified within Council's adopted DCP for Area E.

SOURCE: Map data @ 2012 Google, Whereis® Sensis Pty Ltd

Figure 1.1: Proposed Altitude Aspire Development Location

The current land use zoning is *Zone 2(c) Residential – Urban Expansion*, which is primarily residential development focused on multi-use neighbourhood centres. Currently the site consists of primarily rural farmland as shown in Figure 1.2.

Figure 1.2: Existing Site Formation (looking west from Fraser Drive)

1.2 SCOPE

In line with the DGEAR, this report has been developed in accordance with the *RTA's Guide to Traffic Generating Developments* and includes the following:

- assessment of the impacts of additional traffic generated by the development on the surrounding road network and provide measures to ensure that any impacts are mitigated where required;
- assessment of and demonstrate that the internal road network maximises connectivity within the development and to adjacent proposed urban release areas within Area E;
- assessment of the potential staging requirements including temporary access configurations and impacts on the surrounding road network;
- identifying the measures to manage travel demand and increase public transport and non-motorised travel modes;
- investigation of the options of providing bus services which may cater to the proposed development;
- assess the proposed development against NSW Government Integrating Land Use and Transport Policy and BNSW Planning Guidelines for Walking and Cycling;
- identify the proposed cycle facilities and connectivity to surrounding facilities;
- estimation the internal road layout provides for pedestrians and cyclists including during staging of the development;
- review the public and stakeholder submissions received regarding issues and concerns raised for the proposed development and address the identified comments by amendments to the proposed development or supplying relevant responses; and
- assessing the amended aspects of the proposed development where necessary such as; lot layout, intersection configurations, pedestrian footpaths etc. in accordance with Council's Development Control Plan (DCP) and requirements set out by the relevant authorities e.g. Department of Planning (DoP), Department of Transport (DoT) and NSW Roads and Maritime Service (RMS).

Please refer to Appendix A which includes the Table 2.1 RTA Checklist from; *RTA Guide to Traffic Generating Developments: Section 2: Traffic Impact Studies – CHECKLIST*.

2. EXISTING CONDITIONS

2.1 ROAD NETWORK

Figure 2.1 demonstrates the existing functional hierarchy of the road network surrounding the proposed site as per Council's road designation. Below details the condition, land uses and road environment of key roads relevant to the site.

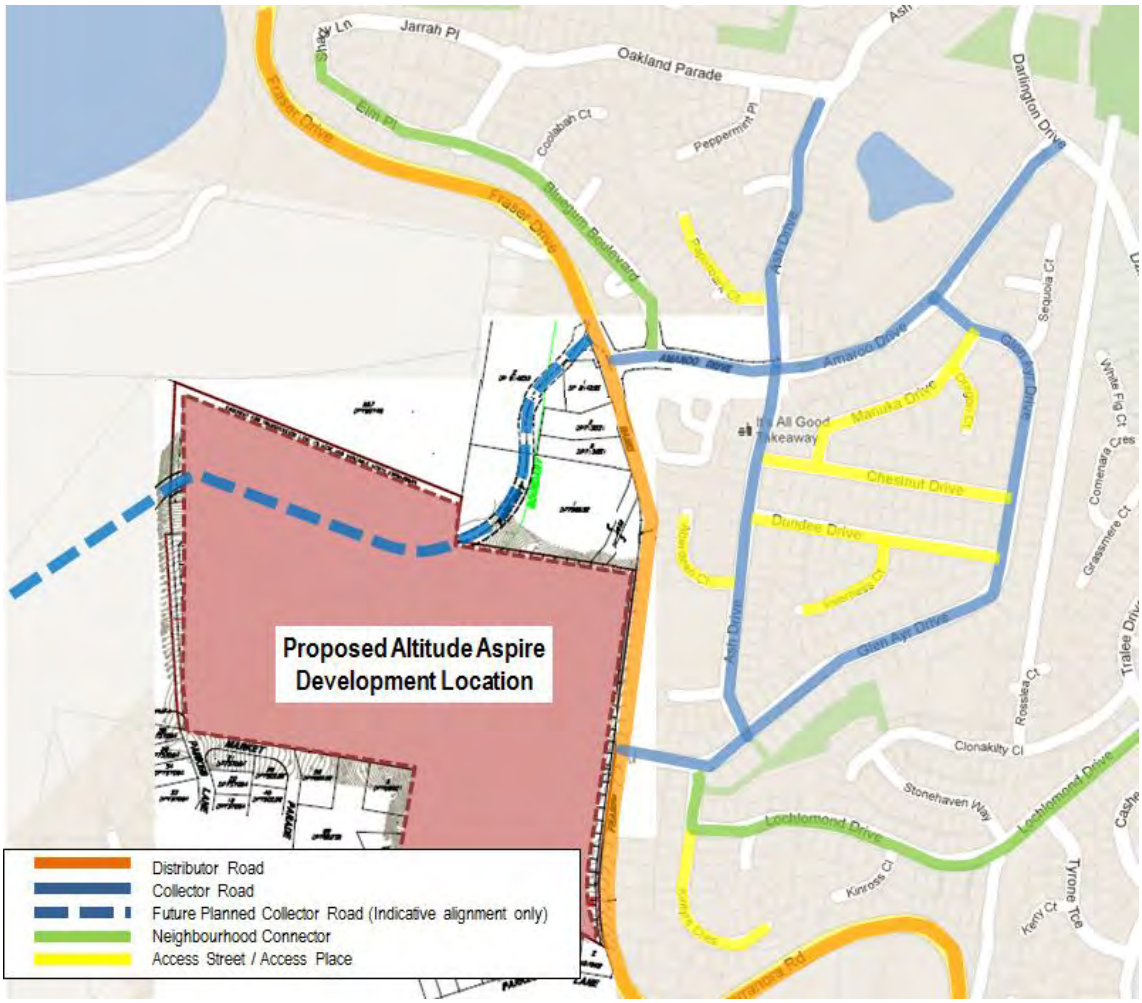


Figure 2.1: Existing Network Road Hierarchy

2.1.1 Fraser Drive

Fraser Drive is a two lane *Arterial / Distributor Road* running north-south connecting Terranora Road in the south to Dry Dock Road 4.8km to the north. Fraser Drive is the primary road that services western Banora Point and acts as a local bypass of South Tweed Heads for residents of Banora Point, Terranora and Vintage Lakes. Recent residential developments along Fraser Drive such as Flame Tree Park and Vintage Lakes have seen notable traffic growth along the central section of Fraser Drive.

As a result of this recent development, Fraser Drive has been recently upgraded to four lanes between Vintage Lakes Drive and Leisure Drive to cater for the increase in turn movements and surrounding land uses, such as the recently constructed Banora Central Shopping Centre. Figure 2.2 shows a two lane section of Fraser Drive just south of the Flame Tree Park residential estate.

Figure 2.2: Central Section of Fraser Drive (looking south from Flame Tree Park)

Whilst the above-mentioned developments have increased traffic volumes along the central section of Fraser Drive, much of the traffic is to/from South Tweed Heads and traffic volumes along the southern section of Fraser Drive (near Terranora Road) have not substantially increased as a result of these developments.

2.1.2 Terranora Road

Terranora Road is a two lane *Arterial / Distributor Road* that connects the Pacific Highway at Sextons Hill through Banora Point, Terranora, and onto the township of Tumbulgum. Recent development at Terranora has resulted in traffic volumes increasing along Terranora Road, particularly west of Fraser Drive. Figure 2.3 shows Terranora Road and its intersection with Fraser Drive in which kerb and channel has been provided on all sections except the eastbound shoulder.

SOURCE: Map data @ 2012 Google, Whereis® Sensis Pty Ltd

Figure 2.3: Terranora Road and Fraser Drive Intersection (looking west)

East of Fraser Drive, Terranora Road includes a meandering section of road adjacent to a vertical drop. This section of Terranora Road has historically had significant safety issues and an extensive crash history.

As such, recent upgrades have been undertaken to provide safety barriers to reduce accident severity and signage to increase driver awareness.

Whilst Terranora Road is designated as an Arterial Road, the historical rural road design and alignment does not comply with Council's road designation in regards to form and acceptable widths. As such, Terranora Road is planned for upgrades within Council's Road Contribution Plan.

2.1.3 Parkes Lane

Parkes Lane is a two lane, 50km/h *Access Street* that serves approximately 150 residential lots and exhibits approximately 500 vehicles per day (vpd). Parkes Lane connects to Fraser Drive immediately south of the proposed development by way of a priority controlled (give way) intersection with no channelisation for right turn movements off Fraser Drive but sufficient width to pass turning traffic (as shown in Figure 2.4 below).

SOURCE: Map data @ 2012 Google, Whereis® Sensis Pty Ltd

Figure 2.4: Parkes Lane and Fraser Drive Intersection

Parkes Lane has kerb and channel, yet no pedestrian footpaths currently provided. The width of the road varies between 7 – 9m wide except for a 60m section of road (with unsealed shoulders) as shown in Figure 2.5.

Figure 2.5: Parkes Lane – Eastern Extent Existing Condition

The 90 degree turn midway along Parkes Lane (see Figure 2.6) has been highlighted as an existing safety concern for the following reasons:

- no pedestrian footpath along Parkes Lane, whereby pedestrians are required to walk on the shoulder or on-road;
- overgrown vegetation within the road reserve restricting driver and pedestrian sight lines;
- concentration of property accesses and of which include relatively steep driveway grades and verge profiles;
- on-street parking, limiting usable road widths and further reducing sight lines; and
- instances of vehicle speeding along this section of Parkes Lane.

Figure 2.6: Parkes Lane – Existing Condition

Improvements to the existing condition of Parkes Lane are therefore required irrespective of the proposed development. This may include restricting parking along curved sections of the road, reducing / removal of vegetation within the road reserve to improve sight lines and provision of a pedestrian footpath. However, the construction of a footpath along Parkes Lane would require the removal or relocation of a number of existing small trees.

2.1.4 Market Parade

Market Parade is an access street and is located at the end of Parkes Lane and services approximately 20 residential lots (including Vista Close). Currently all lots along Market Parade are required to use Parkes Lane to access Fraser Drive. Market Parade includes an 11 metre road width with no pedestrian footpath as shown in Figure 2.7.

Figure 2.7: Market Parade – Existing Condition

2.1.5 Glen Ayr Drive and Amaroo Drive

Both Glen Ayr Drive and Amaroo Drive are wide, two lane roads having predominantly residential frontage and classified under Council's road hierarchy as *Neighbourhood Connectors.* Each street intersects with Fraser Drive in the form of a channelised give-way intersection configuration and connects the residential suburb commonly known as Tweed Heights to Fraser Drive. Amaroo Drive also connects Fraser Drive to Darlington Drive. Darlington Drive circulates Club Banora Golf Course and is the primary neighbourhood connector road for Banora Point. Figure 2.8 demonstrates the existing configuration of Glen Ayr Drive and Amaroo Drive intersections with Fraser Drive.

SOURCE: Map data @ 2012 Google, Whereis® Sensis Pty Ltd

Amaroo Drive / Fraser Drive Intersection *Glen Ayr Drive / Fraser Drive Intersection*

Figure 2.8: Glen Ayr Drive and Amaroo Drive Intersection Configurations

2.2 IMPACT ON STATE-CONTROLLED ROAD NETWORK

The proposed development is located approximately 4km from the state-controlled road network, namely the Pacific Highway at Sextons Hill. Recent construction of the Sextons Hill bypass takes into account traffic forecast data for future development growth in the Tweed Shire and southern Gold Coast and funded by the Federal Government's Auslink and 'Nation Building' Programs.

Traffic generated from the proposed development will be distributed throughout the local road network primarily along Fraser Drive, Leisure Drive and Terranora Road. As such, the level of development traffic reaching the existing state-controlled road network will be negligible and not result in any additional government infrastructure or increase in servicing / maintenance costs to state roads.

Kirkwood Road/Pacific Highway interchange is currently under construction as an immediate upgrade jointly funded by Council and the RMS. This upgrade shall include a southbound off-ramp and southbound on-ramp and is expected to reduce the traffic dependence on the southern section of Minjungbal Drive at the Sextons Hill bypass.

Future road network upgrades within proximity to the development include the following:

- Kirkwood Road / Pacific Motorway interchange upgrade and extension to Fraser Drive;
- Fraser Drive upgrade including 4 laning between the future planned Broadwater Parkway and Kirkwood Road; and
- Terranora Road upgrade between Mahers Lane and Fraser Drive.

In accordance with the Section 94 Contributions Plan, the proposed development shall pay contributions to road network upgrades (including the abovementioned planned upgrades) based on the level of trips generated by the development as outlined within Council's Tweed Road Contribution Plan.

2.3 TRAFFIC VOLUMES

Figure 2.9 demonstrates the historical daily traffic volumes along the surrounding road network collected by Council. These historical traffic volumes have fluctuated from both positive and negative growths in previous years. This may be attributed to recent land releases and residential developments as well as changes in traffic patterns to/from Tweed Heads. The recent residential growth in Terranora and Banora Point however has generally seen an overall increase in traffic volumes when compared to historical values.

Based on a review of the historical traffic counts from Council and the recent traffic growth in Terranora and the surrounding area, a conservative linear growth rate of 3% p.a. (compounding) has been applied to the most recent traffic volumes to determine the existing 2012 traffic volumes on the surrounding road network as shown in Figure 2.9.

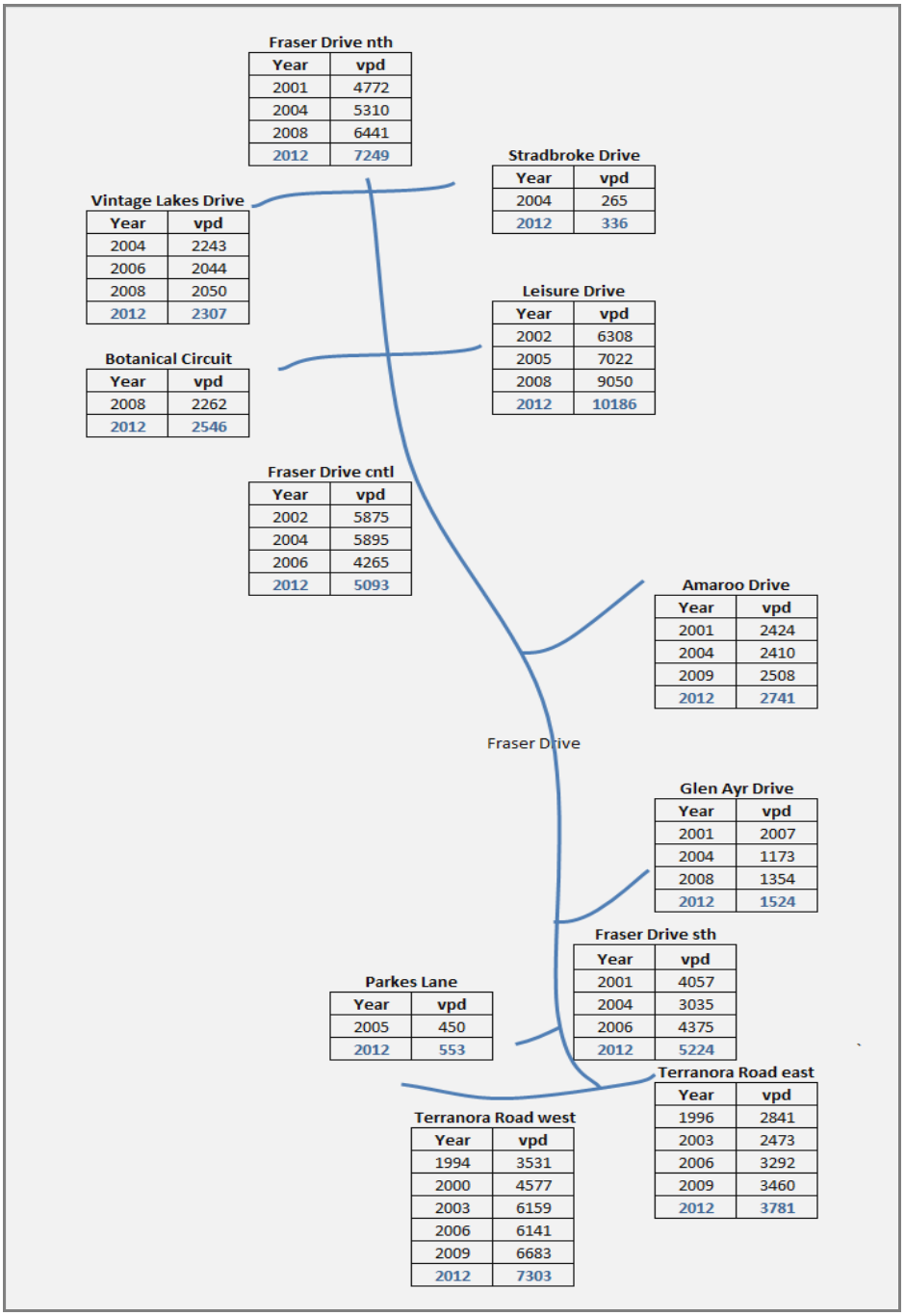


Figure 2.9: Historical Two-way Daily Traffic Volumes

Typically, the AM and PM peak hour traffic volumes are equal to approximately 10% of the overall daily traffic. Figure 2.10 demonstrates the distribution assumption and subsequent peak hour traffic volumes along key streets in proximity to the proposed development site.

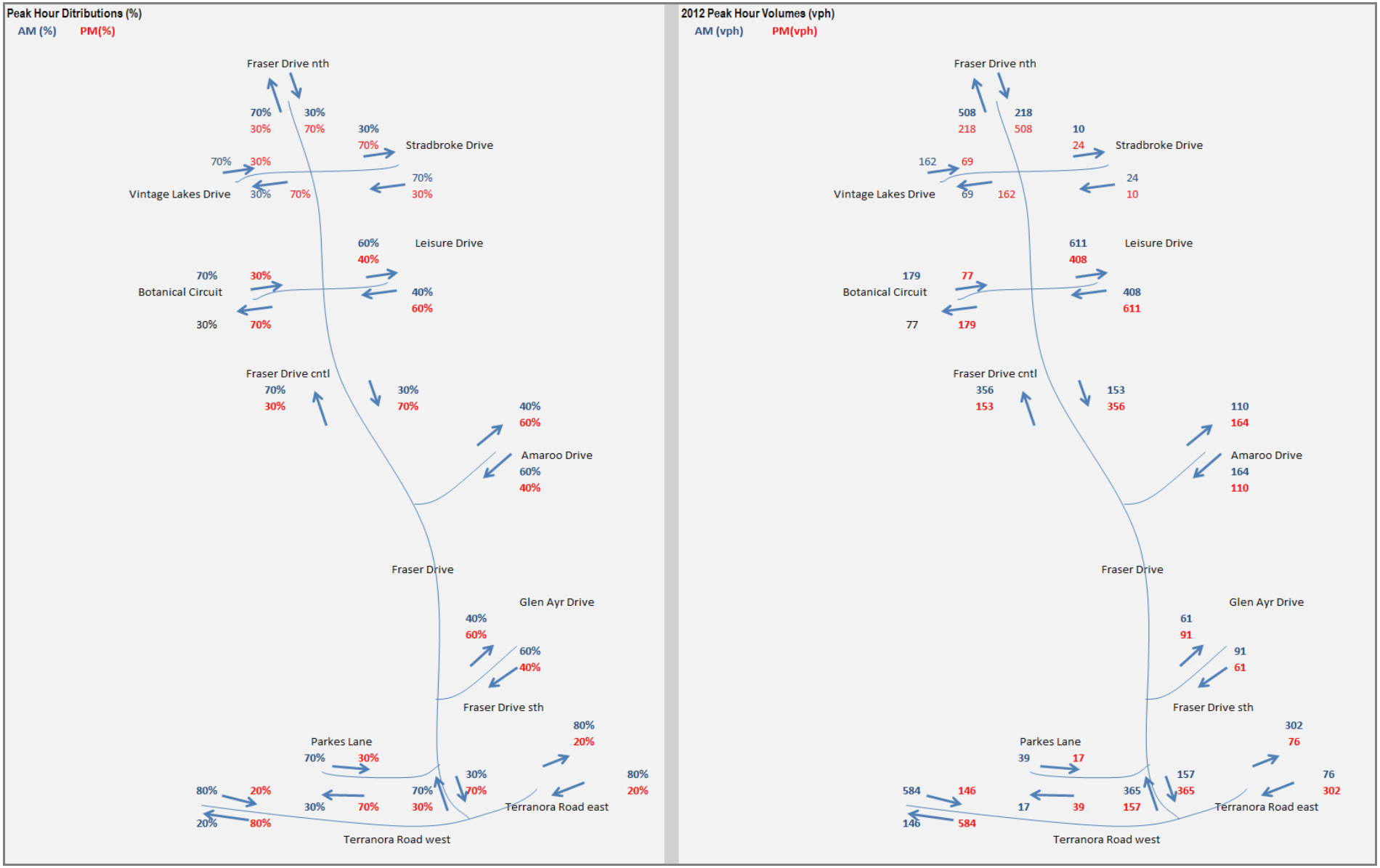


Figure 2.10: Peak Hour Distributions Assumption and 2012 Traffic Volumes

2.4 INTERSECTION TURN VOLUMES

In order to determine the existing intersection performance, traffic observations were undertaken to determine the peak hour turning volume percentages to be applied to each derived link volume previously shown in Figure 2.10. Figure 2.11 shows the 2012 AM and PM peak turn volumes at intersections in proximity to the proposed development.

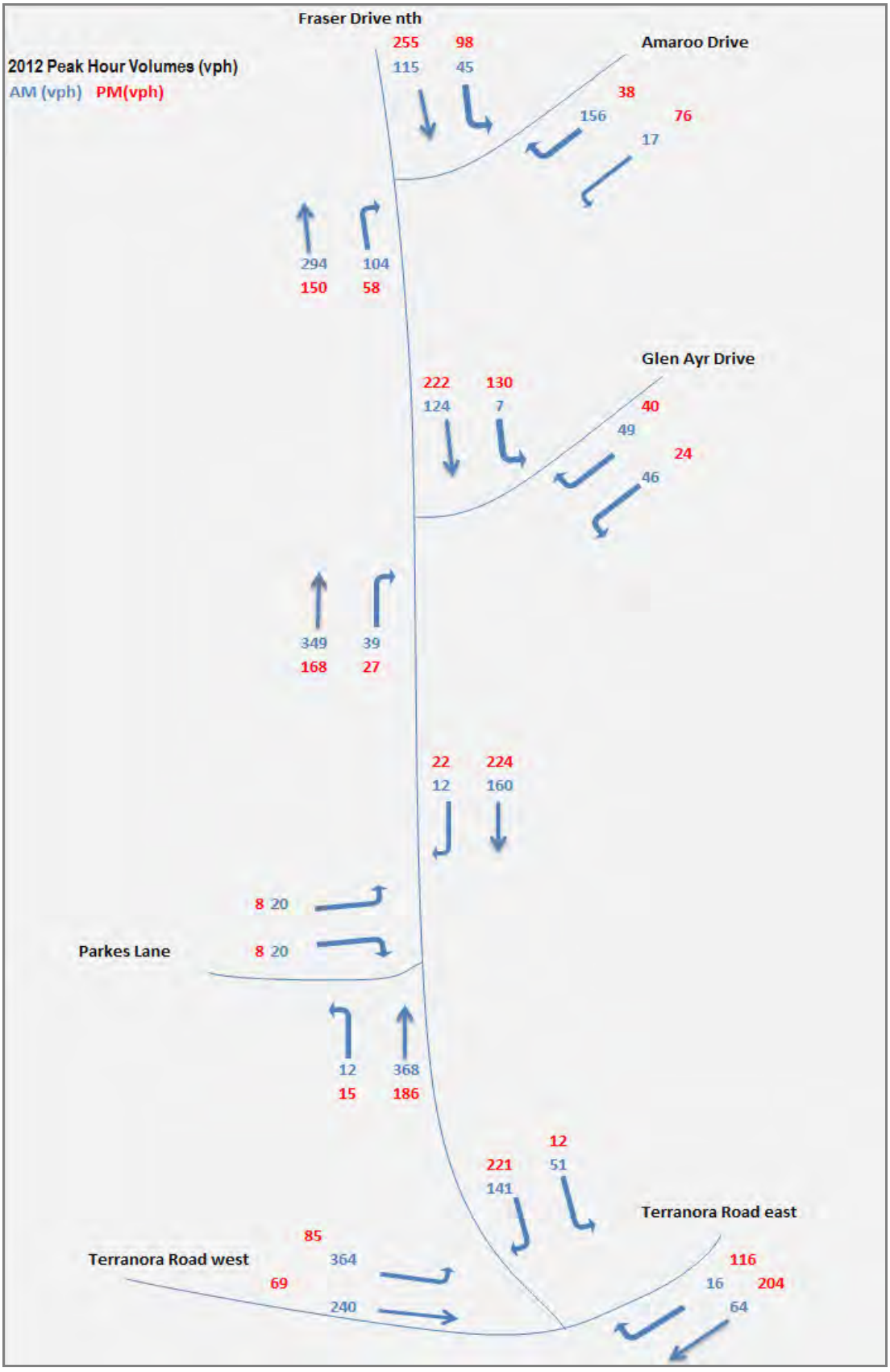


Figure 2.11: 2012 AM and PM Peak Traffic Volumes

2.5 FUTURE CONSIDERATIONS

2.5.1 Broadwater Parkway

Broadwater Parkway is a future planned road to be constructed between Fraser Drive and Mahers Lane and will form the primary *Neighbourhood Connector* road function for the Terranora Urban Release Area E. As a result, Broadwater Parkway is ultimately the primary connection to provide access to the proposed Altitude Aspire development.

Funding and timing of Broadwater Parkway is dependent on Section 94 contributions across all of Area E (including Altitude Aspire) and as such, Council does not expect Broadwater Parkway to be constructed in the short to medium term. Therefore, for the purpose of assessing the proposed development's traffic impacts Broadwater Parkway has not been included and all traffic has been assessed as using the temporary access intersection to Fraser Drive.

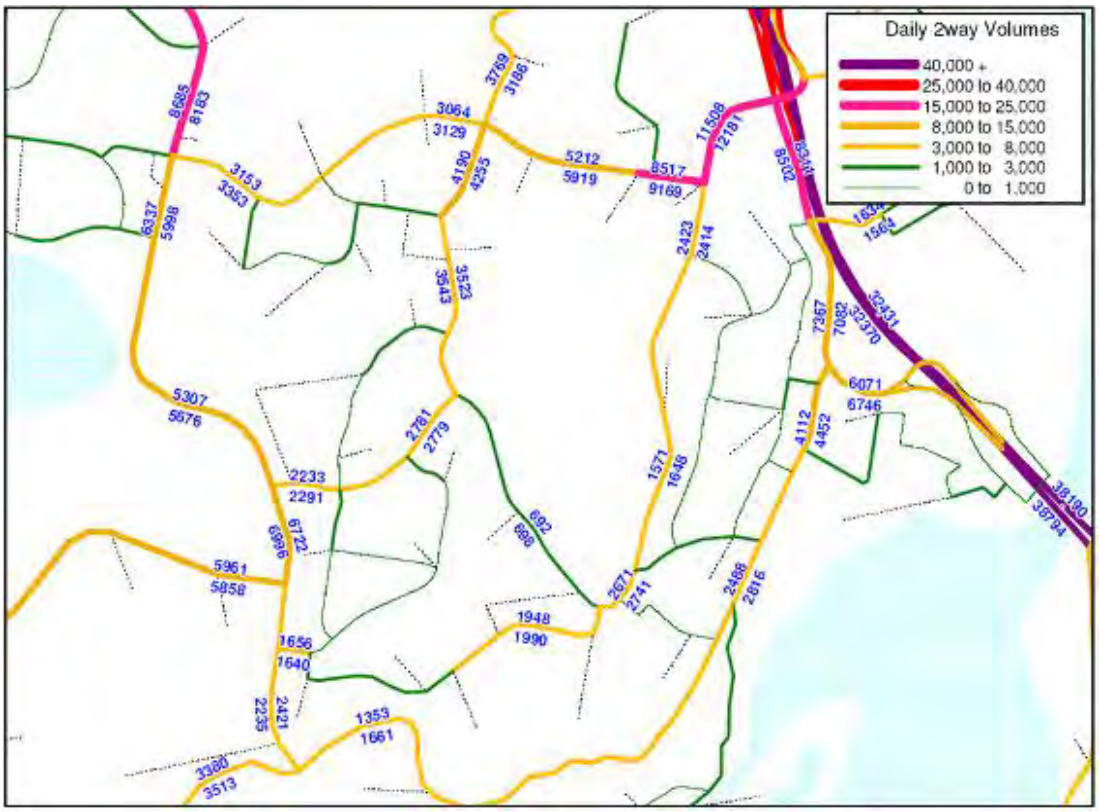
Council's adopted DCP for Area E provides planning details for the proposed alignment as shown in Figure 2.12. Consistent with future planning for Fraser Drive, Broadwater Parkway will be aligned with Fraser Drive north of Amaroo Drive to provide a direct connection and thereby reduce the attraction for vehicles to continue further south along Fraser Drive to Terranora Road or rat run via Amaroo Drive.

SOURCE: Tweed Shire Council's "Area E Urban Release Development Code – Development Control Plan (DCP)"

Figure 2.12: Proposed Indicative Broadwater Parkway Alignment

2.5.2 Future Strategic Traffic Forecasts

Figure 2.13 demonstrates Council's projected 2030 AADT's with the inclusion of Broadwater Parkway. The inclusion of Broadwater Parkway will see a redistribution of traffic onto Broadwater Parkway, which would historically continue along Fraser Drive south of Amaroo Drive and onto Terranora Road. As such, traffic volumes along Terranora Road and particularly on Fraser Drive between Broadwater Parkway and Terranora Road will reduce and Broadwater Parkway will become the primary connection for Area E as well as for residential areas in proximity to Mahers Lane.

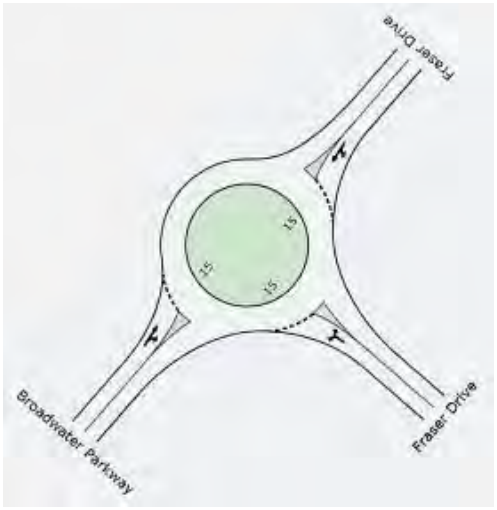


Source: Tweed Shire Council's Traffic Forecast Data

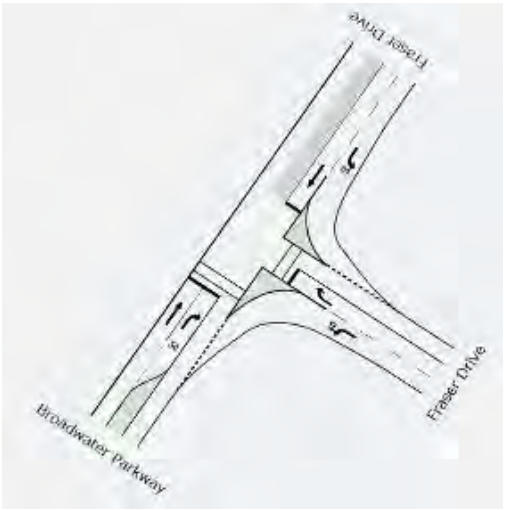
Figure 2.13: 2030 AADT Traffic Volumes

Council is yet to undertake detailed investigations into the specific intersection design requirements for Broadwater Parkway/Fraser Drive intersection. Based on recent discussions with Council officers and the latest proposed alignment, Council indicated the desire to construct a roundabout intersection at this location.

As this intersection is to be located on an area with considerable grades, it is considered that the proposed roundabout may require substantial earthworks and is likely to be expensive to construct. Therefore, in addition to a roundabout, Figure 2.14 below provides an alternative give-way configuration that can ultimately be constructed to signals when required. This advice has been provided for Council's benefit in planning Broadwater Parkway and has no implication for this subject assessment for Altitude Aspire.



Roundabout Configuration



Signalised Intersection Configuration

Figure 2.14: Future Proposed Broadwater Parkway / Fraser Drive Intersection Options

3. PROPOSED DEVELOPMENT

3.1 DEVELOPMENT COMPONENTS

The proposed development comprises of a total of 263 lots throughout 11 stages of development, including; 251 residential lots, 6 public reserves, four medium density lots and one community-associated residential lot, as illustrated in Figure 3.1 below.

Residential Lots	Public Reserves	Medium Density	Drainage Reserves	Community Associated	Total Lots
251	6	4	1	1	263

Figure 3.1: Proposed Altitude Aspire Development – Lots and Stages

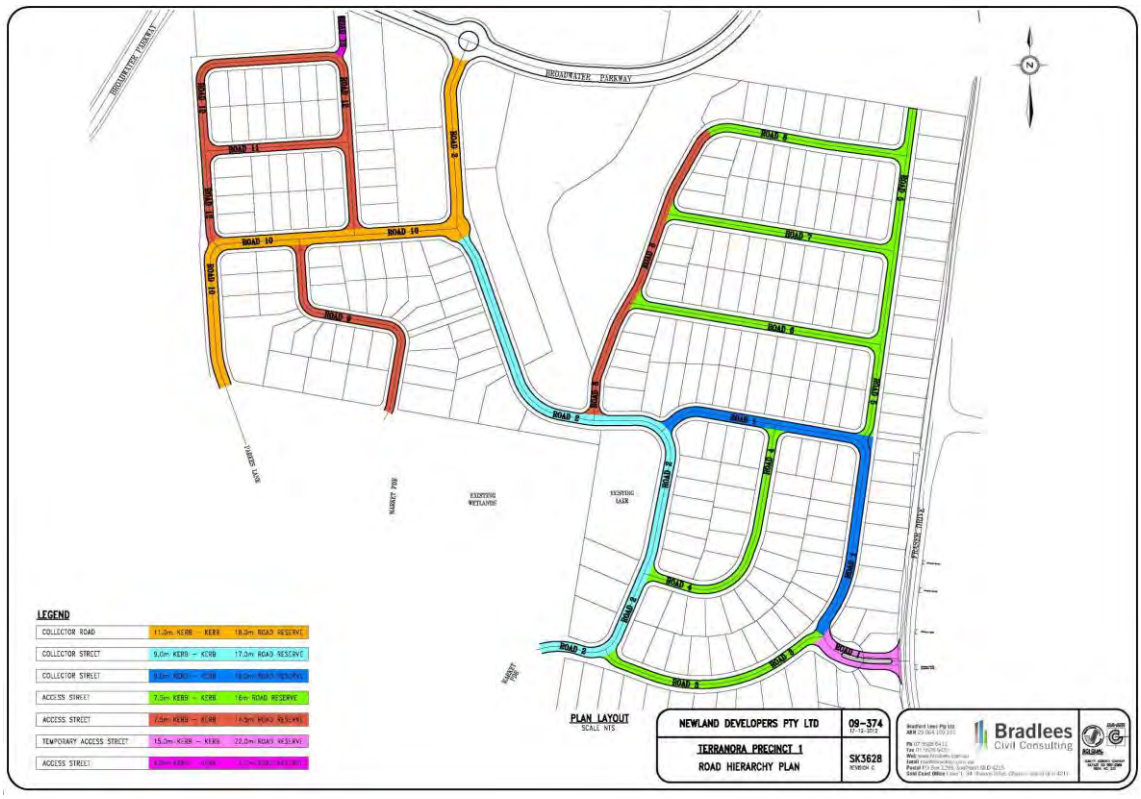
3.2 PROPOSED ROAD CONFIGURATION

Overall, the proposed development minimises the impact of the sites topography constraints and provides connections to all roads surrounding the site including, Fraser Drive, Market Parade, Parkes Lane and the future planned Broadwater Parkway 'when constructed'. The internal road network has been designed in accordance with the requirements set out within Section A5 Subdivision Manual of Council's DCP 2008 as well as Council's adopted Area specific DCP for Area E.

Specifically, the internal road network has been designed in accordance with Council's Development Design Specification D1 'Road Design' and takes into consideration the topography constraints to meet the following objectives:

- provide acceptable levels of safety, convenience and amenity for all street users and adjacent residents in accordance with the roads hierarchical status;
- ensure that each road is conducive to the wider road network with a clear distinction between functional classes of streets;
- provides amenity for public transport permeability and connectivity to existing and future services; and
- provides a safe and convenient network for pedestrians and cyclists.

Figure 3.2 demonstrates the proposed internal road hierarchy and road widths. Refinements to the road hierarchy have been undertaken in regards to Council's comments. Specific details are provided within Brad Lees *"Revised Preferred Project Report – March 2013".*



SOURCE: Brad Lees "Revised Preferred Project Report – March 2013'

Figure 3.2: Proposed Internal Road Hierarchy

The existing cul-de-sac configuration of Market Parade will connect to the collector street (Road 2), which shall continue to the future planned Broadwater Parkway. A connection to Parkes Lane will be provided through Road 10 and maintain the Collector Road standard.

The development's primary access is via Fraser Drive (until such time Broadwater Drive is constructed), which is the main North-South arterial road for the Terranora, West Banora Pont Area (Tweed Heights) and connecting onto South Tweed Heads. In addition, the western extent of the development site provides a future road connection opportunity to future development areas of the Terranora Urban Release Area E, specifically on Lot 1DP175234.

3.2.1 Development Staging

The development and subsequent road network will be constructed in a series of Phases. Whilst it is not yet confirmed that exact phasing the development will be constructed, it is expected that the initial phase of development will include the construction of roads within Stages 1 to 5. This will provide a connection to Market Parade and the completion of a circulating 'loop' to facilitate a bus route.

Should the initial development staging not include the Road 2 connection to Market Parade (i.e. prior to Stages 4 and 5) existing school bus services can continue the current route along Market Parade with the initial Stages 1 to 3 able to access bus services along Fraser Drive.

Further details on bus route provisions through the site are presented within Section 6.

Stages 7 to 11 will include the completions of roads within the development including additional connections to Market Parade and Parkes Lane.

3.2.2 Service Vehicles

The development's internal road network has been revised 'where required' to be in accordance Council's Subdivision Manual (Section A5) as well as Council's site specific requirements in regards to road hierarchy, widths, intersection and overall road design.

A swept path analysis has been carried out for the site using AutoTURN, with results provided in Appendix B. The design vehicle for the proposed development roadway is a Heavy Rigid Vehicle (HRV) which will

cater for refuse and removalist vehicles. The swept path analysis shows that a 12.6 metre HRV can adequately manoeuvre throughout the development's internal roadways.

3.3 ALTITUDE ASPIRE COMMUNITY FACILITY

The Altitude Aspire development proposed to include a new community facility to be located adjacent to the site access intersection with Broadwater Parkway as shown in Figure 3.3.

Figure 3.3: Proposed Altitude Community Facility

The intent of the community facility is to create a local recreational facility for the residents of Altitude Aspire. The community facility comprises of two separate buildings and additional fitness recreational space. Building A will be used as a multipurpose recreational facility for the local residents, whereas Building B includes the gym and fitness amenities. The outdoor recreational area will consist of a 4 lane, 25 m swimming pool and a tennis court.

A parking assessment for the proposed community facility is provided within Appendix C and demonstrates that the proposed facility shall provide 25 car parks and provision for a minimum of 11 cycles, which complies with Council's requirements. The assessment also highlights the following considerations in regards to transport aspects of the community facility:

- parking demand will be spread-out over a typical day and not result in adverse parking demand at peak operating times;
- the facility provides end of journey facilities such as showers and lockers to promote active travel in particular for short local trips ad conducive to the recreational land uses within the facility;
- the proposed facility is designed to primarily cater for nearby residents, with similar large scale facilities such as Club Banora located within close proximity; and
- the proposed facility is strategically located in the centre of Altitude Aspire development to promote walking from the surrounding residential areas.

The community facility therefore complies with Council's requirements and provides nearby local residents a range of recreational facilities and promotes active travel modes as outlined within the NSW Planning Guidelines for Walking and Cycling.

4. TRAFFIC ASSESSMENT

4.1 TRAFFIC GENERATION

Based on the composition of lots across the relevant stages as detailed within Section 3, two peak hour traffic generation rates are applicable in accordance with *RTA's Guide to Traffic Generating Developments*. Specifically they are:

- *Dwelling Houses:* **0.85** peak hour trips per dwelling; and
- *Medium Density Units:* **0.65** peak hour trips per unit.

For the purposes of conducting a conservative assessment, the highest traffic generation rate has been assumed for medium density units as shown above (i.e. 0.65 trips per unit).

The development is proposed to include four medium density lots (see Table 3.2), with the number of units per lot area generally in accordance with Council's adopted DCP (approximately 1/333m^2) as shown in Table 4.1.

Table 4.1: Number of Units per Medium Density Lot

Lot Number	Lot Size / Area	Number of Units
701	5,269	**14**
711	3,745	**10**
925	3,024	**8**
926	7,791	**21**
	Total Medium Density Units	***53***

The resultant 'Full Development' traffic generation of the proposed development is presented in Table 4.2.

Table 4.2: Full Development Peak Hour Traffic Generation and Distribution

Type	Total Dwellings/Units	Trip Rate	Peak Hour Trips	AM Peak Trips[1]		PM Peak Trips[1]	
				IN	OUT	IN	OUT
Dwelling Houses	253	0.85	214	64	150	150	64
Medium Density	53	0.65	35	11	24	24	11
		Totals	**254**	**75**	**174**	**174**	**75**

1. Directionality splits for IN / OUT movements has been assumed at 30/70 and 70/30 for the AM and PM Peak periods respectively.

4.2 TRAFFIC DISTRIBUTION FOR THE PROPOSED DEVELOPMENT

As Broadwater Parkway has been identified by Council as not guaranteed within the project design horizon (2025), traffic impacts of the proposed development on the surrounding road network has been assessed based on full development utilising the temporary intersection to Fraser Drive.

Figure 4.1 shows the full development traffic volumes at the site access intersection and Parkes Lane intersection with Fraser Drive.

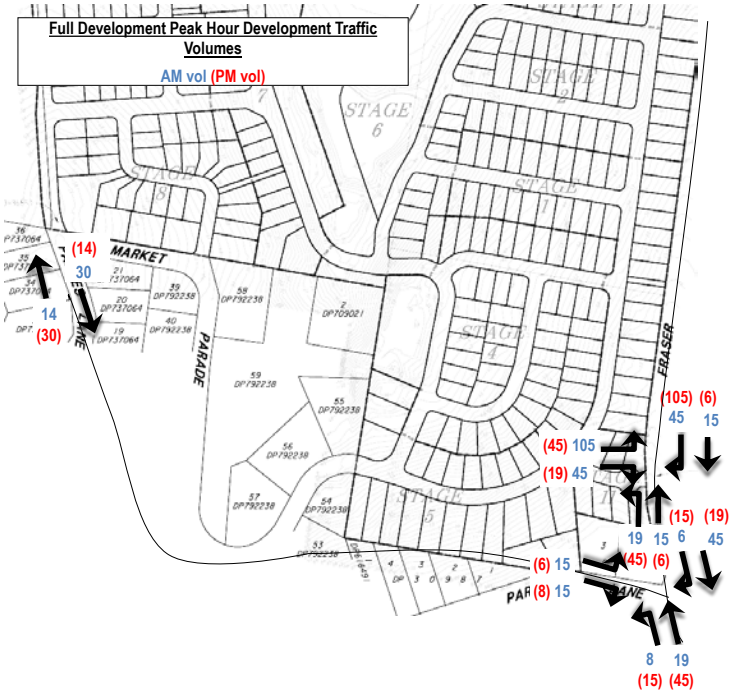


Figure 4.1: Full Development Peak Hour Traffic Volumes – Without Broadwater Parkway

These traffic volumes from the proposed development were applied to background traffic volumes at key intersections surrounding the site to determine any impacts on the surrounding road network.

For completeness and to demonstrate that the development will not adversely impact adjacent roads following the eventual construction of Broadwater Parkway. Figure 4.2 shows the resultant development traffic distributions for the AM and PM peak periods with Broadwater Parkway and closure of the connection to Fraser Drive.

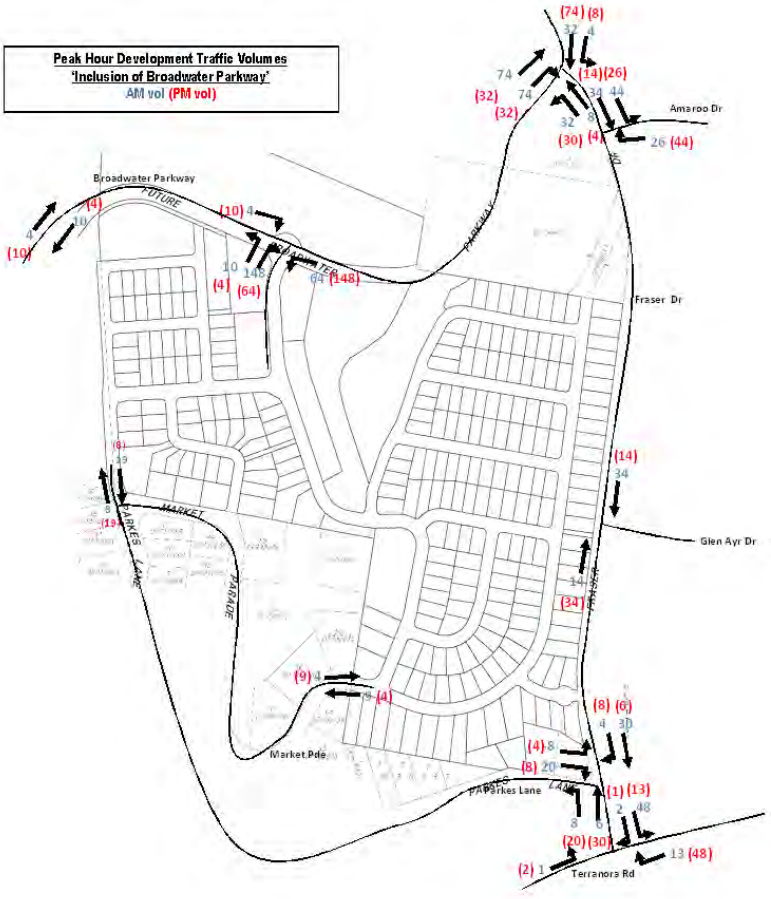


Figure 4.2: Full Development Peak Hour Traffic Volumes - With Broadwater Parkway

4.3 INTERSECTION ASSESSMENT

4.3.1 Intersection Performance

The operating performance of the surrounding intersections has been assessed using aaSIDRA modelling package and focusing on the degree of saturation (DOS), average delay (seconds) and 95th%'ile queue length (metres). Future year assessment was based on the abovementioned development proposal of full development without the inclusion of Broadwater Parkway. Assessment years include full development of all stages (2015) and 10 year design horizon (2025). Detailed outputs from aaSIDRA for each modelled intersection are shown in Appendix D.

Table 4.3 details how the temporary intersection at Fraser Drive performs with full development at 2015 and out to 2025 design horizon.

Table 4.3: Future Intersection Performance 'without Broadwater Parkway'

Scenario	Degree of Saturation (DOS)		Average Delay (s)		95% Back of Queue (metres)	
	AM	PM	AM	PM	AM	PM
Terranora Road / Fraser Drive						
2015 Full Development	0.238	0.349	6.9	7.4	1.5	3.9
2025 Full Development	0.296	0.448	7.7	8.7	2.6	7.6
Parkes Lane / Fraser Drive						
2015 Full Development	0.234	0.186	2.7	2.3	1.4	1.7
2025 Full Development	0.287	0.205	3.2	2.5	2.0	1.9
Temporary Site Access / Fraser Drive						
2015 Full Development	0.323	0.161	3.7	3.4	1.8	0.4
2025 Full Development	0.401	0.193	3.7	3.5	2.4	0.9
Glen Ayr Drive / Fraser Drive						
2015 Full Development	0.259	0.190	2.5	3.2	0.8	0.6
2025 Full Development	0.311	0.223	2.9	3.5	1.3	0.9
Amaroo Drive / Fraser Drive						
2015 Full Development	0.455	0.206	5.6	3.8	3.0	0.7
2025 Full Development	0.670	0.247	7.4	4.1	5.2	0.9

The give way intersection experiences the maximum peak traffic during the PM peak, however this results in a maximum DOS of 0.193 for the site access approach. Maximum queues for the site access approach is one vehicle, which can safely be accommodated on the level section of the approach.

The maximum right turn queue into the site access from the north in 2025 is one vehicle, which can also safely be accommodated within the provided 40 metre long turning lane.

Right turning queues along Fraser Drive at Parkes Lane and Glen Ayr Drive intersection will not extend to influence the site access intersection as a result of the proposed development traffic.

The site access intersection can therefore cater for the full development irrespective of whether Broadwater Parkway is constructed. In addition, surrounding intersections will continue to perform within capacity thresholds as a result of the increased traffic volumes at the site access intersection.

The intersection assessment results also show a good level of resilience within the peak period operations and as such can cater for the development traffic well beyond the 10 year design horizon.

4.4 POTENTIAL IMPACTS ON MARKETS PARADE AND PARKS LANE

In accordance with Council's adopted DCP for Area E and comment received by Council, the proposed road network has been revised to connect to Parkes Lane and Market Parade. As a result, existing traffic volumes shall vary slightly as a result of these connections. The expected traffic variations on Parkes Lane and Market Parade both with and without the inclusion of Broadwater Parkway is provided below.

4.4.1 Without Broadwater Parkway

Prior to the inclusion of Broadwater Parkway (and with the temporary access intersection operational on Fraser Drive), it is expected that a small percentage of trips from Market Place with travel through Altitude Aspire due to improved network permeability. This will potentially reduce volumes in Parkes Lane.

However, upon completion of Stages 8 and 9 of Altitude Aspire, Altitude Aspire residents along the western ridge line are expected to be more likely to use Parkes Lane instead of travelling through Altitude Aspire 'down' and 'back up' to Fraser Drive/Site Access intersection. Therefore, the resultant increase in two-way peak hour traffic on Parkes Lane is expected to be approximately 30 vehicles per hour, or 1 vehicle every two minutes.

This potential increase in traffic is not expected to exacerbate conditions on Parkes Lane that would warrant any improvements over and above what is already required for the existing conditions and will remain within the environmental capacity of the street.

4.4.2 With Broadwater Parkway

With the inclusion of Broadwater Parkway and subsequent closure of the temporary access intersection with Fraser Drive, Broadwater Parkway shall become the primary neighbourhood connection to Altitude Aspire as well as existing residential areas on Market Parade and Parkes Lane.

As a result, only a minimal amount of traffic generated by Altitude Aspire (Stages 8 and 9) is expected to use Parkes Lane to access Fraser Drive. Similarly, traffic from the eastern extent of Parkes Lanes is also expected to benefit from Broadwater Parkway and pass through Altitude Aspire, therefore reducing traffic volumes on Parkes Lane particularly on the eastern extent at the location of identified existing concerns.

The development's traffic generation and road network connections to both Market Parade and Parkes Lane are therefore not expected to exacerbate traffic volumes or existing areas of concern on Parkes Lane that would require additional mitigation measures other than already recommended as a result of existing conditions.

5. SITE ACCESS CONSIDERATIONS

5.1 FRASER DRIVE TEMPORARY SITE ACCESS INTERSECTION

Whilst the temporary site access, as shown in Figure 5.1, is expected to perform within capacity beyond 2025 under full development traffic, it is important to also consider a variety of factors in order to maintain safety, compliance with applicable standards and reduce any impacts on existing land uses surrounding the intersection. As such, the additional considerations taken into account when designing the proposed site access intersection with Fraser Drive are detailed below.

Figure 5.1 demonstrates the proposed configuration for the Site Access / Fraser Drive intersection.

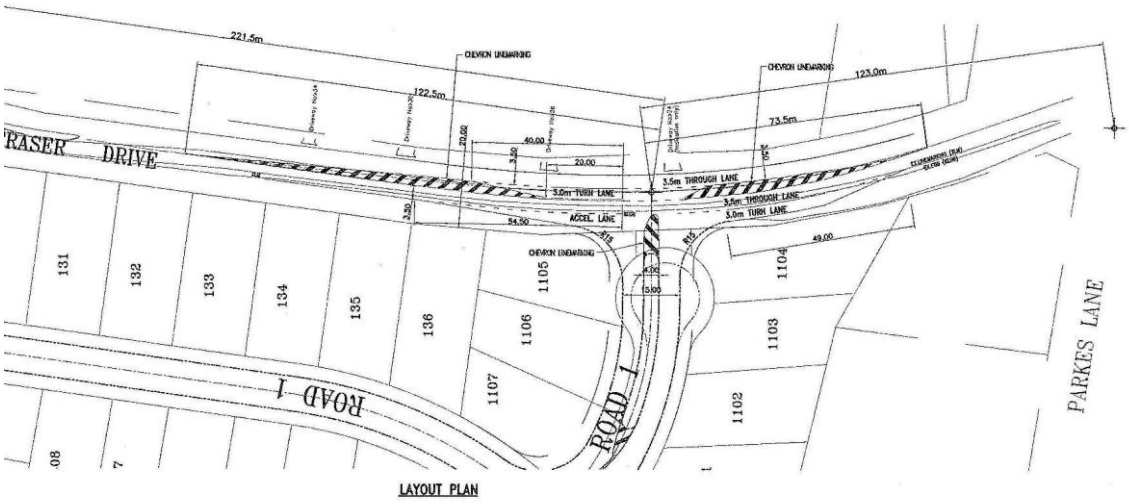


Figure 5.1: Site Access Intersection with Fraser Drive

5.1.1 Approach Gradients

The chosen location for the intersection is the most suitable along the western section of Fraser Drive as it follows the minimum main grade into the site. The Road 1 leg of the proposed intersection includes a downward grade of 3% for the first 12.5 metres, which then increases to 7.15% at 27.5 metres from the intersection. This approach grade to the intersection will therefore provide sufficient sight lines for vehicles approaching the intersection on Road 1.

The assessment of the proposed intersection demonstrated that the maximum queue for the approach in 2025 is under three vehicles. Therefore, the expected volumes will not result in extensive queues to the west along the steeper-graded section of the road.

5.1.2 Intersection Spacing

The proposed location for the intersection with Fraser Drive provides the following clearances between the midpoints of the surrounding intersections:

- south to Parkes Lane intersection: 123.0m; and
- north to Glen Ayr Dr intersection: 221.5m.

The current speed along this section of Fraser Drive is 60km/hr. The proposed intersection provides clear sight lines of 170 metre south (towards and past Parkes Lane) and 350 metres north (towards and past Glen Ayr Drive) on Fraser Drive. This exceeds with the Safe Intersection Sight Distance requirements of Austroads Guide to Traffic Engineering Practice – Part 5: Intersections at Grade for 60km/hr speed limits.

The influence of spacing between closely located intersections is generally considered for where sight lines are poor, traffic speeds are high or signalised intersection queues may influence previous intersections.

The 60km/hr speed limit along this section of Fraser Drive together with the abovementioned sight lines provides drivers entering or exiting the proposed site access with sufficient decision time to identify oncoming vehicles and decide on acceptable gaps in each direction to safely enter/exit Fraser Drive.

Table 5.1 demonstrates Austroads minimum recommended acceptance gaps compared to the provided acceptance gaps from the proposed intersection to the nearby intersections at Parkes Lane and Glen Ayr Drive.

Table 5.1: Acceptance Gap Comparisons

Site Access Movement	AustRoads Min. Required Acceptance Gap	Provided Acceptance Gap
Right turn into Site Access	4 sec	7 sec
Left turn out of Site Access	5 sec	7 sec
Right turn out of Site Access	5 sec in each direction	7 sec south and 13 sec north

Table 5.1 shows that the acceptance gaps between the surrounding intersections exceed the minimum requirements. In addition, the practical acceptance gaps will be greater than stated in Table 5.1 as sight lines from the new intersection extend beyond the surrounding intersections and vehicles entering Fraser Drive at the surrounding intersections will be travelling at less than 60km/hr.

Parkes Lane currently serves approximately 150 dwellings and the already developed nature of the residential catchment has seen limited traffic growth in recent years. Therefore, the 2005 daily traffic volumes for Parkes Lane of 450 vehicles per day is expected to be consistent with daily current traffic volumes in 2012.

The right turn volumes into Parkes Lane from Fraser Drive in the PM peak do not currently produce extensive queues or impacts on the southbound traffic flow along Fraser Drive. Pursuant to this, it is not expected that the right turn queues into Parkes Lane would extend back to influence the proposed new intersection to the north.

Similar to the current traffic patterns for Parkes Lane intersection, the proposed intersection will exhibit maximum right turns into the proposed access road in the PM peak. Peak development traffic turning right into the proposed access is expected to generate a maximum queue of three vehicles. The proposed channelized right turn configuration will provide sufficient storage for right turning vehicles without influencing southbound through traffic along Fraser Drive.

Austroads design guidelines recommends a minimum right turn lane of 40 metres, which includes a 20 metre storage area and a 20 metre taper. The total length from the intersection yield point to the beginning of the delineation line marking is 125 metres. This allows a clearance of 105 metres between Glen Ayr Drive intersection and the beginning of the delineation linemarking of the proposed new right turn pocket and an overall clearance of 190 metres to the beginning of the right turn lane. This provides sufficient clearance for between Glen Ayr Drive and the new intersection for a single lane of traffic travelling at a maximum speed of 60km/hr.

5.1.3 Impact on Property Access

There are currently six property access driveways along the eastern side of Fraser Drive opposite the site access intersection. Fraser Drive currently includes a double unbroken line along the frontage of all nearby property accesses as shown in Figure 5.2.

Figure 5.2: Existing Linemarking Configuration along Fraser Drive

NSW Road Rules No. 134 allows residential property access movements across double unbroken lines where it is safe to do so. Therefore, in order to retain the same level of amenity for property accesses to the east, the prosed intersection does not include raised medians and has been designed to include linemarking turn lanes only as shown in Figure 5.1. This retains the existing turning amenity which is currently provided for each driveway along this section Fraser Drive and allows driveways to be accessed across unbroken lines and chevron markings when it is safe to do so.

5.1.4 Impacts without Fraser Drive Site Access Intersection

Should no access to Fraser Drive be provided, all development traffic would be required to use Market Parade and Parkes Lane to access /egress the site until the construction of Broadway Parkway. This is highly undesirable as it would exacerbate existing safety concerns along Parkes Lane and potentially at Parkes Lane/Fraser Drive intersection. The access to Fraser Drive is therefore the most suitable form of access to the site until Broadwater Parkway is constructed.

5.2 ACCESS TO FUTURE PLANNED BROADWATER PARKWAY

Broadwater Parkway is identified as the primary road for Area E, linking Mahers Lane/Terranora Road in the west to Fraser Drive in the east and providing the northern extent of the urban development.

Once Broadwater Parkway is constructed, Altitude Aspire shall provide its primary access intersection onto Broadwater Parkway via a roundabout intersection configuration in accordance with Council's DCP Figure 2.8 - Diagrammatic Road Network as shown in Figure 5.3.

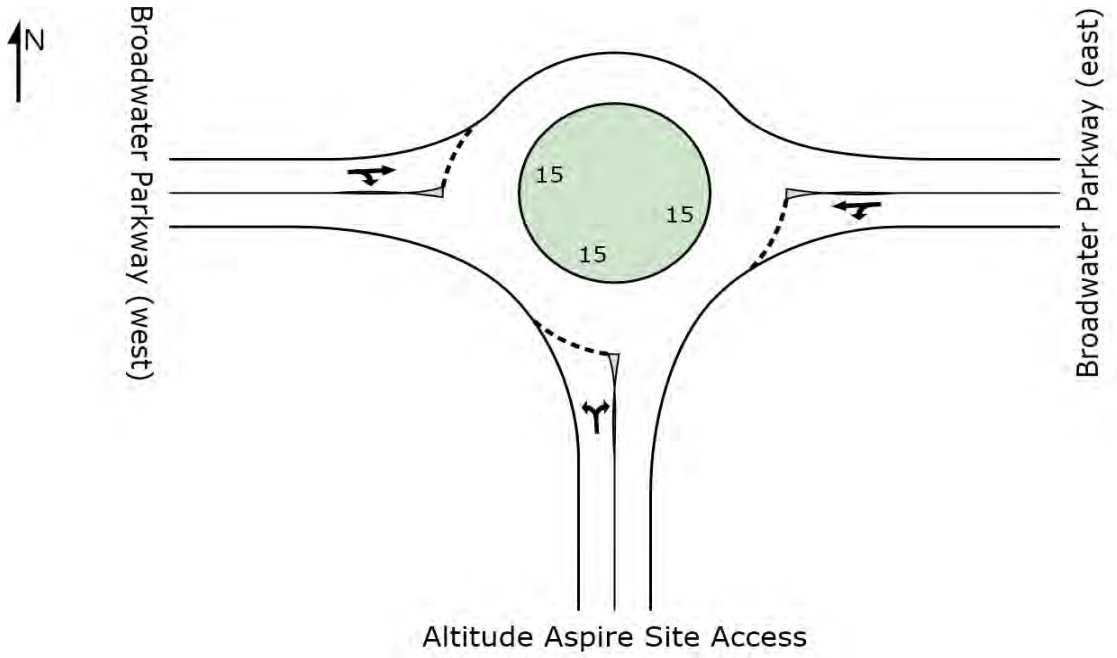


Figure 5.3: Planned Site Access/Broadwater Parkway Intersection Configuration

Sidra assessment of the ultimate (2025) traffic volumes at the site access / Broadwater Parkway roundabout intersection (see Table 5.2) demonstrates that the planned roundabout intersection will perform within acceptable limits.

Table 5.2: Site Access/Broadwater Parkway Intersection Performance

Scenario	Degree of Saturation (DOS)		Average Delay (s)		95% Back of Queue (metres)	
	AM	PM	AM	PM	AM	PM
2025 Full Development	0.482	0.462	7.5	6.7	26.3	25.8

Upon the opening of Broadwater Parkway access, traffic performance will remain within acceptable limits following the closure of the Fraser Drive intersection.

The proposed developments access arrangements therefore adequately cater for the site generated traffic (both prior to and with the inclusion of Broadwater Parkway) and will not result in any adverse traffic impact to adjacent residential areas of intersections.

6. ALTERATIVE TRAVEL MODES

This section details the proposed developments provisions for alternate transport modes such as public transport, walk and cycle. Numerous measures to manage travel demand and increase the use of public and non-car transport modes have been identified for the development and its surrounding areas. The local areas of western Banora Point and eastern Terranora have historically comprised of semi-rural and rural lots which have had limited provision for non-private car transport infrastructure such as bus routes or pedestrian/cycle pathways.

Where applicable, the proposal has been developed by following the objectives within the NSW Governments Integrating Land Use and Transport Policy and Planning Guidelines for Walking and Cycling, which include:

- improving access to housing, jobs and services by walking, cycling and public transport;
- increasing the choice of available transport and reducing dependence on cars;
- reducing travel demand including the number of trips generated by development;
- reduce the distances travelled, especially by car;
- supporting the efficient and viable operation of public transport services, and
- providing for the efficient movement of freight.

In addition, the proposed development has been designed to meet the requirements set out within Council's Section 5 Subdivision Manual and adopted DCP for Area E.

6.1 PUBLIC TRANSPORT

6.1.1 Public Bus Services

The development is located in relative proximity to several existing bus services run by Surfside Buslines (Bus Operator with the Transit Australia Group 'TAG') as shown in Figure 6.1. The bus routes pass within relatively close proximity to the proposed development (300 metres from the site access intersection).

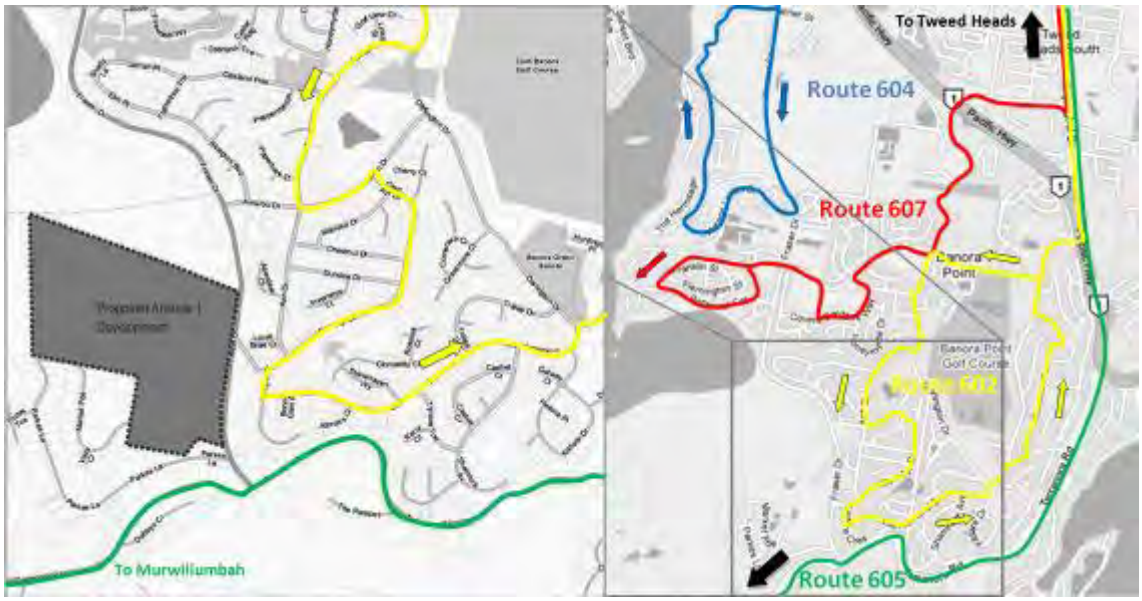


Figure 6.1: Existing Bus Routes

The average weekday frequency for the bus routes shown in Figure 6.1 is one per hour for each route. Bus route 607, which travels from Tweed Heads to Flame Tree Park, is a relatively new service which was developed to serve to the retail showroom precinct along Greenway Drive and the recently developed residential area of Flame Tree Park. There is potential for this service to be expanded into Area E with the introduction of Broadwater Parkway (once demand is developed).

The NSW Department of Transport and Infrastructure has indicated that the allocation of future bus services is done so by liaison with the service provider (currently TAG) and based primarily on a current or expected demand basis.

6.1.2 School Services

There are a number of primary schools and high schools located nearby to the proposed development including Terranora Primary, Centaur Primary, Banora Point High School and Lindisfarne Anglican College. Services to the public schools are funded by NSW Department of Transport and Infrastructure and operated by Surfside Buslines. However, Lindisfarne Anglican College provides its own school bus services.

Currently, school bus services for surrounding primary and secondary schools include routes that utilise Parkes Lane and Market Parade. TAG have advised that current school bus services that u-turn on Market Parade will continue to do so until such time that a route (and demand) is available through Altitude Aspire.

Several school bus services also pass along Fraser Drive. As such, residents of the proposed development can access these services via route extensions into Altitude Aspire or through the proposed pedestrian access linkages to Fraser Drive.

School services are generally reviewed and updated annually based on school specific enrolment locations. As such, the need to provide additional services or re-route existing services is identified by residential density and school enrolments over time.

6.1.3 Potential Bus Routes

Recent liaison with TAG has been undertaken to confirm the potential bus route to serve Altitude Aspire, the greater Urban Release Area E and the existing surrounding areas of Parkes Lane and Market Parade.

Based on these discussions and correspondence received from TAG (see Appendix E), the potential for updates to existing services and new future services to pass through Altitude Aspire can successfully be achieved via the identified potential bus routes as shown within Figure 6.2.

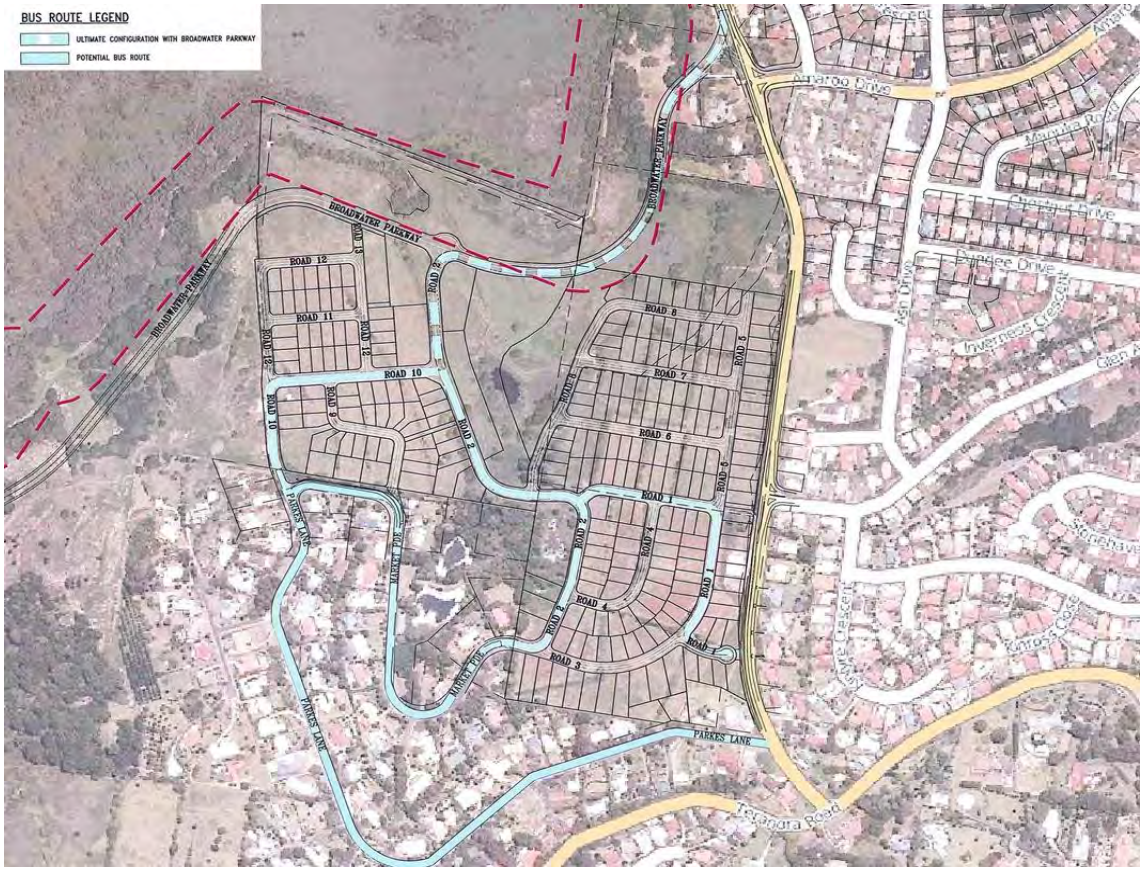


Figure 6.2: Potential Bus Routes

Bus services may include the use of Roads 1, 2 and 10. Roads 2 and 10 provide grades less than 12.5%, however it is noted that a section of Road 1 between Road 2 and Road 5 includes a grade of 16%. Whilst this grade exceeds Council's requirements for road grades to cater for bus routes it is demonstrated within Table 6.1 that existing bus services (both Route Services and School Bus Routes) throughout Banora Point use roads in excess of 12.5%.

Table 6.1 Banora Point Bus Route Grades Comparison

Road	Bus Service	Grade (%)
Lochlomond Drive	Route 602, School Route 1232	15.0%
Banora Hills Drive	Route 602, School Route 1232	17.6%
Summit Drive	School Routes 1220	21.4%

As the subject section of Road 1 is not expected to be used by route services and may only potentially be used by school buses for a short period of time until Roads 2 and 10 are connected to Parks Lane, it is deemed acceptable that Road 1 could cater for bus routes if required.

6.1.4 Bus Stops

Two potential bus stop locations are proposed along Road 2 (refer to Figure 6.3). These bus stop locations comply with standard bus stop design practices by providing a maximum walking distance of 400 metres between stops and dwellings within new residential developments.

Upon construction of Broadwater Parkway, the northern bus stops are recommended to be located closer to Broadwater Parkway (north of Road 10).

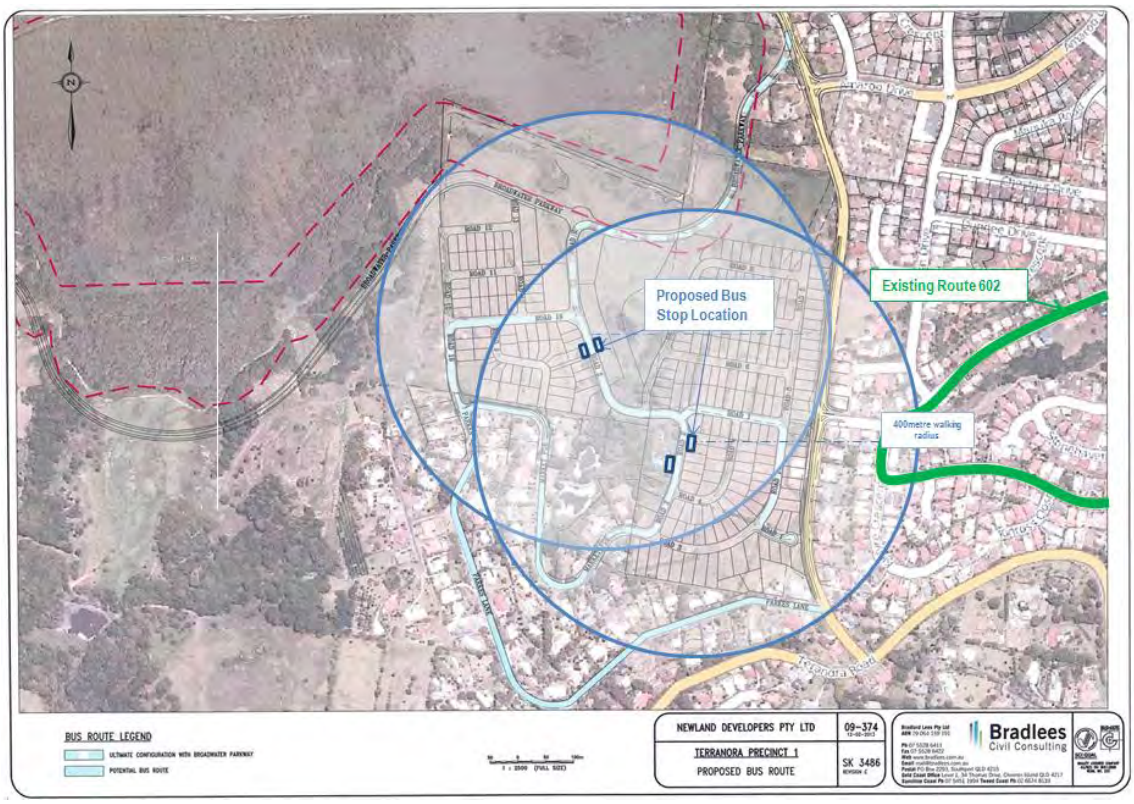


Figure 6.3: Proposed Bus Stops

In addition to the proposed bus stops, local bus services also provide a 'Hail and Ride' service along the route, allowing buses to stop for boardings and alightings where it is safe to do so.

Access to School routes is expected to occur along Fraser Drive via pedestrian linkages and onto existing services such as Routes 602 and 605.

6.2 PEDESTRIANS

The development's pedestrian network has been designed to minimise the topography constraints of the site in order to meet the following objectives in accordance with NSW Planning Guidelines for Walking and Cycling:

- **walking and cycling neighbourhood** – improves walkability and cycleability by providing pathways along site contours and connect to surrounding pathways, public transport routes and nearby local trip attractors such as Tweed Heights Shopping Centre.
- **street pattern** – the proposed developments street pattern minimises the impacts of the sites undulating terrain and provides permeability to existing road network. The street pattern generally provides a grid layout with a circulating collector street that allows traffic easily reach the exit to the development.
- **mixed use neighbourhoods** – the inclusion of the community facility in the centre of the proposed development together with adjacent medium density residential parcels aims to promote healthy living and recreational activities within walking distance to the entire development.
- **connection to local walk and cycle networks** – footpaths and cycleways within the development have been revised based on feedback and integrate to both existing and future planned walk and cycle routes along Fraser Drive and Broadwater Parkway. The pedestrian network has been revised to provide greater permeability and access to key routes as identified with Council's adopted DCP for Area E and A5-Subdivision Manual.
- **security and safety** – footpaths are provided both along residential streets as well as connecting directly through the developments open space providing visually continuous pathways and avoiding areas of concealment.
- **design within road reserve** – footpaths are provided along all streets within the proposed development. Pedestrian crossings are located are primary desire lines and within clear view of adjacent intersections. Footpaths are provided with disability kerb ramps for all road crossings. Intersections include paved areas to promote slow travel speeds.
- **parks and open space** – open space areas include both circulating pathways as well as direct footpaths that follow desire lines and site contours to promote direct and convenient routes for both new residential areas within Altitude Aspire as well as exiting residential areas on Market Parade.

6.2.1 Internal Pedestrian Footpaths

The internal footpath network as shown in Figure 6.4 has been revised to provide greater permeability within the development and connectivity to surrounding areas, consistent with objectives and principles of the NSW Planning Guidelines for Walking and Cycling as well as requirements set out within Council's A5-Subdivision Manual and adopted DCP for Area E.

1.2 metre wide pedestrian footpaths are located all "Access Streets" and "Neighbourhood Connectors", as well as strategically located along green space to connect areas and provide short–cuts for both pedestrians and cyclists.

Pedestrian crossing points of internal roads are set back from intersections and shall be provided with 'pram ramps' to provide disabled pedestrian friendly access.

SOURCE: 'Form Landscape Architects – Altitude Aspire Landscape Masterplan – April 2013'

Figure 6.4: Proposed Internal Footpath Network

6.2.2 Connectivity to the Local Area

In addition to the main site access at Fraser Drive, a pedestrian linkage will be created to maintain connectivity for residents located in the south western corner of the site. This pedestrian connection also improves connectivity through the site for existing residents along Market Parade with a more direct route to Fraser Drive. An additional pedestrian linkage has been provided to Fraser Drive in line with Glen Ayr Drive to improve connectivity to the existing residential area known as Tweed Heights.

The site is located in relative proximity to a number of local shopping facilities. To date, the only convenient shopping centre close enough to attract pedestrian trips is Tweed Heights Shopping Village, which is located on the corner of Amaroo Drive and Ash Drive, approximately 750 metres to the proposed pedestrian linkage adjacent to Glen Ayr Drive.

The revised site plan provides improved access for pedestrians to Fraser Drive via an additional pedestrian linkage between the internal road and Fraser Drive in line with Glen Ayr Drive.

6.3 CYCLIST PROVISION

Figure 6.5 shows the existing cycle network and facilities for Banora Point and Terranora.

Figure 6.5: Existing Cycle Network (*Tweed Shire Council)*

Figure 6.5 demonstrates that current facilities provided for cyclists within the vicinity of the proposed development are limited. However, the local road network is widely used by cyclists, in particular sports cyclists, who use Fraser Drive as an alternate route instead of Minjungbal Drive through South Tweed Heads.

There is a planned cycleway extension along Amaroo Drive from Ash Drive to Bluegum Boulevarde. It is suggested that as part of this future cycleway planning, Council should consider extending this facility to Fraser Drive.

Council has indicated future planning of Fraser Drive will include the construction of shared pedestrian/cycle path north of Amaroo Drive, and on-road cycle lanes on either side of Fraser Drive between Amaroo Drive and Terranora Road.

Figure 6.6 demonstrates the development's connectivity to existing cycle routes surrounding the site.

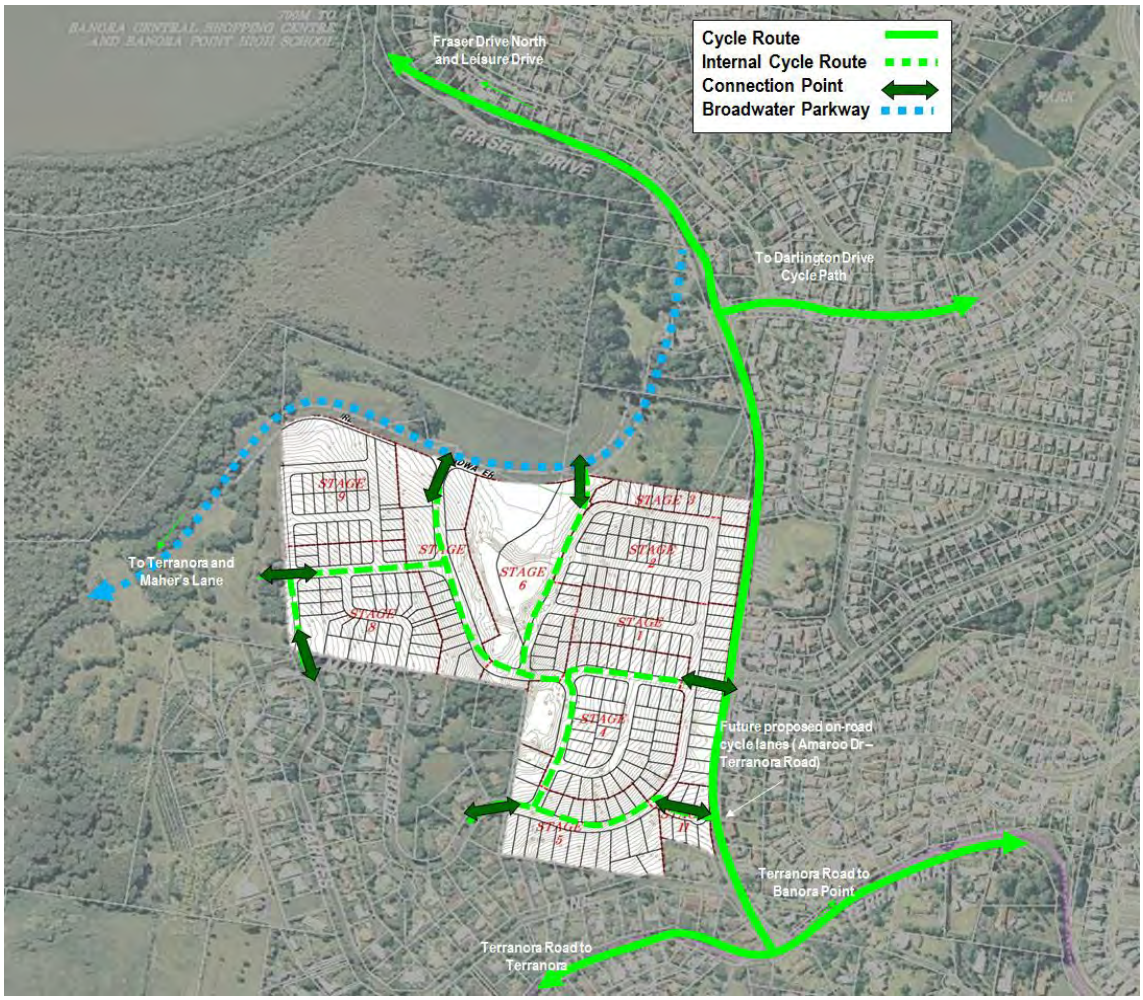


Figure 6.6: Connectivity to Cycle Network

The internal road network together with the open space and linkage pathway network provides connectivity to surrounding areas including future Area E development to the west. In addition, the temporary access pathway connection and additional pathway connection in line with Glen Ayr Drive provide direct access to Fraser Drive for residents travelling towards Terranora Road or Tweed Heights.

Banora State High School is located on Leisure Drive approximately 2 kms from the Fraser Drive-Amaroo Drive intersection. Existing students have been observed using Fraser Drive to travel by bike to and from Banora Point High School and Centaur Primary School. The section of Fraser Drive between Amaroo Drive and Leisure Drive poses potential safety concerns for cyclists because of high traffic volumes, road alignment and lack of separation (no shoulders), between cars and cyclists. Council has indicated that this section of Fraser Drive is planned for future upgrades. As such, it is recommended that Council consider providing cycle lanes as part of any future planning along Fraser Drive between Terranora Road and Leisure Drive.

The proposed Community Centre is expected to be a key destination for cycle trips and as such has been designed to include cycle parking and end of journey facilities such as showers and lockers.

6.4 TRANSPORT ACCESS GUIDE

As requested by DoT, a Transport Access Guide has been developed to encourage the use of active transport for new residents and provide a quick visual guide to local transport information. The Transport Access Guide for Altitude Aspire is provide in Appendix F, and includes the following key components:

- provide a road network map with key locations within proximity to the site;
- shows existing public transport routes as well as contact information for services, including taxi's; and
- shows key pedestrian and cycle routes and facilities (e.g. cycle racks) both within and surrounding the development.

7. RESPONSE TO SUBMISSIONS

Table 7.1 provides a response to relevant submissions received for "ALTITUDE ASPIRE – MP09_0166" and details how the revised development addresses each item raised in regards to transport.

Table 7.1: Response to Submissions

No.	Name/ Organisation	Submission	Bitzios Response
	Tweed Shire Council	**Traffic**	
1.1		The report discusses the proposed "temporary access" from the subdivision to Fraser Drive, near the south eastern corner of the development. The report states that construction of Broadwater Parkway is to occur concurrently with Stage 7 of the development, subject to acquisition of the road corridor for the Parkway. Once connected to Broadwater Parkway, the "temporary access", which would be provided as an easement over a residue parcel, would be closed and redeveloped into residential allotments. As discussed previously with DoP, Broadwater Parkway is included in the Tweed Road Contribution Plan (TRCP) works program, and is subject to a Local Area Contribution. As a result, the construction is dependent on the development of Area E alone, not the broader Terranora / Banora Point area. As such, limited investigation of the road alignment and its potential environmental impacts has occurred, and no efforts have been made at present to acquire a future road alignment or to gain approval to construct the road. The draft preliminary road alignment that is referenced in the EA from Tweed Shire Council is not a final or endorsed route. As is discussed elsewhere in this report, further analysis has been undertaken, identifying an alternate alignment, displayed in Figure 6. The Broadwater Parkway is a long term prospect linked to other potential development projects in Area E, and cannot be relied upon by the subdivision for road access. As such, the subdivision must demonstrate that it has an acceptable alternate road access, to be considered a stand-alone development.	It is agreed that construction timing of Broadwater Parkway is not defined and dependant on development of the greater Area E, not particular stages of this development. The temporary access intersection with Fraser Drive has been assessed to cater for full development of Altitude Aspire. In the event that Broadwater Parkway is not opened and this stage. The assessment confirms that the temporary intersection will continue to operate at acceptable capacity limits. Therefore, the proposed development is not restricted to particular staging prior to the construction of Broadwater Parkway and can function accordingly without Broadwater Parkway without adversely impacting the surrounding road network.
1.2		***Proposed Fraser Drive Access*** The notion that the road access to Fraser Drive is "temporary" should not be factored into engineering assessment of the proposal. The subdivision application must demonstrate that all road and traffic objectives for the subdivision can be achieved for two cases: with and without Broadwater Parkway. The submitted application generally shows that the subdivision will operate satisfactorily in terms of road, public transport, cycleway and pedestrian networks with the Broadwater Parkway, but neglects to examine the alternative and more immediate scenario without the Parkway in place. To address this concern, the following information is provided for consideration: The design of the internal T-intersection, where the connection road from Fraser Drive meets the main internal road in Stage 4 requires either: a. a priority route realignment to minimise potential vehicle collisions (refer to Austroads "Guide to Traffic Engineering Practice – Part 5: Intersections at Grade" and Austroads "Guide to Traffic Management Part 6 : Intersections, Interchanges and Crossings"). This has not been commented on in the report; or b. a roundabout at the intersection of the connection road from Fraser Drive and the main internal road in Stage 4. Any consent for the development must include a condition which requires that the connection road from Fraser Drive which meets the main internal road in Stage 4 must be realigned generally in accordance with Drawing No. E-01 (refer to	The temporary access intersection with Fraser Drive has been assessed to cater for full development of Altitude Aspire. Therefore, the proposed development is not restricted to particular staging prior to the construction of Broadwater Parkway and can function accordingly without Broadwater Parkway. Following receipt of comments from Council and relevant departments, the proposed developments lot layout and road network has been revised to address concerns and comply with required standards. As such, the revised layout includes improved pedestrian and cycle connections between streets and surrounding areas. The public transport route through the site has been discussed and approved with Transit Australia Group (TAG) responsible for Surfside bus lines routes and public bus services. As requested, the internal intersection of the temporary access road (Road 1) and Road 3 has been redesigned to provide defined priority to Road 1 in accordance with Austroads

No.	Name/ Organisation	Submission	Bitzios Response
		Attachment 1) or a roundabout is to be constructed at the intersection of the connection road from Fraser Drive and the main internal road in Stage 4.	Guidelines as detailed in the site plans.
1.3		Bus routes are depicted in Figure 6.2 of the report based on the Broadwater Parkway being constructed. The report should also consider an alternative bus route based on the Broadwater Parkway not being constructed. This will affect carriageway widths which are to be designed to cater for any anticipated bus route (i.e. 9 m minimum carriageway widths). These routes should be provided for further assessment or alternatively a condition of consent should be included in any approval requiring the identification of potential bus routes without the proposed Broadwater Parkway being constructed.	The potential public transport routes through the site have been discussed and approved with Transit Australia Group (TAG) responsible for Surfside bus lines routes and public bus services. Liaison with TAG in regards to the potential bus routes (both public and school routes) through the site without the inclusion of Broadwater Parkway has confirmed that bus routes would be based on potential catchment requirements within Altitude Aspire and be primarily based on extension of existing routes where and if required.
1.4		The current proposed easement for the road connection does not give Council adequate tenure to carry out its duties as road authority. The road corridor, to standards required by DCP-A5 must be dedicated to Council. Should a future connection to Broadwater Parkway occur, the applicant may apply to close the road and re-subdivide it with adjacent residue land. The application for road closure would be supported by Council, provided a public pedestrian and cycleway connection is maintained through to Fraser Drive. In addition, the applicant will also be responsible for removing any embellishments including 'entry statement' items should that site is to be converted to residential allotments.	The proposed temporary access to Fraser Drive will be dedicated as Temporary Public Road under Section 9 of the Roads Act by way of the plan of subdivision for the relevant stage. The temporary public road is to be closed and transferred to Newland pursuant to Sections 30 and 40 of the Roads Act, when permanent access is provided from Broadwater Parkway.
1.5		***Internal and External Connectivity*** A second road connection stub to the north-east (from Road 5B) should be provided to adequately cater for appropriate development potential of adjoining lots. Proposed Roads 10 and 11 should be relocated to the west, to align with the existing ridge line at the property boundary. Alternatively, a second road connection stub to the west (from Road 11) should be provided to adequately cater for appropriate development potential of adjoining lots. The application includes less than desirable connectivity to Parkes Lane, with the existing road carriageway and stormwater infrastructure being predominately ignored. The proposed carriageway location is too far east of the existing road, and is poorly angled – requiring total reconstruction of the existing intersection with Market Parade. This is considered unnecessary and should be avoided. Council encourages an extension to Parkes Lane that prolongates the existing road direction and generally follows the ridge line at the property boundary. Should this not be possible, a second road connection stub to the west (from Road 11) should be provided to adequately cater for appropriate development potential of adjoining lots. The proposal fails to adequately address the frontage to Market Parade. Investigations into large-sized lots for the Market Parade frontage, as a reasonable way of merging with the existing urban fabric on the south side of the road are encouraged. The erection of rear boundary fences should be avoided along this frontage. The Market Parade extension warrants reconsideration: Lots 516/517 should be merged to create a larger lot and avoid an immediate visual barrier of rear and side fencing. Poor pedestrian / cycleway connectivity is provided to Fraser Drive. A permanent pathway link from Road 5A to Fraser Drive, near to the Glen Ayr Drive intersection – somewhere in the NE area of Stage 1 is considered desirable.	The proposed development configuration has been revised to address Council's advice as follows: A secondary road connection has been extended at Road 5 to provide access to adjoining lots. Road 10 has been realigned with Parkes Lane and along the ridge line to provide appropriate development potential of adjoining lots and integration with existing intersection at Market Parade. Lot layouts along Market Parade have been reconfigured to address the southern frontage of Market Parade. Larger 'Rural Residential' size lots have been provided at the interface with Market Parade. An additional pedestrian and cycle connection to Fraser Drive has been provided within proximity to Glen Ayr Drive connecting to Road 5A and Road 1. This provides a direct east-west connection through the site.
1.6		***Road Gradient*** Road gradients are illegible and cannot be verified whether compliant or not. Plans with improved clarity are required prior to further comment being made in this regard. All proposed allotments on grades greater than 15% should be required to demonstrate that practical vehicular access from a constructed street from both cut and fill sides can be provided.	The revised road layout has been designed to comply with Council's adopted DCP. Refer to BradLees Engineering Report for details on road gradients.

No.	Name/ Organisation	Submission	Bitzios Response
1.7		***Road Width Comments*** Road hierarchy establishment is inappropriate: the Transport Assessment Report by Bitzios is incompatible with the Preliminary Engineering Report by Bradlees regarding Neighbourhood Connector road width nominations. Road 10 is nominated as a Neighbourhood Connector and should have an 11m carriageway, in lieu of the 7m carriageway shown in the Engineering Report. The carriageway of Road 2 should be altered to 9m for the initial section coming off the existing end of market Parade, to align with the existing carriageway width – and only to the intersection with Road 3. No objections are raised however, to the 11m width for the remaining length of Road 2, for the intention of a future bus route over this section of road. All other roads, excluding Broadwater Parkway, are shown as having 7m carriageways, which are not compliant with Council's standard Access Street width of 7.5m and should be widened accordingly.	Based on the comments received from Council and relevant departments together with Council's adopted DCP for Area E, the internal road network, hierarchy and road widths has been revised. Collector roads have been redesigned to provide a 11 metre carriageway within an 18 metre road reserve.
2	DoP	Broadwater Parkway - The construction of this road (and its funding, land acquisition etc.) is fundamental to Phase 2 (Stages 6-11) occurring. The proposed alignment of the Broadwater Parkway road corridor to be reserved across the site will have significant bearing on the development footprint for this proposal, and will have implications for the alignment of the Parkway across the rest of Area E. The Department notes there are a number of options tabled for the proposed route/alignment of Broadwater Parkway. Justification for the preferred route will be required (environmental constraints, land acquisition, reduced impact on proponent's land, road design considerations, SoC etc.). While it is unreasonable to expect the proponent to assess the ecological impacts and otherwise for the entire alignment of Broadwater Parkway, the Department recognises that there are constraints external to the site boundary of this application that must be considered. The proponent must ensure that the road corridor proposed to be reserved in this proposal is entirely consistent with the road corridor alignment for Area E as a whole. The Department supports Council's request for inclusion of the current DCP alignment (refer Figure 1of Council's submission) within this proposal as the benchmark road alignment. This alignment would appear to avoid the majority of environmentally sensitive areas (SEPP 14 wetland buffer, freshwater wetland EEC, Lowland Rainforest EEC etc.) and provide a better solution - however more assessment should be completed in this regard.	N/A
2.1	DoP	The Department also notes that the proponent's proposed road alignment through the 7(a) Environmental Protection (Wetlands and Littoral Rainforests) zone is inconsistent with Council's LEP in that alternative road alignments are presently available through the 2(c) Residential (Urban Expansion) zone and therefore must be considered. Siting the road corridor for Broadwater Parkway within environmentally sensitive areas limits currently available alternative routes and will make future applications for road construction difficult and result in avoidable adverse environmental impacts being unnecessarily realised.	N/A
2.2	DoP	Furthermore, the Department notes that there is no guarantee that Broadwater Parkway will be built as it requires significant local area contributions and acquisition of properties where it is proposed to be connected to Fraser Drive in the north-east. With this in mind the proposal should consider the possibility of Broadwater Parkway not being built and design the subdivision and road layout accordingly.	The proposed temporary intersection with Fraser Drive has been assessed to operate within acceptable limits with full development of Altitude Aspire and without the inclusion of Broadwater Parkway.
2.3	DoP	The proposal proposes additional access to neighbouring areas via Parkes Lane and Market Parade. The traffic assessment for Phase 1 does not consider alternative access through Market Parade/Parkes Lane, does not adequately consider the effect additional traffic will have on these roads, their current standard and safety issues.	The temporary access to Fraser Drive is proposed so as to minimise any development traffic using Market Parade and Parks Lane. Connections from Altitude Aspire to Market Parade and Parkes Lane are consistent with Council's DCP for Area E. These connections allow existing lots on Market Parade more direct access to Fraser Drive than currently exists.

No.	Name/ Organisation	Submission	Bitzios Response
			Existing safety and efficiency issues along Parkes Lane will therefore not be exacerbated by the proposed development.
2.4	DoP	At this stage there remains large uncertainty about the construction of the proposed Broadwater Parkway. Therefore the proponent must construct the temporary access to Fraser Drive as a permanent access (refer Council's submission).	Noted. The design of the proposed temporary access includes provisions to cater for full development of Altitude Aspire.
2.5	DoP	The proponent must provide detail and certainty of how the road will be managed into the future (including its future decommissioning and resumption of land) and should make provision to dedicate the road corridor temporarily to Council. Council has indicated that any future application for road closure when/if Broadwater Parkway is constructed would be supported provided a public accessway/walkway/cycleway is maintained in this vicinity to link Fraser Drive with the internal road network. The proponent also needs to address issues raised by Council and the RTA in regards to the design and operation of this intersection.	The proposed development shall include the provision for appropriate temporary road dedication under Section 9 of the Roads Act by way of the plan of subdivision for the relevant stage. The temporary public road is to be closed and transferred to Newland pursuant to Sections 39 and 40 of the Road Act, when permanent access is provided from Broadwater Parkway. The proposed development shall provide pedestrian / cycle provisions to Fraser Drive within the temporary road as well as after the closure of the temporary road and transfer back to Newland via a pedestrian linkage as depicted on the proposed development plans. Additional pedestrian connection has been provided adjacent to Glen Ayr Drive to improve pedestrian permeability through the site.
2.6	DoP	The Department defers to NSW Transport's submission as it relates to active living infrastructure (walking/cycling), and bus services. The development of a Transport Access Guide for future residents should be included in the Statement of Commitments.	Noted. The proposed development has been updated to maximise walking, cycling and public transport opportunities where possible and a Transport Access Guide has been developed as shown within Appendix F of the report.
2.7	DoP	***Traffic*** The Department defers to and supports Council's submission in regards to internal and external connectivity, Fraser Drive access, road gradients, and road widths proposed. If roads are proposed to be dedicated to Council as public assets then they must satisfy Council's specifications, or the proponent shall provide written agreement from Council that they will accept variations to those standards.	As previously demonstrated, the proposed road network, accesses, road widths and alignments have been revised based on Council's and the Department' comments to comply with Council's requirements and relevant design specifications. Refer to Brad Lees Report.
2.8	DoP	Fewer carparks are proposed for the community centre than is required under Tweed's regulations (20 vs. 25 required). The proponent must comply with Council's current requirements or provide an alternative offset in this regard that is agreeable to Council. Detail of any such arrangements is required.	The proposed parking provision for the proposed community centre has been revised to comply with Council's standards as well as promotes active travel modes (i.e walking and cycling) for short trips from within the Altitude Aspire development as identified by the NSW Dept Transport.
2.9	DoP	SEPP 14 buffer currently includes the proposed Broadwater Parkway road reserve and embankment, stormwater treatment ponds, and a transmission line easement and lies at the bottom of a steep slope. Alternative road designs have been put forward by Council that avoid environmentally sensitive areas and environmental protection zones. For a greenfield site, there is no justifiable reason for not considering alternative road locations outside these sensitive areas. The Department would prefer to see land reserved for Broadwater Parkway removed from these areas.	N/A
2.10	DoP	The proposed road running north from the proposed Parkes Lane connection into Stage 10 is undesirable in its current configuration and allowance for equitable access rights for the adjacent owner of Lot 1 DP175234 is required.	The proposed road alignment for extension of Parkes lane to the north has been updated to provide equitable access to adjacent Lot 1 DP175234.

No.	Name/ Organisation	Submission	Bitzios Response
2.11	DoP	Consideration should be given to constructing the road along the existing ridgeline or, alternatively an additional stub road should be provided off Road 11 to provide access to the adjacent property. Refer to Council's submission for further information on internal and external connectivity issues. The proponent should generally realign the road network to have less streets going directly up or down slope and more streets along slope (refer Council's draft structure plan presented to community).	The proposed road alignment for Road 10 has been updated based on Council's comments and consistent with the revised DPC to provide potential access to adjoining lots.
2.12	DoP	The Department notes that acoustic monitoring for the site was undertaken at approximately the point on Fraser Drive where the speed limit changes up from 60km/hr to 80km/hr- this may give rise to artificially inflated noise values as vehicles accelerate at this point and are not maintaining a steady velocity. The Department also requests further information regarding the location of the monitoring equipment (and subsequent modelling) given the likely building envelopes and future built form, combined with the proposed topography and having regard to the RTA's Environmental Criteria For Road Traffic Noise.	N/A
3 (1)	Collin Moores	Furthermore, the proposal we feel does not address adequately the access to so many properties in such an area. Parkes Lane is just that, a lane with many concealed house entrances, narrow and with inadequate on road parking options. There are no dedicated pedestrian pathways and parts still remain with no curb and guttering road drainage. To then expect an additional through traffic flow I fear raises considerably the potential for accidents and serious injury of local children and residents.	The proposed temporary access has been included within the design to reduce any traffic impacts as a result of the development on the existing Market Parade and Parkes Lane by providing direct access to Fraser Drive prior to the construction of Broadwater Parkway. In addition, this access will also improve allow existing lots on Market Parade access to Fraser Dive without using Parkes Lane. Assessment of Parkes Lane has identified an existing need for a pedestrian footpath facility and clearing of overgrown vegetation to improve pedestrian safety and driver sight lines. These improvements can be achieved within the existing road reserve and required to be addressed by Council irrespective of the proposed development.
4 (2)	Donald and Helen Piper	We support the application and set out below various aspects of the project as proposed by the Proponent which, in our view, add credibility to the development: 1. The provision of landscaped streets and extensive areas of open space, taking advantage of the topography of the subject land. 2. The commitment to the protection and rehabilitation of areas of environmental significance. 3. The introduction of cycle and pedestrian pathways. 4. Rainwater tanks will be required by all residences. 5. The provision of shared community infrastructure.16 November 2011 Page 13 of 83 We understand that access to Fraser Drive will be a temporary measure. "Altitude Aspire" and other development within the precinct of Area E will eventually link with Broadwater Parkway, a main access road to be constructed by Tweed Council, and to which all Developers will contribute.	Noted.
5 (3)	John Thebridge	The proposed development is flawed in many respects. 1. It is completely out of character with the existing neighbourhood which consists of block sizes of approximately 2000 sq m and houses which blend into the natural landscape. 2. There is no planned integration of the development and the existing neighbourhood.	6. The proposed temporary access to Fraser Drive has been included within the design to reduce any traffic impacts as a result of the development on the existing Market Parade and Parkes Lane by providing direct access to Fraser Drive prior to the construction of Broadwater Parkway. In addition, this access will

No.	Name/ Organisation	Submission	Bitzios Response
		3. The proposed block sizes, many under 500sq m, cannot and will not harmonise with the existing neighbourhood. 4. The housing density proposed must therefore be completely out of kilter with the neighbourhood. 5. The proposed destruction of the natural landscape to accommodate the excessive number of blocks scars forever the beauty of the area. 6. Parkes Lane already has a number of "danger spots". The extra traffic will exacerbate this problem, putting at risk our children and adults (many elderly), who are forced to walk on the road because there are no footpaths or defined walking areas. 7. It encourages a "You versus Us" philosophy by making exclusive the Aspire community recreation centre. This will only further flame the fires of discontent in the neighbourhood. ? 8. The house designs will lead to increases in power usage as the omission of eaves will leave greater areas of the homes unprotected from the blazing sun necessitating air conditioning use. ? In conclusion I wish to state that any development of the land in question, needs to at least address the issues above. It is essential that it harmonises with both the existing neighbourhood and the existing natural landscape. It must also provide safe walking streets for pedestrians and cyclists. The current proposal does not.	also allow existing lots on Market Parade access to Fraser Dive without using Parkes Lane. Assessment of Parkes Lane has identified an existing need for a pedestrian footpath facility and clearing of overgrown vegetation to improve pedestrian safety and driver sight lines. These improvements can be achieved within the existing road reserve and required to be addressed by Council irrespective of the proposed development.
6 (4)	Lynette Fleming	The traffic from Fraser Drive onto Terranora Road is chaotic and very dangerous every morning and afternoon, without an extra 321 houses. - Most houses have more than one car attached. Terranora Road at present is no more than a bitumen covered goat track and must be upgraded BEFORE any approval - there are no footpaths, cycleways for elderly or young people without cars. Why do you let developers continually reshape the landscape of somewhere, for the sole purpose of the developer making more money. What about the amenity of the people you already take money from in the way of taxes and charges??	The proposed development will provide infrastructure upgrades required to cater for the development's road network impacts where applicable. The developer is also responsible for providing funds per lot to Council for road upgrades as identified within Council's S.94 Development Contributions Plan
7 (5)	Henry Flanagan	I have been a resident in Tweed Heads for the past sixty odd years and during this period I have witnessed the trajectory of our residential planning authority, compounded by inappropriate contributions from the RTA, to seriously impair the exceptional beauty of our Terranora district. I would like to submit my objection to the plans submitted by Newlands Developers for Major Project 09_0166 - 'Altitude Aspire' at Fraser Drive, Terranora. 1. The proposed development should be required to present larger allotments (800-1000 m2) which would integrate and harmonise with the neighbouring Terranora residents. 2. No relaxation of Tweed Shire Council building requirements should be allowed. 3. The council plans, directing all access to the project via the Broadwater Parkway, should be mandatory. Access through Parkes Lane and Market Parade connecting the Altitude Aspire development should be disallowed due to the established driveways here and also due to the Tweed Shire Council being unable to maintain and provide suitable footpaths. 4. It will precipitate an immense ecological disturbance with myriads of reptiles, vermin and regional bird life, previously cultured by an almost dormant farm over the past few years. The harmonious ecology established in the neighbouring community over the past fifteen years will be extensively compromised by these displaced creatures. Newlands Developers and the Tweed Shire Council should be held responsible and should take a compelling interest in this serious implication.	3. The development is planned to use Fraser Drive as its primary access until such time the Broadwater Parkway is constructed. Connections to Market Parade and Parkes Lane proved a network solution as secondary vehicular accesses, integration with surrounding residential areas and are consistent with Council's adopted DCP for Area E.
8 (8)	Brenda Connelly	By changing the existing cul-de-sac roads in the rural living area to through-roads to the proposed development, Newland Developments (Metricon) will exacerbate the loss of character of the existing garden subdivision. There needs to be delineation of these two distinct precincts. This can only be achieved by not having connecting roads and by having a	The proposed internal road network has been designed to comply with Council's adopted DCP. The road connections between the proposed development, Market Parade and Parkes Lane reduce

No.	Name/ Organisation	Submission	Bitzios Response
		native vegetative buffer zone as described in the draft DCP prepared by Tweed Shire Council in 2005.	the existing dependence on Parkes Lane/Fraser Drive intersection and will improve connectivity to the future planned Broadwater Parkway for existing residents.
9 (9)	B J McLauchlan	The Parkway is presented as a two−lane configuration. However, the traffic predictions by Tweed Council is for volumes 11,800 vpd. Reference to Tweed Roadworks Standards depicted in drawing S.D. 002 dated 2004, shows that a normal neighbourhood collector road should cater for up to 7,000 vpd, while volumes in excess of 7,000 vpd require a four lane facility with median strip.	Council's future strategic traffic volumes estimates do not take into consideration all roads within the network. Council have not yet finalised the design requirements for Broadwater Parkway and is expected to undertake further detailed modelling and assessment to determine the ultimate configuration.
10 (10)	Stephen J Trunks	There is no representation or design detail of the proposed Broadwater parkway, from its departure from the developers holding, to any junction to the north with Fraser Drive, which could be studied to ascertain the impacts on ours and other properties. In the very steep terrain earthworks batters to Council standards would be to the detriment of, above lot 3 and total destruction of Lot 2, according to tentative sketching. 2. Broadwater Parkway is to be a major "collector" road, which we understand will service the future "Area E" population, settling on about 1200 allotments. Although just lay−persons, we cannot see how a road to the required standards can be constructed in the proposed general vicinity without major design departures or landscape destruction. 3. Surely the proponents should be required to graphically indicate the impact of the parkway on each of the holdings through which it passes or affects, to give the owners an indication of the future of our properties. Liaison to date is non−existent. 4. The proponents must revisit the "drawing board" and provide a concept for us to study and make ultimate comment. If this means a fresh application under Pt. 3(a) or whatever jurisdiction is applicable, then so be it. Most of us do not want financial loss, loss of amenity, including exposure to resultant traffic noise or trauma of uncertainty, caused by an intruding party.	1. Council have not yet finalised the detailed design requirements for Broadwater Parkway. Council's planning has indicated a realignment of Fraser Drive to the north of Amaroo Drive intersection with a planned roundabout intersection with Broadwater Parkway. It is noted that this location includes relatively steep grades and as a result the report has provided assessment of an alternative intersection configuration with staging from a priority controlled T-intersection to a signalised intersection. This will provide cost effective staging with improved pedestrian and cycle amenity. The proposed development shall provide Section 94 Contributions and/or Voluntary Planning Agreement towards the construction of Broadwater Parkway and its associated intersections. However, the alignment and detailed design is the responsibility of Council and is not yet finalised.
11 (12)	John Turney	Traffic in Parkes Lane currently a quiet safe street will increase exponentially & any temporary access to any proposed development should remain in force until the site can be interconnected to the proposed Broadwater Parkway.	The development's temporary access intersection shall provide access for the development traffic until Broadwater Parkway is constructed. In addition, the temporary intersection will also provide a more direct connection to Fraser Drive for existing residents located on Market Parade. Therefore, traffic volumes on Parkes Lanes as a result of the proposed development are not expected to exacerbate existing concerns.
12 .1 (13)	Kim Burton	Broadwater Parkway This piece of common infrastructure is a vital part of Area E. Without it the development of the greater area cannot proceed in a sustainable and equitable manner. Stakeholders must resolve the alignment. Council needs to take control of the construction of this road with a cost recovery headwork charge created on a per lot basis. Any approval of the site that is subject to this exhibition must see the resolution of the alignment, timing of construction and the required contributions for the subject lots.	Altitude Aspire development shall provide Section 94 contributions to Council towards the construction of Broadwater Parkway.
12.2 (13)	Kim Burton	In addition while they have maintained a link to Broadwater Parkway they have removed the ability to have a logical connection and road pattern for our eastern precinct. This will force vehicle movements from our site either back up the hill (not efficient) or to the west before they can access Broadwater Parkway where most will head east which is again inefficient. There is limited access from our land for a secondary access to Broadwater Parkway as we have a number of proposed	The revised layout provides the extension of Parkes Lane along the western extent of the site and realigned intersection at Market parade. This allows the opportunity for connections to the west for adjacent lots.

No.	Name/ Organisation	Submission	Bitzios Response
		constructed wetlands to deal with storm water run-off from the greater Area E precinct and the previous shared location was the only opportunity. Parkes Lane located on a shared boundary should form part of the common infrastructure as it also forms a key part of a transport link through to Broadwater Parkway.	
13 (16)	Mark Upton	Parkes Lane and Market Pde are existing roads proposed to connect to the new subdivision. Whilst this appears logical at the planning stage, the reality is the existing alignment, lack of off- street parking along crucial lengths of Parkes Lane and steep sections of Market Pde are simply not conducive to additional traffic. At present some sections of these roads give less than 100mtrs clear vision, the roadway is reduced to one lane when vehicles are parked (legally) on the pavement and accordingly increased traffic will only add to the dangers currently experienced for pedestrians, passing traffic, school buses and service vehicles such as garbage trucks and visiting tradesman. I propose the two existing roads be delineated at the new boundaries by no entry signs or no access to Fraser Drive from the subdivision and vice versa. A reasonable alternative is to terminate both existing roads with a cul-de-sac thereby giving the developer 4 or so blocks at each road with little cost, and with minimal traffic increase. (b) The temporary intersection proposal is unacceptable. It would seem the proponent cannot undertake construction of the Broadwater Parkway in the first stage of development due to not owning the land. It would be reasonable to ensure this roadway, being the main access for the entire subdivision and vital to limiting traffic to Parkes Lane and Market Pde be redesigned onto land owned currently by the developer. If in time it can be realigned, then so be it. The other foreseeable problems are the financial viability and long term desire of the developer to carry out the later works. What happens if the developer ceases to exist after the first stages, or if Stage 7 …	The proposed development's temporary access intersection shall provide primary access for the development traffic (until Broadwater Parkway is constructed). In addition, the temporary intersection will also provide a more direct connection to Fraser Drive for existing residents located on Market Parade. Therefore, traffic volumes on Parkes Lanes as a result of the proposed development are not expected to exacerbate existing concerns. Assessment of the existing conditions along Parkes Lane and Market Parade demonstrate that issues associated with sight lines, road width and pedestrian provisions can be mitigated against within the current road reserve and these improvements are recommended irrespective of the proposed development. Timing of the construction of Broadwater Parkway is dependent on Council. Newland shall be responsible for providing infrastructure funding per lot in accordance with Council's Section 94 Infrastructure Contributions Plan and/or Voluntary Planning Agreement. The introduction of Broadwater Parkway will improve accessibility for existing residents on Parkes Lane and reduce traffic volumes using Parkes Lane /Fraser Drive intersection.
14 (17)	Bruce Steel	Tweed Shire Council, in the interests of road safety have designated an entry point off Fraser Drive which is intended to service this development but it initially passes through a small stretch which is not owned by the developers. The Council believes that the developer should purchase this piece of land and build the access road as it is to their benefit. The developer, through its representatives, is urging the community to lobby the council to purchase and pay for this land and build the access road. Therefore, because of the impasse, the developer is seeking a "temporary" access to their initial part of the development via Fraser Drive, close to Parkes Lane. Parkes Lane and its secondary lane, known as Market Parade is zoned Rural Residential. The lanes in this area are narrow, with blind corners and many blind accesses to properties. This area is famed locally as "The Garden Suburb" and is peaceful and beautiful locale. Traffic flow Contrary to Tweed Shire Council's planning intentions which were to not interconnect this area with? Area E but to require a floral boundary around the fully established rural residential Parkes Lane/Market Parade precinct, the developer intends to open these lanes into their development and therefore we believe that the traffic flows that will occur will be extremely excessive and make these lanes very dangerous, especially as, apart from the other factors, there are not even any footpaths and two school buses can barely pass each other here.	Broadwater Parkway is designed to cater for the whole of Area E as well section of Terranora by connecting to Mahers Lane and reducing the existing dependence on Terranora Road. The proposed temporary access is consistent with Council's Adopted DCP for Area E and shall provide primary access for the development traffic (until Broadwater Parkway is constructed). In addition, the temporary intersection will also provide a more direct connection to Fraser Drive for existing residents located on Market Parade. Therefore, traffic volumes on Parkes Lanes as a result of the proposed development are not expected to exacerbate existing concerns. Assessment of the existing conditions along Parkes Lane and Market Parade demonstrate that issues associated with sight lines, road width and pedestrian provisions can be mitigated against within the current road reserve and these improvements are recommended irrespective of the proposed development.

No.	Name/ Organisation	Submission	Bitzios Response
15 (18)	Martin and Margaret Piper	6.1 Traffic Volume It is unclear as to why the apparent surveyed figures for 2009 are 5,930 annual average daily traffic movements and the projected figure for the year of the report being 2010 remains at 5,930. It is not clear as to what period was used to collect the data which may be of importance to whether or not the figures were carried out during a school period or otherwise. Whilst the writer has no expertise in traffic movements, it would appear that the projection is that by 2015 it is anticipated that there will be an annual average traffic flow of approximately three million? five hundred thousand (3,500,000) traffic movements per annum. This date is considered significant as it is not anticipated that an alternative to the temporary road will have been built by that time. We believe that the traffic volume are conservative.	Average Annual Daily Traffic Volumes (AADT's) refers to daily traffic volumes over a 24hour period on an average weekday, inclusive of school periods.
16.1 (18)	Martin and Margaret Piper	Temporary access onto Fraser Drive16 November 2011 Page 31 of 83 The Developer's proposal is that when the development reaches stage 7 (maybe 2016 or later) that they construct the roadway adjacent to the Terranora Broadwater to be known as Broadwater Parkway. The Developer's representatives have been advising persons in the Banora Point, Tweed Heads area that Council will be providing access from Broadwater Parkway onto Fraser Drive. As we have mentioned elsewhere, we would object to Council being required to provide that access and would submit that the developer should be required to provide that access immediately upon commencing development of the property. It would provide a suitable access to the property and we submit that it would present no difficulties for the developer and if the developer decided not to develop Broadwater Parkway immediately, it would still give them access via internal roads to the remainder of its development and it could develop the Broadwater Parkway as it saw fit. ? Whilst it may suit the developer to develop the higher areas first, which we assume would have greater value, we fail to see why this should be a consideration that the Government or Council should take into consideration when considering these matters. The desire to put in the temporary "road" from the site on to Fraser Drive just north of the existing Parks Lane is driven entirely by the Developer's desire to maximise its profit. ? In maximising its profit the Developer is creating a dangerous situation for the local residents including this objector. This objector lives at 30 Fraser Drive and it is unclear as to what access we will retain from our property onto Fraser Drive, particularly travelling North. During a recent telephone conference (tape recorded with their consent) with the developers they advised that they would submit plans to give the writer access to Fraser Drive to travel north and that there would no physical obstruction i.e.; median strip to prevent that. If the development is to proceed we would require that. We have concerns however because of the plans on exhibition do not necessarily appear to provide that access to Fraser Drive to travel north. If we were required to only turn left when coming out of our property i.e.; travel south, we would have to travel probably over a kilometre before we could make a legal u turn. Just to the north of our property is a significant shopping area and it would be extremely inconvenient if we were required to take a detour. A casual observation of Fraser Drive will quickly reveal that there is no room for the proposed turning lane from the eastern side of Fraser Drive into the temporary road. Although not apparent from the plans we understand that Council are indicating that they require a dedicated bike lane on both sides of Fraser Drive. As we don't have access to survey material and plan drawing equipment for this submission it is difficult to describe the difficulties to be encountered and an on ground inspection with interested parties is required. At the moment Fraser Drive approaching Parkes Lane from the North to the south means travelling up a progressive incline on a gradual curve to the left. Eventually it terminates with a T intersection with Terranora Road. The First difficulty already exists particularly for the residents at 26 and,30 and to a lesser extent further down Fraser Drive. There is no vision of Parkes Lane or Terranora road intersection and from our drive way only a little more than 100	The proposed development together with other developments within Area E will provide contributions 'per lot' to Council towards the construction of Broadwater Parkway in accordance with Council's Section 94 Contributions Plan. Timing of the construction of Broadwater Parkway is therefore dependent on the development of Area E and infrastructure funds collected by Council. The proposed temporary access to Fraser Drive has been designed to cater for full development of Altitude Aspire and is consistent with Council's adopted DCP for Area E in the event that Broadwater Parkway is not completed at the time of full development. In addition, the temporary intersection will also provide a more direct connection to Fraser Drive for existing residents located on Market Parade. Therefore, traffic volumes on Parkes Lanes as a result of the proposed development are not expected to exacerbate existing concerns. The proposed temporary access intersection design has been updated to cater for surrounding residential property accesses and complies with relevant standards in regards to form, intersection spacing and sight lines requirements. The proposed temporary intersection shall include the realignment of northbound lane on Fraser Drive to the west to enable sufficient area for channelised right turn without impacting on existing residential lots to the east.

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		metres vision of oncoming cars coming down a sweeping curve. So vision is restricted. Further traffic entering Fraser Drive from Terranora road is often travelling at high speed regardless of the 'Give Way' sign and 60kph speed limit. It is proposed to add to this difficulty a large number of extra cars coming out of a road a short distance from Parkes Lane and Terranora Roads and to top it off by somehow squeezing a right turn lane from Fraser Drive into this temporary road. The proposal defies any sort of intelligent consideration. The conflict between traffic coming out of Parkes Lane and the temporary road should itself be enough to say no to the proposal. As noted in the reports Fraser Drive is a very popular training area for cycling teams and individuals the increased traffic will put those people at unnecessary risk. The narrow nature of Fraser Drive shows how unsupportable the proposal is for this development. Apart from the clear danger created by the proposal there is every reason to believe that the short proposed right turn lane will result in the whole of Fraser Drive being blocked particularly at peak times. It also appears that there has been no consideration to the large amount of extra traffic expected on Fraser Drive during (see reference above 'Traffic Volume') the period of the proposed temporary road. It makes no difference if the increase is the result of the development or not. We do not accept the assessments contained in the reports as to the extra amount of traffic to be generated from the site. There is no public transport available to this subdivision. During the construction phase the expected use of the road by a large number of long trucks creates its own set of problems. It should be anticipated that fro large trucks to turn they will have to block all lanes going in and coming out of the site.	
16.2 (18)	Martin and Margaret Piper	Public Transport The simple answer is that it does not exist to or from this subdivision and the developer's proposal offers nothing viable. This position is not going to improve on the developers advise until at the earliest 2016. We say this because it is suggested that the private bus line Surfside will supply a service when Broadwater Parkway is available. This is dependent on Council meeting the developers demands and providing a connecting road which the developer clearly does not want at this time as it will add to their cost regardless of the community considerations. Because of the topography of the site and the state of Fraser Drive it would not be practical or safe for people to walk from this subdivision to any existing service. As shown in the reports the current bus service is entirely inadequate for most purposes.	Liaison with Transit Australia Group (TAG) who are responsible for planning Surfside bus routes and local school bus routes have supported the development's integration into existing routes which currently serve Banora Point and Terranora. Bus routes updates are undertaken as determined by the operator upon approval, construction and residential up-take of the development over time.
17.1 (21)	Ian Ayers	• Increased traffic, particularly on Parkes Lane, will create a dangerous situation where lives are at risk. We have been living in Parkes Lane for 15 years. The older section of Parkes Lane is not a wide street, has concealed driveways, no footpaths and in places, residents have to use the road when walking. Our driveway, like a number of others, is on a blind bend. By their own admission, Newland Development representatives have stated that Parkes Lane, due to planned through roads to the estate, will experience a notable increase in traffic. This will stem from tradesmens' vehicles (including heavy vehicles) as well as 'Aspire' residents accessing the estate. The lives of residents entering/exiting their properties by car as well as pedestrians, many of whom are children who walk to and from bus stops will be at an increased risk of injury. When we raised our concern with representatives from Newland, we were told, 'This is council's problem, take it up with them'. When questions were put to Newland representatives regarding whether a right hand turn could be made from the proposed Broadwater Parkway into Fraser drive, again we were told 'This is up to Council – talk to them about it." This alone could mean greatly increased traffic on our quiet streets and will increase the risk to the safety of residents and their children.	The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads, namely Market Parade and Parkes Lane. The existing road reserves for Parkes Lane and Market Parade provide sufficient width to implement a pedestrian footpath and clearing of vegetation to improve sight lines and mitigate identified safety concerns for pedestrians. The internal road network has been revised in accordance with Council's adopted DCP. The proposed road network for Area E, inclusive of Broadwater Parkway and Fraser Drive has been designed to discourage traffic increases on existing roads such as Parkes Lanes. Alternatively, the future road network shall improve accessibility and connectivity for existing roads (i.e Market parade and Parkes Lane) and reduce traffic volumes using Parkes Lane

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			to Access Fraser Drive.
17.2 (21)	Ian Ayers	The use of local roads within the (1c) zoned area to access the proposed development will have a negative impact on the character of the existing rural living area. These existing roads have not been designed to carry extra traffic. I have mentioned above how Newland's proposal to link the proposed estate with the roads in the existing rural living estate will be detrimental to the character of the existing garden suburb. However the use of these roads and the subsequent increased traffic will also present safety concerns to the residents. The diagram below (from the Transport Assessment Report prepared by Bizios Consulting for Newland Developments) clearly shows the intention for Parkes Lane to be upgraded from its current designation as an access road to become a neighbourhood connector road. (See green lines) At a public display of the Altitude Aspire development on Saturday 26th February, Newland representative Sean Nicholson and town planning consultant Darryl Anderson conceded to several concerned residents that Parkes Lane will experience increased traffic by being linked to the new residential development and conceded that increases in traffic created by building homes on these allotments over many years had not been factored into the traffic study presented for assessment to State Planning. They even suggested that any extra traffic created by the development would be the "Councils problem"! No!!! Because Newland's proposal is only part of Area E, none of the traffic study presented indicates the future impact on these local roads when the balance of Area E is developed in the future - good reason to wait until the council develops a DCP for the whole area.16 November 2011 Page 37 of 83 The traffic assessment claims that Parkes Lane can cope with increased traffic created by new housing and residents. This is purely based on engineering stats related to road width etc. What the traffic report does not acknowledge is that Parkes Lane is a narrow road that is barely adequate for the traffic generated by the 120 houses it serves. The facts are: this is a roadway with NO footpath, with many concealed driveways and blind curves. (Please see attached photographs) School buses are required to pick up primary aged students at their driveway for safety. High school students must walk carefully along the edge of the bitumen in some areas. None of this was mentioned in the traffic report generated to suit the needs of Newland Developments.	The report has been revised to assess the existing configurations along Parkes Lane and Market Parade. The existing road reserves for Parkes Lane and Market Parade provide sufficient width to construct a pedestrian footpath and clearing of vegetation to improve sight lines and mitigate identified safety concerns. The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). Alternatively, the connection to Market Parade will provide more direct access to Fraser Drive for residents on Market Parade and subsequently remove the need to use Parkes Lane.
18 (25)	Richard Murray (Tweed Heads Environment Group)	NSW RTA Roads – Accessibility and impact on Tweed Shire road traffic network. Tweed Heads Environment Group advises: • Terranora Road is a major road connecting this subdivision of Area E to the recently started Sexton Hill bypass, the completion date of which is uncertain. • The section of Darlington Drive from Leisure Drive to the Pacific Highway Motorway is currently level of service 'D', (i.e. all drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream) • Leisure Drive from Greenway Drive to Darlington Drive is already operating at level of service 'C'. • Major Project 06_0243 recently approved for a further subdivision of 151 freehold Lots and 1 super lot at Fraser Drive, South Tweed Heads, north of this subject proposal will increase the urgency for a four-lane Fraser Drive near the proposed 'Altitude Aspire' development. • The Kirkwood Road upgrade is another uncompleted key road that significantly impacts on increased traffic within the Tweed Shire Road Network. Tweed Heads Environment Group – Comment *Tweed Heads Environment Group objects to this proposal on the grounds that key traffic infrastructure for this subdivision*	Council has planning for future road upgrades along Fraser Drive, Greenway Drive and Leisure Drive and of which are included with the Tweed Road Contributions Plan Schedule. The construction of Broadwater Parkway is dependent on Section 94 contributions to Council from developments within Area E. The proposed development's traffic impacts have been demonstrated to be catered for without the inclusion of Broadwater Parkway.

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		is not in place.	
19 (27)	Rosemary Vickery	Street entry to my home is from Lovat Brae Court but the front of my block is Fraser Drive and overlooks the proposed residential subdivision at Fraser Drive. My home on the Fraser Drive side has a retaining rock wall with a fence atop to assist in minimising noise from traffic from Fraser Drive. The proposed development includes the erection of a 2.4 metre acoustic fence on Fraser Drive situated opposite my home. I have sought advice from an architect as to the sound effects that the erection of such a fence will have upon us in my home. The architect told me that the erection of a 2.4 metre fence in the proposed location would create a sound tunnel ie. noise from traffic on Fraser Drive would bounce between the proposed 2.4 metre fence and my rock wall and that the noise would be significantly louder for us in my home. The lifestyle that we enjoy at present will be significantly hampered by the erection of the 2.4 metre acoustic wall. The erection of such a fence will benefit the residents of the new residential subdivision but will significantly and negatively effect the lifestyles of those not part of the development who live on Fraser Drive. 2. Housing development will include much more traffic on Fraser Drive from builders, trades persons etc. This in turn will create more traffic noise for residents on Fraser Drive, including myself. This will create even further noise in the sound tunnel for my family and I to endure.	N/A
20 (28)	Mike Allen	I refer to the meeting with Council Officers' Connell & Knight on Friday 3 December 2010 concerning Council's proposal to access Area 'E' via Broadwater Parkway from Frazer Drive adjacent to Amaroo Drive. I also refer to the workshop conducted by Council on Thursday, 10 February 2011 in relation to this same matter. In addition to the above, I also refer to the Environmental Assessment submitted by Altitude Aspire (the first stage of Area 'E'), which has just been placed on exhibition, and to which submissions close next Monday (4 April2011). I have very real concerns concerning the adequacy of Broadwater Esplanade as proposed by Council in the plans provided. These concerns are detailed hereunder. I am also lodging an objection to the exhibited EA document (DEP reference 09 0166) primarily on the basis of inadequacy of access. This letter will form part of that submission. The project described by the plans supplied by Council was stated as “Area ‘E’, Terranora Preliminary Concept- Proposed Connector Road” The cover sheet is dated October 2010 and details seven (7) sheets to the set, all issue A. The set actually comprises eight (8) sheets. Sheet 2, Issue B, is titled “Land Zoning and Proposed alignments” and is dated 12/2010. Sheet 2B Issue A, is titled “Aerial Photo and proposed alignments” and is dated I 0/2010. The details are consistent with each other and both depict a proposed roundabout at approximate chainage 60 on Broadwater Parkway. The longitudinal section of Broadwater Parkway shown on Sheet 3 does not provide for this roundabout nor does it detail or provide a cross section of the roundabout. The longitudinal section would require amendment to accommodate the roundabout and in my view this cannot be achieved without further compromising already limiting grades. It is, however, acknowledged that Council plans are preliminary and evolving, and that they may be incomplete. Inconsistencies between Council Plans, its own Planning Instruments and its own design standards are detailed hereunder	As noted, Council’s detailed planning has not yet been finalised for Broadwater Parkway including the form and intersection configurations. The proposed development has assessed Council’s option of a roundabout at Fraser Drive / Broadwater Parkway intersection as well as an alternative option to provide a priority controlled intersection that can ultimately and more cost effectively be upgraded to signals once required. This forms a recommendation to Council in regards to the potential intersection configuration.

No.	Name/ Organisation	Submission	Bitzios Response
		(1) TWEED LEP 2000 Tweed LEP 2000 mandates a corridor for Broadwater Esplanade which, in part, traverses the wetlands adjacent to and north of' Altitude Aspire". This route was nominated by Council subsequent to the gazettal of SEPP14 amendment No 14, and Council would have been aware of the responsibilities and liabilities of any proponent wishing to construct a roadway within a wetland. Such construction is a permissible use, subject to and dependent upon EIS justification, the consent of the Council and the concurrence of the Director (of Planning). 16 November 2011 Page 50 of 83 Any suggestion that the wetland is pristine, that the roadway and associated wetland enhancement works were unlikely to be approved is a misconception of the intent of SEPP14. The enclosed aerial photograph taken on 18/10/1982 clearly indicated that some of the wetland had been clear felled to enable adjustment prior to that date. Present regrowth is primarily Typha (Cumbungi). A roadway and associated works can be of immense benefit to this wetland. A roadway can enable access, can control the inflow of brackish water into the freshwater wetland area and can be used to facilitate embellishment or remedial works. This can only be assessed after the completion of an E.I.S., which is a fundamental and inseparable component of development within Area 'E' or of any D.C.P. prepared pursuant to Clause 53(D) of Tweed LEP 2000. The avoidance of E.I.S. preparation is seen as a dereliction of the intent of Tweed LEP2000. ? (2) ROAD CLASSIFICATION Council have defined Broadwater Esplanade as a "trunk road" .and have projected future traffic volumes of 11,800 vpd. A trunk road is not defined in either Tweed DCP A5 (Sub divisional Manual) or their Development Design Specification D1. Both documents however stipulate an indicative maximum traffic volume of 7,000 – 10,000 vpd for neighbourhood connector roads and in excess of 10,000 vpd for arterial or distributor roads. · Broadwater Parkway would appear to fall within the latter category. (3) ROAD ALIGNMENT · The alignment proposed by Council appears to be totally dictated by the reluctance of Council to carry out proper evaluation of a roadway through SEPP 14 wetlands. Council's proposed alignment (Sheet 2, Issue B) not only totally avoids the SEPP14 wetland boundary, but also, for some unknown reason avoids an additional area nominated as a SEPP14 "buffer area". The origin and status of this additional area of restriction is unknown. The proposed alignment is therefore dictated by adverse topography, which in turn dictates excessive road grades and undesirable and inappropriate earthwork formation. (4) ROAD GRADES The proposed longitudinal section of Broadwater Parkway is detailed in Council drawing Sheet 3, Issue A. As stated earlier, this profile requires amendment to accommodate the roundabout at ch 60. The approach grade is_ already nominated as 12%, which exceeds the absolute maximum grade for a distributor road (8%) and is the absolute maximum grade for a collector road (12%) The proposal clearly is inconsistent with Council's own standards. ?	

No.	Name/ Organisation	Submission	Bitzios Response
		(5) ROAD CROSS SECTIONS AND EARTHWORKS Road cross-sections are depicted on sheets 4-7 with the typical cross section detailed on Sheet 3 Issue A. The roadway proposed has two undivided 3.5 carriageways, each with 2.0m shoulders within an 11.0, formation without K & G. This is a non standard cross section and a significant departure from and grossly inferior to cross sections as mandated by Councils DCP- A5, DDS D1 and standard drawings Cut batters are proposed as 1.0 horizontal (H) to 1.0 Vertical ((V). Fill batters are proposed as 1.5H to 1.0V. These are much steeper than those mandated in Council DDS.D6 of 2.5H to 1.0V and 3.0H to 1.0V respectively. Annexure 20 in the EA documentation is a geotechnical report from Morrison Geotechnics Pty Ltd. This report is site specific to the Altitude Aspire site, but projections of the topographic units, based on landform, northwards along the proposed alignment of Broadwater Parkway can be made. The relevant projected topographic units are units 4 & 5.	
21 (29)	Helen Wilson	This road link simply provides a cost effective solution (for the proponents) to unlock a further 135 allotments on the western side of the major drainage swale using the Fraser Drive roadway infrastructure via a proposed 'temporary' round-a-bout. A more rational design would be to provide a parallel feeder road from the intersection with the proposed Broadwater Parkway to service the allotments on the eastern side of the major drainage swale, that is the allotments in stages 1-6. This would have facilitated a precinct style 'east & west' design with their own design attributes sympathetic to the topography rather than the 'cookie-cutter' layout served up by this proposal. A parallel feeder road would also move the building with the proposed Broadwater Parkway to service the allotments on the eastern side of the major drainage swale, that is the allotments in stages 1-6. This would have facilitated a precinct style 'east & west' design with their own design attributes sympathetic to the topography rather than the 'cookie-cutter' layout served up by this proposal. A parallel feeder road would also move the building envelope for residences along the length of Frazer Drive, further to the West, which would go someway to lowering noise impacts from Fraser Drive traffic. It also may reduce the need of the proposed acoustic barrier/fence along Fraser Drive which will significantly impact on high value distant landscape views (mountain & lake) afforded to motorists traversing Fraser Drive.	The road alignments and connection to Broadwater Parkway have been revised to comply with Council's adopted DCP for Area E. This includes a single access intersection for Altitude Aspire development within Area E to limit the number of intersections along Broadwater Parkway.
22 (30)	Greg Burgis (Friends of Terranora)	It is obvious the developer desires to substantially increase lot yield without upgrading the 2 access roads, Broadwater Pkwy and Terranora Rd, also Fraser Drive, beyond a single lane in each direction. This is totally unacceptable. They would all need to be 4 lane roads. ?? It is apparent from the Preliminary Structure Plan that Area E is now proposed to have a much higher residential density than the LES is based on, with significant 3 storey medium density areas, retirement precincts and a very large village precinct. As only a small commercial area was planned in the adopted LES, it is not known what this village area is meant to become. It incorporates some very steep land. The increase in lot yield is totally unacceptable on such sensitive land and without dual carriageways. Traffic gridlock will result. Not even a new school site is proposed when the local Terranora primary school is at capacity with no further expansion possible. We object to the following: [a] Terranora Road + The second access opposite Sunnycrest Dr is not acceptable. This is the preferred scenic public lookout site. Only one access further west was ever envisaged in the LES. + Terranora Rd landowners will be unable to safely access or leave their properties with the over capacity on the road. Road noise will exceed legal limits of 60DbA daytime and 55 DbA night time. + Council report that Terranora Rd can not be widened to 4 lanes. Therefore, we argue the population density of Area E must be limited to the roads capacity or less. [b]Fraser Drive	Broadwater Parkway is designed to provide a parallel route to Terranora Road to cater for future planned developmental growth of Area E as well and the greater Terranora area. The alignment of Broadwater Parkway and intersection with Fraser Drive shall reduce the existing dependence on the southern section of Fraser Drive and Terranora Road. Council is proposing the alignment of Broadwater Parkway to intersect Fraser Drive to the north of Amaroo Drive. The proposed temporary access to Fraser Drive is located mid-block between Parkes Lane and Glen Ayr Drive and complies with relevant separation, sight distance and intersection configuration requirements.

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		+ For the noise level to reach 70DbA, traffic volumes are going to be very high- equal to the local Pacific Highway which has similar noise levels. This is ominous proof of Area E over loading the roads. Relief must be given to all land owners on the eastern side of Fraser Drive by creating a service road which will give them safe access by separation from passing traffic; and offering free double glazed windows and air conditioning [RTA do these things]. ? + Widening Fraser Drive to dual carriageway with 3metre medium strip. If the extra lanes are not built then the land should still be dedicated for the future when it will be needed. Do not repeat the Greenway Drive fiasco of deliberately not widening the road to discourage use. It does not work. +Not building a 2.4 metre 'graffiti wall' or any other height fence near the road– the wider road will push the new lots down the hill for most of the frontage. This will decrease the noise level on the lots as the road will be above the lots. Maintaining the appealing scenic vista over Terranora Broadwater to the rugged mountain skyline for the public and residents alike. + Council Strategic Planner Douglas Jardine promised the junction of Broadwater Pkwy and Fraser Drive would not be near Amaroo Drive so that the latter Road would not become a' rat- run'. The iconic large fig tree opposite Amaroo Drive must not be destroyed for Area E road access. + Ban temporary access from the proposed estate. It is dangerously close to Parkes Lane [c]Broadwater Pkwy + The LES locations of this road were deliberately vague but were within the Residential Zone. No road should be within SEPP 14 wetland. Remnant high value rainforest patches along the edge of the wetland and within the residential zone must not be destroyed. The road location must be up slope from these trees for conservation purposes and to improve the appeal of the drive. +Grades must not exceed legal limits	
23 (31)	Michael Evans	In that time I have seen a lane (not a street) slowly develop some curb and channeling and be resealed. It still is narrow, has no pavements and has a number of very sharp bends which completely limit vision of oncoming traffic-pedestrians(children, people exercising and people with pets),school buses, cyclists, skateboarders and of course other motor vehicles. The gardeners who are working on their properties bordering the lane are also often very close to vehicles using this lane. Every week it is a common occurrence when driving to have to brake suddenly to avoid collision with any of the previously mentioned lane traffic, especially on the bends or if vehicles are parked on the side of the lane. The danger increases dramatically if vehicles are parked on the sides of the road near the bends. The chances are high that a severe accident will occur. If Parkes Lane has added traffic as indicated by the development of the new estate then the chances are extremely high for severe damage or death to occur on this narrow lane. I cannot imagine the trauma caused to a family if this occurred especially if the chance could have been minimised with forethought and planning. Please consider this aspect carefully when dealing with the new estate development.	The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). The existing road reserves for Parkes Lane and Market Parade provide sufficient width to implement a pedestrian footpath and clearing of vegetation to improve sight lines and mitigate identified safety concerns for pedestrians.
24 (32)	Pat Tate (Banora Point and District Residents Association)	Members of our Association have held positions of responsibility in areas of traffic management, road construction and road design. We can speak with considerable expertise in this area. The Association has also had considerable input into the design and construction of the Banora Point upgrade (currently under construction) and have actively promoted the Kirkwood Road extension and interchange. These initiatives are now coming to fruition. The Kirkwood Road extension and interchange are primarily to discourage the use of internal local roads at Banora Point, including Amaroo Drive and Glen Ayr Drive, as through traffic to the major retail and commerce centre of South Tweed Heads, and the Pacific Highway.	Newland will be responsible for payment of infrastructure contributions in accordance with Council' Section 94 Contributions Plan towards the construction of Broadwater Parkway. As timing of the construction of Broadwater Parkway is dependent

No.	Name/ Organisation	Submission	Bitzios Response
		Fundamental to development of Area E has always been the construction of a satisfactory point of access. Tweed LEP 2000 (which is still current) proposes an internal collector road which intersects with Fraser Drive, near the northern end of Lot 6, DP 788780. Lot 6 was purchased by Council circa 1998 for this specific purpose. This internal collector road (Broadwater Parkway) has been allocated a corridor within Area E and links Mahers Lane with Fraser Drive, and is generally located on land which provides near level grades and good horizontal alignment. Much of the corridor is located within the degraded 7(a) wetland within the northern precinct of Area E.	on Council though the Tweed Road Contributions Plan. The proposed development shall provide a temporary access to Fraser Drive which can cater for full development traffic projections.
25 (34)	David Robbins	Access to the new development should not be permitted through Parkes Lane as the corner (See UBD map 92 A10) is extremely dangerous even with the present traffic flow as there are a lot of driveways that converge on that corner both from the high side of the road and the low side. This is exasperated by any large vehicles or anyone who is unfamiliar with the road or simply not driving defensively. I built a house down the end of Parkes Lane so I know from personal experience over the months that I worked there that you have to approach the corner below the speed limit to avoid a possible collision.	The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). Alternatively, the connection to Market Parade will provide improved access for existing residents through Altitude Aspire, therefore reducing the dependence on Parkes Lane The existing road reserves for Parkes Lane and Market Parade provide sufficient width to construct a pedestrian footpath and clearing of vegetation to improve sight lines and mitigate identified safety concerns. These improvement measures are required irrespective of the proposed development.
26 (47)	Peter Anthony Stark & Leonne Cheryl Stark	Due to the narrowness of Parkes Lane we object to the use of Parkes Lane as extra vehicle access for this new development, We live of a Lane from Parkes Lane that we share with 3 other residents & as our driveway is right on the bend of the road it is already dangerous for all of us especially negotiating large caravans & trailers onto Parkes Lane & also with no footpaths & plenty of concealed driveway's it already has its dangerous aspects without large trucks & extra vehicles Parkes Lane is also a no through road as is Trutes Terrace & Market Parade ,Also School buses are a daily occurrence here & our children are at risk, Please rethink this madness before people start getting hurt.	The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). Alternatively, the connection to Market Parade will provide improved access for existing residents through Altitude Aspire therefore reducing the existing dependence on Parkes Lane. The existing road reserves for Parkes Lane and Market Parade provide sufficient width to construct a pedestrian footpath and clearing of vegetation to improve sight lines and mitigate identified safety concerns.
27 (48)	Anne M Wright	At present there are approximately 500 traffic movements per day from Market Parade and Parkes Lane to Fraser Drive. • This will increase particularly during the initial phase 1-5 development, even though the temporary entrance and construction site is off Fraser Drive. Altitude Aspire Transport Assessment report (Bitzios p8 & DGEAR 5.8) states "traffic from the development will be able to access both Parkes Lane and Market Parade." DGEAR5.9 • The proposed development expects to generate 145 peak hour trips for phase 1 prior to the construction of the Broadway Parkway and 264 peak hour trips for the full development. • In the second phase 7- 11 construction vehicles and others are sure to use Parkes Lane as it is a direct route to the site	The proposed development's access and internal road network is consistent with Council's Adopted DCP for Area E. The temporary access intersection with Fraser Drive is included to limit the proposed development's traffic impacts on surrounding roads (Market Parade and Parkes Lane). Alternatively, the connection to Market Parade will provide improved access for existing residents on Market Parade through Altitude Aspire without using Parkes Lane. Whilst it is expected that Altitude Aspire residents on the north western stage may connect directly into Parkes

No.	Name/ Organisation	Submission	Bitzios Response
		rather than using the temporary site access. This will cause extra traffic, large vehicles, noise and rat runs!, • Has Altitude Aspire taken into consideration all this traffic and the cumulative effect on Parkes Lane, Market Parade and Fraser Drive, particularly in the event of the late development of the Broadway Parkway.	Lane, the net traffic volumes on Parkes Lane are expected to be negligible and not expected to exacerbate existing concerns. The existing road reserves for Parkes Lane and Market Parade provide sufficient width to construct a pedestrian footpath on the northern side and clearing of vegetation to improve sight lines and mitigate identified safety concerns.
28 (49)	Leslie T Zahn	That it does not adequately provide for access to and from my property at 26 Fraser Drive, Banora Point and does not deal adequately with traffic flow to and from the proposed development generally. B. The proposed creation of a temporary road is an inadequate and inappropriate provision of access to and from the development to Fraser Drive.	Currently, Fraser Drive includes a double unbroken line along the full extent between Parkes Lane and Glen Ayr Drive in front of property accesses located on the eastern side. The revised temporary access intersection provides line-marked turn lanes within the intersection and no raised medians, maintaining the existing provision for property access along Fraser Drive. The priority controlled intersection is located within adequate spacing from the neighbouring Parkes Lane and Glen Ayr Drive intersections and complies with relevant standards to cater for full development of Altitude Aspire.
29.1	NSW Transport	I refer to your letter dated 23 February 2011 requesting comment on the Environmental Assessment Exhibition of Major Project 09_0166; Altitude Aspire, at Fraser Drive, Terranora. Transport NSW (TNSW) is the lead transport agency in NSW bringing together the delivery of transport services, policy, planning, coordination, information and engagement with the community. TNSW oversees the development and maintenance of transport networks, infrastructure and assets, allowing for an integrated approach to planning and delivery of safe and reliable transport throughout NSW. In keeping with the objectives of the State Plan, TNSW encourages land use and transport measures that will facilitate greater mode shift away from car usage to public transport, together with walking and cycling. TNSW supports the location of housing close to shops and public transport as outlined in the strategy and TNSW acknowledges that these measures have been addressed in the Environmental Assessment and in Annexure 24 Part A and Part B. The preparation of Environmental Assessments provides a fundamental opportunity to take advantage of the significant investment by the State Government into NSW's transport networks as well as to implement State transport policy including: • The State Plan (www.nsw.gov.au/stateplan/), including objectives for public transport, walking, cycling, roads and location of jobs and population; and • The State Infrastructure Strategy (www.treasury.nsw.gov.au); Detailed comments on the Environmental Assessment Exhibition of 'Altitude Aspire at Fraser Drive, Terranora' are attached for the Department's consideration. I trust that these comments are of assistance. Should you wish to discuss this matter further, please contact Lauren O'Connor on (02) 8202 2292 or email lauren.o'connor@transport.nsw.gov.au. Yours sincerely David Hartmann	The proposed development has been revised based on comments from Council and relevant departments (i.e Department of Planning, Department of Transport). Additional pedestrian connections have been included to increase permeability of the proposed lot layout and connect to potential desire lines both within and external to the development. The proposed community centre has been revised to comply with Council's parking requirement and has been designed to promote active travel by providing end of journey facilities for pedestrians and cyclists.

No.	Name/ Organisation	Submission	Bitzios Response
29.1	NSW Transport	The proposal has limited direct access to Fraser Drive for pedestrians and cyclists. It is requested that a shared mid block access point be considered for pedestrians and cyclists. – • TNSW is satisfied with the level of bike parking that has been allocated to the proposed community facility. This bicycle parking should be located in areas close to entrances in well lit and secure locations. Bicycle racks should allow cyclists to lock up the frame and at least one wheel of their bicycles, in accordance with the NSW Bicycle Guidelines. TNSW acknowledges the developer is supplying 'end of journey' facilities for cyclists. These facilities should include appropriate showering and changing amenities. The following documents may be of further assistance to Council in this regard: • NSW Bike Plan, NSW Government, 2010; • Healthy Urban Development Checklist, NSW Health, 2010. • More information on active infrastructure development related to specific housing types, and how to integrate active transport into planning, is available in: • Development and Active Living: Designing Projects for Active Living, NSW Premier's Council for Active Living, 2010. • TNSW encourages the developer to take advantage of the BikePlan's programs for improvement to local cycle networks and promotion of bicycle tourism, which include opportunities for joint funding with the Roads and Traffic Authority (RTA). As part of the BikePlan, the NSW Government will double the existing matched funding program for local cycleway networks in regional NSW. For more information about matched funding for cycling programs, please contact you area RTA representative. • TNSW advises that our contract with Surfside buses requires the provision of services in accordance with Schedule 10 "Service planning Guidelines". Bus services in new residential developments are to be designed and operational as soon as practicable. Where a new development falls within or adjacent to a country town, or the urban centre or locality of a country town is expanded or there is demand for non school services outside the country town, then the country town of the country town operator will be extended to cover the additional Urban Region. • TNSW also suggests the development of a Transport Access Guide for residents of the Altitude Aspire development. A Transport Access Guide provides customised travel information for people travelling to and from a particular site or venue using sustainable forms of transport - walking, cycling and public transport. More information on producing a guide is available on the RTA website: • /wwwhttp:1. rta. nsw. gov.au/usingroads/traveldemandmanagementltransportaccess guides/index.html	The proposed development has been revised based on comments from Council and relevant departments. Additional pedestrian connections have been included to increase permeability of the proposed lot layout and connect to potential desire lines both within and external to the development. The proposed community centre has been designed to reduce car dependence, particularly for short local trips, by reduce parking provision to as sustainable level and providing end of journey facilities for pedestrians and cyclists. Transit Australia Group (TAG) who are responsible for planning Surfside bus routes and local school bus routes have supported the developments integration into existing routes which currently serve Banora Point and Terranora. Bus routes updates are undertaken as determined by the operator upon approval and construction of the development over time. A Transport Access Guide for Altitude Aspire has been developed to inform future prospective residents of the sustainable transport provisions associated with Altitude Aspire and surrounding areas.
30	RTA	The Roads and Traffic Authority (RTA) has no objection to the proposed residential development at Fraser Drive Terranora. Your Department may wish to consider the following comments when considering this proposal. The temporary access to Fraser Drive for stages one to five will impact on existing driveways accessing Fraser Drive. AS2890 identifies driveways opposite intersections as prohibited locations for access to the road network. It is understood at least one existing driveway will be opposite the temporary connection for this development to Fraser Drive. To reduce the extent of impact on existing properties, it i s suggested roundabout control of the temporary access be considered for the connection to Fraser Drive for the initial stages of the proposal. To ensure sufficient parking is provided for the Community Facility component of the proposal, Tweed Shire Council's parking rate should be adopted as the minimum requirement. Traffic signals or traffic control lights are regulated by section 87 of the Roads Act 1993. In particular, part 87(4) of the Roads Act relevantly provides that the consent of the RTA is required for the installation of traffic control lights. Due to the safety and traffic management significance of traffic signals, the RTA has not delegated this consent function to any other authority, and operates and maintains all traffic lights in NSW. The traffic modelling supporting the proposal assumes in the future traffic signals will control the intersection of Fraser	Whilst RTA's proposed roundabout intersection configuration may resolve potential issues associated with the neighbouring residential accesses, the land requirements to provide a roundabout intersection would be such that the Altitude Aspire access approach would be located on a downward grade. This would limit vehicle sight distances when approaching the roundabout. Currently, property accesses along Fraser Drive include a double unbroken line on Fraser Drive. The proposed priority controlled intersection does not include raised medians and as such does not vary Council's existing property access provision. The proposed priority controlled intersection allows yielding vehicles at the intersection to be located closer to through lanes on Fraser Drive on a reduced grade and with acceptable sight

No.	Name/ Organisation	Submission	Bitzios Response
		Drive and Broadwater Parkway. The installation of traffic signals will require approval of the RTA before adopting this method of intersection control. To ensure the RTA requirements for signals are met, consultation with the RTA will be necessary before traffic signals can be installed.	lines in either direction. To date, Council has proposed to include a roundabout configuration at the planned Broadwater Parkway / Fraser Drive intersection. Due to potential costs associated with providing a roundabout in this location the report has suggested that a staged intersection within ultimate signalised control would provide a safer, cheaper and more efficient intersection. The construction of this intersection does not form part of this application and shall be further assessed by Council as part of further design considerations.

8. SUMMARY AND KEY CONCLUSIONS

The proposed development comprises of a total of 263 lots throughout 11 Stages of development, including; 251 residential lots, six public reserves, four medium density lots, one drainage reserve, and one community-associated residential lot.

Irrespective of whether or not Altitude Aspire is developed, improvements to Parkes Lane are required. This may include restricting parking along curved sections of the road, reducing / removal of vegetation within the road reserve to improve sight lines and provision of a pedestrian footpath. The construction of a footpath along Parkes Lane would however require the removal or relocation of a number of existing small trees. The proposed development's traffic generation and road network connections to both Market Parade and Parkes Lane are not expected to exacerbate traffic volumes or existing areas of concern on Parkes Lane that would require additional mitigation measures other than already recommended for existing traffic volumes.

The proposed location for the temporary site access intersection is the most suitable along the western section of Fraser Drive. The proposed temporary intersection location complies with requirements for site distance, approach gradients, intersection spacing and impact on existing property accesses in accordance with Austroads design requirements. No raised medians are provided within the intersection design so as to retain existing level of access to adjacent residential driveways.

The site access intersection can cater for the full development of the site. In addition, surrounding intersections will continue to perform within capacity as a result of the increased traffic volumes at the site access intersection.

The internal road network has been designed in accordance with the requirement set out within Section A5 Subdivision Manual of Council's DCP 2008 as well as Council's adopted Area Specific DCP for Area E. The swept path analysis shows that a 8.8 metre MRV can adequately manoeuvre throughout the proposed development's internal roadways.

A parking assessment of the proposed community facility demonstrates that the proposed facility will provide sufficient vehicle and cycle parking amenity to cater for the demand and has been developed in line with principles of the NSW Planning Guidelines for Walking and Cycling.

Liaison with TAG has been undertaken to confirm the potential bus routes to serve Altitude Aspire, the greater Urban Release Area E and the existing surrounding areas of Parkes Lane and Market Parade. The potential bus routes and centrally located bus stops within the site provide a maximum walking distance of 400 metres for the development.

The internal footpath network has been revised to provide permeability between internal streets and connectivity to surrounding areas, consistent with objectives and principles of the NSW Planning Guidelines for Walking and Cycling as well as requirements set out within Council's A5- Subdivision Manual and adopted DCP for Area E. 1.2 metre wide pedestrian footpaths are located all Access Streets and Neighbourhood Connectors, as well as strategically located along green space to connect areas and provide short–cuts for both pedestrians and cyclists.

The internal road network together with the open space and linkage pathway network provides connectivity to surrounding areas including future Area E development to the west. In addition, the access pathway connection and additional pathway connection in line with Glen Ayr Drive provide direct access to Fraser Drive for residents travelling towards Terranora Road or Tweed Heights. An important consideration into cyclist usage and amenity is the connection of provided viable cyclist route that connect to local schools. The additional pathway in line with Glen Ayr Drive will improve connection to Fraser Drive and onto Banora Point High School and Centaur Primary School.

A Transport Access Guide has been developed to encourage the use of active transport for potential residents and provide a quick visual guide to local transport information.

The above findings indicate that no significant matters of a traffic and transport nature exist that would preclude development of the site as proposed.

APPENDIX A

RTA GUIDE TO TRAFFIC GENERATING DEVELOPMENTS:

Section 2: Traffic Impact Studies – CHECKLIST

2.3 Issues to be addressed.

A traffic impact study should follow the standard format and structure that is listed in Table 2.1. This format covers the key issues to be addressed in determining the impact on traffic of a development. Use of this format and the checklist will ensure those involved in the preparation and / or assessment of Development Applications that the most significant matters are considered.

Table 2.1
Key issues in preparing traffic impact studies

Procedures & Key Parameters	Source	Check✓
Brief description of the development		✓
Application and study process		✓
Introduction		
Background		✓
Scope of report		✓
The key issues and objectives of a traffic impact study		✓
General Data Collection / Existing Conditions		
Description of the Site and Proposed Activity		✓
Site location		✓
Current land use characteristics (zoning) of the proposed site and land use in the vicinity	Development Consent Authority	✓
Site access		✓
The Existing Traffic Conditions		✓
Road hierarchy; including the identification of the classified road network (major and minor roads) which may be affected by the development proposal	Council / RTA	✓
Inventory of road widths, road conditions, traffic management and parking control	Council / RTA and Survey	✓
Current and proposed roadworks, traffic management works and bikeways	Council / RTA	✓
Traffic Flows		✓

Procedures & Key Parameters	Source	Check✓
Selection of key streets - possibly divided into the major and the minor road network; selection of key assessment periods, chosen to cover the times at which the development would be expected to have its major impacts	Section 3	✓
AADT on key streets	Council / RTA and Survey	✓
Daily traffic flow hourly distribution, particularly in or near residential areas	Survey	✓
Estimate of the speed of traffic on the road to which vehicular access is proposed	Survey	✓
Current traffic generation of site	Survey	NA
Daily and peak period heavy vehicle flows and percentages	Survey	NA
The adaptation of appropriate computer models or techniques for assessing levels of traffic congestion and queuing conditions		✓
Traffic Safety		✓
Accident history of road network in the area	Council / RTA	✓
Parking Supply and Demand		✓
On-street parking provision	Council	✓
Off-street parking provision	Council / Survey	✓
Current parking demand, including utilisation by time of day and turnover rates	Survey	✓
Short term pick up and set down areas	Council / Survey	NA
Modal Split		NA
Public Transport		✓
Rail station locations	State Rail / Cityrail	NA
Bus routes and bus stop locations; Pedestrian access to bus stops; Constraints and conflicts	STA / Private Operators / Council / Survey	✓
Rail and bus service frequencies, ideally separated into Monday to Friday, Saturday and Sunday, for both peak and off-peak times	State Rail / Cityrail / Survey	✓

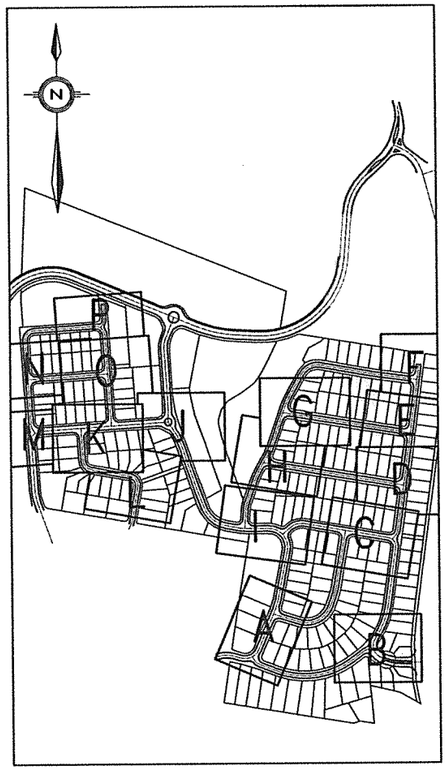
Procedures & Key Parameters	Source	Check✓
Commuter parking provision	State Rail / Cityrail / Survey	NA
Pedestrian Network		✓
Identify major pedestrian routes	Survey	✓
Pedestrian flows and potential conflicts with vehicles, particularly where such conflicts cause capacity constraint on either vehicular or pedestrian movement	Survey	✓
Pedestrian infrastructure	Survey	✓
Proposed developments in the vicinity		✓
Proposed Development		
The Development		✓
Plan reference, if plans not contained in study report		✓
Nature of development		✓
Gross floor areas of each component of development		✓
Projected number of employees/users/residents		✓
Hours and days of operations		NA
Staging and timing of development		✓
Selection of appropriate design vehicles for determining access and circulation requirements	Section 6	✓
Access		✓
Driveway location, including review of alternative locations	Sections 5, 6	✓
Sight distance of driveways and comparisons with stopping and desirable minimum sight distances	Section 6	✓
Service vehicle access	Section 6	✓
Analysis of projected queuing at entrances	Section 6	✓
Current access to site and comparison with proposed access		NA
Provision for access to, and by, public transport	Section 6	✓

Procedures & Key Parameters	Source	Check✓
Circulation		✓
Proposed pattern of circulation	Section 6	✓
Internal road widths	Section 6	✓
Provision for bus movements	Section 6	✓
Service area layout		NA
Parking		✓
Proposed supply		✓
Parking provision recommended by State Government policy	RTA / DUAP	✓
Council code and local parking policies and plans	Council	✓
Parking layout		✓
Projected peak demand, based where appropriate on similar research reports and on surveys of similar developments;	Section 5	✓
Parking for Service / courier vehicles and bicycles	Section 5	✓
Impact of Proposed Development		
Traffic generation during design periods		✓
Daily and seasonal factors		✓
Pedestrian generation and movements		✓
Traffic Distribution and Assignments		✓
Hourly distribution of trips		✓
Assignments of these trips to the road system based where possible on development feasibility studies or on origin/ destination surveys undertaken at similar developments in the areas		✓
Impact on Traffic Safety		✓
Assessment of Road Safety Impact		✓
Impact of Generated Traffic		✓
Daily traffic flows and composition on key streets and their expected effect on the environment particularly in residential areas		✓

Procedures & Key Parameters	Source	Check✓
Peak period volumes at key intersections and effect of generated traffic on congestion levels	Survey	✓
Impact of construction traffic during construction stages		NA
Other proposed developments in the vicinity their timing and likely impact, if known		✓
Assessment of traffic noise		NA
Public Transport		✓
Options for extensions and changes to bus routes and bus stops following discussions with the STA and or private bus operators	STA / Private Operators	✓
Provision for pedestrian access to bus stops		✓
Recommended Works		✓
Improvements to site access and circulation		✓
Improvements to roads, signals, roundabouts and other traffic management measures		✓
Improvements to pedestrian facilities		✓
Effect of recommended works on the operation of adjacent developments		✓
Effect of recommended works on public transport services including access to bus routes and bus stops		✓
Provision of LATM measures		NA
Funding of proposed improvement projects		NA
Noise attenuation measures		NA

APPENDIX B

SERVICE VEHICLE SWEPT PATHS



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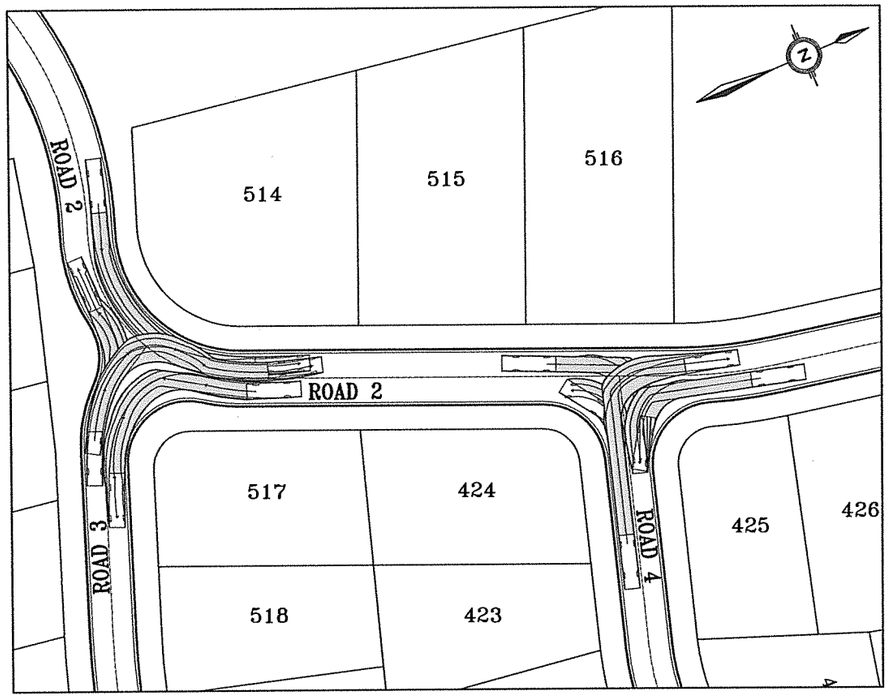

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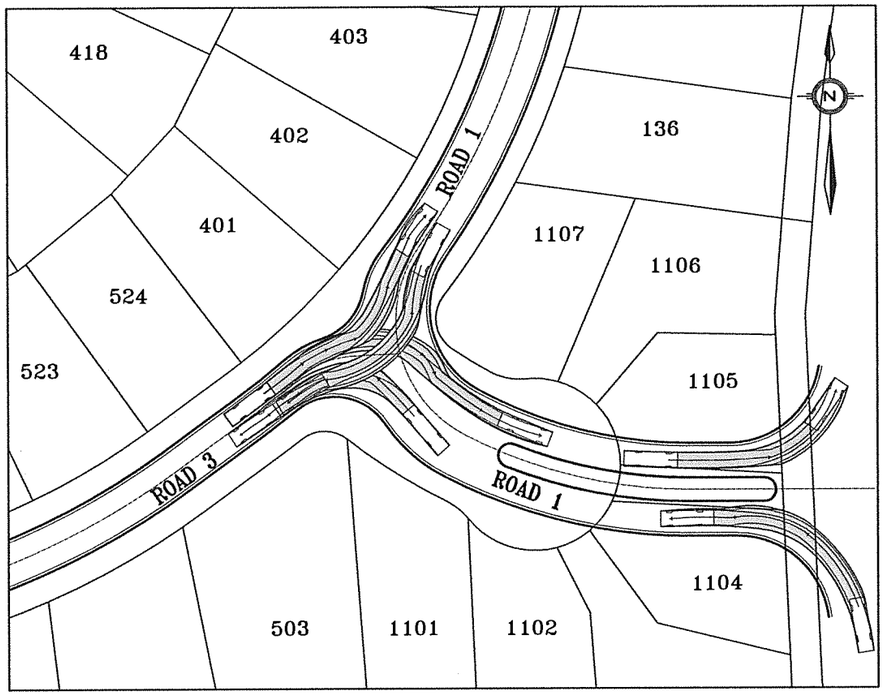

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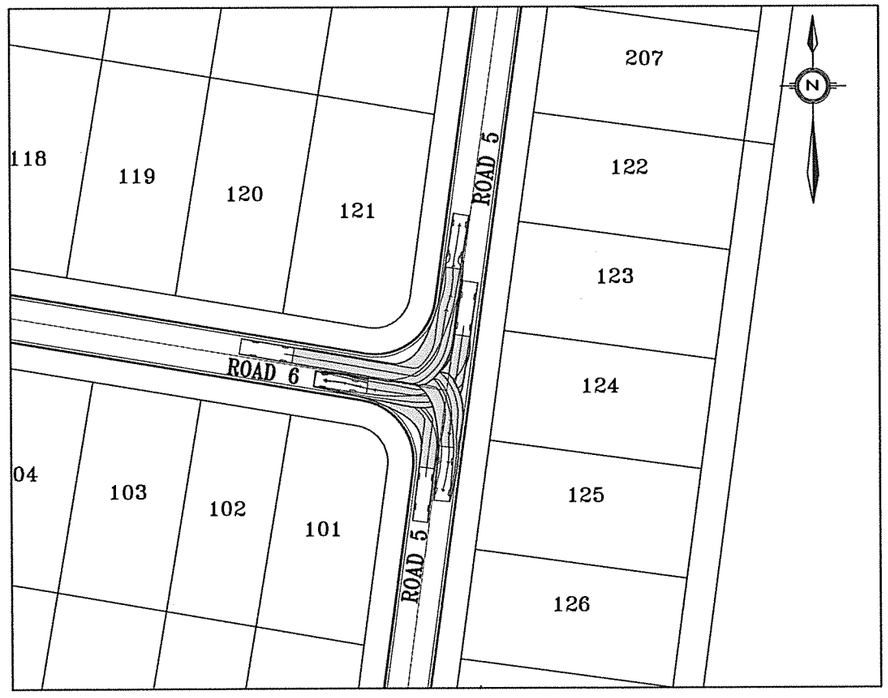

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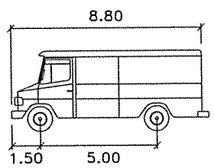

SVEH

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 26.2

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5 0 5 10 15 20 25m
1 : 500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD	09-374 11-01-2013
TERRANORA PRECINCT 1 8.8m SERVICE VEHICLE SWEPT PATHS SHEET 1 OF 4	SK 3980 REVISION A

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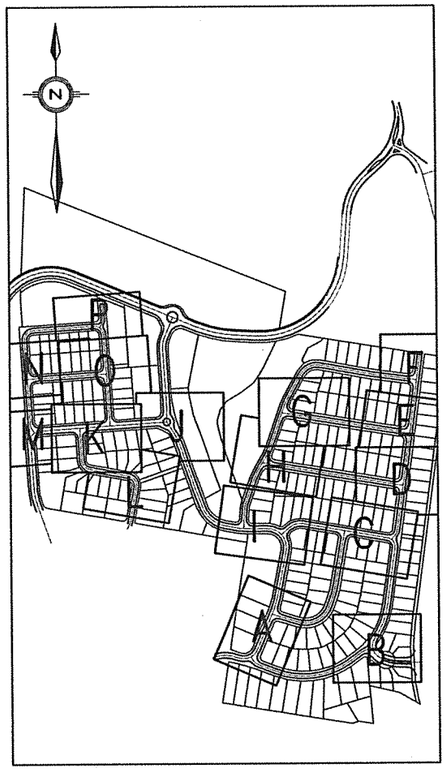

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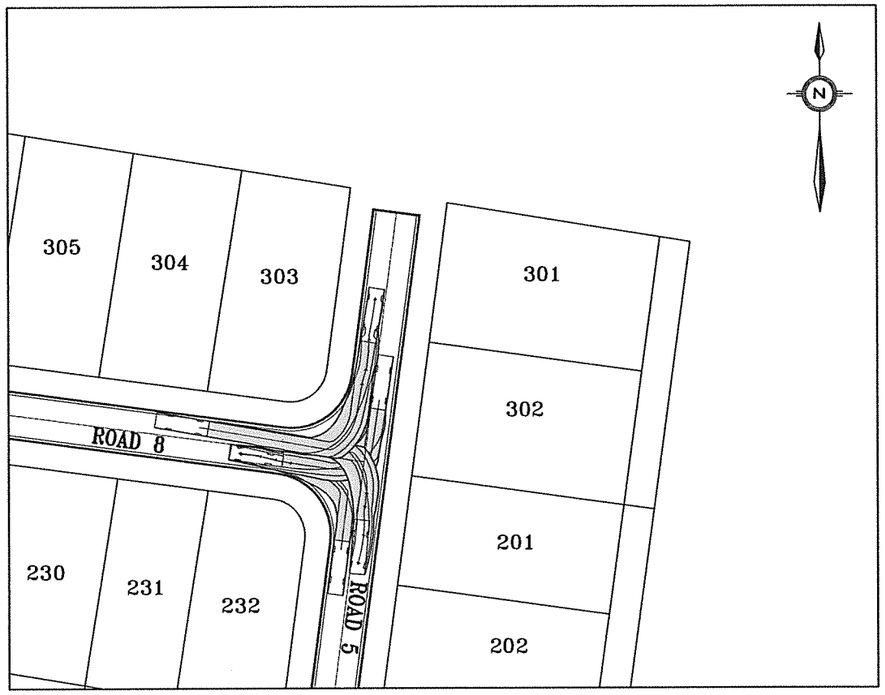

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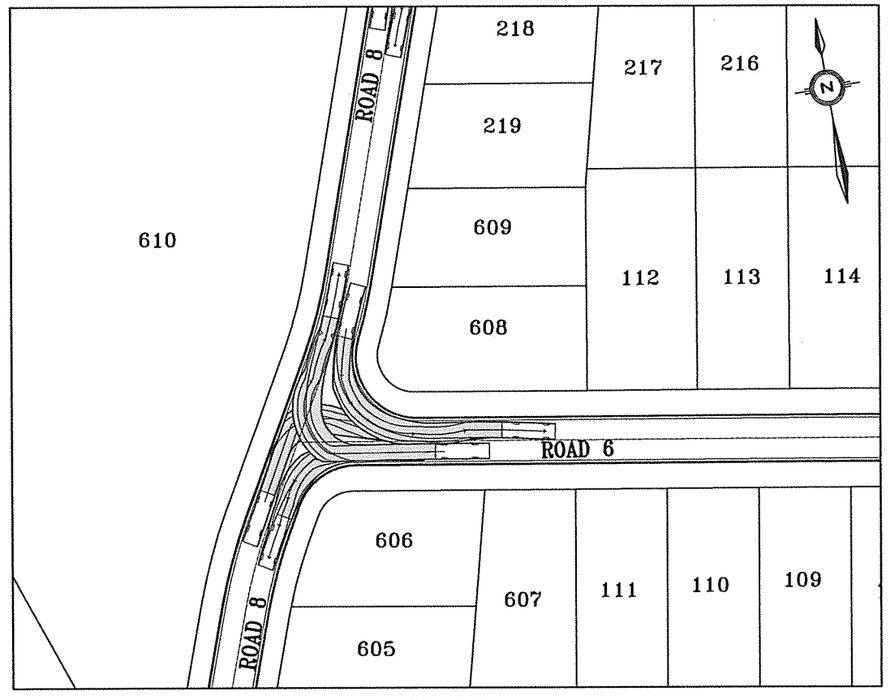

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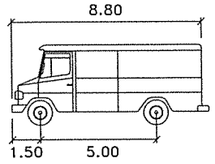

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	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 26.2

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1 : 5000 (FULL SIZE)

5 0 5 10 15 20 25m
1 : 500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD	09-374 14-03-2013
TERRANORA PRECINCT 1 8.8m SERVICE VEHICLE SWEPT PATHS SHEET 2 OF 4	SK 3981 REVISION B

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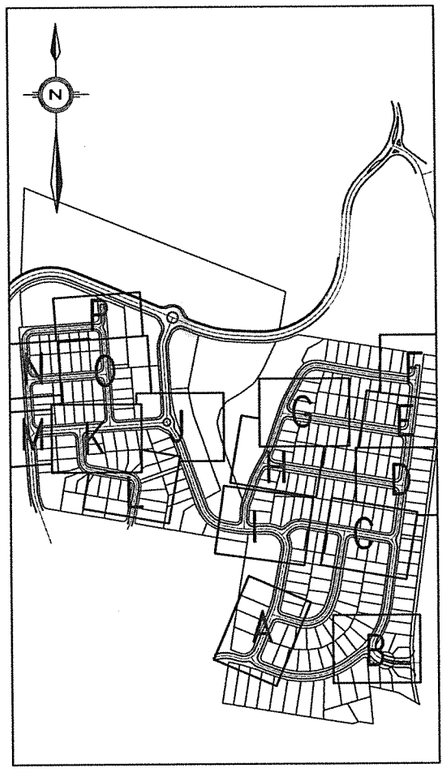

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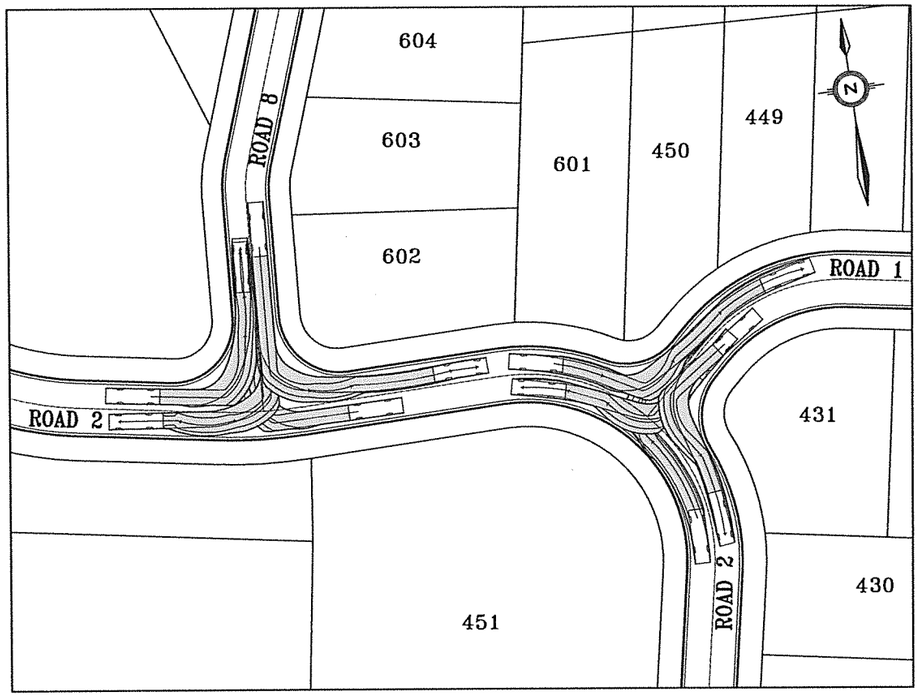

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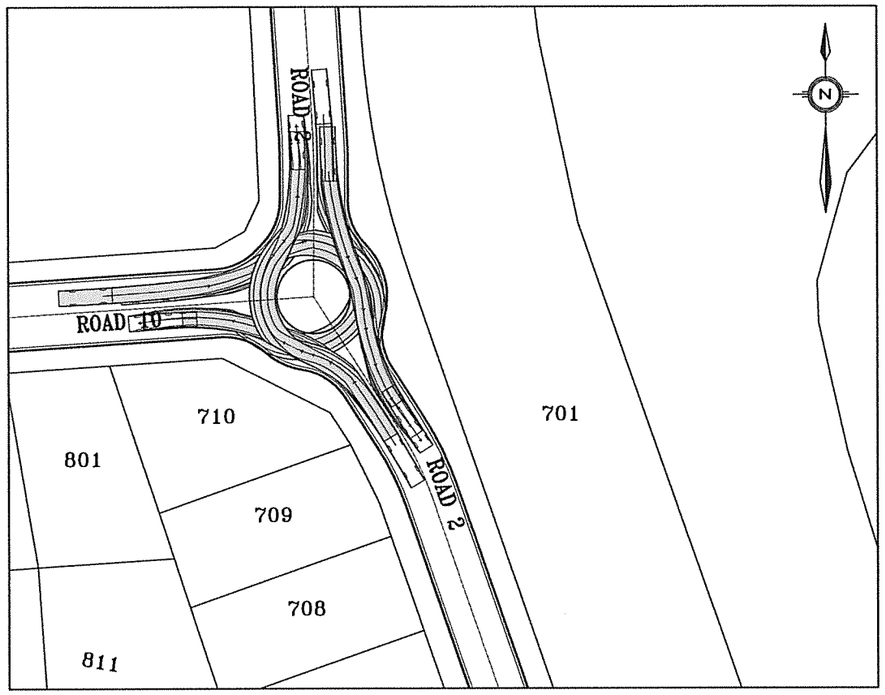

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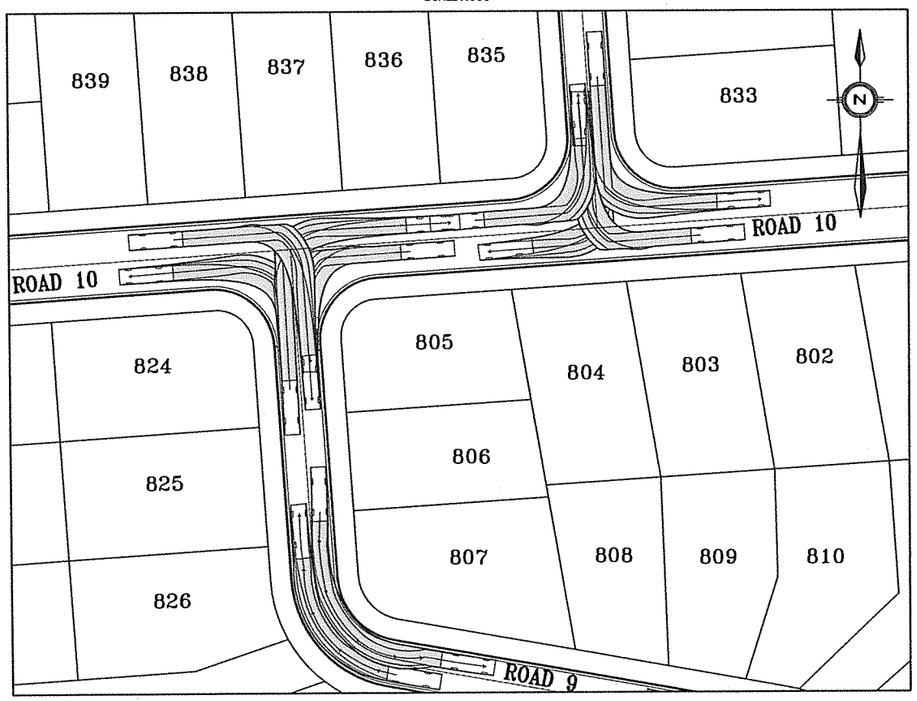

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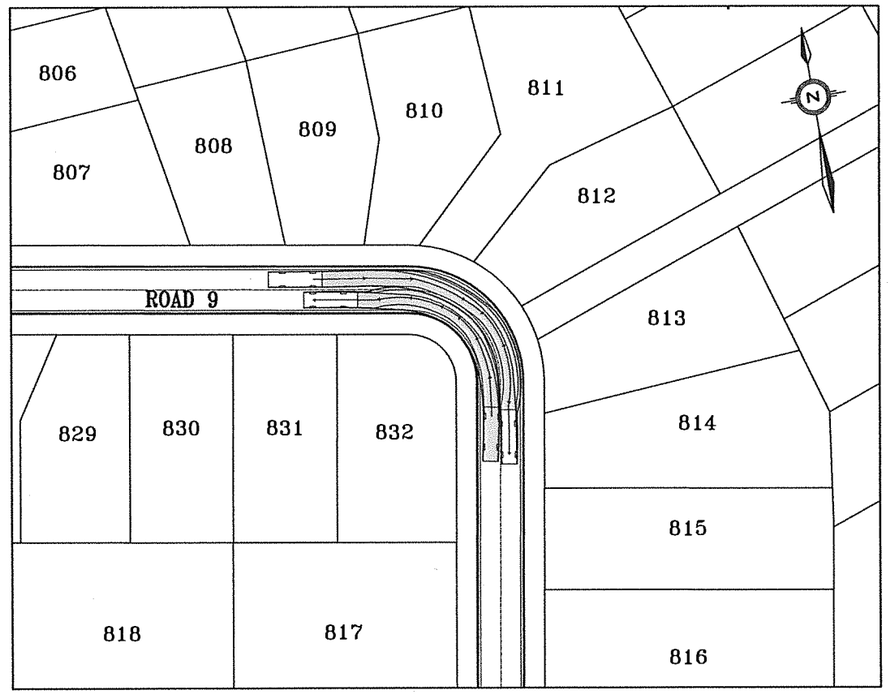

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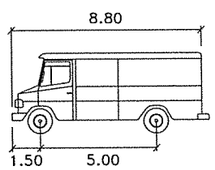

SVEH

	meters
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Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 26.2

50 0 50 100 150 200 250m
1 : 5000 (FULL SIZE)

5 0 5 10 15 20 25m
1 : 500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD	09-374 11-01-2013
TERRANORA PRECINCT 1 8.8m SERVICE VEHICLE SWEPT PATHS SHEET 3 OF 4	SK 3982 REVISION A

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Bradlees Civil Consulting

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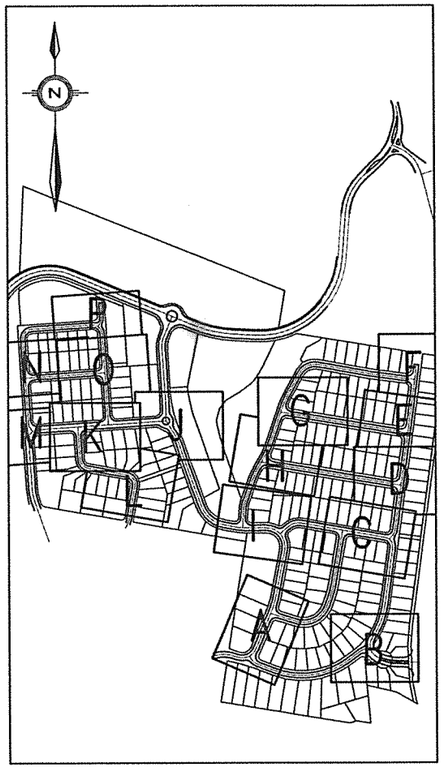
QUALITY ASSURED COMPANY AS/NZS ISO 9001:2008 REGN. NO. 233



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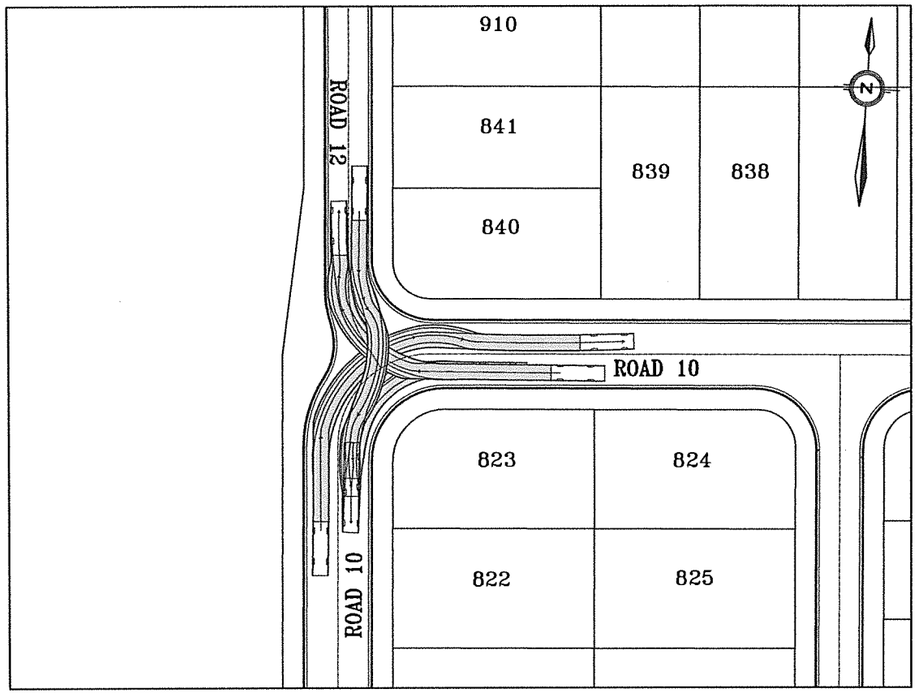

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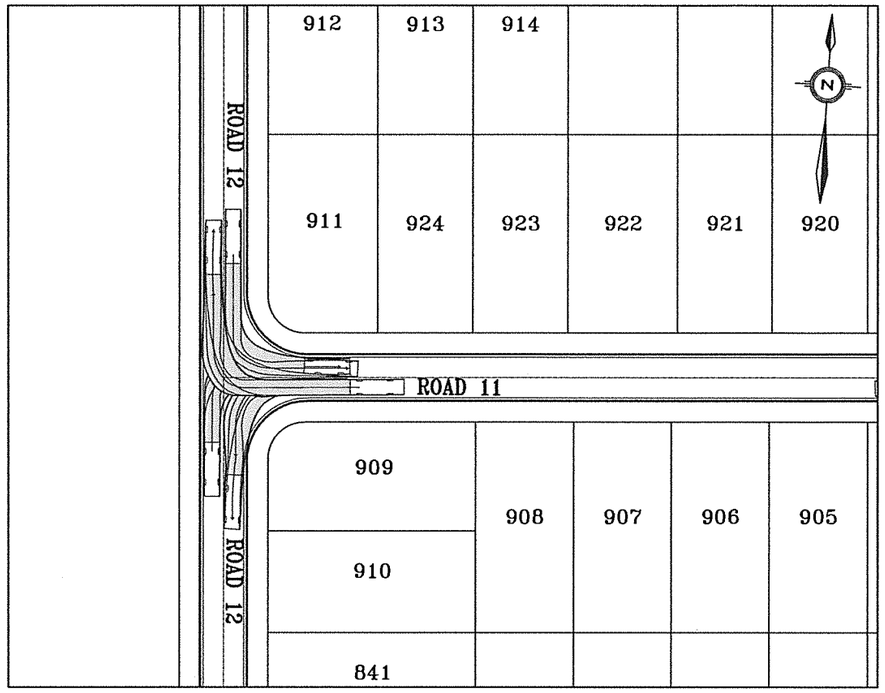

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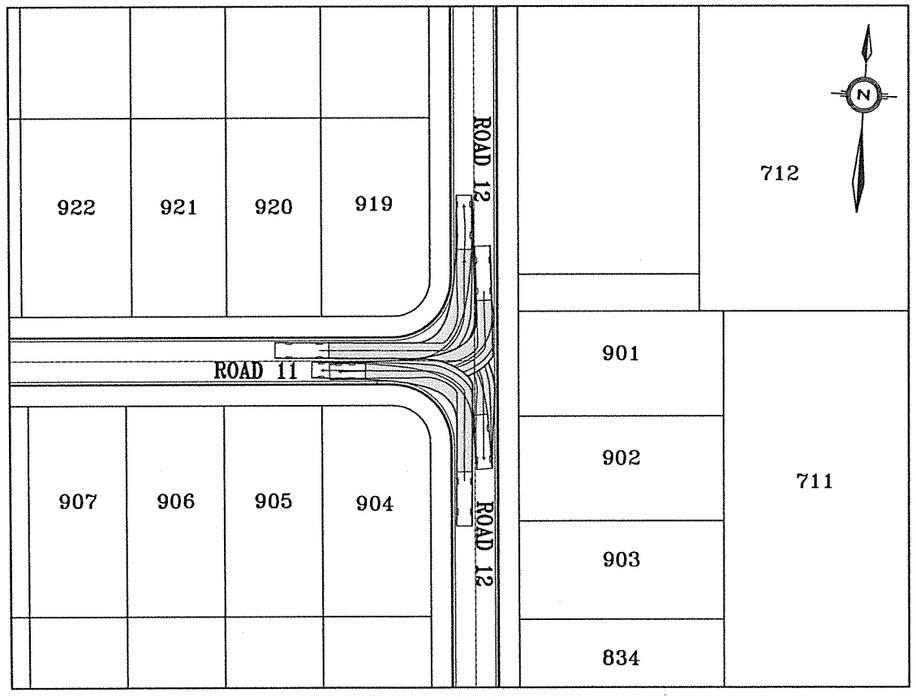

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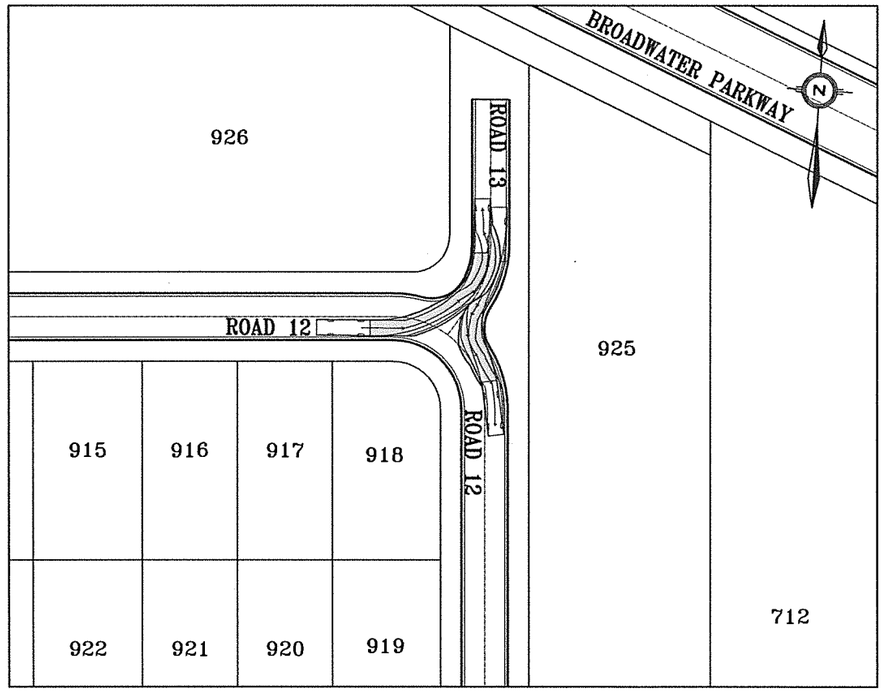

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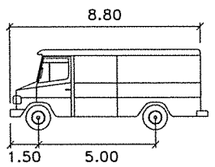

SVEH	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 26.2

50 0 50 100 150 200 250m
1 : 5000 (FULL SIZE)

5 0 5 10 15 20 25m
1 : 500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD	09-374 11-01-2013
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QUALITY ASSURED COMPANY AS/NZS ISO 9001:2008 REGN. NO. 253

APPENDIX C

COMMUNITY FACILITY PARKING ASSESSMENT

Gold Coast Office
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W: www.bitziosconsulting.com.au

Brisbane Office
S: Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
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Spring Hill QLD 4000
P: (07) 3831 4442
F: (07) 3831 4455
E: admin@bitziosconsulting.com.au

Sydney Office
S: Studio 203, 3 Gladstone Street
Newtown NSW 2042
M: Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: (02) 9557 6202
F: (02) 9557 6219

Our Reference: P0726.001L
Your Reference: -

28 September 2010

Metricon
Po Box 3407
Robina TC Qld 4230

Attention: Shaun Nicholson
Sent via email: *shaunnicholson@metricon.com.au*

Dear Shaun

RE : ALTITUDE 1 COMMUNITY FACILITY PARKING ASSESSMENT

This letter discusses the parking requirements (for vehicles and bicycles), regarding the proposed community facility to be constructed within the Altitude 1 development at Banora Point (see Figure 1). The proposed Altitude 1 development is to be located on the western side of Fraser Drive north of Parkes Lane. The intent of the community facility is to create a local recreational service for the residents of Altitude 1 development.

The community facility area comprises of two separate buildings and additional fitness recreational space. Building A will be used as a multipurpose recreational facility for the local residents, whereas Building B includes the gym and fitness amenities. The outdoor recreational area will consist of a 4 lane, 25 m swimming pool and a tennis court.

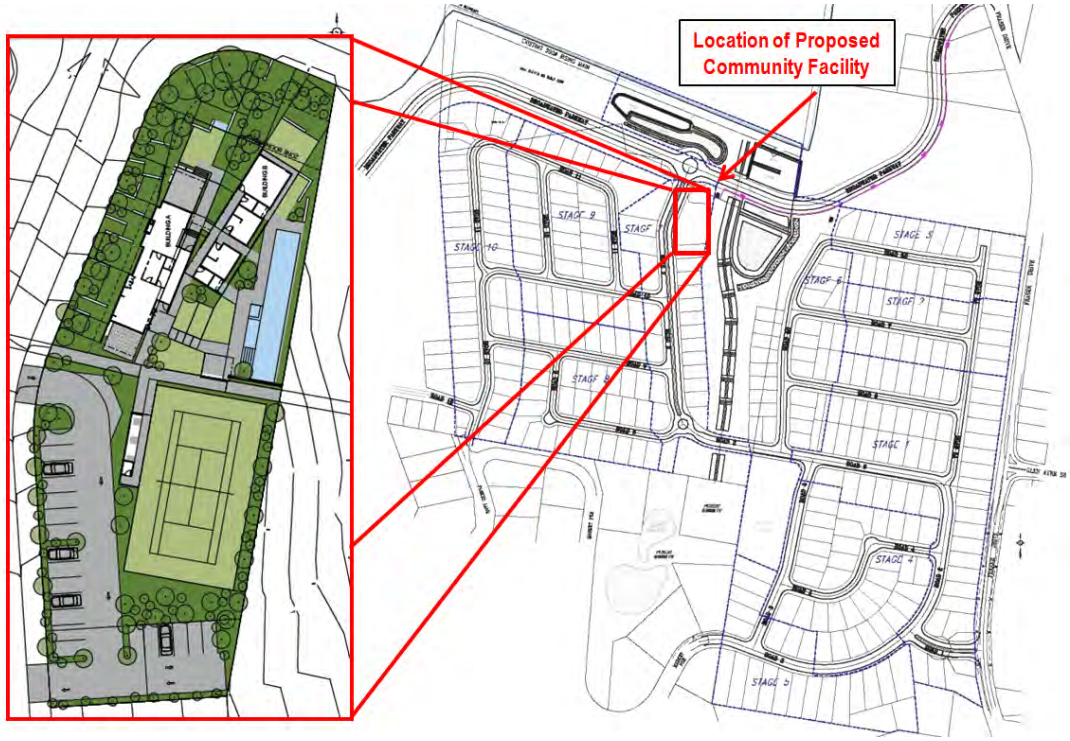


Figure 1: Location of the Proposed Community Facility

Car Parking Provisions

Table 1 displays the requirements for vehicle parking spaces of the proposed community facility. The parking rates provided are calculated in accordance with Table 4.9 – *Numerical Provision of Access Facilities and Parking Spaces* from Tweed Shire Council's (TSC) Development Control Plan. Altogether, the proposed development would require a total of 25 parking spaces based on the provided development yield for the individual land uses.

Table 1: Community Facility Proposed Vehicle Parking Requirements

Land Use	Development Yield	Parking Rate Item No.	Unit Parking Rate (Car)	Spaces Required
Community Centre	149.7 m^2 of GFA	D10	6/100 m^2 of GFA	9
Hall	7.7 m^2 of GFA	F12	1 space per 1 m^2 of net floor area	8
Office	4.5 m^2 of GFA	G4	1/40 m^2 of GFA	1
Gym / Sauna	44.4 m^2 of GFA	D8	6/100 m^2 GFA	3
Swimming Pool	100 m^2 of GFA	D17	1/50 m^2 of water surface	2
Tennis Court	1 tennis court	D19	2/court plus 1/6m^2 of club house area + 0.3/spectator seat	2
Total Spaces Required				25
Total Proposed Spaces (20% reduction)				20

A proposed parking space provision of 20 bays has been recommended, which is considered sufficient for the site based on the following grounds;

Centrally Located within Residential Precinct

The proposed community centre is located centrally within the proposed Altitude 1 residential development. The proximity of the development to the surrounding residential catchment and available pedestrian and cycle network will encourage cycling and walking as alternate trip modes therefore reducing the on site parking demand. The facility is aimed at providing nearby local residents with a range of recreational facilities without the need to drive a vehicle to and from the facility.

Existing Nearby Facilities

There is an existing large scale community centre at Club Banora, which is approximately 3 km from the proposed development. Club Banora caters for the regions recreational needs, and comprises of numerous tennis courts, lawn bowl greens and an Olympic sized swimming pool in addition to providing a range of community services.

In addition to Club Banora, Banora Community Centre which is approximately 2.5 km from the proposed development (located on the corner of Leisure Drive and Woodlands Drive), also services the Banora Point community. This facility offers cultural services relating to: baby health, youth counselling and women's wellbeing. Because of these two community facilities and numerous fitness centres located within close proximity to the proposed development, it is expected that only residents from Altitude 1 would utilise the proposed community centres facilities.

Shared Parking

The car parking demand rates apply to isolated public use facilities catering for a larger catchment area. The parking rates do not consider shared parking, which has a considerable effect on reducing the parking demand. TSC's parking requirements assume that all development components peak at the same time.

The fitness facilities (gym, swimming pool and tennis court) are expected to experience a morning and evening peak period (specifically between 7:00AM-9:00AM and 5:00PM-7:00PM respectively). Whereas the community centre and hall would experience peaks throughout the duration of the day, dependant on the

various services it provides for the community. It is also expected that the largest parking generators (the community centre and hall) will unlikely be booked at the same time.

Similar Assessments

A study was carried out by Cardo Eppell Olsen in 2009 for a similar development located in Riverstone Crossing (Upper Coomera). For this assessment, Gold Coast City Council approved a 25% reduction in parking spaces for a community facility centrally located within the development primarily on the basis of development serving the local Riverstone development and not aimed at attracting external trips. Like Coomera for the northern Gold Coast, Banora Point is a primary outer residential suburb for the southern Gold Coast and Tweed Shire. As such, both suburbs share a similar trip generation and vehicle mode share. Therefore a reduction in 20% of the total community facilities required parking spaces should comparable based on the comparable development.

Cycling Provisions

Bicycle storage facilities within the community facility are recommended to promote cycling as a sustainable form of transport within the development. Table 2 displays the proposed cycle spaces suggested within Table 4.9 – *Numerical Provision of Access Facilities and Parking Spaces* of TSC's Development Control Plan.

Table 2: Community Facility Proposed Bicycle Parking Requirements

Land Use	Development Yield	Parking Rate Item No.	Cycle Parking Rate	Cycle Spaces Required
Community Centre	149.7 m^2 of GFA	D10	1/5 car park spaces	2
Hall	7.7 m^2 of GFA	F12	1 space per 10 m^2 of net floor area	1
Office	4.5 m^2 of GFA	G4	1/100 m^2 of GFA	1
Gym / Sauna	44.4 m^2 of GFA	D8	1/5 car park spaces	1
Swimming Pool	100 m^2 of GFA	D17	1/25 m^2 of water surface	4
Tennis Court	1 tennis court	D19	1/car park	2
Total Spaces Required				11

Table 2 shows that 11 cycle parking spaces should desirably be provided for the community facility. This amount of bicycle parking spaces is adequate and will not be reduced for the community facility in order to promote a sustainable neighborhood.

Whilst the proposed development does not fully comply with Council's standard requirement in regards to parking provision, the abovementioned considerations demonstrate that the provided parking amenity would be sufficient and would not negatively impact on surrounding land uses or road network. Therefore, the proposed parking deemed adequate to serve the local Altitude 1 community.

Yours faithfully

Andrew Eke
Traffic Engineer / Transport Planner
BITZIOS CONSULTING

APPENDIX D

AASIDRA ASSESSMENT RESULTS

MOVEMENT SUMMARY

Site: FraserDr_AmarooDr_2015_AM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	405	3.0	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	143	3.0	0.126	9.3	LOS A	0.6	4.6	0.32	0.66	47.5
Approach		548	3.0	0.212	2.4	LOS A	0.6	4.6	0.08	0.17	56.1
East: Amaroo Drive (East)											
4	L	23	3.0	0.023	8.5	LOS A	0.1	0.7	0.28	0.58	48.3
6	R	162	3.0	0.455	21.1	LOS C	3.0	21.5	0.74	1.02	38.0
Approach		185	3.0	0.456	19.5	LOS C	3.0	21.5	0.68	0.96	39.1
North: Fraser Drive (North)											
7	L	48	3.0	0.027	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
8	T	160	3.0	0.084	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		208	3.0	0.084	1.8	LOS A	0.0	0.0	0.00	0.14	57.2
All Vehicles		942	3.0	0.455	5.6	NA	3.0	21.5	0.18	0.32	51.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_AmarooDr_2015_PM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	179	3.0	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	69	3.0	0.081	10.8	LOS B	0.4	2.8	0.49	0.75	46.3
Approach		248	3.0	0.094	3.0	LOS B	0.4	2.8	0.14	0.21	55.4
East: Amaroo Drive (East)											
4	L	106	3.0	0.145	10.5	LOS B	0.7	4.8	0.49	0.74	46.8
6	R	39	3.0	0.117	17.5	LOS C	0.5	3.8	0.66	0.89	40.5
Approach		145	3.0	0.145	12.3	LOS C	0.7	4.8	0.53	0.78	45.0
North: Fraser Drive (North)											
7	L	105	3.0	0.058	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
8	T	395	3.0	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		500	3.0	0.206	1.6	LOS A	0.0	0.0	0.00	0.13	57.5
All Vehicles		894	3.0	0.206	3.8	NA	0.7	4.8	0.12	0.26	54.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_AmarooDr_2025_AM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	487	3.0	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	173	3.0	0.153	9.6	LOS A	0.8	5.9	0.37	0.68	47.3
Approach		660	3.0	0.255	2.5	LOS A	0.8	5.9	0.10	0.18	56.1
East: Amaroo Drive (East)											
4	L	26	3.0	0.028	8.7	LOS A	0.1	0.9	0.31	0.59	48.1
6	R	192	3.0	0.670	31.2	LOS D	5.2	37.6	0.87	1.19	32.3
Approach		218	3.0	0.669	28.5	LOS D	5.2	37.6	0.80	1.12	33.6
North: Fraser Drive (North)											
7	L	61	3.0	0.034	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
8	T	192	3.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		253	3.0	0.100	1.9	LOS A	0.0	0.0	0.00	0.15	57.1
All Vehicles		1131	3.0	0.670	7.4	NA	5.2	37.6	0.21	0.35	49.9

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_AmarooDr_2025_PM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	221	3.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	85	3.0	0.112	11.7	LOS B	0.5	3.9	0.55	0.80	45.5
Approach		306	3.0	0.116	3.2	LOS B	0.5	3.9	0.15	0.22	55.1
East: Amaroo Drive (East)											
4	L	121	3.0	0.185	11.4	LOS B	0.9	6.2	0.54	0.80	46.0
6	R	46	3.0	0.177	21.3	LOS C	0.8	5.6	0.75	0.92	37.8
Approach		167	3.0	0.185	14.1	LOS C	0.9	6.2	0.60	0.83	43.4
North: Fraser Drive (North)											
7	L	133	3.0	0.073	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
8	T	473	3.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		605	3.0	0.247	1.7	LOS A	0.0	0.0	0.00	0.13	57.4
All Vehicles		1079	3.0	0.247	4.1	NA	0.9	6.2	0.14	0.27	54.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_GlenAyrDr_2015_AM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	496	3.0	0.259	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	55	3.0	0.048	9.1	LOS A	0.2	1.6	0.28	0.64	47.6
Approach		551	3.0	0.259	0.9	LOS A	0.2	1.6	0.03	0.06	58.5
East: Glen Ayr Drive (East)											
4	L	65	3.0	0.065	8.5	LOS A	0.3	2.2	0.29	0.59	48.2
6	R	49	3.0	0.179	20.5	LOS C	0.8	5.7	0.73	0.92	38.4
Approach		115	3.0	0.179	13.7	LOS C	0.8	5.7	0.48	0.73	43.5
North: Fraser Drive (North)											
7	L	8	3.0	0.006	7.9	LOS A	0.0	0.2	0.14	0.56	49.0
8	T	175	3.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		183	3.0	0.091	0.4	LOS A	0.0	0.2	0.01	0.03	59.4
All Vehicles		848	3.0	0.259	2.5	NA	0.8	5.7	0.08	0.15	56.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_GlenAyrDr_2015_PM_Full Developmnt (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	205	3.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	34	3.0	0.034	10.0	LOS B	0.2	1.2	0.42	0.68	47.1
Approach		239	3.0	0.107	1.4	LOS B	0.2	1.2	0.06	0.10	57.8
East: Glen Ayr Drive (East)											
4	L	37	3.0	0.049	10.1	LOS B	0.2	1.6	0.45	0.68	47.2
6	R	42	3.0	0.138	18.7	LOS C	0.6	4.4	0.69	0.90	39.6
Approach		79	3.0	0.138	14.7	LOS C	0.6	4.4	0.58	0.80	42.9
North: Fraser Drive (North)											
7	L	142	3.0	0.102	7.8	LOS A	0.5	3.9	0.11	0.57	49.2
8	T	363	3.0	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		505	3.0	0.190	2.2	LOS A	0.5	3.9	0.03	0.16	56.5
All Vehicles		823	3.0	0.190	3.2	NA	0.6	4.4	0.09	0.20	55.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_GlenAyrDr_2025_AM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	595	3.0	0.311	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	66	3.0	0.057	9.3	LOS A	0.3	2.0	0.31	0.65	47.5
Approach		661	3.0	0.311	0.9	LOS A	0.3	2.0	0.03	0.07	58.5
East: Glen Ayr Drive (East)											
4	L	75	3.0	0.078	8.8	LOS A	0.4	2.6	0.32	0.61	48.1
6	R	59	3.0	0.282	27.6	LOS D	1.3	9.5	0.82	0.98	34.1
Approach		134	3.0	0.282	17.1	LOS D	1.3	9.5	0.54	0.77	40.8
North: Fraser Drive (North)											
7	L	11	3.0	0.008	7.9	LOS A	0.0	0.3	0.15	0.55	48.9
8	T	209	3.0	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		220	3.0	0.110	0.4	LOS A	0.0	0.3	0.01	0.03	59.3
All Vehicles		1015	3.0	0.311	2.9	NA	1.3	9.5	0.09	0.15	55.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_GlenAyrDr_2025_PM_Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
2	T	253	3.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R	41	3.0	0.045	10.5	LOS B	0.2	1.5	0.46	0.71	46.7
Approach		294	3.0	0.132	1.5	LOS B	0.2	1.5	0.06	0.10	57.7
East: Glen Ayr Drive (East)											
4	L	41	3.0	0.061	10.8	LOS B	0.3	1.9	0.50	0.73	46.5
6	R	49	3.0	0.209	23.5	LOS C	0.9	6.7	0.78	0.94	36.4
Approach		91	3.0	0.208	17.7	LOS C	0.9	6.7	0.65	0.84	40.5
North: Fraser Drive (North)											
7	L	179	3.0	0.129	7.8	LOS A	0.7	5.0	0.13	0.57	49.1
8	T	426	3.0	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		605	3.0	0.223	2.3	LOS A	0.7	5.0	0.04	0.17	56.3
All Vehicles		989	3.0	0.223	3.5	NA	0.9	6.7	0.10	0.21	54.7

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_ParksLane_2015_AM_Full Development (No Broadwater Parkway)

FraserDr_ParksLane_AM_Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	25	3.0	0.234	8.3	LOS A	0.0	0.0	0.00	1.06	49.0
2	T	421	3.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		446	3.0	0.234	0.5	LOS A	0.0	0.0	0.00	0.06	59.2
North: Fraser Drive (North)											
8	T	224	3.0	0.132	2.5	LOS A	1.4	9.8	0.56	0.00	50.4
9	R	13	3.0	0.132	11.1	LOS B	1.4	9.8	0.56	1.44	50.7
Approach		237	3.0	0.132	3.0	LOS B	1.4	9.8	0.56	0.08	50.4
West: Parks Lane (West)											
10	L	36	3.0	0.171	15.3	LOS C	0.8	5.5	0.61	0.81	42.2
12	R	36	3.0	0.171	15.6	LOS C	0.8	5.5	0.61	0.89	42.1
Approach		72	3.0	0.171	15.5	LOS C	0.8	5.5	0.61	0.85	42.1
All Vehicles		755	3.0	0.234	2.7	NA	1.4	9.8	0.23	0.14	54.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_ParksLane_2015_PM_Full Development (No Broadwater Parkway)

FraserDr_ParksLane_AM_Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	27	3.0	0.146	8.3	LOS A	0.0	0.0	0.00	1.03	49.0
2	T	249	3.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		277	3.0	0.145	0.8	LOS A	0.0	0.0	0.00	0.10	58.7
North: Fraser Drive (North)											
8	T	281	3.0	0.186	1.4	LOS A	1.7	11.9	0.45	0.00	51.8
9	R	42	3.0	0.185	10.0	LOS B	1.7	11.9	0.45	1.32	50.4
Approach		323	3.0	0.186	2.6	LOS B	1.7	11.9	0.45	0.17	51.6
West: Parks Lane (West)											
10	L	16	3.0	0.060	12.8	LOS B	0.3	1.9	0.49	0.66	44.4
12	R	16	3.0	0.060	13.0	LOS B	0.3	1.9	0.49	0.83	44.3
Approach		32	3.0	0.060	12.9	LOS B	0.3	1.9	0.49	0.75	44.3
All Vehicles		632	3.0	0.186	2.3	NA	1.7	11.9	0.25	0.17	54.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_ParksLane_2025_AM_Full Development (No Broadwater Parkway)

FraserDr_ParksLane_AM_Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	22	3.0	0.287	8.3	LOS A	0.0	0.0	0.00	1.08	49.0
2	T	525	3.0	0.287	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		547	3.0	0.287	0.3	LOS A	0.0	0.0	0.00	0.04	59.5
North: Fraser Drive (North)											
8	T	269	3.0	0.170	3.6	LOS A	2.0	14.1	0.63	0.00	49.2
9	R	22	3.0	0.170	12.2	LOS B	2.0	14.1	0.63	1.35	49.9
Approach		292	3.0	0.170	4.3	LOS B	2.0	14.1	0.63	0.10	49.3
West: Parks Lane (West)											
10	L	39	3.0	0.243	19.3	LOS C	1.1	8.1	0.72	0.92	39.1
12	R	39	3.0	0.243	19.6	LOS C	1.1	8.1	0.72	0.94	39.1
Approach		78	3.0	0.244	19.5	LOS C	1.1	8.1	0.72	0.93	39.1
All Vehicles		917	3.0	0.287	3.2	NA	2.0	14.1	0.26	0.14	53.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_ParksLane_2025_PM_Full Development (No Broadwater Parkway)

FraserDr_ParksLane_AM_Base
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	32	3.0	0.150	8.3	LOS A	0.0	0.0	0.00	1.03	49.0
2	T	254	3.0	0.150	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		285	3.0	0.150	0.9	LOS A	0.0	0.0	0.00	0.11	58.5
North: Fraser Drive (North)											
8	T	305	3.0	0.205	1.5	LOS A	1.9	13.4	0.46	0.00	51.6
9	R	48	3.0	0.204	10.1	LOS B	1.9	13.4	0.46	1.29	50.4
Approach		354	3.0	0.205	2.7	LOS B	1.9	13.4	0.46	0.18	51.4
West: Parks Lane (West)											
10	L	17	3.0	0.067	13.2	LOS B	0.3	2.1	0.50	0.67	44.0
12	R	17	3.0	0.067	13.4	LOS B	0.3	2.1	0.50	0.85	43.9
Approach		34	3.0	0.067	13.3	LOS B	0.3	2.1	0.50	0.76	44.0
All Vehicles		673	3.0	0.205	2.5	NA	1.9	13.4	0.27	0.18	53.7

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: FraserDr_SiteAccessRd_2015_AM _Full Development (No Broadwater Parkway)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	22	3.0	0.012	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	435	3.0	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		457	3.0	0.227	0.4	LOS A	0.0	0.0	0.00	0.03	59.4
North: Fraser Drive (North)											
8	T	191	3.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	49	3.0	0.055	10.5	LOS B	0.3	1.9	0.47	0.72	46.6
Approach		240	3.0	0.100	2.2	LOS B	0.3	1.9	0.10	0.15	56.7
West: Stage 1 Development Site Access Road (West)											
10	L	116	3.0	0.323	14.9	LOS B	1.8	13.1	0.61	0.89	42.6
12	R	49	3.0	0.323	15.0	LOS B	1.8	13.1	0.61	0.92	42.6
Approach		165	3.0	0.323	14.9	LOS B	1.8	13.1	0.61	0.90	42.6
All Vehicles		862	3.0	0.323	3.7	NA	1.8	13.1	0.14	0.23	54.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: FraserDr_SiteAccessRd_2015_PM _Full Development (No Broadwater Parkway)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	48	3.0	0.027	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	217	3.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		265	3.0	0.113	1.5	LOS A	0.0	0.0	0.00	0.12	57.6
North: Fraser Drive (North)											
8	T	229	3.0	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	117	3.0	0.127	9.6	LOS A	0.5	3.9	0.36	0.67	47.3
Approach		346	3.0	0.127	3.2	LOS A	0.5	3.9	0.12	0.23	55.0
West: Stage 1 Development Site Access Road (West)											
10	L	21	3.0	0.161	14.7	LOS B	0.7	5.4	0.55	0.69	42.8
12	R	49	3.0	0.161	14.8	LOS B	0.7	5.4	0.55	0.86	42.7
Approach		71	3.0	0.161	14.8	LOS B	0.7	5.4	0.55	0.81	42.7
All Vehicles		682	3.0	0.161	3.8	NA	0.7	5.4	0.12	0.25	54.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: FraserDr_SiteAccessRd_2025_AM _Full Development (No Broad-water Parkway)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	22	3.0	0.012	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	542	3.0	0.283	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		564	3.0	0.283	0.3	LOS A	0.0	0.0	0.00	0.03	59.5
North: Fraser Drive (North)											
8	T	235	3.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	49	3.0	0.062	11.2	LOS B	0.3	2.1	0.52	0.76	45.9
Approach		284	3.0	0.123	2.0	LOS B	0.3	2.1	0.09	0.13	57.0
West: Stage 1 Development Site Access Road (West)											
10	L	116	3.0	0.401	18.4	LOS C	2.4	17.1	0.69	0.98	39.9
12	R	49	3.0	0.399	18.5	LOS C	2.4	17.1	0.69	0.97	39.9
Approach		165	3.0	0.401	18.4	LOS C	2.4	17.1	0.69	0.98	39.9
All Vehicles		1014	3.0	0.401	3.7	NA	2.4	17.1	0.14	0.21	54.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: FraserDr_SiteAccessRd_2025_PM _Full Development (No Broad-water Parkway)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fraser Drive (South)											
1	L	48	3.0	0.027	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
2	T	271	3.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		319	3.0	0.141	1.3	LOS A	0.0	0.0	0.00	0.10	58.0
North: Fraser Drive (North)											
8	T	284	3.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	117	3.0	0.129	9.9	LOS A	0.6	4.1	0.40	0.69	47.1
Approach		401	3.0	0.149	2.9	LOS A	0.6	4.1	0.12	0.20	55.6
West: Stage 1 Development Site Access Road (West)											
10	L	21	3.0	0.193	16.8	LOS C	0.9	6.3	0.61	0.73	41.1
12	R	49	3.0	0.193	16.9	LOS C	0.9	6.3	0.61	0.88	41.0
Approach		71	3.0	0.192	16.8	LOS C	0.9	6.3	0.61	0.83	41.1
All Vehicles		791	3.0	0.193	3.5	NA	0.9	6.3	0.11	0.22	54.8

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: TerranoraRd_FraserDr_2015_AM_ Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Terranora Rd (East)											
5	T	69	3.0	0.101	12.8	LOS B	1.5	10.5	0.77	0.00	41.4
6	R	18	3.0	0.101	21.3	LOS C	1.5	10.5	0.77	1.11	41.2
Approach		87	3.0	0.101	14.6	LOS C	1.5	10.5	0.77	0.23	41.3
North: Fraser Drive (North)											
7	L	73	3.0	0.121	9.4	LOS A	0.3	2.3	0.36	0.66	47.4
9	R	200	3.0	0.192	10.0	LOS B	1.0	7.4	0.43	0.72	47.0
Approach		273	3.0	0.192	9.9	LOS B	1.0	7.4	0.41	0.70	47.1
West: Terranora Rd (West)											
10	L	433	3.0	0.238	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
11	T	260	3.0	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		693	3.0	0.238	4.8	LOS A	0.0	0.0	0.00	0.38	53.1
All Vehicles		1053	3.0	0.238	6.9	NA	1.5	10.5	0.17	0.45	50.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: TerranoraRd_FraserDr_2015_PM_ Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Terranora Rd (East)											
5	T	220	3.0	0.349	3.2	LOS A	3.9	28.1	0.57	0.00	49.0
6	R	157	3.0	0.349	11.7	LOS B	3.9	28.1	0.57	0.92	47.9
Approach		377	3.0	0.349	6.7	LOS B	3.9	28.1	0.57	0.38	48.6
North: Fraser Drive (North)											
7	L	16	3.0	0.024	8.6	LOS A	0.1	0.4	0.17	0.61	48.2
9	R	293	3.0	0.271	10.0	LOS A	1.6	11.2	0.44	0.71	47.0
Approach		308	3.0	0.271	9.9	LOS A	1.6	11.2	0.42	0.71	47.1
West: Terranora Rd (West)											
10	L	119	3.0	0.065	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
11	T	75	3.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		194	3.0	0.065	4.7	LOS A	0.0	0.0	0.00	0.37	53.2
All Vehicles		879	3.0	0.349	7.4	NA	3.9	28.1	0.39	0.49	49.0

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: TerranoraRd_FraserDr_2025_AM_ Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Terranora Rd (East)											
5	T	87	3.0	0.159	21.4	LOS C	2.6	19.0	0.92	0.00	35.2
6	R	22	3.0	0.159	29.9	LOS D	2.6	19.0	0.92	1.04	36.0
Approach		109	3.0	0.159	23.1	LOS D	2.6	19.0	0.92	0.21	35.3
North: Fraser Drive (North)											
7	L	87	3.0	0.151	9.8	LOS A	0.4	3.0	0.41	0.69	47.2
9	R	240	3.0	0.253	10.7	LOS B	1.4	10.0	0.50	0.77	46.5
Approach		327	3.0	0.253	10.4	LOS B	1.4	10.0	0.48	0.75	46.7
West: Terranora Rd (West)											
10	L	539	3.0	0.296	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
11	T	328	3.0	0.172	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		867	3.0	0.296	4.8	LOS A	0.0	0.0	0.00	0.37	53.2
All Vehicles		1304	3.0	0.296	7.7	NA	2.6	19.0	0.20	0.45	49.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: TerranoraRd_FraserDr_2025_PM_ Full Development (No Broadwater Parkway)

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Terranora Rd (East)											
5	T	278	3.0	0.448	5.8	LOS A	7.6	54.6	0.74	0.00	46.6
6	R	189	3.0	0.448	14.2	LOS B	7.6	54.6	0.74	1.00	46.1
Approach		467	3.0	0.448	9.2	LOS B	7.6	54.6	0.74	0.41	46.4
North: Fraser Drive (North)											
7	L	19	3.0	0.029	8.6	LOS A	0.1	0.5	0.19	0.61	48.1
9	R	355	3.0	0.357	10.8	LOS B	2.4	17.1	0.52	0.79	46.3
Approach		374	3.0	0.357	10.7	LOS B	2.4	17.1	0.50	0.78	46.4
West: Terranora Rd (West)											
10	L	143	3.0	0.079	7.7	LOS A	0.0	0.0	0.00	0.60	49.8
11	T	95	3.0	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		238	3.0	0.079	4.6	LOS A	0.0	0.0	0.00	0.36	53.4
All Vehicles		1079	3.0	0.448	8.7	NA	7.6	54.6	0.50	0.53	47.8

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (HCM).
Approach LOS values are based on the worst delay for any vehicle movement.

MOVEMENT SUMMARY

Site: Site Access / Broadwater Parkway PM

Site Access / Broadwater Parkway
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Altitude Aspire Site Access											
1	L	4	0.0	0.083	10.0	LOS A	0.4	3.1	0.61	0.68	46.5
3	R	67	0.0	0.083	14.4	LOS B	0.4	3.1	0.61	0.75	43.5
Approach		72	0.0	0.083	14.2	LOS B	0.4	3.1	0.61	0.75	43.7
East: Broadwater Parkway (east)											
4	L	156	0.0	0.462	6.7	LOS A	3.7	25.8	0.10	0.56	50.2
5	T	624	0.0	0.462	6.0	LOS A	3.7	25.8	0.10	0.47	50.9
Approach		780	0.0	0.462	6.1	LOS A	3.7	25.8	0.10	0.49	50.8
West: Broadwater Parkway (west)											
11	T	378	0.0	0.274	6.3	LOS A	1.8	12.8	0.26	0.49	49.9
12	R	11	0.0	0.274	11.4	LOS B	1.8	12.8	0.26	0.80	46.3
Approach		388	0.0	0.274	6.4	LOS A	1.8	12.8	0.26	0.50	49.8
All Vehicles		1240	0.0	0.462	6.7	LOS A	3.7	25.8	0.18	0.51	50.0

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Site Access / Broadwater Parkway AM

Site Access / Broadwater Parkway
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Altitude Aspire Site Access											
1	L	11	0.0	0.144	7.8	LOS A	0.7	5.2	0.39	0.57	48.1
3	R	156	0.0	0.144	12.2	LOS B	0.7	5.2	0.39	0.69	45.0
Approach		166	0.0	0.144	11.9	LOS B	0.7	5.2	0.39	0.68	45.2
East: Broadwater Parkway (east)											
4	L	67	0.0	0.178	6.6	LOS A	1.1	7.5	0.04	0.58	50.5
5	T	235	0.0	0.178	6.0	LOS A	1.1	7.5	0.04	0.49	51.3
Approach		302	0.0	0.178	6.1	LOS A	1.1	7.5	0.04	0.51	51.1
West: Broadwater Parkway (west)											
11	T	617	0.0	0.482	7.0	LOS A	3.8	26.3	0.47	0.56	48.6
12	R	4	0.0	0.482	12.1	LOS B	3.8	26.3	0.47	0.78	46.1
Approach		621	0.0	0.482	7.0	LOS A	3.8	26.3	0.47	0.56	48.5
All Vehicles		1089	0.0	0.482	7.5	LOS A	3.8	26.3	0.34	0.56	48.7

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

APPENDIX E

TRANSIT AUSTRALIA GROUP (TAG) CORRESPONDENCE

Transit Australia Group

14 February 2013

Andrew Eke
Manager Gold Coast & Northern NSW
Bitzios Consulting

Dear Andrew

RE – Proposed bus routes for ALTIDUDE ASPIRE Development

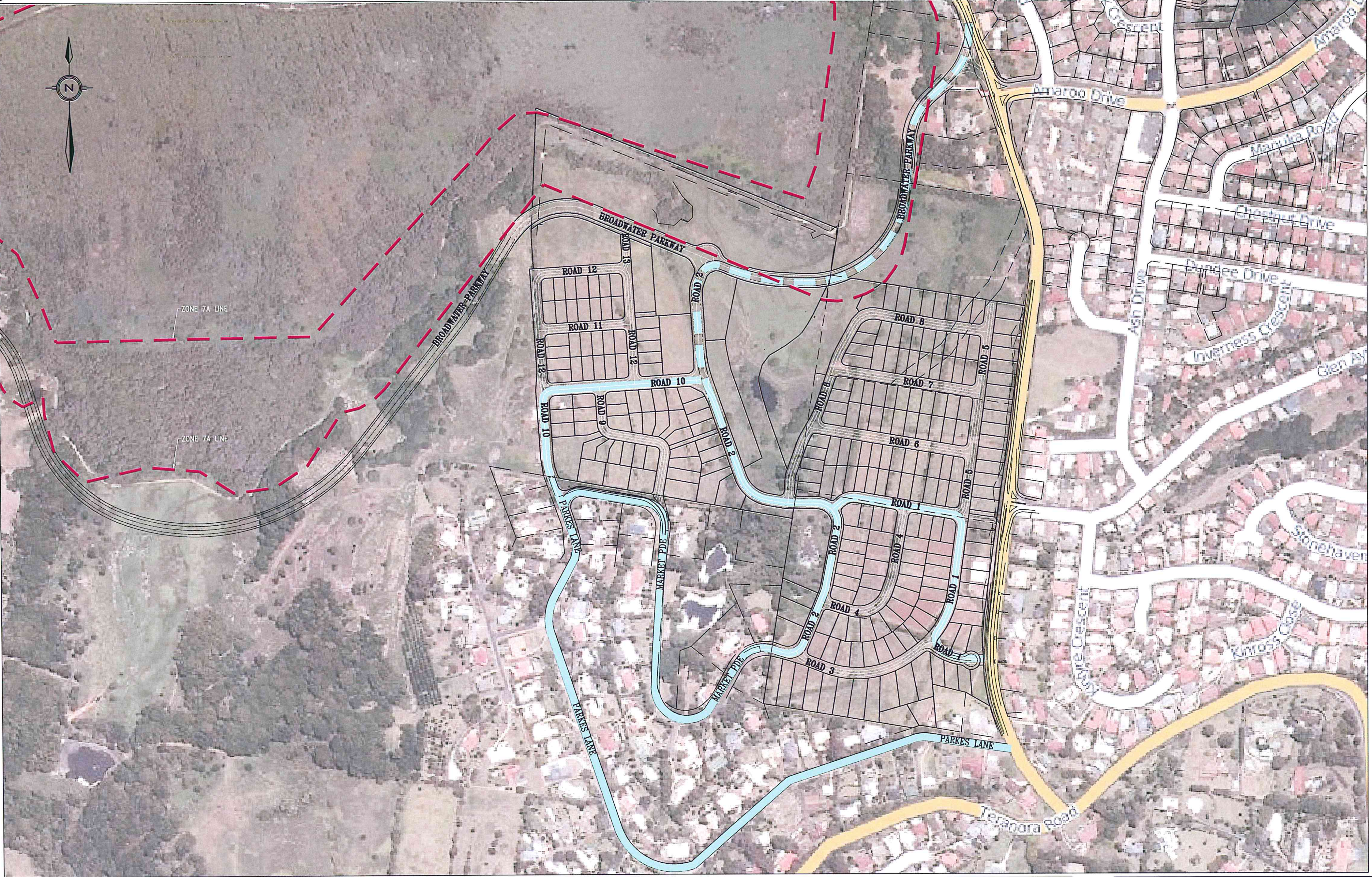
Following consultation with the design team & review of the proposed plans for Part 3A Application No. 09_166 Residential Subdivision at Fraser Drive Terranora (known as Altidude Aspire), TAG are satisfied with the proposed bus route as outlined in the attached plan No 09-374 dated 12-02-2013 prepared by Bradlees Consulting.

The proposed bus route shall provide connection with existing and future potential school bus routes surrounding the site.

Kind regards

David Bishara
Group Manager – Network Planning
Transit Australia Group

Level 1, 43 Commerce Drive Robina QLD 4226
PO Box 3036 Robina QLD 4226
P: (07) 5579 5900 Ext.909 **F:** (07) 5593 0645
M: 0418 764 082 **E:** davidbishara@tagroup.net.au



BUS ROUTE LEGEND

ULTIMATE CONFIGURATION WITH BROADWATER PARKWAY

POTENTIAL BUS ROUTE

50 0 50 100m

1 : 2500 (FULL SIZE)

NEWLAND DEVELOPERS PTY LTD

09-374
12-02-2013

TERRANORA PRECINCT 1

PROPOSED BUS ROUTE

SK 3486
REVISION C

Bradford Lees Pty Ltd
ABN 29 064 159 191

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Sunshine Coast Ph 07 5451 1994 **Tweed Coast Ph** 02 6674 8133

Bradlees
Civil Consulting

SCI QUAL INTERNATIONAL
JAS-ANZ
QUALITY ASSURED COMPANY
AS/NZS ISO 9001:2008
REGN. NO. 233

APPENDIX F

TRANSPORT ACCESS GUIDE

TRANSPORT ACCESS GUIDE FOR ALTITUDE ASPIRE

BUS AND RAIL TIMETABLE INFORMATION

TRANSLink

CONTACT TRANSLINK:
PH: 13 12 30
www.translink.com.au

TAXI SERVICES

TAXI SERVICE TWEED COOLANGATTA

CONTACT TWEED COOLANGATTA TAXIS:
PH: 13 34 22