



Ordinary Meeting

LATE ITEMS

27 May 2024 at 6.00pm



ORDER OF BUSINESS

- Prayer by Rosemary Brook
Attendance, Apologies,
Declarations of Interests
- 1 Confirmation of Minutes
 - 2 Business Arising
 - 3 Reports
 - 4 Other Business

Charter of Respectful Behaviour

1. *Comments to be "task" focused + Focus on the issue*
2. *Actively listen + be attentive*
3. *Allow others to finish their point*
4. *Deliver solutions based comments*
5. *Develop your resilience*
6. *Be informed + ask questions*
7. *Seek to understand others*
8. *Be on time + use time wisely*
9. *Acknowledge differences or personal circumstances*
10. *Value each other's contributions*

HUNTER'S HILL COUNCIL
ORDINARY MEETING OF COUNCIL
27 May 2024

LATE ITEMS

INDEX

4 - COUNCIL REPORTS

4.11 Farnell Street - Traffic Calming

1

ITEM NO	: 4.11
SUBJECT	: FARNELL STREET - TRAFFIC CALMING
STRATEGIC OUTCOME	: SAFE WALKING, CYCLING, AND ACTIVE TRAVEL IS SUPPORTED AND ENCOURAGED WITH IMPROVED INFRASTRUCTURE.
ACTION	: IMPLEMENT THE RECOMMENDATIONS OF THE LOCAL TRAFFIC COMMITTEE
REPORTING OFFICER	: SAMANTHA URQUHART

Ref:702580

PURPOSE

The purpose of this report is to provide background information pertaining to the Local Area Traffic Management Scheme (LATMS), undertaken for 'Boronia', and how it relates to the installation of traffic calming devices upon Farnell Street.

This report will discuss the investigation undertaken into the works and recommend next steps.

RECOMMENDATION

1. That the report be received and noted.
2. That Council determine to proceed with one of the available options and next steps as proposed within the body of this report. These options are:
 - a. Option 1- Remove the two slow points constructed in North Farnell Street
 - b. Option 2- Retain the two slow points constructed in North Farnell Street until further consultation has been undertaken.
 - c. Option 3- Retain the two slow points constructed on North Farnell Street.
3. That the detailed design for all future works associated with the 'Boronia' Local Area Traffic Management Scheme and other traffic management projects be put out to public consultation, prior to final endorsement through the Local Area Traffic Committee, including consideration of community feedback.

BACKGROUND

On 15 February 2021 a Notice of Motion resolved the following:

A Local Area Traffic Management (LATM) Scheme for the Boronia Park be prepared to guide future traffic decisions. In order to inform future traffic management in the Boronia Park area:

1. *That Council allocate \$30,000 funding in the 2020/2021 budget from the Community Initiatives and Minor Works and the remaining balance sourced from savings in this year's capital works budget allocation, to engage an appropriately qualified and experienced traffic consultant, to develop a Local Area Traffic Management Scheme for the area bounded by Pittwater Road to the West, Ryde Road to the South, Park Road to the East and High Street / Barons Crescent to the North, to investigate traffic impacts on local streets;*
2. *That as part of the brief a road safety audit of the local road network in the study area also be included;*

3. *As part of this process broad consultation be undertaken, including with the following groups:*
 - i. *Beautiful Boronia Working Group*
 - ii. *School Safety Committee*
 - iii. *Local and Area Traffic Committee*
 - iv. *Particularly seeking early input and support from the TFNSW Movement; and Place team.*
4. *That a further report be provided to Council following the preparation of the draft LATM for consideration, ahead of public exhibition.*

This Notice of Motion resolved to prepare a LATMS to address ongoing community concerns, regarding safety and amenity for residents in and around Boronia Park. The concerns raised by residents included:

- Increase in volume of traffic using local streets particularly in AM and PM (rat running).
- Loss of amenity for local residents.
- Decrease pedestrian/cycle safety.

Council appointed traffic consultants (ptc) to prepare the 'Boronia' LATMS. The Study area is shown at Diagram 1, below.

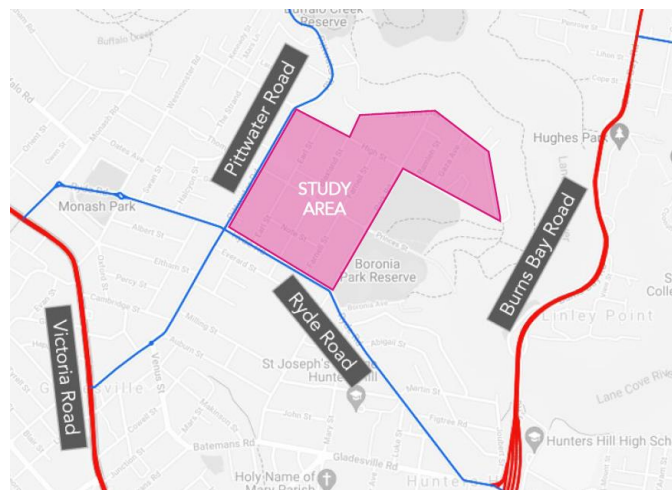


Diagram 1 - Boronia Park LATMS Study Area

'BORONIA' LOCAL AREA TRAFFIC MANAGEMENT SCHEME (LATMS)

An LATMS outlines the planning and management of road space usage within a local area, including:

- reducing traffic volumes and speeds in local streets;
- to increase amenity; and
- to improve safety and access for residents, especially pedestrians and cyclists.

An LATMS provides guidance for planners and engineers associated with the design, development and management of residential precincts.

The 'Boronia' LATMS was drafted in 2021, as shown at Attachment 1. This LATMS assessed the concerns raised by Council and the community, through a community survey, and concurrently gathered extensive traffic data, including (but not limited to) traffic volumes, vehicle types, crashes, road inventory and traffic calming infrastructure in place, destination surveys, traffic

speeds, travel times and delays, bus routes, pedestrian, parking and cyclist volumes to analyse and determine the outcomes for the 'Boronia' LATMS.

COMMUNITY CONSULTATION

Community consultation for the 'Boronia' LATMS was carried out on two occasions. Council carried out consultation via Social Pinpoint on their website for 3 weeks (26 April – 17 May). Links were included on social media and in newsletters, websites and QR codes on signs around the 'Boronia' Precinct. This consultation received 275 comments and 3,242 likes or dislikes clicked. These responses were broken down into key areas, these areas being:

- Traffic Management
- Road Safety
- Speeding

In October 2021 the draft LATMS was placed on public exhibition and received a further 27 submissions, including 4 from residents at Farnell Street.

DATA ANALYSIS

Traffic Volumes

Tube counters were placed at most mid-block locations. The results demonstrate disproportionate volumes, that identifies rat running, as shown at Diagram 2 below.

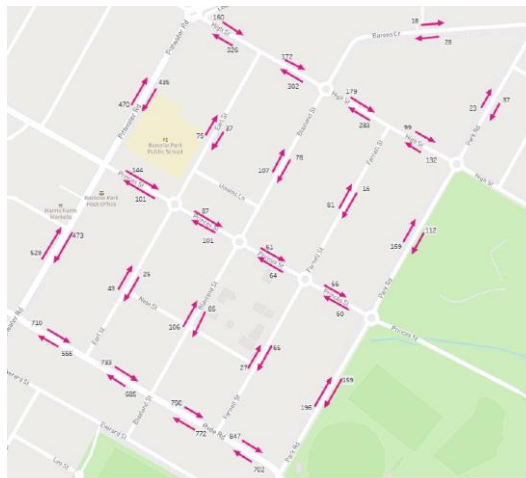


Diagram 2 - Weekday morning peak hour traffic volumes

Traffic Speed

Speed surveys were conducted 24 hours a day for 7 days to identify speed problems and potential safety issues. The results are shown in Diagram 3 below, demonstrating that the 85th percentile speeds are below the 50 km/h speed limit on local roads, with the exception of Farnell Street and Park Road. This result corroborates the rat running issue.

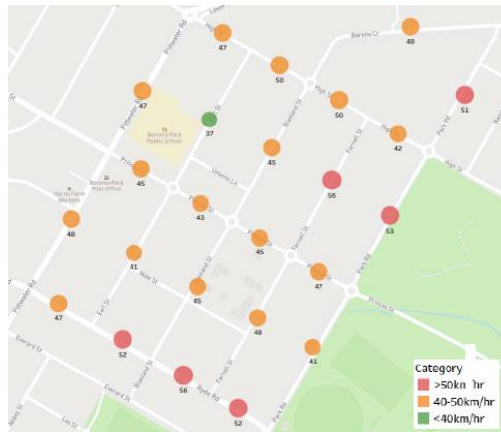


Diagram 3 - Weekday morning peak speeds

Crash Data

The Crash data obtained concluded that there are below average crash incidents within the study area.

Existing LATM Devices

Most existing LATM Devices in the study area are old and have not been constructed to the appropriate standards or guidelines, and were deemed non-performing as traffic management devices. The LATM Devices are shown at Diagram 3 below.

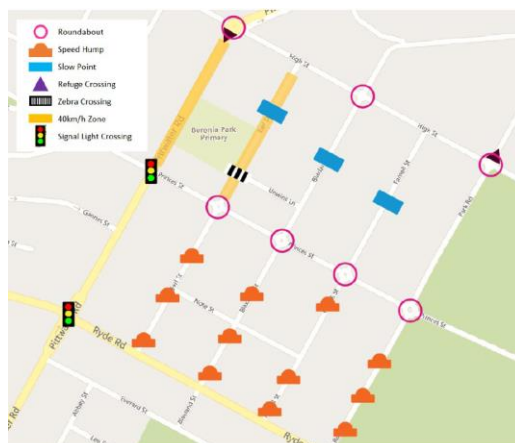


Diagram 4 - Existing LATM Devices

LATMS Action Plan

Upon analysis of the community feedback and all of the data and documentation pertinent to the LATMS, an action plan was developed. The action plan considers a range of traffic management treatments that would align with the objectives of the LATMS. These actions are listed at Table 1, below.

Council has completed the road safety audits, and the installation of the speed humps on High Street and has allocated \$60,000 in its 23/24 Capital works budget to proceed with the action plan as outlined at Table 1 and Diagram 5 below, in order of priority.

Item	Location	Action	Priority	Status
------	----------	--------	----------	--------

S1	Ryde Road, Pittwater Road to Park Road	Road Safety Audit	High	Completed
S2	Pittwater Road, High Street to Ryde Road	Road Safety Audit	High	Completed
R1	Earl Street, Ryde Road to Princes Street	Reconstruct 3 road humps to Austroads standards	Medium	Not commenced
R2	Blaxland Street, Ryde Road to Princes Street	Reconstruct 3 road humps to Austroads standards	Medium	Not commenced
R3	Farnell Street, Ryde Road to Princes Street	Reconstruct 3 road hump to Austroads standards	Medium	Not commenced
R4	Park Road, Ryde Road to Princes Street	Reconstruct 3 road hump to Austroads standards	Medium	Not commenced
R5	Earl Street, High Street to Princes Street	<ul style="list-style-type: none"> Reconstruct slow point to Austroads standards. Reconstruct zebra crossing to Austroads standards. 	High	Not commenced
R6	Blaxland Street, High Street to Princes Street	Reconstruct slow point to Austroads standards.	High	Not commenced
R7	Farnell Street, High Street to Princes Street	Reconstruct slow point to Austroads standards.	High	Under review
L1	Park Road, High Street to Princes Street	Reconstruct 2 slow points to Austroads standards.	High	Not commenced
L2	High Street, Pittwater Road to Blaxland Street	Construct 2 new road hump to Austroads standards.	High	Completed
L3	High Street, Blaxland Street to Park Road	Construct 2 new road hump to Austroads standards.	High	Completed
L4	Barons Crescent, High Street to Park Road	Construct new road hump to Austroads standards.	Low	Not commenced
L5	Park Road, High Street to Barons Crescent	Construct new slow point to Austroads standards.	Low	Not commenced

Table 1 - LATMS Action Plan

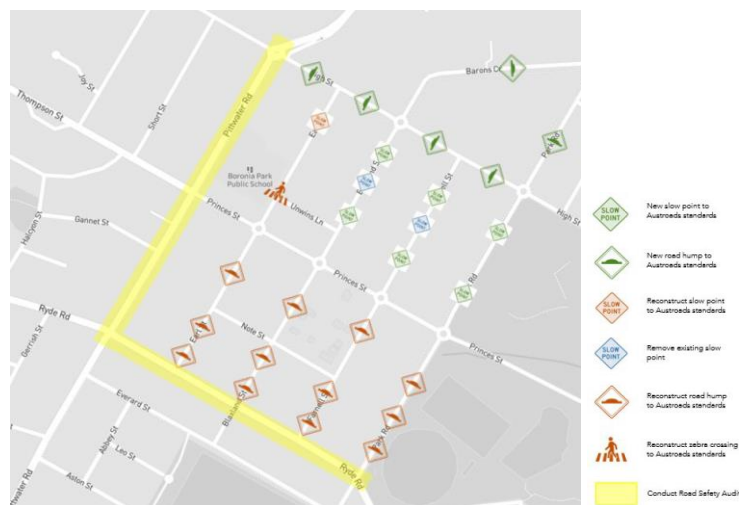


Diagram 5 - Plan of Action items

REPORT

Farnell Street slow point installation

As part of the planned implementation of the 'Boronia' LATMS Council chose to proceed with the prescribed Farnell Street slow point works as its next priority, considering the following factors:

- The morning speed data, showing that over 85% of people were going over 56km/ hour in the morning peak, with some reaching speeds of 70km/hour; and
- The excessive traffic volumes, due to rat running in the morning peak.

The Austroads Local Traffic Management guide describes slow points as:

7.3.2 Slow Points

Description of slow points

A slow point is a series of kerb extensions on alternating or opposite sides of a roadway, which narrow and/or angle the roadway. Slow points are intended to reduce vehicle speeds. Slow points can be either one or two lanes wide and can be angled. In a two-lane slow point, a median island is generally very effective in separating opposing traffic. This will also provide a greater visual restriction and it can be used as a pedestrian refuge if designed appropriately.

Application of slow points

It is appropriate to use slow points on local streets where:

- *vehicle speeds are considered excessive*
- *there is a high proportion of through traffic*
- *the resulting traffic volume will be low (not more than 1000 vehicles per day) otherwise congestion and*

A design was undertaken for a two-lane slow point, given the width of the road, lower noise generation and parking demand. A notification letter was sent to affected residents, by way of a letter drop, the week prior to the works. These two slow points were designed in accordance with the Austroads standards and unique site parameters, and are shown at Diagram 6 below.



Diagram 6 - Farnell Street Slow Point design

The scope of works included:

- the removal of an existing slow point; and
- the installation of the two new two-lane slow points.

The net loss of parking in the street is approximately 10 spots, given the northern slow point had a net zero loss of parking, due to the previous slow point being at that location. The works commenced on 14 May 2024.

Since the commencement of the works there have been numerous emails from affected residents, and as such the completion of the works has been placed on hold, pending an investigation.

Council staff organised a community discussion on 15 May 2024 to discuss the works, and to seek feedback from residents on the current slow point installation. Up to 50 residents were present at this meeting and the issues raised were:

- The slow point is not an appropriate solution for this location.
- The placement of the slow points is not appropriate.
- The slow point affects driveway access.
- The slow points are increasing the risk of accidents.
- There was a lack of community consultation.
- Loss of parking.

Residents made some suggestions for Council to consider in their investigations, these are outlined at Table 2 below.

No	Suggestion	Response
1	Install a No Right-Hand turn from Ryde Road to Farnell St in peak periods.	Traffic Consultant, Varga Traffic was engaged in September 2021 to undertake a traffic assessment and prepare the required TfNSW Traffic Management Plan. The restriction of Right Turn at all the streets intersecting with Ryde Road would require the 'No Stopping' zone on the approach to the signals at Ryde Road and Pittwater to be increased significantly (140m), given the No Stopping restrictions on the southern side of Ryde Road to the intersection of Pittwater Road. This would also prevent access to the precinct for residents and visitors.
2	Consider a Roundabout at the intersection of High and Farnell Street	The study did not recommend this. Roundabouts are costly. One roundabout would not regulate speeds over the whole length of High Street
3	Install a speed radar on Farnell St.	This radar has been installed intermittently. Recent speed data did not show a reduction in speed as a result, however this can be re-instated at any time.
4	Consider speed humps as opposed to slow points.	The 'Boronia' LATMS did not recommend speed humps, however Council will consider these as an alternate option. This is outline below.

<p>Consider altering the traffic light phasing for the right hand turn from Ryde Road onto Pittwater Road.</p>	<p>Council Officers will contact TfNSW to continue ongoing discussions on the phasing of these lights. This may improve wait times and improve traffic congestion in the area.</p>
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Table 2 - Community Suggestions

Alternate Traffic Calming Devices

Council has considered some alternate traffic calming devices, such as centre blister islands, raised pavements, flat top road humps, road cushions and road humps. The analysis of these devices is shown at Attachment 2.

Council will consider all of the appropriate traffic calming measures referenced in Attachment 2, should further consultation be required. However, given the suggestions from multiple residents and for the purposes of this report Council has investigated road humps as an alternative traffic calming device in Farnell Street.

Road Humps

Road Humps are an effective way to reduce speed, however the spacing of these road humps should be 85 metres apart to effectively reduce speed in the area. An indicative diagram has been drafted, (subject to detailed design that considers site specifics) demonstrating what a road hump treatment would look like at this location, as shown at Diagram 7 below. Council would consider road humps that did not have kerb blisters, to ensure parking loss is minimised.



Diagram 7 - Indicative road hump treatment on Farnell Street

CONCLUSION

Council has now completed its investigation and review of the steps undertaken to design and construct the two slow points in Farnell Street. This investigation has included all relevant

documents, traffic data and the recent community feedback and suggestions received from the Farnell Street residents. In consideration of this Council proposes the following:

1. The detailed design for all future works associated with the 'Boronia' Local Area Traffic Management Scheme be placed on public exhibition, prior to final endorsement through the Hunters Hill Local Area Traffic Committee (including the consideration of community feedback). Works will only commence, post endorsement of the detailed design.
2. That Council proposes the following options and next steps:
 - a. **Option 1:**
 - i. Remove slow points installed- **commence early June 2024**; and
 - ii. undertake public consultation to seek feedback on appropriate traffic calming devices to be placed on Farnell Street- **June 2024**; and
 - iii. work with TfNSW to change traffic light phasing for the Right-Hand turn onto Pittwater Road- **June 2024**.
 - iv. That a further report be brought back to Council to consider the outcomes of the public consultation and alternate traffic calming devices. - **July 2024**
 - b. **Option 2:**
 - i. Retain Traffic Calming Devices until an alternate solution is approved- commence **July 2024**; and
 - ii. undertake public consultation to seek feedback on appropriate traffic calming devices to be placed on Farnell Street- **June 2024**; and
 - iii. work with TfNSW to change traffic light phasing for the Right-Hand turn onto Pittwater Road- **June 2024**.
 - iv. That a further report be brought back to Council to consider the outcomes of the public consultation and alternate traffic calming devices. - **July 2024**
 - c. **Option 3:**
 - i. Retain Traffic Calming Devices; and
 - ii. work with TfNSW to change traffic light phasing for the Right-Hand turn onto Pittwater Road- **June 2024**.

FINANCIAL IMPACT ASSESSMENT

The installation of the two slow points at Farnell Street, cost Council \$55,000 incl. GST. these works were budgeted within Councils 23/24 Capital Works program, which has a \$60,000 allocation.

The costs to remove the slow points are estimated at up to \$20,000. The funding for these works will come from savings within Council's capital works program.

The installation of any further traffic calming devices may be considered within a future report.

ATTACHMENTS

1. Attachment 1- Boronia - Local Area Traffic Management Scheme [↓](#)
2. Attachment 2- Comparison of traffic comparison devices [↓](#)



Boronia Park Precinct;

Draft Local Area Traffic Management Plan

For Hunter's Hill Council
15 June 2021

**parking;
traffic;
civil design;
wayfinding;
ptc.**



Document Control

Local Area Traffic Management Study; Boronia Park Precinct

Issue	Date	Issue Details	Author	Reviewed	For the attention of
1	27/05/2021	Draft	DK	DB	Leanne Stathakis
2	15/06/2021	Revised for circulation	DK	DB	Leanne Stathakis

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ptc.**Contents**

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Appendix A Proposed LATM Actions

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1 Introduction

ptc. has been engaged by Hunter's Hill Council to undertake a Local Area Traffic Management Study (LATMS) for the "Boronia" precinct. The study was undertaken in response to feedback from various sources and increasing apprehension in relation to safety and decreased amenity on local roads by residents. Population growth and subsequent traffic congestion on the classified road network has meant that the local roads may be seen as an alternative and the existing traffic management infrastructure is not meeting the needs of the community.

The following report provides a LATM Plan to address the concerns raised and presents an assessment of relevant background information, traffic data, community consultation surveys and an on-site investigation, Background

1.1 LATM Objectives and Process

In an attempt to not deal with local traffic problems in isolation from the community and network contexts in which they occur, this LATMS and resulting Plan is being shown in the wider context of the things that the community seeks to maintain and achieve. The desired outcomes of this study process are consistent with the other goals of local land use and community planning within the Hunter's Hill Local Government Area (LGA). The LATMS is facilitated by a broader strategic context which sets down visions and general processes for such things as:

- community values and goals
- amenity and environmental standards
- road safety targets
- development plans and standards
- level of service performance measures for the whole network
- integrated local transport commitments
- encouragement of walking and cycling

These will help to set the goals for LATM and define the more broadly based assessment criteria that will help in the decision process.

1.2 Local Planning Context

1.2.1 Local Environmental Plan

The Hunter's Hill Local Environmental Plan 2012 aims to make local environmental planning provisions for land in Hunter's Hill in accordance with the relevant standard environmental planning instrument under section 3.20 of the Act.

The specific aims of this Plan that are relevant to this study are:

- to maintain and enhance the character and identity of established neighbourhoods in Hunter's Hill by regulating the use and development of land,



- to accommodate a range of housing that will maintain the garden suburb character of the municipality, while responding to the needs of a growing population and changing demographics,
- to consolidate housing growth in locations that are well-served by shops, transport and community services,
- to provide for employment and a variety of businesses that service residents of the municipality and surrounding areas,
- to maintain a network of open spaces that conserve natural and scenic qualities, as well as providing a variety of active and passive recreation opportunities for residents of the municipality and surrounding areas,
- to accommodate a range of community and educational infrastructure for residents of the municipality and surrounding areas,
- to promote high standards of urban and architectural design quality.

1.2.2 Development Control Plan

The Hunter's Hill Development Control Plan (HHDCP) includes detailed controls for all development within the LGA. It came into effect on 12 August 2013.

It ensures that development applications provide an evaluation of relevant impacts which are likely to be generated by future development having particular regard for Traffic.

The particular aims of this DCP that are relevant to this study are regarding streetscapes i.e. that the landscaping of public or communal streets should:

- (i) Define a theme for new streets, or complement existing streetscapes.
- (ii) Complement existing or desired functions of the street.
- (iii) Reinforce desired traffic behaviour and speed.

1.2.3 Local Strategic Planning Statement

The Local Strategic Planning Statement (LSPS) is a 20 year plan to manage land use growth and change in the Hunter's Hill LGA until 2040 in light of community aspirations and broader economic, social and environmental matters. It sets out the strategic planning priorities for managing growth and change and will be a guide for land use planning and infrastructure delivery in the area.

In the LSPS, Council commits to working with TfNSW, as an action of the LSPS to progress their delivery of better bus and ferry services, parking on major roads in centres and to contribute to place-based planning outcomes. A balance between arterial road priority for through traffic (vehicles and public transport) and their role in shaping centre usage needs to be addressed as part of the place-based approach to planning of the LSPS. Council will work with Transport for NSW and in particular its Movement and Place team, to progress movement on the roads.

This commitment is something that will be relied on when dealing with strategies along Pittwater Road and Ryde Road.

ptc.

1.2.4 Boronia Park Plan of Management

A Plan of Management was developed in May 2020 to determine and guide the future management of Boronia Park. It sets out management objectives and performance targets for the community land as well as providing management and use direction and actions.

Some key issues raised in the development of the plan were:

- Traffic and parking congestion along Boronia Avenue on major game days and events
- Ryde Road playground impacted by traffic noise and fumes at heavy traffic periods

As a result, an action item was that all larger community or special events will be subject to Council's Events on Council Land, Sustainable Event Management and Playing Fields Bookings Policies or other policies and procedures as applicable and that such events will require Council approval—which may include special conditions around traffic and parking, vehicle access, temporary structures, food and alcohol, noise and lighting control, waste management, on-site security and crowd safety, bonds, insurance, and other issues.

1.2.5 Boronia Park Sports and Community Facility

Council is planning for a Sports and Community Facility at Boronia Park, a district-level sport, recreation and nature reserve. The purpose of the facility is to provide greater community amenity, enabling people of all ages, genders and abilities improved opportunity to participate, spectate and enjoy organised sport at Boronia Park.

It is expected a Transport Impact Assessment will accompany the DA that will assess the impacts on traffic and parking in the area associated with the proposed trip generation of the new facility. Accordingly, the LATM and effects on amenity will a major consideration.

ptc.

2 Study Area Characteristics

2.1 Characteristics of Study Area

Boronia is not officially a suburb of the Hunter's Hill LGA, but is a destination precinct and well known amongst residents and visitors. The study area is generally defined as a road grid bounded by Pittwater Road to the northwest, Ryde Road to the southwest, Boronia Park Reserve to the southeast and High Street to the northeast. The small peninsular to the northeast, bounded by Barons Crescent and High Street has also been included as it can only be accessed through the grid described above.

The Boronia Precinct is relatively self-contained with the commercial/shopping strip along Pittwater Road and Boronia Park Public School on Pittwater Road and the main generator/attractor and most recognised feature, Boronia Park Reserve to the east on the banks of Lane Cove River. The Precinct has large residential blocks and generally wide streets. In the late 1800's and early 1900's subdivision took place throughout the area, which saw an increase to the local population and lots of families moving to the area.



Figure 1: Boronia Park Precinct LATMS Area



2.2 Road Hierarchy

2.2.1 Administrative Road Hierarchy

Transport for NSW (TfNSW) has adopted an administrative Road Hierarchy to manage the road network across NSW. The three administrative classes are:

- State Roads
- Regional Roads
- Local Roads

In terms of traffic management, Council has been delegated the responsibility for managing traffic on local and regional roads. TfNSW has an input into the local and regional road system through Council’s Traffic Committee and through direct contact with Council. Changes to the local road system by Council which influence traffic flows require the submission of a Traffic Management Plan (TMP) to the TfNSW for approval. Although State Roads remain under the care and control of TfNSW, Council works closely with TfNSW to ensure that traffic on the State Road network does not adversely impact on the Regional or Local Road network to which it is responsible for.

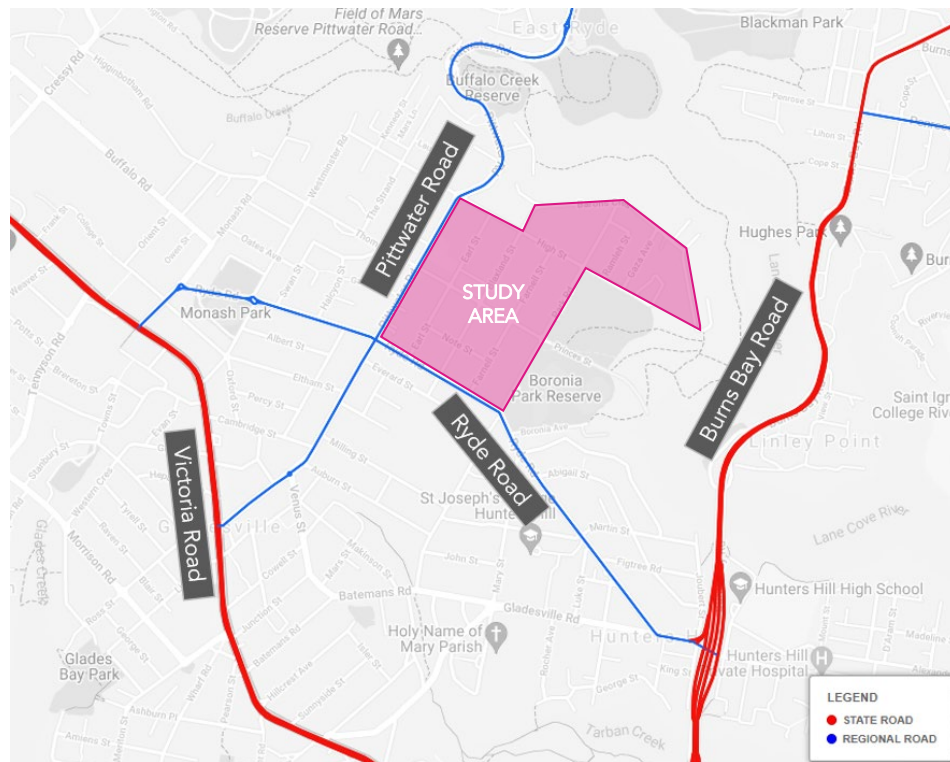


Figure 2: Road Hierarchy



2.2.2 Functional Road Hierarchy

The functional classification of roads relates to their role within the overall road network. Changes to traffic flows on roads can then be assessed within the context of the functional road hierarchy. TfNSW has developed guidelines for functional classifications of roads. These guidelines are published in the document titled "The Functional Classification of Roads".

Council recognises the importance of defining the roles of roads within the overall road network and proposes to adopt the TfNSW Functional Classification of Roads. The four functional road classes are:

Arterial Road - typically a main road carrying in excess of 15,000 vehicles per day and over 1,500 vehicles per hour in the peak periods. They predominately carry traffic from one region to another, forming principal avenues for metropolitan traffic movements.

Sub Arterial Road – typically a secondary road carrying between 5,000 – 20,000 vehicles per day and over 500 and 2,000 vehicles per hour in the peak period. They predominately carry traffic from one sub-region to another forming secondary inter-regional transport links.

Collector Road – typically a minor road carrying between 2,000 and 10,000 vehicles per day and over 250 and 1,000 per hour in the peak period. They provide a link between local areas and regional areas carrying low traffic volumes. At volumes greater than 5,000 vehicles per day, residential amenity begins to decline. Trunk collector and spine roads with limited property access can carry traffic flows greater than 5,000 vehicles per day.

Local Road – typically a local street carrying less than 2,000 vehicles per day and 250 vehicles per hour in the peak period. They provide direct access to individual houses and carry low traffic volumes.

2.3 Active Transport

2.3.1 Walking

A Pedestrian Access and Mobility Plan (PAMP) provides a framework and a strategic list of actions for developing safe and more convenient pedestrian routes and fostering improvements in pedestrian mobility.

Council has completed a PAMP for Hunters Hill Village and Gladesville (jointly with City of Ryde).

A PAMP in the Precinct and specifically along Pittwater Road will help guide the priority of improvements to pedestrian accessibility and mobility in this key commercial area.

2.3.2 Cycling

In 2020 a review of Council's strategic Bike Plan was undertaken to ensure that Council's efforts are up-to-date, relevant and appropriate to the current planning and cycling infrastructure context.

Key objectives of the Plan within the local context were to:

- Develop the updated Bike Plan, taking into account Council's priorities, stakeholder input and the auditing of the existing cycleway network with reference to Council's renewable roads program.
- Develop a network of bicycle routes to meet the current and future community's needs including route maps, concepts etc.
- Identify any pinch points, intersection design issues or other site specific items and provide sketch plans of potential remedies.



- Develop a cohesive bike network complementing existing facilities and providing consistent, logical links to regional routes and local destinations.
- Align the Bike Plan and actions with NSW Government plans and strategies
- Align the Bike Plan with NSROC Transport Strategies and neighbouring Councils' Bike Plans
- Align with Council's Local Strategic Planning Statement (LSPS)
- Provide an understanding of the cycling context in Hunters Hill and the connecting area
- Prepare a 4 year priority list of works, based on Council's forecasted budgeting
- Prepare a preliminary 5 to 10 year list of works, including indicative costings; and
- Audit the current condition and compliance with standards and guidelines of Council's existing bicycle network.

Figure 3 shows the future network in relation to the study area, based on the proposed implementation plan.

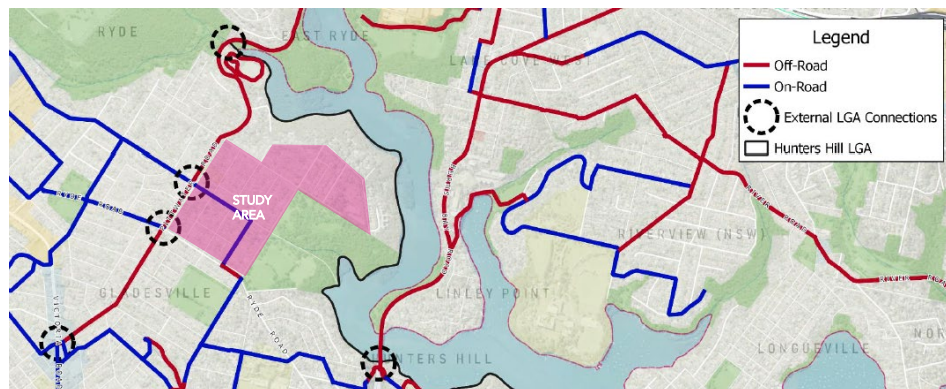


Figure 3: Future Cycling Network (source: Hunters Hill Bike Plan)

2.4 Public Transport

2.4.1 Bus Services

Hunters Hill LGA is well served by public transport, particularly for commuters to the Sydney CBD. Buses are easily accessed within the study area for local residents and workers, as shown in Figure 4.

Six bus routes travel through or around the study area and their frequency facilitates good access to Sydney and surrounding suburbs. Other local bus routes from Gladesville to Chatswood via Hunters Hill 536 and Gladesville to Woolwich 538.

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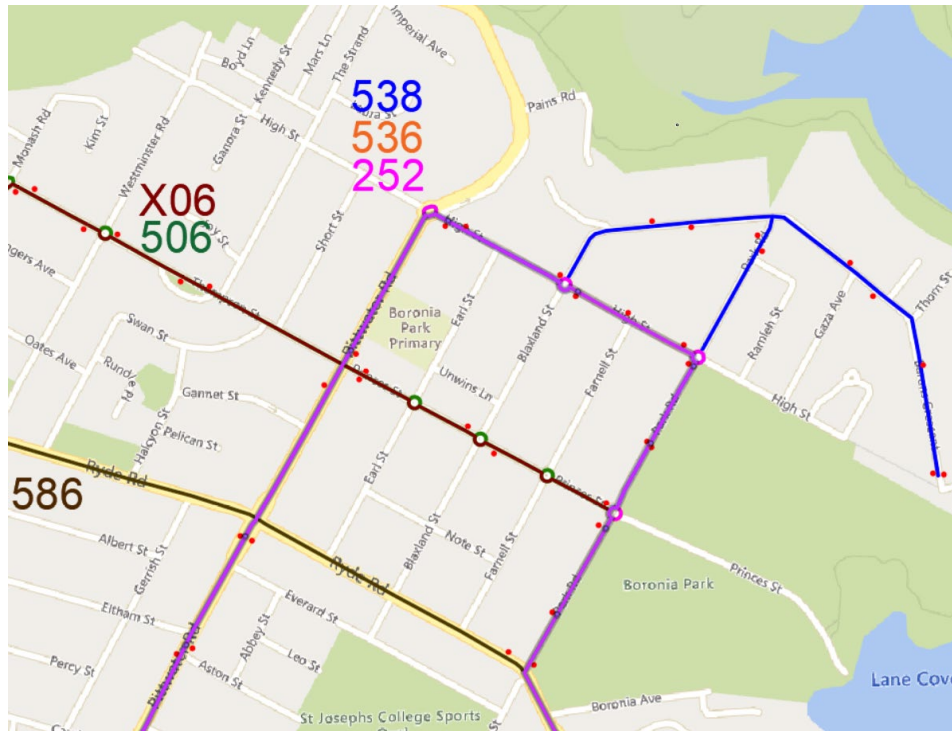


Figure 4: Local bus routes and stops

2.4.2 Ferry Services

There are two ferry wharves within the LGA that are serviced by Sydney Ferries—Huntleys Point Wharf and Woolwich Wharf. Convenient access to these two wharves is not provided from within the study area without travelling approximately 4-5km.



3 Data Collection and Problem Identification

The primary uses of data in LATMS are to:

- help to define and quantify the nature and extent of the problems
- provide input information for developing strategies and countermeasures
- form the basis of an assessment of alternatives and post-assessment of the implemented scheme
- develop modifications to the plan or design of elements

The scope of data collection extends beyond the immediate study area to allow for the effects of and on conditions in surrounding areas being assessed.

The data collected mostly relates to road and traffic conditions. However, there was also a need to have community information to assist in anticipating difficulties and responses from specific groups of people and to help design the participation program and materials.

The Environmental Capacity of an area is determined by the impact of traffic, roads and various aspects of the location and a major consideration of this LATMS. Several factors affect the Environmental Capacity, including:

- Traffic characteristics:
 - traffic volume
 - traffic composition, in particular the proportion of heavy vehicles
 - vehicle speed
- Road characteristics:
 - road reserve and carriageway width.
 - number of traffic lanes.
 - gradient.
 - road surface condition.
- Locality characteristics:
 - distance from road carriageway to property boundary.
 - nature of intervening surfaces.
 - setback of building from property boundary.
 - type and design of building.



3.1 Data Collected

Table 1 identifies the types of data collected as part of this LATMS and the purpose for which analysis has been conducted.

Table 1: Types of data collected

Data	Purpose
Traffic volumes	To compare with adopted maxima and to calculate peaking percentage. Traffic levels may constrain the types of devices that can be considered.
Traffic composition (vehicle types)	To identify problems with specific vehicle types, e.g. commercial vehicles.
Crashes	To identify problem locations and for use in determining warrants and priorities. A major input for before and after assessments. Note that local information may indicate the extent of unreported crashes.
Road inventory and other existing infrastructure	To provide information on existing infrastructure, road furniture, street planting, driveways, etc. on streets, to flag possible major maintenance or reconstruction works, and to provide site design information.
Origin/destination surveys	To identify through traffic proportions and provide input data for estimates of traffic changes resulting from the scheme.
Traffic speeds	To identify speed problems and potential crash situations. To provide information about free speeds for use in speed-based design.
Travel times and delays	To provide information about the external connectivity of the local street system. To monitor changes in travel times for travel within, through and around the study area, and the quality of access into and out of the area.
Level of Service	To establish how various measures (such as mobility, access, safety and amenity) combine to satisfy the needs of various road users.
Bus routes (existing and potential)	To identify problems for operators and specify design requirements for treatments.
Pedestrian volumes, desire lines and activity	To provide information on the location, number, strategic linkages, and design of devices and how these may influence pedestrians' use of space, including social interaction and street life.
Cyclist volumes, desire lines and parking	To provide information on the location, number, strategic linkages and design of facilities and how these may influence cyclists' travel and parking needs.
Parking	To identify parking-related problems and provide design data.
Community survey	To provide feedback based on local knowledge on issues in the study area

3.2 Traffic volumes

Tube counters were placed at most of the mid-block locations within the study area and the results shown in Figure 5 to Figure 7 were considered in conjunction with the other data sources.

The results demonstrate disproportionate volumes that identify rat runs confirmed by the OD surveys. Also, volumes along Pittwater Road and Ryde Road are not as high as expressed by the local community.

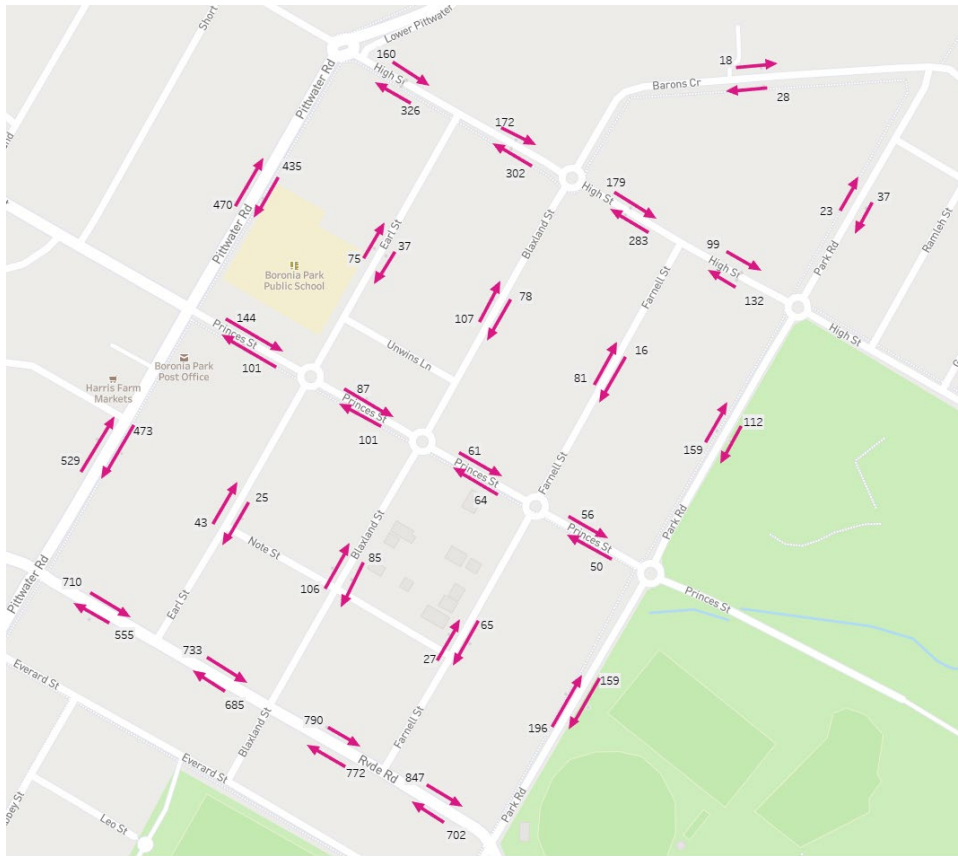


Figure 5: Weekday morning peak hour traffic volumes

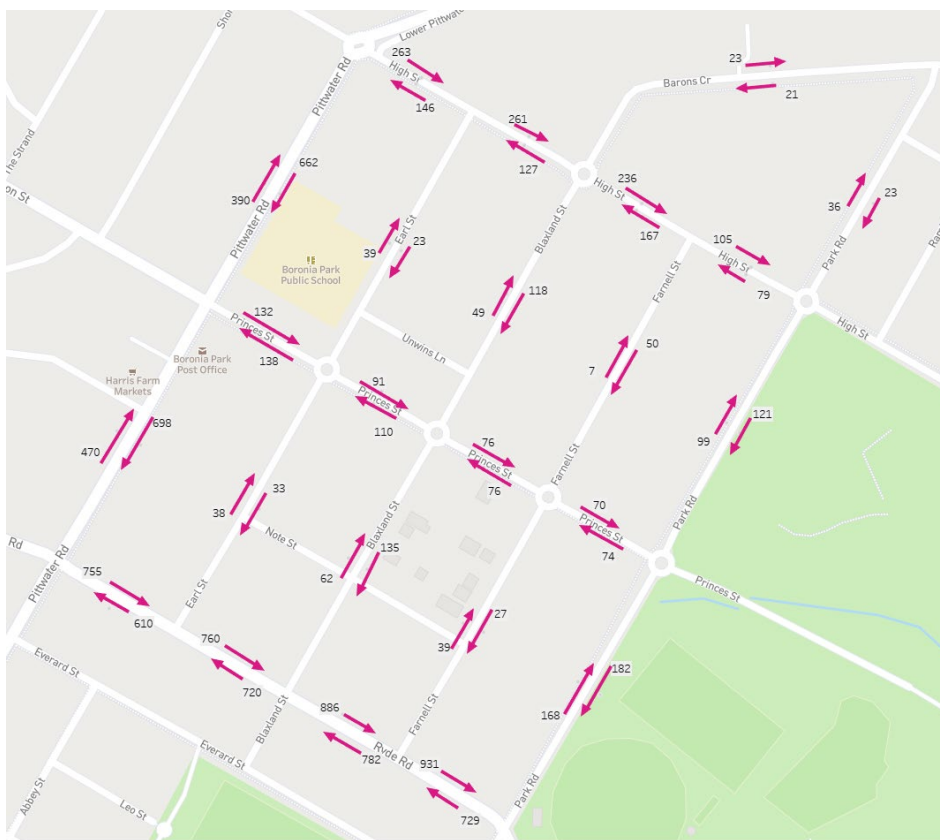


Figure 6: Weekday evening peak hour traffic volumes

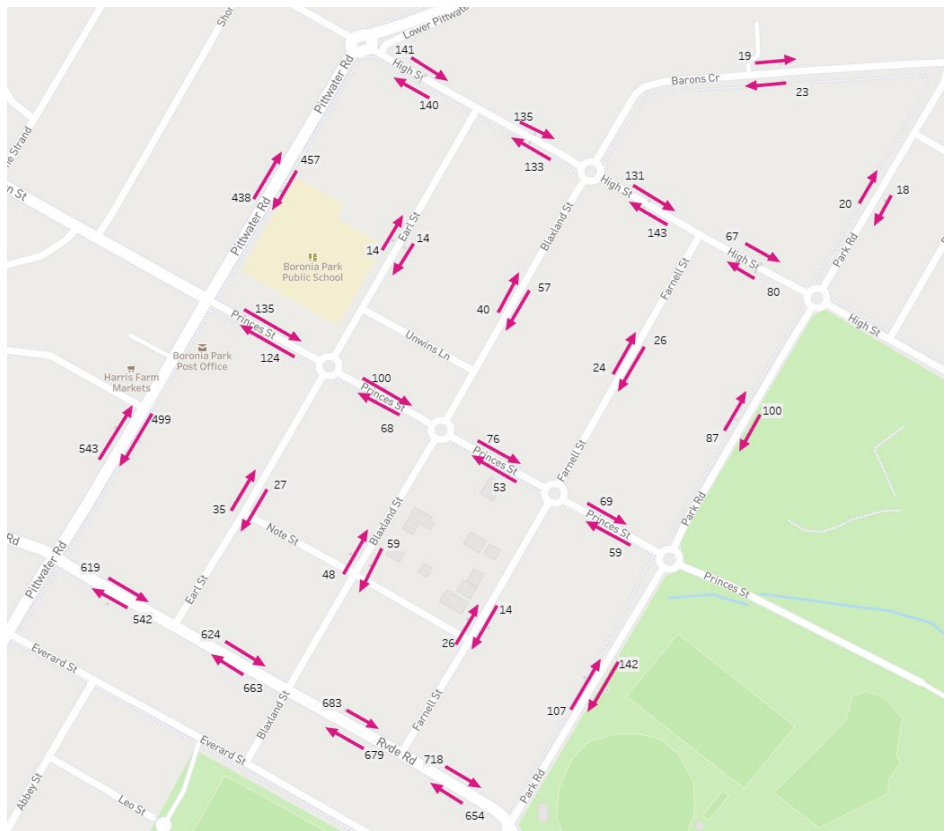


Figure 7: Saturday peak hour traffic volumes

Traffic limits are necessary on minor roads as pedestrian safety on these roads is a primary concern. Environmental capacity considerations are relevant to streets in residential areas, neighbourhood shopping centres and educational precincts. Each of the roads in the study area, other than Note Street and Unwins Lane can be classified as either a Local or (Local) Collector Road as they provide link between local areas and regional areas carrying low traffic volumes. The following Environmental capacity performance standards on residential streets are provided by TfNSW:

Local Road:	200 environmental goal	Collector Road:	300 environmental goal
	300 maximum		500 maximum

High Street, between Pittwater Road and Farnell Street is the only location where these limits are exceeded in the study area.



3.3 Crashes

An analysis of the TfNSW crash database shows that over the past five years, locations for crashes have been almost exclusively limited to Pittwater Road, Ryde Road and High Street with the frequency decreasing each year.

The types of crashes also do not indicate a particular type of issue that can be mitigated by treatment or enforcement.

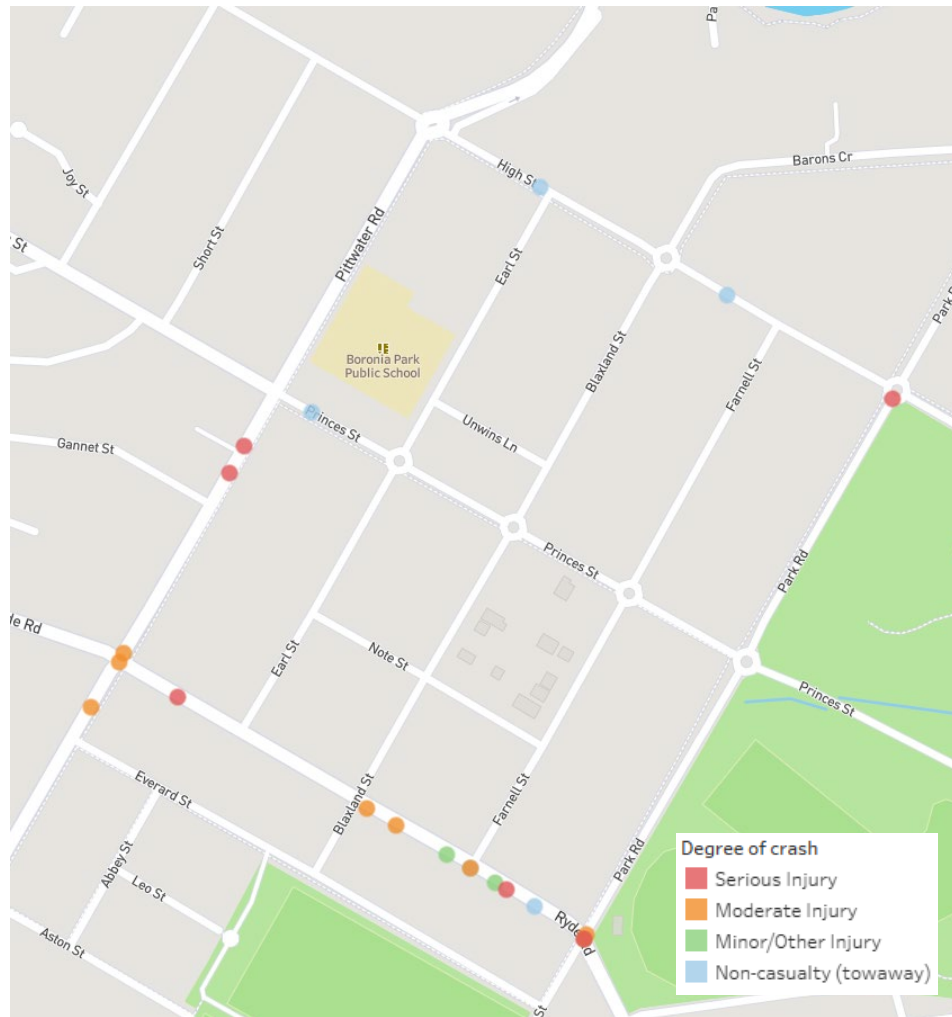


Figure 8: Five year crash history (source: TfNSW crash database)

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Table 2: Crash analysis

Year	Crash ID	Degree	Description	Type	Lighting	Injured	Killed
2015	1063972	Moderate Injury	Right near	T-junction	Dusk	2	0
	1066863	Minor/Other Injury	Off rd left => obj	2-way undivided	Daylight	1	0
	1070431	Non-casualty (towaway)	Off rd left => obj	2-way undivided	Daylight	0	0
	1070933	Moderate Injury	Off rd left => obj	2-way undivided	Daylight	1	0
	1075683	Moderate Injury	Off rd left => obj	2-way undivided	Daylight	1	0
	1076593	Serious Injury	Lane sideswipe	2-way undivided	Darkness	1	0
	1082188	Serious Injury	Off left/rt bnd=>obj	X-intersection	Daylight	1	0
	1087449	Minor/Other Injury	Rear end	2-way undivided	Daylight	2	0
	1088771	Moderate Injury	Rear End	X-intersection	Dusk	2	0
2016	1104259	Non-casualty (towaway)	Rear end	T-junction	Dusk	0	0
	1109593	Serious Injury	Ped other	2-way undivided	Daylight	1	0
	1115059	Moderate Injury	On road-out of cont	2-way undivided	Darkness	1	0
	1116259	Non-casualty (towaway)	Off rd left => obj	2-way undivided	Darkness	0	0
2017	1126568	Moderate Injury	Off left/rt bnd=>obj	T-junction	Darkness	1	0
	1136797	Moderate Injury	Left far	X-intersection	Daylight	1	0
	1146984	Non-casualty (towaway)	U turn	2-way undivided	Daylight	0	0
	1149612	Serious Injury	Lane change right	2-way undivided	Daylight	1	0
	1150884	Moderate Injury	Rear end	X-intersection	Daylight	1	0
2018	1176019	Serious Injury	Other manoeuvring	Roundabout	Darkness	1	0
	1178626	Non-casualty (towaway)	Off end of road	T-junction	Darkness	0	0
	1184187	Serious Injury	Ped on carriageway	2-way undivided	Darkness	1	0
2019	1195360	Non-casualty (towaway)	Off rd left => obj	2-way undivided	Daylight	0	0
	1218312	Non-casualty (towaway)	Off rd right => obj	T-junction	Darkness	0	0

Compared with other local areas in NSW the study area has a relatively low crash rate, decreasing each year (2 in 2019), with no clear trends.



3.4 Parking Facilities

3.4.1 Restricted Parking Controls Operations

Council operates parking controls across the LGA. The three main types within the study area are 12P, 30 minute, 10 minute, as well as the school drop-off/pick-up zone and no parking zones shown in Figure 9.



Figure 9: Parking restrictions

3.5 Existing LATM Devices

Most of the existing LATM devices in the study area (shown in Figure 10) have been installed some time ago and have not been constructed to the relevant guidelines and standards. Therefore, the poor geometry, signage and delineation is contributing to the lack of performance.

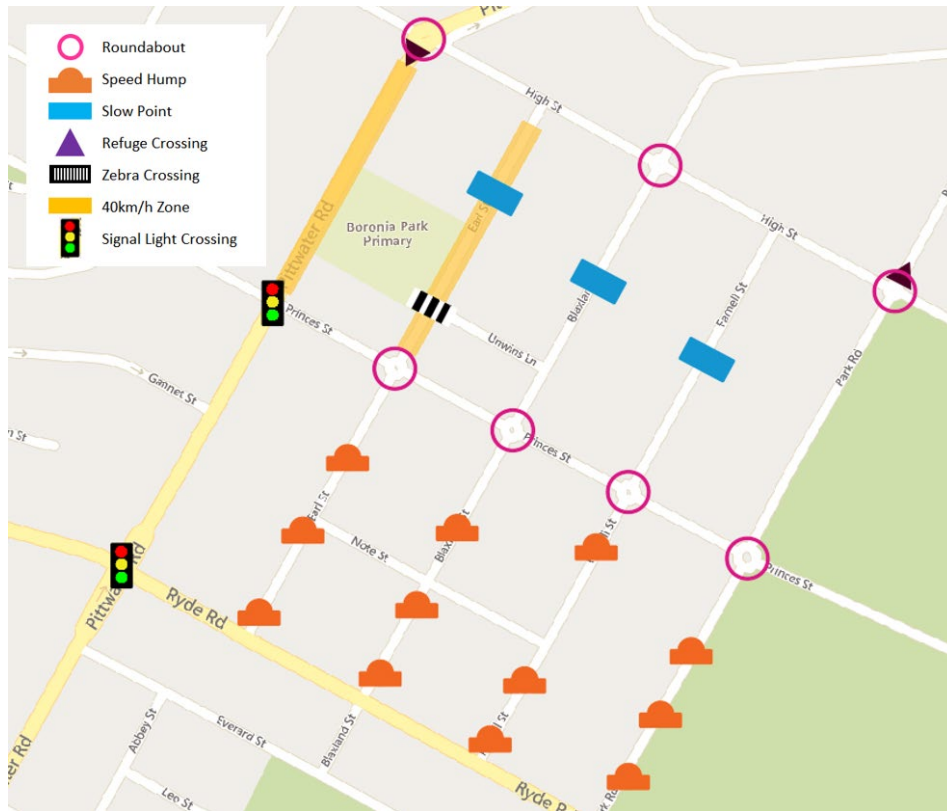


Figure 10: Existing LATM Devices

3.5.1 Roundabouts

The seven roundabouts within the Precinct serve two main purposes. The three along High Street are primarily for traffic management to facilitate traffic movements to and from the classified road network, whereas the four along Princes Street would likely mainly be for traffic calming as the peak volumes are not high enough to cause delays that would warrant an upgrade from priority controlled intersections.

The roundabout at the intersection of Pittwater Road/High Street has an elongated central island to achieve the deflection required to slow traffic and create gaps. 29 comments/likes/dislikes were received commenting specifically on the ineffectiveness of the roundabout in deterring rat runners along High Street. It is recommended that further analysis be conducted in consultation with TfNSW to determine whether an alternative design would be more appropriate.

The other two roundabouts along High Street are not designed in accordance with current standards and guidelines, likely to prevent acquisitions, reduce costs and minimise impact on street parking. They are both



mountable due to the bus route. However, this also adds to their ineffectiveness in managing traffic and deterring rat runners.

3.5.2 Speed Humps

There are 12 speed humps within the precinct, all south of Princes Street. None of these are designed to current standards and guidelines with generally poor delineation and visibility. The surveys demonstrate that the 85th percentile speed is below 50km/h. However, maximum speeds of 59 km/h, 68 km/h and 73 km/h were recorded in Earl Street, Blaxland Street and Farnell Street (south of Princes Street) respectively. This indicates that spacing and vertical deflection of these devices is not sufficient.

3.5.3 Slow Points

There are 3 existing slow points within the precinct, on Earl Street, Blaxland Street and Farnell Street, between High Street and Princes Street. None of these are designed to current standards and guidelines with poor delineation, visibility and no effective horizontal deflection and narrowing—required to reduce speeds.

The surveys demonstrate that the 85th percentile speed exceeds 50 km/h in these locations with maximum speeds approaching 70km/h.

3.5.4 Pedestrian Facilities

The pedestrian facilities in the Precinct are associated with Boronia Park Public School (zebra crossing) and in pedestrian phases of the traffic lights along Pittwater Road in the vicinity of the commercial zone.

3.5.5 Speed Zones

All roads within the study area are 50 km/h zones due to not being signposted and being a built-up area with the exception of Pittwater Road and Ryde Road which are signposted 60km/h.

40km/h school zones are in operation from 8:00am to 9:30am and from 2:30 to 4:00pm on Pittwater Road and Earl Street in the vicinity of Boronia Park Public School to help protect children on their way to and from schools.



Table 3: Design and construction of existing LATM devices

	<p>Roundabouts are newer and more acceptable than other devices. However, visibility and no splitter islands (paint only) are a recurring issue.</p>
	<p>Pedestrian crossing in Earl Street has poor delineation on approaches and less vertical deflection than required.</p>
	<p>Most road humps have poor delineation on approaches and less vertical deflection than required to be effective.</p>
	<p>Horizontal deflection devices are practically a waste due to being so far below standard.</p>

3.6 Origin/Destination Surveys

Origin/Destination surveys were conducted at 16 gates within the Precinct to identify patterns considered to be "rat runs" where local roads are being used as a faster alternative to the classified road network due to intersection or mid-block congestion.

Excluding Pittwater Road and Ryde Road, an analysis of the through traffic proportions demonstrated that the three most used routes as alternatives were Blaxland Street, Farnell Street and Park Road as shown in Figure 11 and Figure 12.

These results clearly identify rat-running with High Street as the common element. This behaviour is more likely to be regular commuters as they are travelling completely through the study area.

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Figure 11: Top 3 Rat Runs (North to South)



Figure 12: Top 3 Rat Runs (South to North)



3.7 Traffic Speeds

Speed surveys were conducted 24 hours a day for 7 days to identify speed problems and potential safety issues and to provide information about free speeds for use in speed-based design. The results shown in Figure 13 to Figure 15 demonstrate that the 85th percentile speeds are below the 50 km/h speed limit on local roads, with the exception of Farnell Street and Park Road. This result corroborates the rat running issue identified by the OD data.

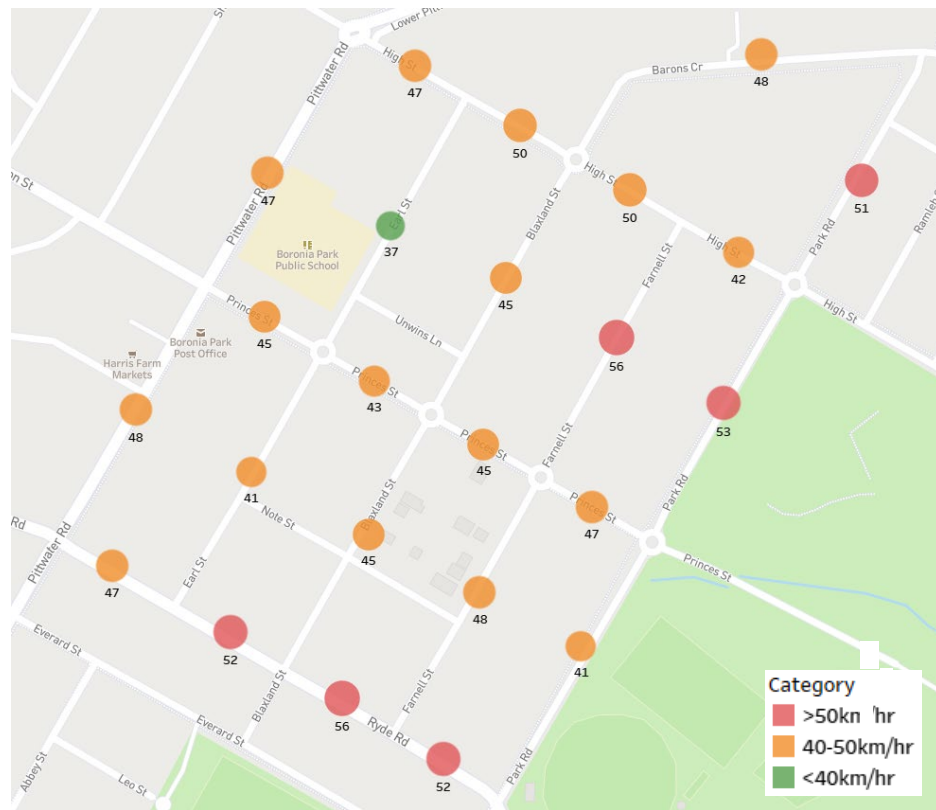


Figure 13: 85th Percentile Speed – Weekday Morning Peak

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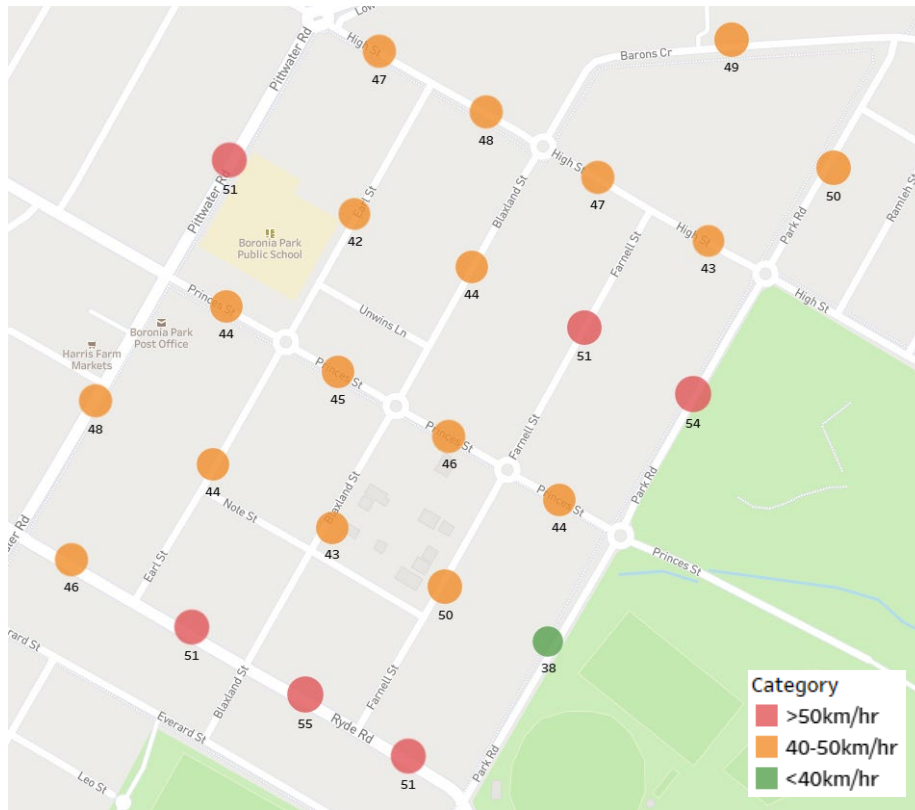


Figure 14: 85th Percentile Speed – Weekday Evening Peak

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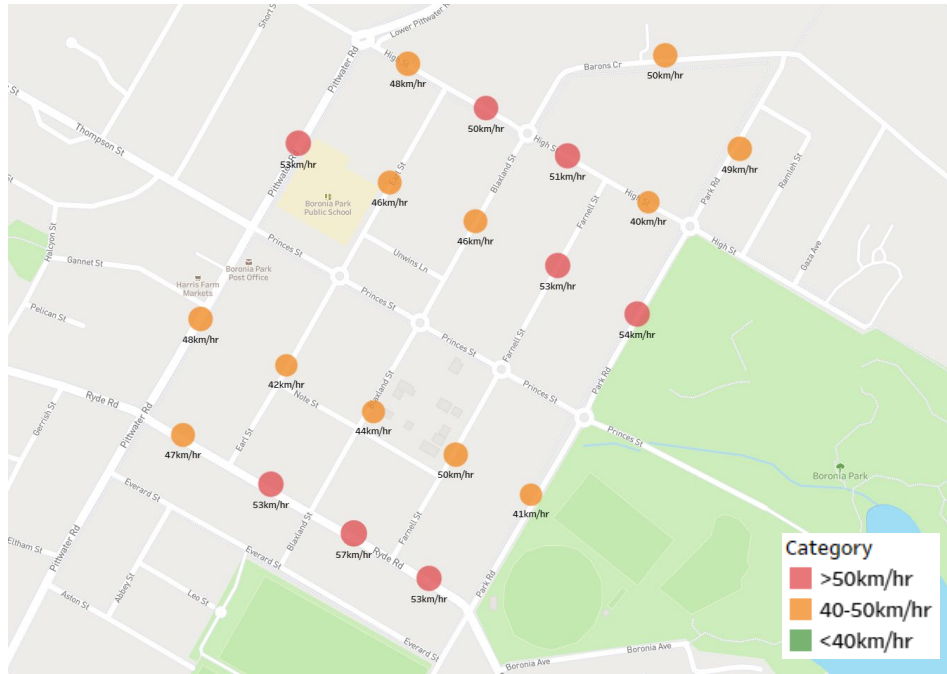


Figure 15: 85th Percentile Speed – Saturday Peak

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3.8 Community survey

Council carried consultation via Social Pinpoint on their website for 3 weeks (26 April – 17 May). Links were included on social media and in newsletters, websites and QR codes on signs around Boronia Precinct. A snapshot of the responses from the website in Figure 16 demonstrates an excellent response.



Figure 16: Social Pinpoint community survey

Council asked residents to provide feedback on issues in the study area via an online, interactive map and the responses have been collated, analysed and assessed as a major component of this study.

Respondents were given the opportunity to enter their own comments and/or like/dislike other comments. This caused an element of ambiguity when assessing certain comments where it was difficult to determine if a 'dislike' agreed or disagreed with a negative comment.

Notwithstanding, the response to the survey was significant with 275 comments received and 3,242 likes or dislikes clicked. These responses were broken down into key areas as shown in Table 4. Clearly, Traffic Management, Road Safety and Speeding are the three most important issues for locals, aligning with the rat-running, safety and speed issues identified from the other data collected.



Table 4: Community survey response categories

Category	Likes	Dislikes
Amenity	150	27
Maintenance	207	24
Parking	254	98
Road Safety	651	244
Speeding	365	110
Traffic Management	838	267
Total	2,467	775

Table 5: Community survey response categories

Location	Likes	Dislikes
Amenity	150	27
Pittwater Road	7	1
Princes Street	9	2
Multiple/Not specified	134	24
Maintenance	207	24
Multiple/Not specified	207	24
Parking	254	98
Park Road	13	10
Princes Street	13	4
Multiple/Not specified	228	84
Road Safety	651	244
Pittwater Road	38	26
Thompson Street	1	2
Speeding	365	110
Barons Crescent	8	4
Blaxland Street	21	15
Farnell Street	99	16
High Street	17	0
Park Road	38	21
Pittwater Road	106	30
Ryde Road	76	24
Traffic Management	838	267
Blaxland Street	11	12
Farnell Street	17	20
High Street	114	36
Park Road	18	3
Pittwater Road	17	1
Westminster Road	4	8
Multiple/Not specified	657	183
Total	2,467	775

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4 Problem Identification

The issues to be resolved through this study have arisen in the following ways:

- Objective assessment of street conditions compared with standards, acceptable thresholds or comparative conditions elsewhere in the locality.
- Complaints and suggestions from members of the community.

It is recommended that further subjective identification of problems be incorporated as part of a thorough and robust assessment, including:

- Definition and confirmation of objectives as part of area improvement and maintenance programs by Council.
- Anticipation of changed conditions resulting from new development, or planned land use or activity changes.

It is clear that complaints and technical deficiencies focus on the same sorts of issues:

- excess traffic
- traffic-related intrusion
- through traffic
- traffic composition
- the amenity of the street
- recorded traffic crashes

Other things that residents have reported, but which are less likely to emerge from routine technical assessments, include:

- crashes: unreported crashes and near misses, concern about routes to school, and traffic security in general in the neighbourhood
- the quality of the cycling and walking environment
- problem vehicles, especially speeding and noisy ones
- Local amenity

Both objective and subjective identification of problems has and will play a part in the public debate that will lead to the clarification of the LATM project objectives. Through this process, demands for street work that has no genuine foundation (objective or subjective) has been filtered out.



5 Proposed LATM Measures and Recommendations

A number of proposed LATM measures have been recommended by **ptc.** to address the main traffic issues identified from the traffic and community consultation data, in consultation with Council officers.

5.1 Key Issues

The following 'key issues' were identified to guide the formulation of appropriate recommendations:

- 1) Rat running on High Street, Blaxland Street, Farnell Street, Park Road.
- 2) Traffic congestion on Pittwater Road and Ryde Road
- 3) Traffic speeds and irresponsible driving on High Street, Blaxland Street, Farnell Street, Park Road.
- 4) Pedestrian safety in Pittwater Road, High Street, Blaxland Street, Farnell Street, Park Road.
- 5) Improved pedestrian facilities on Pittwater Road and Earl Street.
- 6) Parking on Park Road and Pittwater Road.

5.2 Clarifying Strategies

The first step of a LATM scheme design is the selection of the strategies or general approaches that are appropriate to the objectives being sought. Among the alternative strategies, it may be appropriate to consider alternatives to LATM.

LATM is not always the best or feasible option. The focus should be on outcomes at this stage, not on specific types of measures. A combination of strategies is required to meet the objectives. As part of the strategy selection stage of the process, it should be confirmed that there are not alternatives to LATM that could be considered first. These alternatives may include:

- Regional Road improvements along Pittwater Road and Ryde Road. These roads carry relatively larger amounts of traffic around and to/from the Precinct. TfNSW may consider measures to improve flows, reduce intersection delays and facilitate turns on the as a complement to, if not a sufficient alternative to LATM.
- Land use and community design. Re-zoning to reduce the intrusion of non-resident traffic may be appropriate. Improved streetscaping, provision of play areas and careful location of more intense residential development to reduce its traffic impacts may also be considered. It should be noted that these—apart from changes to the streetscape—tend to be more gradual and longer-term measures.
- Vehicle trip reduction. A form of travel demand management, local trip reduction programs may be considered. Their success in reducing local street traffic problems will be dependent on their effectiveness in significantly reducing the number of vehicle trips generated in the local area. Changes in household composition and the ageing of the population in some areas may have a possible spontaneous influence on traffic generation. This effect has not been adequately researched and is not directly under Council's ability to influence.
- Non-physical speed management. Proposals that include lower speed limits and more intense enforcement, speed cameras, electronic speed detection, education and attitudinal change programs. Some of these ideas are already known to be at best only marginally effective, while with others there is so far inadequate development, experience, or research to be able to recommend their adoption.



6 LATM Actions Plan

6.1 Action Plan Development

The proposed LATM measures consider a range of traffic management treatments intended to consider the objectives and combined inputs.

The table below outlines the required interventions and actions within the Precinct. Locations have been broken down into sections of road that can easily be staged for construction purposes.

Priorities have been defined as:

- High: Requires immediate attention due to safety risks
- Medium: Necessary to manage traffic management issues and safety
- Low: Supplementary measures to enhance other priorities

Categories have been grouped into:

- Road Safety: S
- Reconstruction: R
- New LATM Devices: L

Table 6: LATM Action Plan

Item	Location	Action	Priority
S1	Ryde Road, Pittwater Road to Park Road	Road Safety Audit	High
S2	Pittwater Road, High Street to Ryde Road	Road Safety Audit	High
R1	Earl Street, Ryde Road to Princes Street	Reconstruct 3 road humps to Austroads standards	Medium
R2	Blaxland Street, Ryde Road to Princes Street	Reconstruct 3 road humps to Austroads standards	Medium
R3	Farnell Street, Ryde Road to Princes Street	Reconstruct 3 road hump to Austroads standards	Medium
R4	Park Road, Ryde Road to Princes Street	Reconstruct 3 road hump to Austroads standards	Medium
R5	Earl Street, High Street to Princes Street	<ul style="list-style-type: none"> • Reconstruct slow point to Austroads standards. • Reconstruct zebra crossing to Austroads standards 	High
R6	Blaxland Street, High Street to Princes Street	Reconstruct slow point to Austroads standards.	High
R7	Farnell Street, High Street to Princes Street	Reconstruct slow point to Austroads standards.	High
L1	Park Road, High Street to Princes Street	Reconstruct 2 slow points to Austroads standards	High
L2	High Street, Pittwater Road to Blaxland Street	Construct 2 new road hump to Austroads standards	High
L3	High Street, Blaxland Street to Park Road	Construct 2 new road hump to Austroads standards	High
L4	Barons Crescent, High Street to Park Road	Construct new road hump to Austroads standards	Low
L5	Park Road, High Street to Barons Crescent	Construct new slow point to Austroads standards	Low



7 Next Steps

7.1 Scheme Design

Once the draft scheme is approved, more detailed cost estimates can be prepared, priorities refined, and the timing and staging can be confirmed.

Detailed design and documentation for treatments can then be undertaken in order to:

- carry out further street assessments if necessary (kerb and property lines, driveway locations, location of above-ground and below-ground services, drainage channels and pits, tree locations and assessments, pavement surface details, etc.
- prepare detailed drawings
- prepare construction and contract documentation
- maintain close consultation with residents adjacent to device locations, services companies, and (if concerns have previously been raised) bus companies and relevant emergency services.
- develop a maintenance strategy
- pursue funding if external funding opportunities exist.

Detailed design covers two stages:

- layout design, to determine the form of the device
- engineering design, as part of construction documentation.

7.2 Implementation

7.2.1 Timing and Staging

Work may be staged, or implemented in full at one time. Staging is usually undertaken for practical or funding reasons, but it may also be used as a form of trial or familiarisation. In particular, there may be uncertainty about the traffic displacement effects of a set of treatments, so the scheme may be implemented gradually and the changes monitored at each stage.

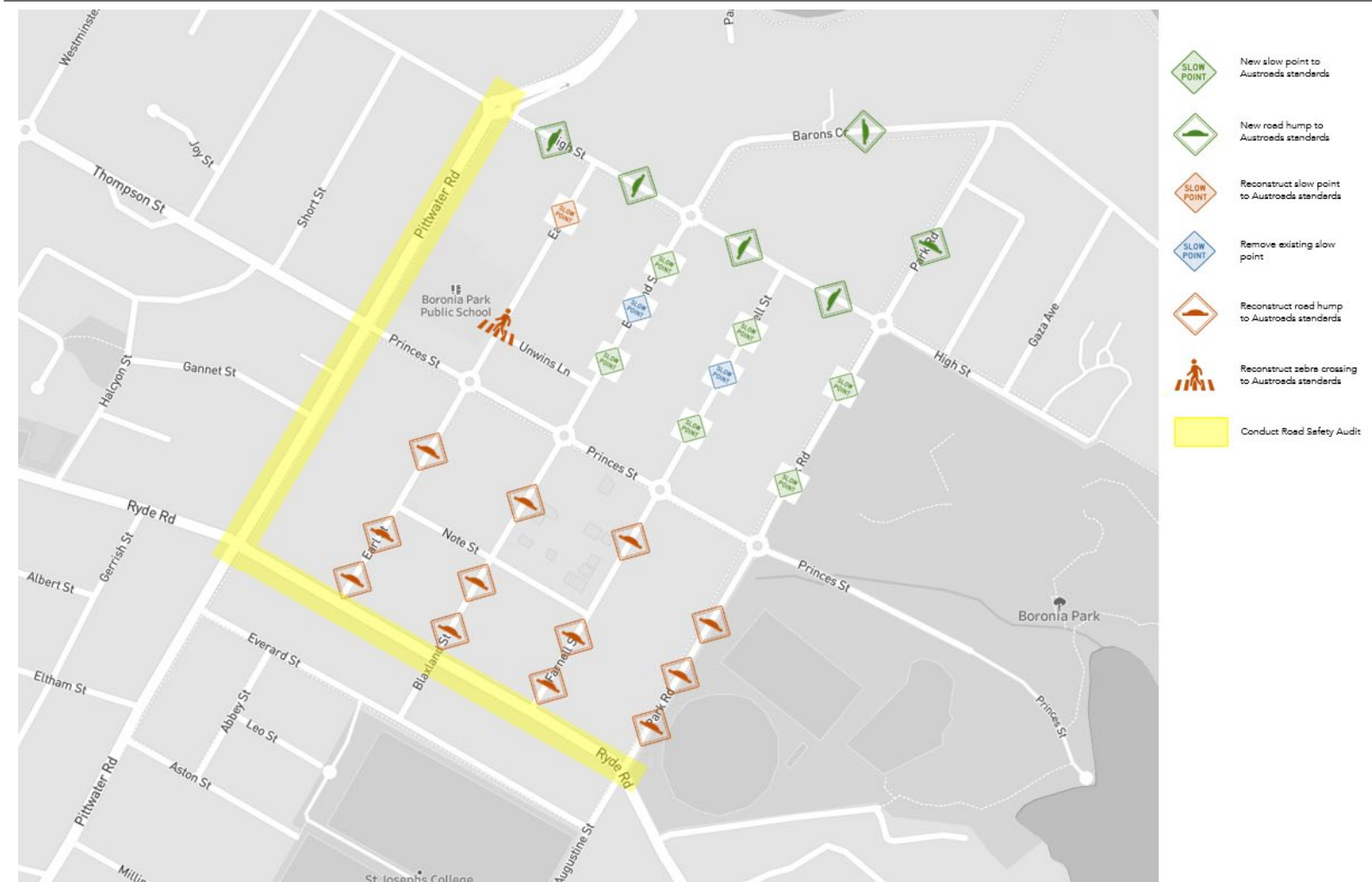
7.2.2 Monitoring and Review

Monitoring and evaluation of the final scheme and any intermediate stages is an essential part of the planning process. It is often overlooked or neglected because of time and resource pressures. The purposes and value of monitoring and evaluation include:

- assessing the scheme as a whole and individual treatments against the adopted objectives
- to identify any undesirable impacts that might indicate modifications that could be made
- to assess the impacts of each stage so that subsequent stages can be modified if necessary
- to provide objective information on impacts and effects for the community
- to provide information on the performance of the scheme and individual devices which may be useful in later projects.




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Appendix A Proposed LATM Actions



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ATTACHMENT 2- COMPARISON OF TRAFFIC CALMING DEVICES

Measure	Application	Advantages	Disadvantages	Photo
Road hump	<ul style="list-style-type: none"> - To reduce speed. - Where there is adequate lighting. - Effective on streets with low traffic volumes. - On low speed roads. - At mid-block locations. 	<ul style="list-style-type: none"> - Significant reduction in speed. - Significant reduction in road crashes. - Moderate cost to install and maintain. - Discourage through traffic. - If used without kerb extensions can result in low impact to parking. 	<ul style="list-style-type: none"> - the traffic noise. - Uncomfortable for passengers. - Adversely affect access for buses, commercial vehicles and emergency vehicles. - less effective slowing motor cycles. - not recommended for streets with low lighting. 	
Road cushion	<ul style="list-style-type: none"> - To reduce speed. - Highly visible. - Effective on streets with low traffic volumes. - On low speed roads. - At mid-block locations. 	<ul style="list-style-type: none"> - Low cost. - Discourage through traffic. - Don't restrict cyclists. - Can accommodate large vehicles. - Effective in reducing speeds in the vicinity by 27%. 	<ul style="list-style-type: none"> - the traffic noise. - less effective in slowing wide vehicles. - less effective slowing motor cycles - Can detach from the road. 	
Flat top road hump	<ul style="list-style-type: none"> - To reduce speed. - Where there is adequate lighting. - Effective on streets with low traffic volumes. - On low speed roads. - At mid-block locations. 	<ul style="list-style-type: none"> - Significant reduction in speed. - Significant reduction in road crashes. - Discourage through traffic. - If used without kerb extensions can result in low impact to parking. 	<ul style="list-style-type: none"> - the traffic noise. - Uncomfortable for passengers. - Adversely affect access for buses, commercial vehicles and emergency vehicles. - less effective slowing motor cycles. - not recommended for streets with low lighting. - Can be more expensive. 	

<p>Raised pavements</p>	<ul style="list-style-type: none"> - To reduce speed. - Where there is adequate lighting. - Effective on streets with low traffic volumes. - On low speed roads. 	<ul style="list-style-type: none"> - Significant reduction in speed. - Significant reduction in road crashes. - Discourage through traffic. - If used without kerb extensions can result in low impact to parking. 	<ul style="list-style-type: none"> - the traffic noise. - Uncomfortable for passengers. - Adversely affect access for buses, commercial vehicles and emergency vehicles. - less effective slowing motor cycles. - expensive - Road markings can be confused as pedestrian crossings. - not recommended for streets with low lighting. - Can be expensive. 	
<p>Slow Points</p>	<ul style="list-style-type: none"> - To reduce speeds. - On roads where there is a high proportion of traffic. - On roads that require a lower traffic volume. 	<ul style="list-style-type: none"> - Reduction in speed. - Minimal inconvenience on local residents. - Discourage through traffic. - Can visually enhance the street if landscaped. 	<ul style="list-style-type: none"> - they may restrict emergency vehicles and buses. - possible increase in traffic noise. - they will impact on-street parking. 	
<p>Centre blister islands</p>	<ul style="list-style-type: none"> - To reduce speed. - where vehicle speeds on a street are less than 60 km/h. - on wide streets. - On bus routes. 	<ul style="list-style-type: none"> - Reduction in speed. - Prevent overtaking. - Can allow for buses and commercial vehicles. - Can visually enhance the street if landscaped. 	<ul style="list-style-type: none"> - Expensive - Impact on parking - Can prohibit movement from driveways - Not effective in reducing through traffic. 	