

2. REPORTS

2.1. Tivoli Drive, Curlewis - Traffic and Planning

Source: City Services

Director: Guy Wilson-Browne

Purpose

1. The purpose of this report is to respond to the Notice of Motion raised at the May 2021 Council meeting requesting a report to consider options for Tivoli Drive until the road is duplicated.

Background

2. The Jetty Road Urban Growth Plan (JRUGP) was adopted in 2007 and is included in the Greater Geelong Planning Scheme.
3. Tivoli Drive was delivered as a single carriageway road during Stage 1 of JRUGP and is planned to be duplicated to cater for Stage 2 of JRUGP. See maps at
4. **Attachment 2.**
5. The southern section of Tivoli Drive (from Stanley Avenue to Portarlington Road) and intersection at Portarlington Road was funded by a Development Contributions Plan (DCP) and delivered by the City, with the road opening to traffic in August 2020.
6. Residents have raised concerns regarding traffic volume, speeding drivers, noise, road width and lack of prior knowledge about the overall road network and extent of the JRUGP development.
7. The City has undertaken remedial works in response to community concerns, including installing speed humps, restricting parking and improved signage at an approximate total cost of \$98,000.

Key Matters

8. Since the extension opened complaints have reduced but several residents still have concerns with the interim arrangement of Tivoli Drive.
9. At the Council meeting in May 2021, the Council endorsed a Notice of Motion (NOM) requesting the Chief Executive Officer prepare a report which considers alternatives in the operation and modification of Tivoli Drive until the road is duplicated. NOM items and detailed responses are provided in **Attachment 1**.
10. Items 1.1 – 1.7 were considered by the City, with an independent traffic assessment report at Attachment 2, provided by Ratio Consultants.
11. In their independent traffic assessment, Ratio Consultants:
 - 11.1. noted the current road cross section supports two-way traffic flow, and traffic volume is within the acceptable range of 4,000 – 5,000 vehicles per day; and

- 11.2. noted that indented parking, sealing Coriyule Road or closing Tivoli Drive (options 2, 3 and 4 respectively) would be costly, temporary and likely to cause further issues on Tivoli Drive and/or surrounding streets.
- 11.3. recommended installing the following measures:
 - 11.3.1. a fully raised intersection treatment at the Coriyule Road/Tivoli Drive intersection;
 - 11.3.2. fixed radar information signs;
 - 11.3.3. two additional traffic calming devices between existing speed humps e.g. road cushion with splitter island; and
 - 11.3.4. revert speed limit of Tivoli Drive between Portarlington Road and the Bellarine Rail Trail to 60km/hr.
- 11.4. recommended a continued holistic approach to traffic management through education, enforcement, engagement and infrastructure.
12. Ratio Consultants were engaged based on the items outlined in the NOM which did not include a noise assessment. They did not have the expertise to investigate noise as part of their report.
13. Following requests to expand the investigation to include vehicle noise, the City will engage a contractor to complete an acoustic assessment of Tivoli Drive, Curlewis
14. The projected timeline for Stage 2 JRUGP indicates a duplicated Tivoli Drive and Greenvale Drive would open in 2025-2026.
15. Due to the timing, further consideration will be given to Option 3 of Attachment 2 – partial closure of Tivoli Drive.
16. The City will investigate the feasibility of a partial road closure and following the investigation undertake community engagement.

RESOLUTION - Item 2.1

Cr Mason moved, Cr Sullivan seconded -

That Council:

- 1. Note the findings of the independent traffic assessment and Notice of Motion Tivoli Drive, Curlewis report;**
- 2. Note that a specialist acoustic assessment will be completed shortly for Tivoli Drive;**
- 3. Further explore Option 3 partial closure of Tivoli Drive and Option 5 in Attachment 2 additional traffic calming as an interim solution until Tivoli Drive is duplicated; and**
- 4. Endorse the City's approach to community engagement outlined in Attachment 1 including consultation on additional traffic calming and potential partial closure of Tivoli Drive, and ongoing engagement regarding traffic concerns and proactive engagement on Stage 2 of the Jetty Road Urban Growth Plan.**

Carried

Financial Sustainability

17. Ratio Consultants have provided a cost estimate only for the installation of traffic calming devices.
18. Costs range between \$20,000 and \$50,000 depending on the treatment.
19. Further site investigations and community engagement is required to determine the most appropriate treatment(s).
20. Funding for additional traffic calming of up to \$50,000 can be re-allocated from the City Services 2021-22 budget through re-prioritisation of projects.
21. Community engagement will be delivered through existing channels where possible and utilise City owned facilities for drop-in sessions.
22. Funding for community engagement will be sourced from existing budget.

Community Engagement

23. The Notice of Motion was raised in response to continued concerns raised by some community members regarding traffic volume, noise, speeding drivers and road width.
24. The City has engaged with residents regarding their concerns and installation of traffic calming measures via letter drop, phone and email, and via a dedicated Have Your Say (HYS) page.
25. The City sent letters to over 700 property owners in April introducing the HYS page for Tivoli/Greenvale Drive.
26. In the eight weeks following the letter the HYS page received:
 - 26.1. A total of 720 views from 187 unique visitors;
 - 26.2. A total of 38 new contributions from 8 community contributors; and
 - 26.3. A total of 14 followers to receive notifications of web page updates.
27. The City will hold a community meeting to discuss the report following the August Council meeting.
28. The community meeting will be in person at a local venue (to be determined) subject to COVID-19 restrictions. Residents will be sent a letter with information on how to attend.
29. Following further investigation into a partial road closure and additional traffic calming measures the City will consult the community on the proposed options. This consultation will be through direct mail out, survey and HYS page.
30. The City will continue to engage with residents regarding road safety and amenity issues by providing regular updates via the HYS page and addressing individual concerns as they arise.
31. The City will engage with the community regarding Stage 2 of JRUGP as outlined in **Attachment 1**.

32. Landowners and interested parties will be notified by mail when the planning scheme amendment report goes to Council.
33. Landowners and interested parties will also be notified should the planning scheme amendment proceed to public exhibition.
34. Information regarding Stage 2 will also be made available via the City's website and HYS page.
35. Engagement may also include community drop-in sessions during the planning scheme amendment process.

Social Equity and Sustainability

36. In accordance with the intent of *Local Government Act 2020* principles, services are to be provided to the community on an equitable basis. Social equity and resident amenity regarding traffic is consistent with other residential properties on Category 3 – secondary distributor roads. The function of Tivoli Drive is unchanged from the JRUGP Stage 1, when the properties fronting Tivoli Drive were developed and dwellings constructed.
37. The report and independent traffic assessment are based on current research, best practice and analysis of local traffic data to enable transparent and equitable decision making in relation to the provision and investment in infrastructure.
38. The principle of sustainability is embedded in the recommended options through the consideration of short- and longer-term impacts, taking a 'best value' approach.
39. The existing and proposed traffic calming devices to be a temporary nature, so they can be repurposed when Tivoli Drive is duplicated as JRUDP Stage 2.

Relevant Law/Policy/Legal Implications

40. No policy or statutory implications result from the recommendation to undertake further traffic calming measures.
41. A future planning scheme amendment to progress stage 2 of JRUGP will follow statutory processes under the *Planning & Environment Act 1987*.

Alignment to Community Plan and Vision

42. This report aligns with Our Community Plan 2021-2025 strategic priority:
Sustainable growth and environment.
43. This report aligns with the Community led 30-year Vision, "Greater Geelong: A Clever and Creative Future" community aspiration:
A fast, reliable and connected transport network.

Conflict of Interest

44. No officer involved in the preparation of this report declared a general or material conflict of interest.

Risk Assessment

45. There is a risk that the community may not support the installation of additional traffic calming measures.
46. There is a risk that Stage 2 of JRUGP may not proceed in a timely manner as the timing is controlled by the landowners and developers. The continued demand for housing in the region minimises this risk.

Environmental Sustainability

47. There are no environmental implications associated with installing additional traffic calming.

Attachments

1. Tivoli Drive - Response to Notice of Motion [2.1.1 - 17 pages]
2. Ratio Consultants Transport Assessment [2.1.2 - 38 pages]

THE CITY OF
GREATER GEELONG

NOTICE OF MOTION – TIVOLI DRIVE, CURLEWIS

ATTACHMENT 1

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Executive summary

The Jetty Road Urban Growth Plan (JRUGP) was adopted in 2007 and appears in the Greater Geelong Planning Scheme. The JRUGP will be constructed in two stages. Stage 1 is almost complete, and Stage 2 is expected to commence upon the approval of a planning scheme amendment.

The current cross section of Tivoli/Greenvale Drive¹ was constructed by developers during Stage 1 and will be duplicated to a boulevard style road during Stage 2. The City opened the Tivoli Drive extension (from Stanley Avenue to Portarlington Road) in August 2020 which connected Tivoli Drive to Portarlington Road. Prior to the extension, Tivoli Drive ended at Stanley Avenue.

Since opening the extension, the City has received feedback from some members of the community in relation to traffic volume, speeding drivers, noise, and road width. The City has since implemented several traffic calming measures including speed humps, line marking, parking restrictions, reduced speed limit, speed detection devices and intersection upgrade at Coriyule Road.

While the complaints have reduced, several residents still have concerns with the interim arrangement of Tivoli Drive.

At the Council meeting on 25 May 2021 a Notice of Motion was supported requesting the CEO prepare a report which considers various alternatives, costs and benefits in the operation and modification of Tivoli Drive until it is duplicated including

- 1.1 an overview of the proposed development, developer responsibilities and contributions, and larger feeder areas such as Jetty Road development, and related timelines;
- 1.2 potentially the continuation of the status quo;
- 1.3 opportunity for formalisation of inset parking on nature strips;
- 1.4 possibility of a partial closure of the road to prevent access to Tivoli Drive from the Portarlington Road C123;
- 1.5 completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline;
- 1.6 other traffic calming measures to reduce through traffic; and
- 1.7 the need for on-going community engagement to consider an overview of future planning and timelines.

The response to NOM items 1.1 and 1.7 has been prepared by the City. Items 1.2 – 1.6 were investigated by an independent consultant specialising in traffic and transport engineering. The full report is included in Attachment 2.

Stage 2 of the JRUGP requires a planning scheme amendment before construction can commence. It is anticipated that an amendment application will be lodged on behalf of landowners for Stage 2 later in 2021.

A Development Contributions Plan (DCP) will be prepared as part of the rezoning amendment for Stage 2. The duplication of Tivoli/Greenvale Drive will not be included as a DCP item and will be the responsibility of the developer to deliver this section of road.

Should the amendment be approved by the Minister for Planning, the approximate timeframes to complete the amendment and certify permits is approximately 24 – 36 months.

Based on this, a duplicated Tivoli Drive and Greenvale Drive could be delivered in 2025-2026, subject to the planning scheme amendment being approved.

Items 1.2 – 1.6 of the NOM, considers a series of options to address community concerns with traffic volume, noise, speeding drivers and road width. Table 1 provides a summary of these options and their potential impact.

¹ The north-south section of road between the Bellarine Rail Trail and the Coriyule Road intersection is named 'Tivoli Drive' and the section of road between the Coriyule Road intersection and shopping centre is named 'Greenvale Drive'.

Table 1: Options assessment

NoM item	Description	reduce volume	reduce noise	reduce speeding drivers	increase road width
1.2 Continuation of the status quo	No further actions from the City. Risks: continued poor driver behaviour Cost estimate: minimal/as required to maintain current arrangement.	No	No	Over time	No
1.3 Formalisation of inset parking on nature strips	Installation of approximately 40 parking spaces to widen travel lanes. Risks: net reduction in on street parking and may increase traffic volumes, noise and drivers speeding Cost estimate: \$600,000 (excluding reinstatement after road duplicated)	No	No	No	Yes
1.4 Partial closure of the road to prevent access to Tivoli Drive from the Portarlington Road C123	Considers one-way traffic on Tivoli Drive or a complete closure at Stanley Avenue. Risks: Traffic is distributed to smaller local roads Cost estimate: >\$100,000	Yes, on Tivoli Drive, but will result in increase on alternative routes	Possibly, via a reduction in volume on Tivoli Drive, but will result in increase on alternative routes.	No	No
1.5 Completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline	Hermsley Road intersection is a Regional Roads Victoria (RRV) project. Option for the City to seal full length of Coriyule Road prior to Stage 2 JRUGP. Risks: City fully funds works without development contribution. Interim solution only as the road alignment changes during Stage 2. Cost estimate: \$1,000,000	Yes	Possibly, via a reduction in volume.	No	No
1.6 Other traffic calming measures to reduce through traffic	Holistic approach to traffic calming through education, enforcement, infrastructure and engagement. Risks: Relies on support from external agencies and accountability of motorists. Cost estimate: \$20,000 - \$50,000.	No	No	Over time	No

Background

The JRUGP was adopted in 2007 and appears in the Greater Geelong Planning Scheme. The JRUGP will be constructed in two stages with Stage 1 almost complete and Stage 2 expected to commence upon the approval of a planning scheme amendment.

The current cross section of Tivoli/Greenvale Drive was constructed by developers during Stage 1 and will be duplicated to a boulevard style road during Stage 2.

The City constructed the Tivoli Drive extension and intersection at Portarlington Road in 2020. The works were fully funded by the City from Development Contribution Plan income. Prior to the extension, ended at Stanley Avenue and access to the area was via Hermsley Road or Jetty Road.

Tivoli Drive when first constructed was categorised as Access Street Level 2. After the extension of Tivoli Drive to Portarlington Road it has been categorised as a Collector Road as per the Municipal Road Management Plan.

Since opening, the City has received feedback from the community in relation to traffic volume, speeding drivers, noise, and road width.

In response to community concerns the City has,

- reduced the speed limit from 60km/hr to 50km/hr from Portarlington Road to Stanley Avenue
- introduced line marking and increased warning signage at the crossroads of Appleby Street with Tivoli and Greenvale Drive
- introduced parking restrictions on the west side of Tivoli Drive and near the intersection of Stanley Avenue to improve sightlines
- introduced speed humps to reduce speed and volume concerns
- upgraded the intersection of Coriyule Road/Appleby Street and Tivoli/Greenvale Drive with splitter islands to slow turning traffic
- requested support from Victoria Police to monitor and manage poor driver behaviour
- requested heavy vehicles accessing the local shopping centre and nearby developments seek an alternate route via Jetty Road to reduce truck movements on Tivoli/Greenvale Drive
- installed speed detection trailers on Tivoli Drive to alert drivers if they are speeding, and

The City also created a Have Your Say page as a source of information and updates on Tivoli/Greenvale Drive. The page has also provided an opportunity for residents to ask questions of the City.

The City sent letters to over 700 property owners in April 2021 announcing the HYS page for Tivoli/Greenvale Drive. In the eight weeks following the letter the HYS page received

- 720 views from 187 unique visitors
- 38 new contributions from 12 contributors (of the 12 contributors 4 were staff populating FAQ's prior to the page going live)
- 14 followers.

At the Council meeting in May 2021 a Notice of Motion was supported requesting the CEO prepare a report which considers various alternatives, costs and benefits in the operation and modification of Tivoli Drive until it is duplicated.

The Notice of Motion requested the following items be addressed:

- 1.1 an overview of the proposed development, developer responsibilities and contributions, and larger feeder areas such as Jetty Road development, and related timelines;
- 1.2 potentially the continuation of the status quo;
- 1.3 opportunity for formalisation of inset parking on nature strips;
- 1.4 Possibility of a partial closure of the road to prevent access to Tivoli Drive from the Portarlington Road C123;
- 1.5 Completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline;
- 1.6 Other traffic calming measures to reduce through traffic; and
- 1.7 The need for on-going community engagement to consider an overview of future planning and timelines.

This document addresses each of items raised in the Notice of Motion. Items 1.2 – 1.6 were investigated by an independent consultant specialising in town planning, traffic and transport engineering. The full report is included in **Attachment 2**.

Notice of Motion items

RESPONSE TO ITEMS 1.1 AND 1.7

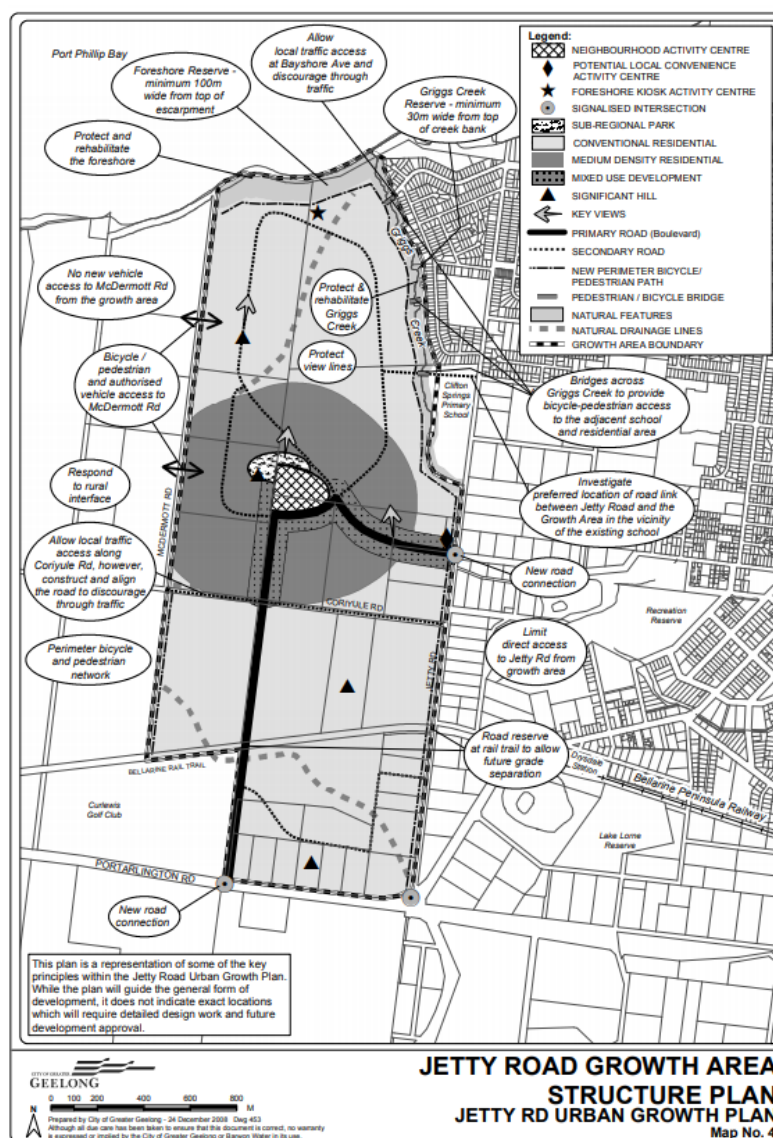
The response to Items 1.1 and 1.7 were provided by the City Planning and Economy Directorate.

Item 1.1: An overview of the proposed development, developer responsibilities and contributions, and larger feeder areas such as Jetty Road development, and related timelines

Proposed development

The Jetty Road Urban Growth Plan (JRUGP) was adopted in 2007 and appears in the Greater Geelong Planning Scheme at Clause 21.14 (Figure 1).

Figure 1: Jetty Road Urban Growth Plan 2007 (amended September 2008)



The JRUGP will be constructed in two stages with Stage 1 almost complete and Stage 2 expected to commence upon the approval of a planning scheme amendment (figure 2).

Figure 2: Jetty Road Urban Growth Plan Stage 1 and Stage 2



Stage 1 of JRUGP consists of 1,470 dwellings and a neighbourhood activity centre (Woolworths supermarket and specialty shops). Construction commenced in 2012 and at the time of this report, the final subdivision stage has been approved and only building permits are required. Once the final stage is complete there will be no further multi-lot subdivisions within Stage 1.

Stage 2 of JRUGP makes up one half of the Jetty Road Urban Growth Area. It includes 96.70 hectares of Farming Zone west of Stage 1, and 52.75 hectares Rural Living Zone south of the Bellarine Rail Trail.

Once developed, Stage 2 will contain the following features:

- Projected 1600 lots consisting of single and attached dwellings.
- Duplication of Tivoli Drive and Greenvale Drive.
- A 2-hectare hilltop park adjacent to the neighbourhood activity centre.
- Foreshore reserve similar to Stage 1.

- A local road network.
- A network of open space consisting of conservation reserves, parks, wetlands and stormwater retarding basins, shared paths and waterway trails.

The Jetty Road Growth Area Structure Plan identifies the main roads as Tivoli Drive/Greenvale Drive (north-south) and Centennial Boulevard (east-west).

Developer responsibilities and contributions

During the development of land, infrastructure is either delivered by the developer during works or constructed by the City via a Development Contribution. A Development Contribution Plan (DCP) formalises funding of shared infrastructure to support the development of an area.

Tivoli Drive (north of the Rail Trail) and Greenvale Drive were delivered by developers. While the construction of Tivoli Drive (south of the Rail Trail) and the Portarlington Road/Tivoli Drive intersection were DCP items completed by the City in August 2020.

A DCP will also be prepared as part of the rezoning amendment for Stage 2. At this time, the duplication of Tivoli/Greenvale Drive would not be included as a DCP item and would be the responsibility of the developer to deliver this section of road.

It is normally the responsibility of developers to deliver local road infrastructure at their cost to the satisfaction of the City. As a result, works are generally scheduled based on forecast lot sales to ensure developer viability.

Duplicating the road and bearing the costs up-front before Stage 2 is rezoned presents financial risk to the City as there would be no guarantee the funds would be recouped when development is complete. The City would also need to acquire land and commence a planning scheme amendment process which can take 2 years.

An alternative approach would be for the duplication to be included in the DCP. This option could provide greater control on timing of construction if the land can be compulsorily acquired. The necessary justification for the inclusion of the duplication and land acquisition as a DCP item has not been prepared.

The cost to design and construct Tivoli Drive north of the Bellarine Rail Trail and Greenvale Drive, including a roundabout at the intersection with Coriyule Road, is approximately \$6.4 million excluding GST [source: CardnoTGM email 1/7/2021]. This cost estimate has not been independently reviewed and does not include land acquisition.

Council officers are currently in discussion with the lead developer about the timely delivery of the duplication and the preferred option for delivery. Timely delivery of this critical infrastructure is supported by State planning policy and the Jetty Road Urban Growth Plan.

Nearby developments

There are several smaller housing estates currently under construction or planned in Drysdale/Clifton Springs (see figure 3). These developments will have little to no impact on Tivoli/Greenvale Drive due to their proximity and access to other roads.

Figure 3: Nearby housing estates



Timeframes for Stage 2 of JRUGP

Council officers are currently in pre-application discussions with the lead developer and their consultants about the technical reports and planning documents required. This process is on-going, and a developer-initiated application is expected to be submitted in late-2021.

Once a formal planning scheme amendment and planning permit application have been lodged with the City, officers will assess the application and prepare a Development Contributions Plan. This can take 6 months before a report is presented at a Council meeting for approval to proceed to public exhibition.

If the amendment is then authorised by the Minister for Planning, the approximate timeframes would be:

- Complete the amendment and permit - 12-18 months
- Certify secondary consent permit conditions and subdivision plans - 12 months
- Construction commences including the duplication of Tivoli Drive and Greenvale Drive

Based on this, a duplicated Tivoli Drive and Greenvale Drive would open in 2025-2026, subject to the planning scheme amendment being approved.

Should the Council decide in the 2022/23 budget to assume responsibility and construct the road, the project would take approximately 24 months to complete. This would allow time for detailed design, land acquisition, regulatory approvals and construction. If a Public Acquisition Overlay is required, an additional 24 months would be required.

Item 1.7: The need for on-going community engagement to consider an overview of future planning and timelines.

The land identified as Jetty Road Stage 2 is zoned Farming Zone and Rural Living Zone. A planning scheme amendment which includes community engagement will be required to rezone the land to a residential zone prior to development.

As part of the preparation of the amendment, council officers will seek to inform the community about Stage 2. Methods of engagement may include drop-in sessions, information brochures and updates on the City's website.

The first step in the amendment process where the community is engaged is when the Council considers a report to prepare and exhibit the amendment. If an amendment application is lodged by the developer in 2021, this would likely be considered by the Council in 2022.

Prior to the Council meeting letters will be sent to directly affected landowners and other interested landowners and residents informing them of the timing of the meeting and the availability of the agenda to read the council report.

Anyone is able to attend the council meeting in-person or by video (subject to COVID-19 restrictions) and anyone is able to ask questions at the meeting or prior by written form using the City's normal processes.

Should the Council decide to proceed with the amendment and should the Minister for Planning authorise the Council as the planning authority, to prepare the amendment, exhibition and notice will be in accordance with Part 3 of the *Planning and Environment Act*. This means letters will be sent to interested and affected owners/occupiers, notices are published in local newspapers and documentation available on the Geelong Australia website.

The amendment documentation would include traffic and transport assessments, recommended road infrastructure requirements and staging of construction.

Anyone can lodge a submission to the amendment. Lodging a submission allows the submitter to be further engaged in the amendment process as follows:

1. The submission is considered by the planning authority at a Council meeting;
2. The submitter can participate in an independent planning panel hearing if one is required;
3. After receiving the panel's report, the Council at an ordinary meeting is required to decide whether or not to adopt the amendment; and
4. Were the amendment to be adopted, submitters would need to engage with the Minister for Planning in his role under the *Act* in deciding whether or not to approve the amendment.

The decision of the Minister is final and ends the planning scheme amendment process. There is no further community engagement other than notifying submitters of the minister's decision and placing a notice in newspapers and the Victoria Government Gazette.

RESPONSE TO ITEMS 1.2 – 1.6

Items 1.2 and 1.6 were investigated by Ratio Consultants and have been summarised below by council officers. The full report from Ratio Consultants is included in Appendix 3.

Item 1.2: Potentially the continuation of the status quo

Following the opening of the Tivoli Drive extension the City received complaints from residents regarding an increase in traffic, speeding drivers and road width. Following this feedback, the City implemented speed humps, parking bans, splitter islands, speed detection trailers and other intersection improvements. The City also created a webpage to keep local residents informed.

Enquiries via RFS regarding Tivoli Drive have since dropped from 60 requests between August – December 2020 to 14 this calendar year.

Continuation of the status quo would see no further works or actions outside of what has already been committed to.

Item 1.3: Opportunity for formalisation of inset parking on nature strips

Ratio conducted site observations in June 2021. They noted that when northbound vehicles kept to the left there is enough road width for two vehicles to pass each other, even with parked vehicles on the eastern side of Tivoli Drive. Some motorists chose to give way regardless resulting in minimal delay.

Indented car parking along the eastern side of Tivoli/Greenvale Drive would widen the trafficable road to approximately 7 metres compared to the existing 5.2 metres (with a car parked kerbside).

Implementing indented parking would require the removal of kerb and channel and street trees, relocation of underground utilities and the construction of a hardstand area. When the duplication of Tivoli/Greenvale Drive occurs, the indented spaces would be removed as a dedicated parking lane will be provided on-road.

While indented parking addresses the residents' concerns with road width, it may encourage increased use of Tivoli Drive and see volumes and speeding drivers increase. Indented parking would not be linked to individual properties and there would be an overall reduction in on-street parking.

A single indented parking space is estimated at \$5,000 - \$20,000. Over 40 spaces would be required along Tivoli/Greenvale Drive costing over \$20,000 each due to the high number of services within the nature strip. The cost of the project is estimated at over \$800,000 (excluding reinstatement) and relies on a suitable alternative location for services.

Item 1.4: Possibility of a partial closure of the road to prevent access to Tivoli Drive from the Portarlington Road C123

A partial closure would see traffic limited to one way only along Tivoli Drive between Portarlington Road and Coriyule Road. A full closure would see Tivoli Drive truncate at Stanley Avenue.

Any closure of Tivoli Drive would be in place until Tivoli/Greenvale Drive is duplicated. The duplication is not expected for 3-4 years so temporary signage would not be suitable and a more permanent solution would be required.

A partial or full closure would result in part or all traffic currently using Tivoli Drive to use Jetty Road or Hermsley Road and Coriyule Road to access the Growth Area (figure 5).

Figure 4: Potential Road Closure at Tivoli Drive and Portarlington Road



This would result in increased traffic on Coriyule Road which is unsealed and increased volumes at the Appleby Street/Jetty Road intersection, which is unsignalised.

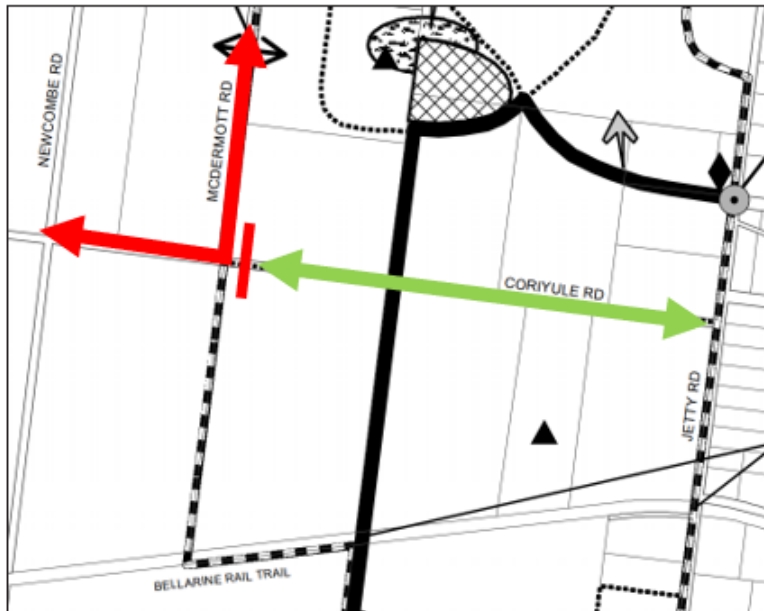
Closure of Tivoli Drive may also disrupt the residents that live east of Tivoli Drive who may have purchased their property due to the proximity and access to Portarlington Road.

Item 1.5: Completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline

The Hermsley/Geelong Road lights are being delivered by Regional Roads Victoria and are scheduled to be active by early 2022.

Coriyule Road is a gravel, rural access road that connects Tivoli Drive to Hermsley Road. As part of Stage 2, the developer will seal Coriyule Road from Tivoli Drive to McDermott Rd where it will be truncated (figure 5). Drivers will not have direct access to Tivoli Drive from Hermsley Road. Coriyule Road west of McDermott Road will remain open to maintain access to local properties.

Figure 5: Stage 2 Road Network – Coriyule Road



Sealing Coriyule Road would result in less traffic on Tivoli Drive south of Coriyule Road. This would also result in Coriyule Road becoming an additional collector road into the Jetty Road Urban Growth Area. This conflicts with the intent of the growth plan and will impact nearby intersections and other local roads.

Sealing the full length of Coriyule Road prior to Stage 2 would also require upgrades to the Coriyule Road/Hermsley Road intersection and Coriyule Road/Tivoli Drive intersection. Design and delivery of a full road reconstruction would take approximately 12-24 months and cost approximately \$1.25 million.

Item 1.6: Other traffic calming measures to reduce through traffic

Following the extension of Tivoli Drive, the City implemented several traffic calming measures, including speed humps, parking restrictions, splitter islands and other intersection improvements.

In May 2021, two speed trailers were placed in Tivoli Drive, which have demonstrated to improve compliance with speed limits in the street.

Ratio Consultants have suggested a holistic approach not dissimilar to what has already been undertaken. Noting that the items require different levels of responsibility and accountability, from motorists, the City, RRV, and Victoria Police.

- Education
 - Implement permanent speed radar information displays.
- Enforcement
 - Ongoing advocacy to Victoria Police to enforce speed limits.
 - Enforcement of illegal parking.
- Traffic management infrastructure
 - Implement a raised intersection treatment at the intersection of Coriyule Road and Tivoli Drive to reduce speed on approaches.

- Implement two additional traffic calming devices between the existing speed humps on Tivoli Drive between Stanley Avenue and Coriyule Road (at locations with streetlights at property No. 41 Tivoli Drive and No. 59 Tivoli Drive).
- Undertake traffic counts in Greenvale Drive north of Coriyule Road to assess if further traffic calming devices are required in this section.
- Revert the speed limit of Tivoli Drive between Portarlinton Road and the Bellarine Rail Trail to 60km/h such that it reflects the rural and low risk road environment. This would improve compliance with both 60km/h and 50km/h speed limits in different sections.
- Community engagement
 - Undertake periodic reviews and provide updates to local residents on the effectiveness of the above initiatives.

Summary and Recommendations

Stage 2 of JRUGP is zoned Farming Zone and Rural Living Zone. A planning scheme amendment which includes community engagement is required to rezone the land prior to development.

The City will keep the community informed regarding the planning scheme amendment and the progress of Stage 2. Engagement methods will include a range of channels such as drop-in sessions, information brochures and updates on the City's website to cater for the individual needs and interest in Stage 2.

Since the opening of the Tivoli Drive extension the City has heard concerns from the community regarding traffic volume, noise, speeding motorists and road width.

In response to the Notice of Motion, Ratio Consultants were engaged to investigate the following options:

1. Potentially continuing with the status-quo conditions;
2. Indented car parking along Tivoli Drive between the Bellarine Rail Trail and Greenvale Drive;
3. Closure of Tivoli Drive at Portarlinton Road;
4. Upgrading and encouraging traffic to use Hermsley Road and Coriyule Road for access; and
5. Implementation of further traffic calming and other measures.

Noting the current cross section of Tivoli Drive can support two-way traffic flow due to the car parking ban on the western side, the road could cater for a daily traffic volume of between 4,000-5,000 vehicles per day.

The duplication of Tivoli/Greenvale Drive will occur during Stage 2 of JRUGP and will assist to reduce impacts of the issues raised by the community. However, traffic volume will increase alongside population growth in the area. Noise may also increase in the short-term as the site is developed.

In addition, Ratio Consultants were asked to investigate the effect of removing any of the speed humps to address the feedback provided by residents regarding noise associated with the speed bumps. Ratio Consultants do not recommend the removal of the remaining speed humps within Tivoli Drive and instead propose implementing further traffic calming measures.

The City supports the recommendation by Ratio Consultants to implement the actions outlined in item 1.6. The City will deliver this holistic approach to traffic management in partnership with motorists, residents, RRV, and Victoria Police.

As the projected timeline for Stage 2 JRUGP indicates a duplicated Tivoli Drive and Greenvale Drive would open in 2025-2026 the City will also give further consideration to item 1.4 – a partial closure of Tivoli Drive. The City will investigate the feasibility of a partial closure and following the investigation undertake community engagement.





CITY OF GREATER GEELONG

WADAWURRUNG COUNTRY
PO Box 104, Geelong VIC 3220
P: 5272 5272
E: contactus@geelongcity.vic.gov.au
www.geelongaustralia.com.au

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Transport Assessment

Tivoli Drive, Curlewis

July 2021

r:

ratio:transport

ratio:consultants

Suite 2, 12-14 Union Street
Geelong VIC 3220
ABN 93 983 380 225

Prepared for:

City of Greater Geelong
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1 Introduction:

1.1 Introduction

Ratio Consultants has been engaged by City of Greater Geelong (the City) to undertake a technical transport engineering assessment of Tivoli Drive in Curlewis.

1.2 Purpose of this Report

The purpose of this report is to identify existing issues and opportunities as it relates to the performance of and road safety within Tivoli Drive, and to identify and assess potential solutions.

The report is being prepared in response to a recent Notice of Motion (NoM) raised at the Council meeting on 25 May 2021.

The assessment has taken into consideration the on-site observations, high-level constructability considerations, and existing and ultimate road conditions.

1.3 References

In the preparation of this report, we have considered the following documents, as referenced throughout:

- Infrastructure Design Manual;
- City of Greater Geelong Municipal Road Management Plan (May 2021);
- Austroads Guide to Road Design;
- Austroads Guide to Traffic Management;
- On-site observations undertaken during June 2021;
- Traffic and pedestrian survey data provided by the City of Greater Geelong;
- Community engagement results (<https://yoursay.geelongaustralia.com.au/tivoli-drive-curlewis>);
- Landchecker high-res aerial imagery (accessed 16/6/2021);
- Nearmap high-res aerial imagery (accessed 22/6/2021);
- Other plans, reports and information relevant to Tivoli Drive, provided by City of Greater Geelong; and
- other documents and information as referenced throughout this report.

2 Background and Context

2.1 Notice of Motion – Tivoli Drive (Council meeting - 25 May 2021)

This assessment responds directly to the Notice of Motion raised at the Council meeting on Tuesday 25 May 2021.

The Notice of Motion requests:

The Chief Executive Officer prepare a report for the August 2021 Council meeting which considers various alternatives, costs and benefits in the operation and modification of Tivoli Drive to cover the interim period until the next phase of development on the west side of Tivoli Drive commences, and major development of a “boulevard style” access road begins.

The report will contain and include consideration of:

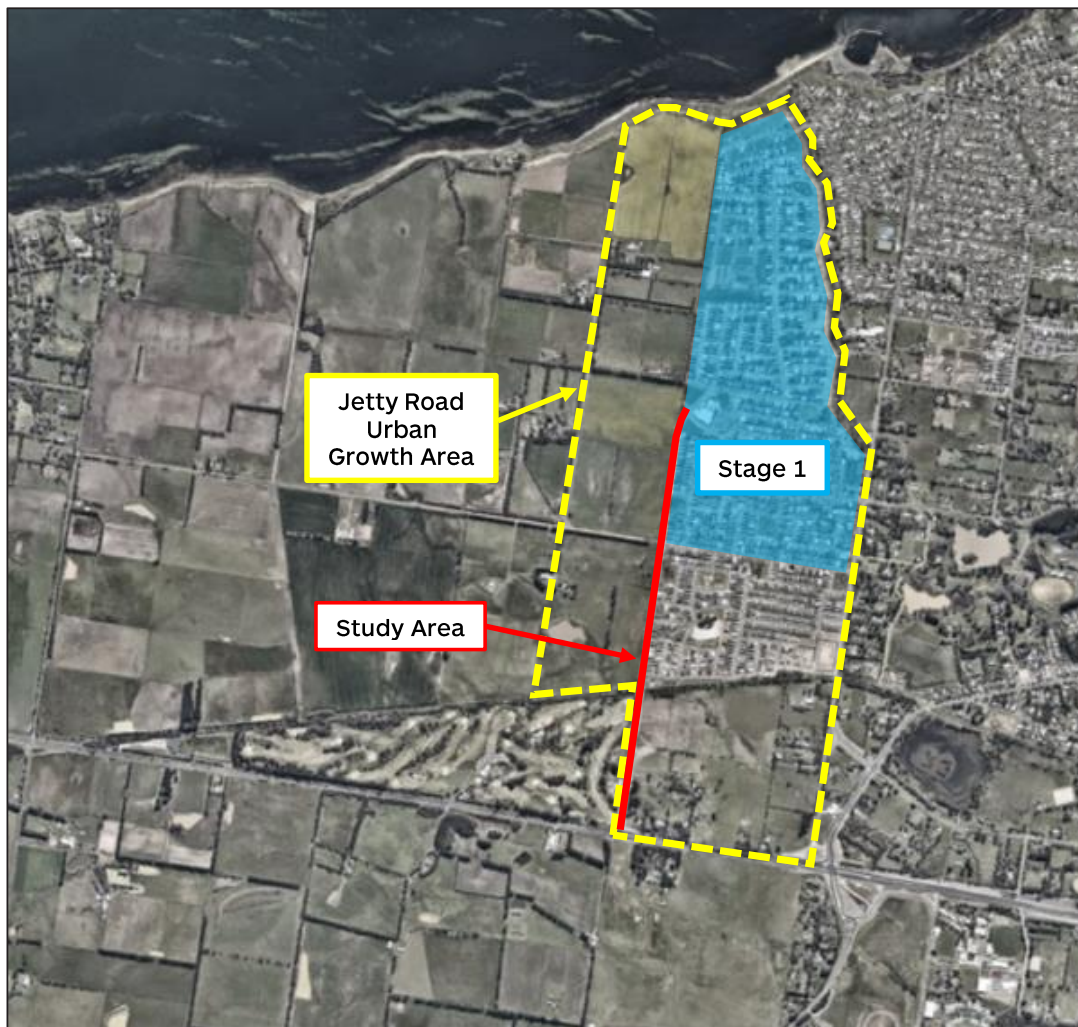
- 1.1 an overview of the proposed, development, developer responsibilities and contributions, and larger feeder areas such as Jetty Road development, and related timelines;*
- 1.2 potentially the continuation of the status quo;*
- 1.3 opportunity for formalisation of inset parking on nature strips;*
- 1.4 Possibility of a partial closure of the road to prevent access to Tivoli Drive from the Portarlinton Road C123;*
- 1.5 Completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline;*
- 1.6 Other traffic calming measures to reduce through traffic; and*
- 1.7 The need for on-going community engagement to consider an overview of future planning and timelines.*

Relevant to this report are items 1.2 – 1.6 of the above list, contained within the Notice of Motion. Items number 1.1 and 1.7 are directly covered by a separate report being completed by council officers, however, are still broadly considered in the preparation of this report.

2.2 Jetty Road Urban Growth Plan

The Jetty Road Urban Growth Plan (UGP) was prepared in September 2008 and provides a framework for the development of land in the Jetty Road Growth Area, Curlewis. ‘Stage 1’ as identified in the Jetty Road UGP is nearing completion. The balance of land within the UGP area is identified within the UGP as “Stage 2”. This land has yet to be rezoned for future development.

Tivoli Drive to Portarlinton Road is identified within the UGP as a primary “boulevard” road link to support the UGP area. The UGP Development Contributions Plan (DCP) identifies the sooner of the 2016/17 financial year or the delivery of 900 lots as the trigger for the delivery of Tivoli Drive through to Portarlinton Road. The Jetty Road UGP area, including the Stage 1 development area, in context of existing residential development and the study area for this assessment, is shown in Figure 2.1.

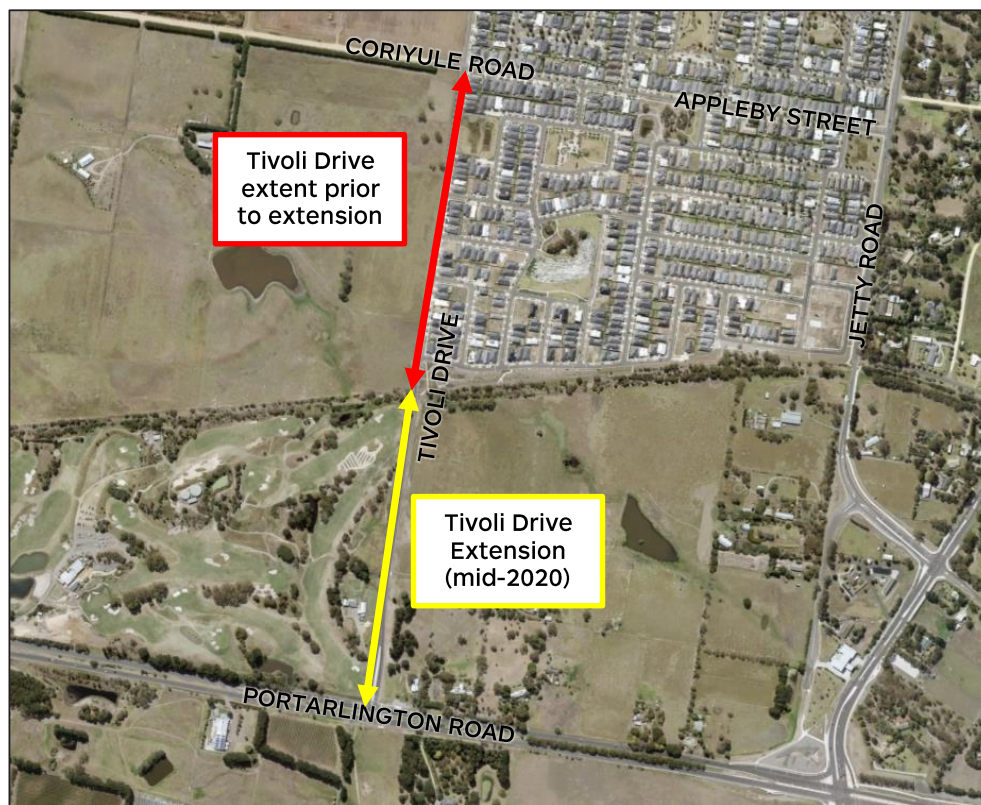
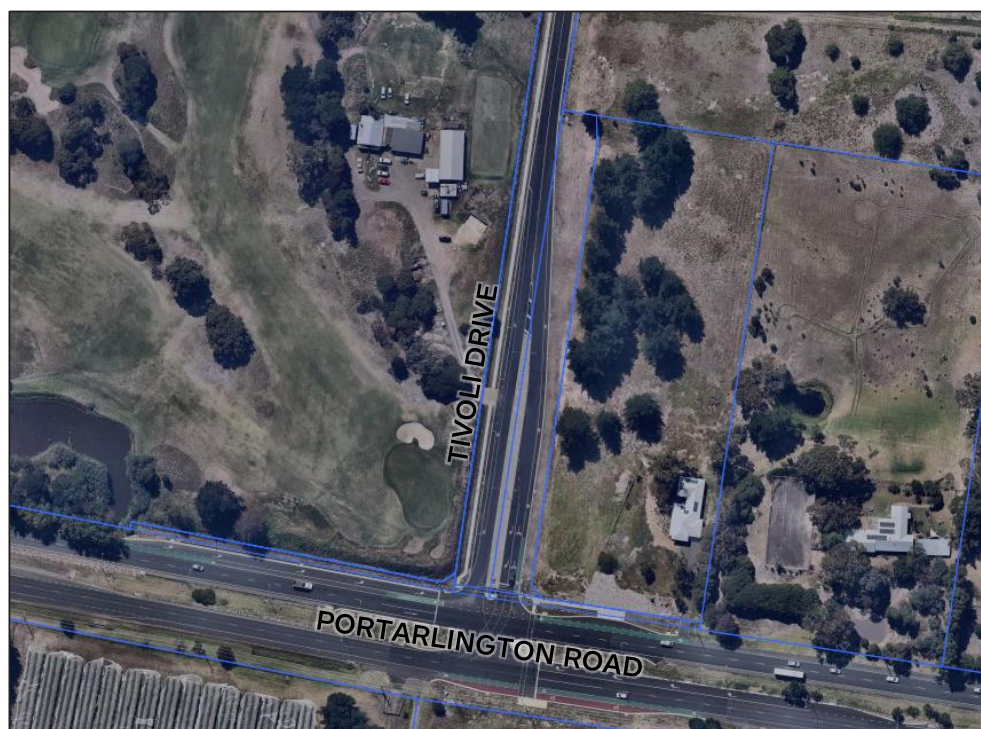
Figure 2.1: Jetty Road Urban Growth Area and Study Area

2.3 Tivoli Drive Extension

The Tivoli Drive connection between Portarlington Road and previous extent of Tivoli Drive near the Bellarine Rail Trail occurred during mid-2020.

It is understood that to undertake the works, land was acquired directly to the east of the golf course to provide for the road reserve, including a widened section near Portarlington Road to support the construction of traffic signals in the ultimate format.

Diagrams showing the extent of the Tivoli Drive extension and the intersection of Tivoli Drive and Portarlington Road are shown below in **Error! Reference source not found.** and Figure 2.3 respectively.

Figure 2.2: Extent of Tivoli Drive Extension**Figure 2.3: Aerial Photograph of Tivoli Drive/Portarlington Road**

2.4 Subsequent and Recent Improvement Works

Since the opening of Tivoli Drive's connection to Portarlington Road, the City received feedback from the community regarding concerns about traffic volumes, speeds, noise and the appropriateness of the road width.

To address feedback received, the City implemented a number of traffic calming measures including:

- *reduced the speed limit from 60km/hr to 50km/hr from Portarlington Road to Stanley Avenue;*
- *introduced line marking and increased warning signage at the crossroads of Coriyule Road with Tivoli and Greenvale Drive;*
- *introduced parking restrictions on the west side of Tivoli Drive and on the east side near the intersection of Stanley Avenue to improve sightlines;*
- *introduced speed humps to help manage speed and volume concerns (one speed hump was subsequently removed due to resident noise concerns);*
- *upgraded the intersection of Coriyule Road and Tivoli/Greenvale Drive with splitter islands to slow down turning traffic;*
- *requested support from Victoria Police to monitor and manage poor driver behaviour; and*
- *requested heavy vehicles accessing the local shopping centre and nearby developments seek an alternate route to reduce truck movements on Tivoli/Greenvale Drive.*

2.5 Tivoli Drive Ultimate Cross Section

Ultimately, it is understood that Tivoli Drive will be duplicated as a Boulevard style road with north and south bound traffic provided in separate carriageways as indicated in the Jetty Road Urban Growth Plan's future road network which is reproduced below in Figure 2.4.

The Jetty Road UGP Development Contributions Plan indicates that Tivoli Drive in its ultimate format will *"be capable of safe and efficient management of full development traffic (15,000 vehicles per day) generated by the growth area".*¹

¹ C230 Jetty Road Urban Growth Area Development Contributions Plan, September 2011

Figure 2.4: Jetty Road Urban Growth Plan: Future Road Network (Map No. 14)



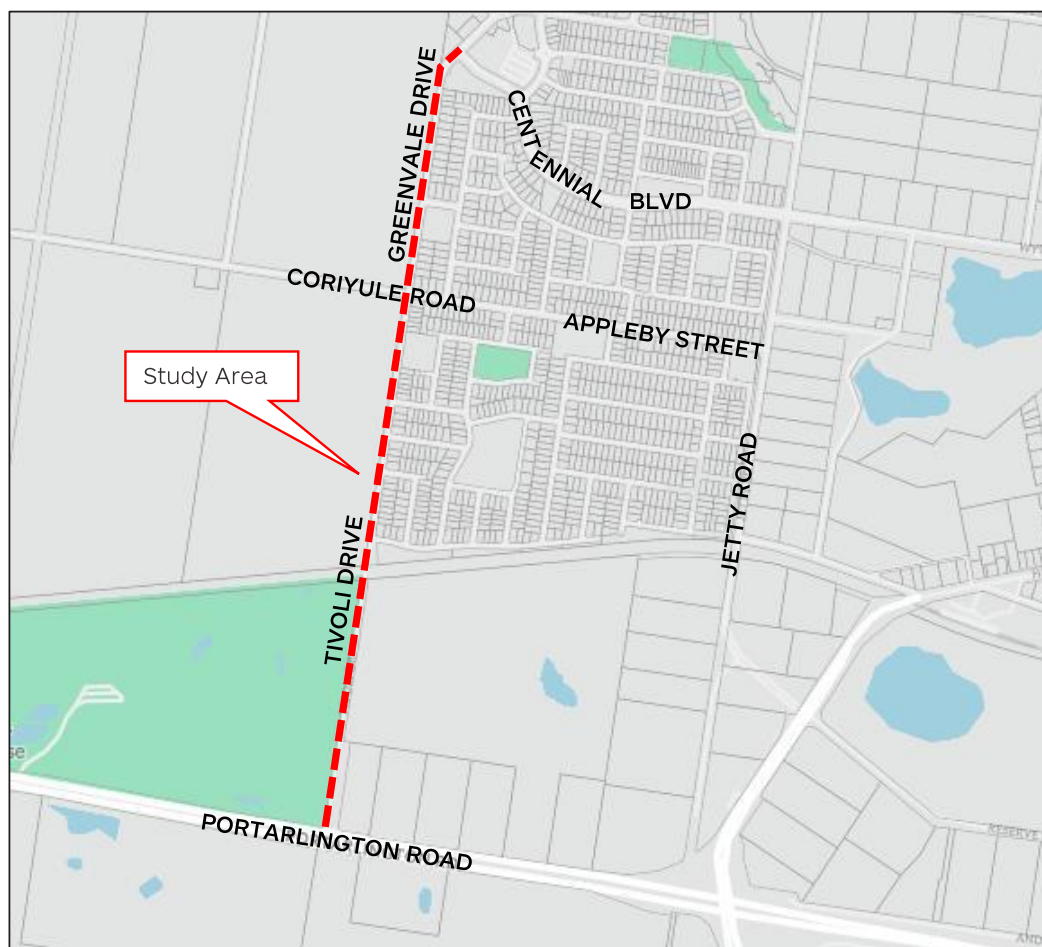
3 Existing Conditions:

3.1 Location

Tivoli Drive is located in Curlewis, approximately 18 kilometres east of Geelong, and 3 kilometres south-west of Drysdale.

The location of Tivoli Drive, in context of the local road network is shown in Figure 3.1.

Figure 3.1: Study Area



Source: landchecker.com.au

3.2 Road Network

Tivoli Drive and Greenvale Drive

Tivoli Drive is aligned north-south and currently extends from Coriyule Road in the north to Portarlington Road in the south. North of Coriyule Road, Tivoli Drive becomes Greenvale Drive.

Tivoli Drive and Greenvale Drive have a signed speed limit of 50km/h and its current road width comprises an approximately 7.3 metre carriageway with a single lane in each direction, a concrete pedestrian path is provided along the east side of the road.

At the approach to its intersection with Portarlinton Road, Tivoli Drive widens and separates opposing lanes of traffic with a central median. The southbound lane also widens to provide two turning lanes. The intersection with Portarlinton Road is signalised.

Tivoli Drive, looking north and along the road, near Stanley Avenue are shown in Figure 3.2 and Figure 3.3 respectively.

Figure 3.2: Tivoli Drive looking south near Stanley Avenue



Figure 3.3: Tivoli Drive looking north near Stanley Avenue**Other Roads of Significance**

Other roads of significance in the vicinity of the site are detailed in Table 3.1.

Table 3.1: Nearby Significant Road Details

Road	Ownership / Management	No. of Carriageways and Approximate Width	No. of Lanes	Speed Limit
Portarlinton Road	Department of Transport	Two @ 11.2m wide per carriageway	Two lanes per carriageway (four in total)	80 km/h
Jetty Road	COGG	Single carriageway, 12m wide	One lane in each direction	60 km/h
Coriyule Road (west of Tivoli Drive)	COGG	Single carriageway, 8m (unsealed)	Accommodates two-way traffic flow	80 km/h
Appleby Street	COGG	Single carriageway, 7m	Accommodates two-way traffic flow, with kerbside parking on both sides	50 km/h
Centennial Boulevard	COGG	Two @ 7.3m wide per carriageway	One lane in each direction and kerbside parking	50 km/h

3.3 Existing Traffic Volumes and Speeds

Traffic classifier surveys were undertaken over a number of dates throughout 2020 and 2021 in Tivoli Drive and other roads described in Table 3.1 above.

Weekday daily average traffic volumes (AADT 5-day) and 85th percentile speeds for these roads are presented in Table 3.2 below, for the following time periods:

- Late August / Early September 2020; and
- Late March / Early April 2021.

The above time periods generally correspond to the traffic conditions post-opening of the Tivoli Drive extension, and then after the implementation of traffic management and other temporary mitigating treatments.

The AADT 5-day traffic volumes and 85th percentile speeds are accepted engineering standard of measuring typical traffic conditions on a particular road section.

Table 3.2: Existing Traffic Volumes

Road Name	Section / Location	Late August / Early September 2020 ¹		March / April 2021 ¹	
		Volume (AADT 5-day)	Speed (85th Percentile)	Volume (AADT 5-day)	Speed (85th Percentile)
Tivoli Drive	South of Bellarine Rail Trail	3368 vpd	65.1 km/h	4468 vpd	65.6 km/h
	Arenal Street to Komodo Avenue	2958 vpd	57.9 km/h	3286 vpd	54.7 km/h
Greenvale Drive	Seabath Drive to Centennial Boulevard	2078 vpd	58.0 km/h	2126 vpd	57.7 km/h
Stanley Avenue	Tivoli Drive to Kakadu Drive	747 vpd (December 2020)	44.6 km/h (December 2020)	N/A	N/A
Coriyule Road	West of Tivoli Drive	284 vpd	67.1 km/h	262 vpd	61.9 km/h
	Tivoli Drive to Domain Avenue	1157 vpd	51.4 km/h	1100 vpd	45.2 km/h
Appleby Street	Amber Avenue to Pastoral Place	N/A	N/A	849 vpd	50.8 km/h
	Pastoral Place to Jetty Road	1919 vpd	45.2 km/h	2156 vpd	43.9 km/h

¹ Multiple surveys were undertaken for some sections of road within the nominated time period, and the volumes presented are averaged.

3.4 Public Transport

The extent of the study area does not currently form part of a public bus route. Bus routes which pass within close proximity to the study area are detailed in Table 3.3.

Table 3.3: Nearby Public Transport Services

Service	Route No's	Route	Nearest Stop
PTV Bus Route	60	Geelong Station – St Leonards via Drysdale and Portarlington	Tivoli Drive / Portarlington Road Intersection
	61	Geelong Station – St Leonards via Portarlington	Bayview Central Curlewis Shopping Centre

A review of aerial photography indicated that a bus stop has been line marked on Greenvale Road within the study area, approximately 50 metres south of Seabath Drive. The bus stop doesn't have a PTV bus flag and does not appear to be operational as a public transport route.

It is possible that this stop:

- was constructed as part of a future bus route; or
- may be utilised as a changeover location for drivers; or
- provides for school bus pick up / drop offs only.

3.5 Walking and Cycling

A pedestrian footpath is provided on the east side of Greenvale Drive and Tivoli Drive north of the Bellarine Rail Trail, south of the Bellarine Rail Trail the footpath is on the west side of Tivoli Drive.

The short, duplicated section of Tivoli Drive, which approaches the Portarlington Road intersection, has on-road bicycle lanes on both sides of the road. It is understood that the ultimate cross section will have bicycle lanes on both carriageways for the entire length, similar to Centennial Boulevard.

The Bellarine Rail Trail is an off-road shared pedestrian and bicycle route which crosses Tivoli Drive approximately 600 metres north of the Tivoli Drive/Portarlington Road intersection. Bellarine Rail Trail runs between South Geelong to Queenscliff and passes through the town of Leopold, Curlewis and Drysdale.

3.6 Crash Statistics Review (2015-2020)

The most recent 5 years of available crash statistics were reviewed using the publicly accessible Crashstats tool provided by the Department of Transport.

The review found that there have been no recorded injury casualty crashes on Tivoli Drive or Greenvale Drive in the last five years, nor have there been any along Coriyule Road.

It is acknowledged however that other crashes may have occurred within the study area during the most recent period for which crash data is not available, such as crashes where emergency services were not required to attend.

4 Issues, Constraints and Opportunities:

4.1 Overview

The following section outlines the issues, constraints and opportunities, having regard to both on-site observations, previous community feedback, and assessment of existing conditions. The outcome of this section is a summary of transport and safety issues and objectives to guide the assessment of potential options.

4.2 Community Feedback

Earlier in 2021, an online community engagement page was set up on the City's website, whereby members of the community could ask questions or raise concerns regarding Tivoli Drive (<https://yoursay.geelongaustralia.com.au/tivoli-drive-curlewis>). During the four week engagement period, a total of 24 submissions were made by 8 contributors.

Comments, questions and concerns were raised on a number of issues, which included (but not limited to) the following:

- Volumes of truck traffic;
- Road is too narrow;
- Speeding vehicles;
- Requests for enforcement;
- Interim and ultimate road conditions;
- Road safety concerns;
- Residential amenity.

4.3 On-Site Observations

Detailed on-site observations were undertaken on multiple dates and times during June 2021, including the AM peak period and during the middle of the day. The purpose of the site inspections were to:

- Understand and validate the feedback received from the community, in particular as it related to amenity and safety concerns;
- Observe typical transport conditions and any safety issues not previously identified; and
- Identify existing underground or overhead service utilities which may impact the feasibility of any road network or transport infrastructure changes.

The findings of these on-site observations, against the existing conditions information, and themes raised by the community are contained within the following sections.

4.4 Existing Cross Section

The existing cross section along Tivoli Drive is an interim cross section which provides access to Stage 1 of the Jetty Road UGP area. The existing road reserve including road pavement is effectively half of the ultimate road cross section.

It is understood that the existing cross section will be mirrored in the ultimate road cross section, with the north bound lanes provided to the east of the existing cross section south of the Bellarine Rail Trail, and on the west side towards the north. By way of example, the ultimate cross section will look similar to Centennial Boulevard.

To achieve this, the adjacent land must be developed. As such, duplication of Tivoli Drive is likely to occur at the time of constructing the subdivision and will open prior to construction of new housing.

This arrangement is shown schematically in Figure 4.1 below.

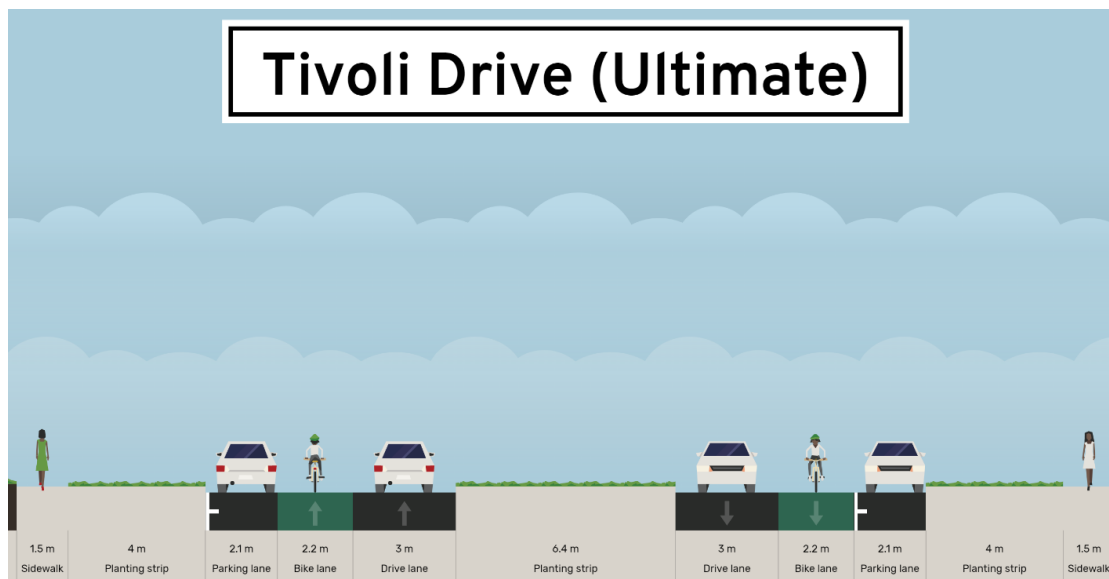
Figure 4.1: Future Arrangement of Tivoli Drive

A comparison of the existing and anticipated ultimate cross sections are presented in Figure 4.2 and Figure 4.3, respectively, to demonstrate how the existing carriageway and road reserve will form part of the overall future cross section.

Figure 4.2: Existing Tivoli Drive Cross Section (Looking north)



Figure 4.3: Anticipated Future Tivoli Drive Cross Section (looking north)



4.5 Existing Road Width

A number of different guides and objectives relate to the suitable width for a road in a new or proposed subdivision road network. The recently adopted updated Municipal Road Management Plan notes that categories of road follow the Infrastructure Design Manual and Local Planning Scheme classifications for residential streets.

Clause 56.06-8 of the Greater Geelong Planning Scheme, which provides a guide for consistency across the State of Victoria for newly constructed roads, outlines the typical characteristics for different road types.

For an Access Street Level 2 the characteristics include:

- Traffic volume = 2,000 – 3000 vehicle per day
- Target speed = 40km/h
- Carriageway width and parking provision = 7-7.5 metres wide with parking permitted on both sides of the road carriageway.

For a Connector Street the characteristics include:

- Traffic volume = 3,000 – 7000 vehicle per day
- Target speed = 50km/h
- Carriageway width and parking provision = 7.0 metres trafficable excluding on-road car parking and cycle infrastructure.

The current management of on-street parking along the length of Tivoli Drive provides for two way traffic clear of areas of on-street parking, albeit that effective traffic lanes, and does provide dedicated on-road cycle infrastructure.

In our view, the acceptable daily traffic volumes for Tivoli Drive in its current format, are considered to be approximately 4,000-5,000 vehicles per day, which is higher than the definition for an Access Street Level 2, but less than a Connector Street.

Daily traffic volumes in the section between Portarlington Road and Stanley Avenue exceed 4,000 vehicles per day. However it is noted that parking is prohibited on both sides of the road (except some marked spaces near Portarlington Road). Daily traffic volumes also exceed 3,000 vehicles per day between Stanley Road and Coriyule Road, noting parking is prohibited on the western side of the road.

4.6 Traffic Capacity and Congestion

With the presence of parked vehicles on the eastern side of Tivoli Drive, there is sufficient remaining road width for two vehicles to comfortably pass each other, and this was observed on site. However, this requires a level of courtesy from north-bound vehicles to keep as far as possible to the left.

It is acknowledged however that some motorists will choose to give way regardless, subject to the level of driver confidence, including size of vehicle approaching in the opposite direction (e.g. a waste truck). These movements are not considered unreasonable, noting they occur on most local streets within new and existing subdivisions.

The 'indicative maximum daily traffic volumes²' set out in various documents such as the Planning Scheme, Infrastructure Design Manual and Municipal Road Management Plan are not a measure of the traffic capacity of the road, but rather a reasonable environmental capacity balancing both residential amenity and traffic volumes. The target traffic volumes for a particular street vary depending on the location and function within the road network.

As above, the acceptable daily traffic volume for a road such as Tivoli Drive (north of Stanley Avenue) in its current format are considered to be approximately 4,000 - 5,000 vehicles per day noting the car parking ban on the western side of the road and higher order function within the road network.

Notwithstanding the above, based on observations on site, the delays to vehicles are typically only several seconds, and impact only one vehicle at a time, which is not considered unreasonable.

4.7 Road Safety

As it relates to safety, the presence of parked vehicles does not represent a significant road safety risk for vehicles travelling at 50km/h or less. The road is well lit with street lighting on both sides of the road. Opposing traffic movements and the parked vehicles are clearly seen during both the day and evening periods.

² From Greater Geelong Planning Scheme Clause 56.06-8 – Key to Table C1

The presence of pedestrians crossing the road or cyclist movements is very low, noting that the western side of Tivoli Drive and Greenvale Drive is undeveloped, and most cyclists can access the Bellarine Rail Trail from within the internal road network.

The vertical geometry along the length of Tivoli Drive includes a series of low crests and shallow depressions between Stanley Avenue and Coriyule Road. This geometry means that the road surface is not fully visible from a particular fixed point (e.g. looking north from Stanley Avenue). However, from our observations, against the posted speed limit there is sufficient forward sight distance such that a driver vehicle travelling along the road has sufficient ability to observe, react and avoid hazards on the road. This is assisted in key locations by solid centerline marking and hazard lane marking (i.e. zig-zags).

From a Safe Systems perspective the risk of crashes is relatively low, as would be expected for a road of its type in a built-up area. The exception is in the section between the Bellarine Rail Trail and Coriyule Road where excessive speeds and poor driver behaviour may result in a minor increase in the likelihood or severity of a crash occurring, when combined with sight distance constraints. As such, the existing safety issues are a driver behaviour issue, as opposed to road design.

4.8 Speeding Vehicles

As outlined in Table 3.2, the recorded 85th percentile speeds on a number of roads exceed the speed limit. While the default speed limit on all road in built up areas within Victoria is 50km/h, Tivoli Drive has a signed 50km/h speed limit.

During the survey periods, the recorded 85th percentile speed on Tivoli Drive, or the speed at which 85% of all motorists travel at or below, ranged from 54.7 km/h north of the Bellarine Rail Trail to 65.6 km/h in the newly extended section of Tivoli Drive. The results of these surveys indicate that both high levels of illegal and unsafe driving are occurring.

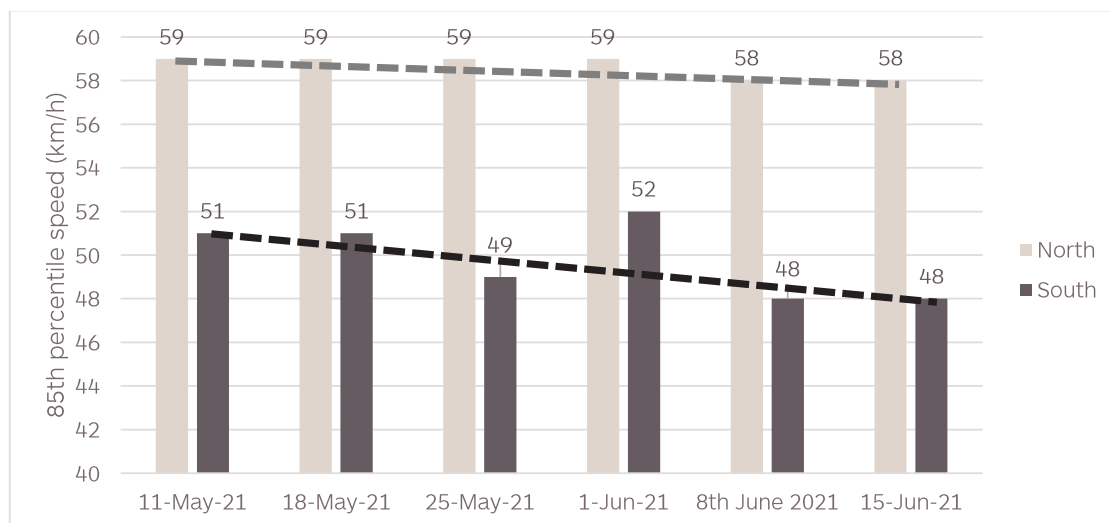
In addition to tube counts, vehicle speeds on Tivoli Drive were measured using two speed trailers, one measuring northbound traffic near Portarlington Road, and the other measuring southbound traffic closer to Coriyule Road.

A sample of data was collated for Tuesdays over a period of 6 weeks. The speed trailers observed 85th percentile speeds ranging between 58 km/h and 59 km/h for northbound traffic and 48 km/h to 52 km/h for southbound traffic.

The northbound 85th percentile speeds recorded by the speed trailer generally align with the tube count surveys, although towards the lower estimates.

The highest southbound 85th percentile speed recorded by the speed trailer was less than the lowest recorded 85th percentile speed recorded by the tube counts, suggesting traffic speeds have been decreasing.

The sample data analysis from the speed trailer for six Tuesdays between 11th May 2021 and 15th June 2021 are shown below in Figure 4.4.

Figure 4.4: Speed Radar Trailer 85th Percentile Speeds (May and June 2021)

4.9 Heavy Vehicular Traffic

The traffic classifier tube counts, discussed in Section 0, also recorded the size of vehicle. Along Tivoli Drive, it was found that between 5-10% of vehicles were heavy vehicles (depending on the survey date), or between 171 and 357 heavy vehicles.

While this would be considered a relatively high percentage of heavy vehicles in a residential street, the vast majority were classified as Class 3 (two axle truck or bus) which is the lowest classification of heavy (note: heavy vehicle classifications range from Class 3 to Class 12 depending on the number and spacing of axles). This likely reflects heavy vehicle traffic associated with on-going development and housing construction in the area. As such we would expect heavy vehicle volumes to reduce to typical levels once development of the area complete.

Trucks which have an origin or destination within a particular area are permitted to use roads which provide the most direct route to and from 'truck preferred roads' such as collector or arterial roads.

4.10 Noise

It is understood that one of the key concerns raised by the community in relation to Tivoli Drive is noise associated with traffic movements along the frontages of residential properties, including vehicles traversing speed humps. While noise in this context is related to motor vehicles, it is not an issue which can be assessed or mitigated through the use of traffic engineering principles, knowledge or solutions. Any issues pertaining to the impacts of noise or how they could be mitigated must be assessed by a qualified acoustics engineer.

Notwithstanding, it is acknowledged that all vehicles generate a level of noise, and that this may be heard by adjacent properties.

From a regulatory perspective, there are laws and vehicular registration requirements that guide the acceptable levels of noise emitted from a vehicle, and these are matters for Victoria Police and / or the Department of Transport (VicRoads) to enforce. Further to this, we were advised by Council that there are currently no legislated policies or guidelines in Victoria for the control of assessment of noise from local traffic travelling over speed humps.

While a noise assessment has not been undertaken by a qualified acoustics engineer as part of this assessment, there is a general expectation that residents living adjacent to a trafficable road will experience vehicle related noise and that for Tivoli Drive this would be no different.

4.11 Stage 1 Residential Development

While much of residential lots of Stage 1 (in the Jetty Road UGP) have been constructed, a high-level review of aerial imagery indicates that there are still over 200 lots without a dwelling delivered.

A review of Nearmap aerial imagery from 22 May 2021 revealed the following distribution of empty lots (approximate):

- North of Oceania Drive: 135 empty/incomplete lots.
- Oceania Drive to Coriyule Road: 13 empty/incomplete lots.
- Coriyule Road to Bellarine Rail Trail: 57 empty/incomplete lots.

The above assessment indicated there were approximately 205 empty/incomplete residential lots. By conservatively assuming a traffic generation of 8 vehicle movements per dwelling per day results in 1,640 additional vehicle movements which will be generated once these lots have been delivered.

Based on a review of the location of empty lots and vehicle access points to the surrounding road network, it is estimated that approximately 25% of the additional 1,640 vehicle movements will be distributed via Tivoli Drive, with the balance via Jetty Road and internal trips to the shopping centre.

Therefore, before the ultimate cross sections is delivered, Tivoli Drive may experience up to an additional 400 additional vehicle movements per day. This does not take into account any temporary traffic associated with ongoing residential construction, which would ultimately be subtracted once dwellings are constructed.

4.12 Utility Services

An on-site inspection was undertaken and a Dial Before You Dig enquiry was completed for the study area to understand the presence of underground and above ground utilities within Tivoli Drive and Greenvale Drive.

Given that the road is part of a relatively new subdivision, the majority of service utility infrastructure is provided underground, with the exception of light poles, which are located on both the east and west sides of the road, and above ground NBN / fibre optic infrastructure.

In the verge area alongside residential frontages on Tivoli Drive, the following underground infrastructure exists, with typical size and offsets outlined in Table 4.1 below.

Table 4.1: Underground Service Infrastructure on Tivoli Drive

Service Utility	Asset Owner / Manager	Size ¹	Offset (to property boundary) ¹
Water	Barwon Water	150mm dia (east) 300mm dia (west)	3.8 – 4.1 metres 1.6 – 1.7 metres
Gas	AusNet Gas Services	125mm dia	3.4 metres
Stormwater / Drainage	City of Greater Geelong	Varies between 300 and 1050mm dia	5 metres
Sewer	Barwon Water	150mm dia	0.9 – 1.1 metres
Fibre Optic / Telecoms	Multiple	Various	Approx. 2.0 – 3.0 metres
Electricity (Low Voltage)	Powercor	Various	Typically within footpath or next to lighting posts

¹ Sizes and offsets are typical only, based on DBYD plans, and should not replace a detailed service proving exercise.

4.13 Street Trees

Based on advice from the City's arborist, it is understood that the street trees planted in verges along Tivoli Drive and Greenvale Drive by the developer:

- are Australian native and cannot be relocated because they will not survive; and
- cannot be re-planted within other locations in the verge because of the presence of underground utilities and subsequent protection zone requirements.

As such, in newer subdivisions, any tree removed cannot be relocated, or be guaranteed to be replaced at a later date.

Street trees provide an important biodiversity value and urban heat island mitigating effect, which benefits the whole community. Trees also provide intermittent shading for people walking along the footpath which is valuable during warmer months.

4.14 Parking on Naturestrips

It was noted on site that vehicles were illegally parked on naturestrips along Tivoli Drive and Greenvale Drive. A naturestrip is typically defined to include the area between the road and footpath, and not including vehicle crossovers. Naturestrips can either be grass or some form of approved rock / gravel surface.

The prohibition of parking on naturestrips is a state-wide road rule, contained within the Victorian Road Safety Road Rules.

Some key reasons why parking on naturestrips is prohibited include:

- To protect the integrity of underground assets, such as fibre optic, gas, water etc.
- To protect against damage to drainage pit lids and other utility pit covers;
- To protect against damage to trees, including the root zone which typically aligns with the tree canopy;
- Concrete barrier kerbing is typically not reinforced, and apart from its drainage function, it is designed to stop vehicles driving onto the road side area; and
- Provide separation between vehicle movements and pedestrians walking along the footpath.

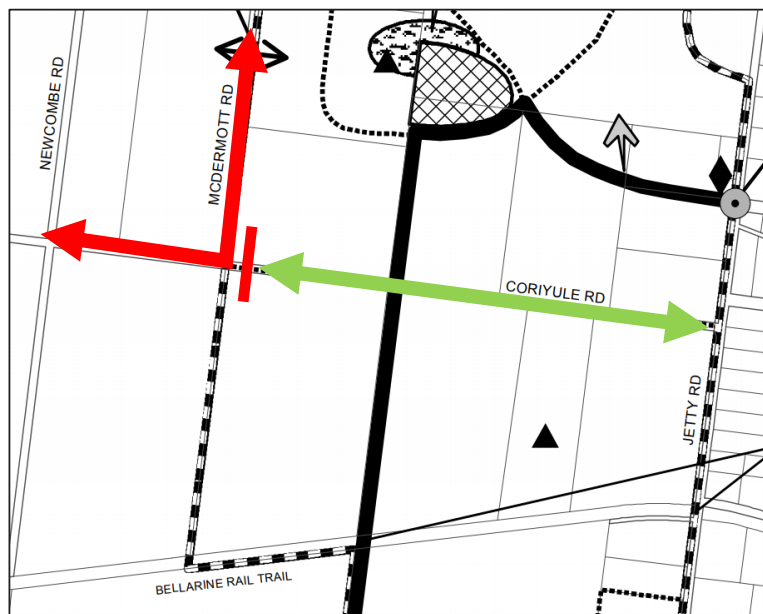
4.15 Stage 2 Road Network

It is understood that as part of the Stage 2 development of the Jetty Road UGP, that Coriyule Road will either:

- be terminated at McDermott Road, such that traffic can only access the Jetty Road UGP area via either Jetty Road or Tivoli Drive; or
- designed in a way as to only encourage use by local residents to the west (in Farming Zoned land).

A representation of how this might look is shown on an excerpt of the Jetty Road UGP Future Road Network plan below in Figure 4.5.

Figure 4.5: Stage 2 Road Network – Coriyule Road



4.16 Summary

In summary, the key issues and opportunities as it relates to Tivoli Drive and Greenvale Drive, in the broader context of the Jetty Road UGP are:

- It is understood that the ultimate cross section can only be constructed when adjacent land is rezoned and will be required to open prior to any dwellings being constructed within the ‘Stage 2’ land.
- The ultimate cross section will effectively duplicate the existing cross section, and the existing cross section will not be modified, except for changes to traffic flows and the addition of a bicycle lane.
- The existing road width and car parking ban along the west side of Tivoli Drive still allows for 2-way traffic flow, although requires a level of courtesy from northbound drivers to remain as far left of the road as practicable.
- It is observed on site that when vehicles are parked on the east side of Tivoli Drive, that some southbound vehicles will stop and give way to northbound vehicles. The delays are typically a few seconds at most and only impact one vehicle at a time. These types of situations are not unreasonable and could be expected in most residential streets.
- Based on the current width of Tivoli Drive and the car parking ban on the western side of the road, the target daily traffic volume north of Stanley Avenue could be expected to be in the order of 4,000-5,000 vehicles per day.

- From a Safe Systems perspective, the risk of a crash occurring on Tivoli Drive is low for most crash types. An exception is in the section between the Bellarine Rail Trail and Coriyule Road where excessive speeds or poor driver behaviour may result in a minor increase in the likelihood or severity of a crash occurring. Any existing safety issues are therefore contributed to by driver behaviour as opposed to road design factors.
- Traffic classifier surveys indicate that there is a high level of illegal and unsafe speeds in Tivoli Drive. The implementation of speed trailers has been demonstrated to effectively lower speeds albeit not to within acceptable limits.
- There were a high percentage of heavy vehicles recorded during the traffic classifier surveys. The majority of heavy vehicles were in the lowest range (Class 3) and could likely be attributed to building sites which is not unexpected in a development area.
- There are approximately 200 vacant lots in Stage 1 yet to be constructed which could potentially yield up to an additional 1,640 vehicle movements once built. Of these, conservatively up to 25% or 400 additional vehicles could be expected to utilise Tivoli Drive.
- Several underground and above ground utility assets are located within the naturestrips along Tivoli Drive and Greenvale Drive. Street trees are also located within naturestrips on the residential frontages, which cannot be relocated.
- The presence of vehicles parked on naturestrips may be impacting the integrity of underground assets including tree roots and may be causing damage to other above ground infrastructure.
- It is understood that Coriyule Road will be discontinued at McDermott Road as part of the ultimate Stage 2 road network, or at a minimum designed in a way so as to only encourage use by local residents to the west outside of the Jetty Road UGP area in Farming Zoned land.

5 Options Assessment

5.1 Overview

The following section outlines an assessment of the potential options and solutions, having regard to the issues, constraints and opportunities outlined in the previous section.

The options assessed throughout this section, include those identified in the Notice of Motion (NoM).

In this regard, the following options are not necessarily the recommendations, but rather an assessment of potential solutions to mitigate against road safety and amenity issues prior to the ultimate cross section being constructed along Tivoli Drive and Greenvale Drive.

A summary of the options assessed are listed below (including NoM reference where applicable):

1. potentially the continuation of the status quo (NoM item 1.2);
2. opportunity for formalisation of inset parking on nature strips (NoM item 1.3);
3. possibility of a partial closure of the road to prevent access to Tivoli Drive from the Portarlington Road C123 (NoM item 1.4);
4. completion of Hermsley/Geelong Road lights, connection with Coriyule Road, projected sealing options and timeline (NoM item 1.5); and
5. other traffic calming measures to reduce through traffic (NoM item 1.5).

5.2 Option 1: Maintaining the Status Quo

As outlined in the previous section, there is still a number of residential dwellings to be constructed within the existing rezoned land. No further development may occur outside of this area until such time that other rezoning is complete, and Tivoli Drive is duplicated to its ultimate cross section.

The additional growth in traffic volumes could be in the order of 400 vehicle movements per day along the section of Tivoli Drive closest to Portarlington Road and progressively lower further towards the north.

The benefits, impacts and costs of maintaining the status quo (i.e., no further interventions) along Tivoli Drive and Greenvale Drive are outlined in Table 5.1 below.

Table 5.1: Option 1: Maintaining the Status Quo

Benefits	<ul style="list-style-type: none"> Avoids upgrades or works associated with implementing other interim mitigations which would be temporary only and may have to be wound-back or removed post the ultimate cross section being implemented.
Impacts	<ul style="list-style-type: none"> Without a reduction in vehicular speeds or improvement of driver behaviour, any existing amenity or road safety issues might be exacerbated by the increase in traffic expected with the completion of the remaining dwellings in the existing rezoned and subdivided land.
Costs and Timing	<ul style="list-style-type: none"> This option does not involve works and hence no financial costs. Timeframes will be from the present day until such time as the ultimate cross section is constructed.

5.3 Option 2: Indented Car Parking

The provision of indented car parking along the eastern side of Tivoli Drive would be at the expense of naturestrips (including trees) and would effectively widen the existing trafficable width of road such that there is a clear approx. 3.5 metre wide lane of traffic in each direction compared to the existing approx. 5.2 metres total trafficable width (when a car is parked kerbside).

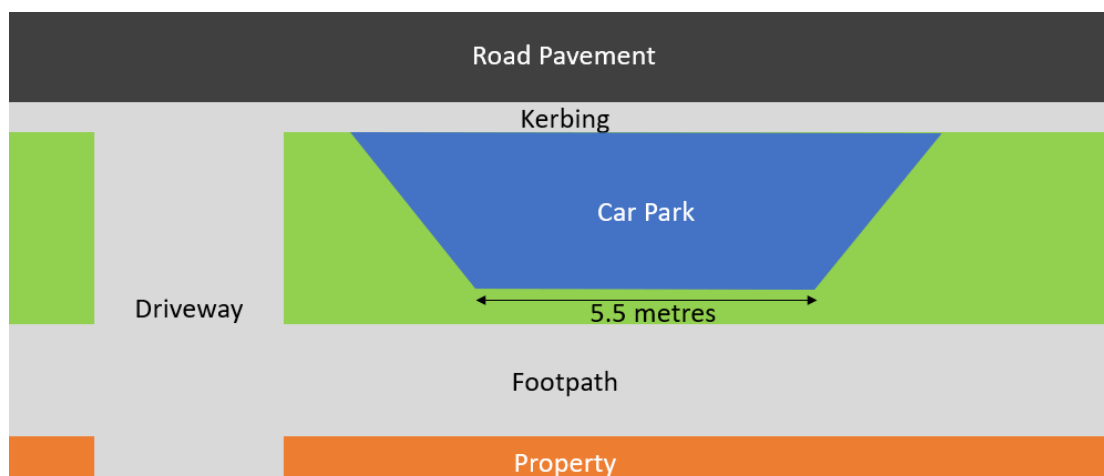
Based on the identified issues, the key area of focus appears to be on Tivoli Drive between Stanley Avenue and Coriyule Road. As such, the following considers the implementation of indented car parking between Stanley Avenue and Coriyule Road only.

Indented car parking in this instance, would require the following works:

- Removal of kerb and channel and replacement with driveable or fully mountable kerbing;
- Tree removal;
- Utility relocations, including vertical or horizontal relocation;
- Hardstand area approximately 2.1 metres wide behind-kerb for parked vehicles.

A diagrammatical representation of our indented car parking could look is shown below in Figure 5.1.

Figure 5.1: Indented Car Parking Diagram



Based on a standard car parking length of approximately 5.5 metres as shown above, the application of the above to Tivoli Drive would allow for one car space in front of each property. Indented car parking would not be located within 10 metres of an intersection. This would result in a total of approximately 21 spaces (or 31 if including in front of the reserve), as shown below in Figure 5.2.

Figure 5.2: Potential extent and number of indented car parking spaces

Indented car parking is provided within the public road reserve, it would not be allocated to a single property, and could be utilised by any resident or visitor to the area.

To support the implementation of indented car parking along Tivoli Drive, any remaining kerbside areas on the road pavement would need to have car parking banned (e.g. near intersections and in front of reserves). The implementation along the full length is required for consistency (across larger segments of road).

The benefits, impacts and costs of implementing indented car parking along Tivoli Drive between Stanley Avenue and Coriyule Road are outlined in Table 5.2 below.

Table 5.2: Option 2: Indented car parking spaces

Benefits	<ul style="list-style-type: none"> • Additional trafficable width for two-way traffic flow as well as an additional margin of safety for parked vehicles. • Remove amenity/traffic flow impacts created by some motorist decision to pull over to allow vehicles in the opposing direction to pass when cars are parked on carriageway. • Removes legality issues associated with the current observed practice of parking on naturestrips (whether grass or rock)..
Impacts	<ul style="list-style-type: none"> • A 'street' wide approach to indented parking is required to respond to road safety matters such as confusion about where cars should be parked and where the trafficable lanes are. As such, the treatment may need to be extended for the entire length of Tivoli Drive and Greenvale Drive (north of Stanley Avenue). • On-road car parking provides some local traffic management benefit. The removal of this parking may result in increased traffic volumes and the attractiveness of Tivoli Drive rather than use other streets. • Similarly, vehicle speeds may increase with the removal of on-street parking as traffic lanes widen, further exacerbating the issue of illegal and poor driver behaviour. • Less parking will available along property frontages than if parking was maintained on the road carriageway. • Indented car parking will be for any resident / visitor and not able to be linked to individual properties, and parking may not be able to be provided in front of every property. • Will require removal of significant numbers of protected trees in naturestrips. • Trees could not be relocated or replanted in the naturestrip due to the presence of underground utility protection zones. • Will likely require the relocation of both above and below ground service utility assets, including light posts, NBN nodes, drainage pits etc. • When the duplication of Tivoli Drive occurs, the indented spaces would need to be removed as a dedicated parking lane will be provided on-road.
Costs and Timing	<ul style="list-style-type: none"> • Based on historic examples, a single indented car parking space can cost between \$5,000 - \$20,000 depending on the level of infrastructure change required including underground utilities. Noting the high number of services within the naturestrip, the costs could be expected to be in the higher range. • Due to design requirements and potential service relocations, implementation timeframes would be extended.. • There will also be an additional cost to removing the indented spaces when the ultimate cross section is constructed.

5.4 Option 3: Partial or Full Road Closure (Tivoli Drive)

The Notice of Motion requests that a partial closure of Tivoli Drive be considered, which is interpreted to mean restricting vehicular movements between Portarlington Road and Stanley Avenue in order to reduce traffic volumes in the section of Tivoli Drive north of Stanley Avenue. Ultimately this could be done via a partial or full road closure, somewhere between Portarlington Road and Stanley Avenue.

Any closure of Tivoli Drive whether full or partial would be in place until at least such time as the duplication of Tivoli Drive between Stanley Street and Coriyule Road is completed. The timing of this duplication is unknown but is not expected in the short term. As such, a full or partial close of Tivoli Drive will be a long-term response and not something that could be undertaken under temporary traffic management.

Regardless of the location or type of closure, approval would be required from the Department of Transport and a transport impact assessment prepared which also identifies the mitigating works. This requirement would be in place regardless of a partial or full road closure.

A full closure of Tivoli Drive would require a physical road closure along Tivoli Drive between Stanley Avenue and Portarlington Road, including supporting signage at both Portarlington Road and near Stanley Drive. A partial closure could be considered that limits traffic to one way only between Stanley Avenue and Tivoli Drive. Ultimately, the location of the closure would be dependent on property access requirements in the section of Tivoli Drive between Stanley Avenue and Portarlington Road.

The significant outcome will be that part or all traffic currently using this Tivoli Drive would be required to use either Jetty Road or Hermsley Road and Coriyule Road/Appleby Street to access the Growth Area. This is not consistent with the Growth Area movement and access strategy, and we note that the streets and signalised intersections across the Growth Area network have likely been designed with the extension of Tivoli Drive in mind, and the interim traffic volumes and cross section prior to Stage 2.

Key streets and intersections, that would be impacted are illustrated in Figure 5.3 below.

Figure 5.3: Potential Road Closure at Tivoli Drive and Portarlington Road



The benefits, impacts and costs of implementing a full or partial road closure on Tivoli Drive between Portarlington Road and the Bellarine Rail Trail are outlined in Table 5.3 below.

Table 5.3: Option 3: Partial Road Closure

Benefits	<ul style="list-style-type: none"> Traffic levels along Tivoli Drive, and to a lesser extent on Greenvale Drive would return to conditions near pre-extension of Tivoli Drive.
Impacts	<ul style="list-style-type: none"> The closure could be in place for an extended period until such time that Tivoli Drive is 'duplicated' into its ultimate cross section. There are several properties which have legal right of access to the southern section of Tivoli Drive which existed prior to the construction of Tivoli Drive. Consideration would be required to maintain this access through the intersection of Tivoli Drive and Portarlington Road. Existing traffic would be redistributed throughout the transport network, which will result in issues at other locations. The most likely impacts in this regard would be: <ul style="list-style-type: none"> excessive use of Coriule Road west of Tivoli Drive, which is currently an unsealed rural access road which carries approx. 300 vehicles per day; use of Portarlington Road and High Street, and Jetty Road and High Street signalised intersections which have not be designed to accommodate these traffic flows and hence may result in additional delays and queues for motorists; increased volumes at the intersection of Appleby Street and Jetty Road intersection, which is currently unsignalised; increased use of Appleby Street which has a similar cross section to Coriule Road but with vehicles parked on both sides of the road; and additional kilometres travelled on local roads, resulting pre-Tivoli Drive extension travel times and road wear and tear. Potential works to mitigate against the closure of the Jetty Road extension may include, but not limited to: <ul style="list-style-type: none"> A full remodel of the intersection of Portarlington Road and Tivoli Drive will be required, including potential infrastructure modifications works. Potential remodel and infrastructure changes to the signalised intersections of Hermsley Road / Portarlington Road, Portarlington Road / High Street, and High Street / Jetty Road. Potential signalisation of Jetty Road and Appleby Road intersection to accommodate capacity of vehicles expected. If the above mitigating works were implemented as part of a closure, they would also need to be reversed once Tivoli Drive is duplicated in its ultimate cross section.
Costs and Timing	<ul style="list-style-type: none"> If all the above works are required, the cost to implement the partial or full closure could potentially be in the order of \$20-30k per intersection. The total cost of the closure could be expected to exceed \$100,000, noting design, approvals and implementation costs for each of the intersections as well as physical works for the closure location and additional transport studies. Further investigations including modelling and design would be required to inform the level of works required and hence the costs to implementing a full or partial closure. The closure of Tivoli Drive will require Department of Transport approval including a detailed traffic impact assessment report. Any works identified through this process would need to be completed prior to the closure. If approvals are granted by the Department of Transport, considerable time will be required for design and implementation of works and this would likely take at least a year to complete.

5.5 Option 4: Access via Hermsley Road and Coriyule Road

Works to signalise the intersection of Hermsley Road and Portarlington Road are currently underway. Coriyule Road provides a connection between Tivoli Drive and Hermsley Road that allows access to these signals from the Growth Area.

Currently, Coriyule Road is a gravel rural access road, which carries low volumes of traffic. In order for this option to be implemented, the following works and upgrades would likely be required:

- Construction and sealing of Coriyule Road to a Low-Density Residential Collector Road, with a 6.2m wide seal and 1.5m wide shoulders;
- Upgrades to the intersection of Coriyule Road and Hermsley Road, including localised widening and addition of turn lanes on Hermsley Road;
- Upgrades to the signalised intersection of Hermsley Road and Portarlington Road which is currently under construction (in June 2021); and
- Upgrades to the intersection of Coriyule Road and Tivoli Drive.

The location of the Coriyule Road upgrade, including other nearby intersections which may require upgrades, is shown below in Figure 5.4.

Figure 5.4: Upgrade and Access via Coriyule Road



The benefits, impacts and costs of upgrading Coriyule Road for improved access as an alternative to Tivoli Drive are outlined in Table 5.4 below.

Table 5.4: Option 4: Upgrade and Access via Coriyule Road

Benefits	<ul style="list-style-type: none"> A portion of traffic currently accessing Tivoli Drive would use Hermsley Road and Coriyule Road, resulting in less volumes of traffic on Tivoli Drive south of Coriyule Road. There is unlikely to be an improvement in driver behaviour or average speeds.
Impacts	<ul style="list-style-type: none"> The redistribution of traffic would not change the existing speed profile for Tivoli Drive, or fully resolve any safety or amenity concerns. The widening and upgrade of Coriyule Road may require consideration of environmental impacts to roadside vegetation. The works would effectively create an additional collector road function access into the Jetty Road UGP area which was not currently identified. An increase in traffic volumes along Coriyule Road is beyond what was contemplated within the Jetty Road UGP.
Costs and Timing	<ul style="list-style-type: none"> Further engineering assessment would be required to understand the geotechnical design requirements and suitability of the existing road pavement to carry additional volumes of traffic. If a full road reconstruction were required, this could comfortably exceed \$1.25 million. To upgrade Coriyule Road to the relevant highest standards, vegetation removal may be required where encroaching into the required cross section. In section, safety guard rail may be required where trees or utility poles are within 'clear zones'. The intersection of Hermsley Road and Portarlington Road may require further improvement works beyond those already being undertaken. This will result in additional costs, depending on the exact nature of works required. From a timing perspective, design and construction works could take in the order of one or more years to complete. Approvals works and any changes to utility infrastructure may further extend timeframes for the commencement of construction.

5.6 Option 5: Traffic Calming Measures on Tivoli Drive

Following the initial extension of Tivoli Drive, the City implemented a number of traffic measures, including speed humps, parking bans, splitter islands and other intersection improvements. Following further feedback, we understand a speed hump was removed due to noise.

Furthermore, two speed trailers were placed in Tivoli Drive, which have been demonstrated to improve compliance with speed limits in the street.

A holistic approach to local area traffic management can be broken down into four key areas, including:

- *Education;*
- *Enforcement;*
- *Traffic management infrastructure; and*
- *Engagement with the community.*

The above also requires different levels of responsibility and accountability, including from motorists, road authorities such as the City, and Victoria Police.

The installation of traffic management infrastructure should be undertaken in accordance with best practice design standards, acknowledging that the effective of treatments is reduced where this is not achieved. Enforcement and education strategies are key tools relevant to issues of driver behaviour.

It is highlighted that this Option is not significantly different to that currently being done, and the following relates to additional suggestions, and what might further benefit from these initiatives.

Based on a review of the existing conditions and issues within Tivoli Drive, the following traffic management strategy has been identified:

Education

- Implementation of permanent speed radar information displays in Tivoli Drive (i.e. permanent versions of the speed trailers currently located within Tivoli Drive).

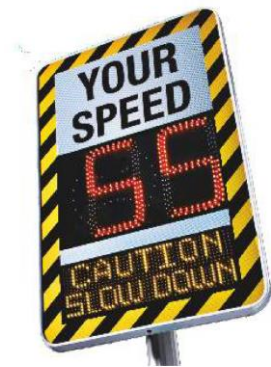
Enforcement

- Ongoing advocacy to Victoria Police to enforce speed limits within Tivoli Drive including sharing of speed data and analysis.
- Enforcement of illegal parking, including parking on naturestrips and within 10 metres of intersections.

Traffic management infrastructure

- Implementation of a fully raised intersection treatment at the intersection of Coriyule Road and Tivoli Drive, which would reduce speeds on approaches.
- Implementation of fixed speed radar information signs.
- Implement an additional two traffic calming devices between existing speed humps on Tivoli Drive between Stanley Avenue and Coriyule Road (at locations with street lights at property No. 41 Tivoli Drive and No. 59 Tivoli Drive). A suggested treatment may include road cushions with splitter island, which can be done as a temporary measure similar to existing speed humps.
- Undertake traffic classifier surveys in Greenvale Drive north of Coriyule Road to confirm existing speeds and whether or not further traffic calming devices are required.
- Revert the speed limit of Tivoli Drive between Portarlinton Road and the Bellarine Rail Trail to 60km/h such that it reflects the rural and low risk road environment, and improves compliance with both 60km/h and 50km/h speed limits in different sections.

The potential treatments are shown below in Figure 5.5.

Figure 5.5: Potential additional local area traffic management treatments*Road Cushion (Rubber) with Splitter Island**Raised intersection treatment**Speed radar sign*Engagement with the community

- Formalise a local area traffic management strategy for Tivoli Drive, including treatment types and seek community input and feedback on the locations and designs.
- Undertake periodic reviews and provide updates to local residents on the effectiveness of the above initiatives.
- This may include periodic traffic surveys to record traffic volumes and speeds.

The benefits, impacts and costs of upgrading Coriule Road for improved access as an alternative to Tivoli Drive are outlined in Table 5.4 below.

Table 5.5: Option 5: Traffic Management Strategy

Benefits	<ul style="list-style-type: none"> • Reduced speeds and better compliance with existing speed limits, including improved amenity for local residents. • Minimal potential flow-on impacts to other areas of Curlewis or Drysdale (as seen under Options 2, 3 and 4).
Impacts	<ul style="list-style-type: none"> • Where no suitable alternative routes are provided (as is the case for Tivoli Drive), the implementation of traffic calming is unlikely to reduce traffic volumes. • May result in localised parking bans at locations of traffic calming devices. • Potential that additional traffic calming devices may result in increased number of complaints received regarding impacts associated with accelerating, braking, and travelling over speed humps.
Costs and Timing	<ul style="list-style-type: none"> • The costs of potential infrastructure treatments outlined above would range from \$5,000 - \$10,000 per road cushion treatment, and between \$20,000 - \$50,000 for a raised intersection treatment. • Fixed speed radar signs range in cost depending on supplier, but could be expected to be in the order of approximately \$20,000 per sign including supply and installation. • The treatments would not require detailed design, and could be implemented relatively quickly, noting there would be no impact to underground utilities or trees. • Other items such as advocacy, education or enforcement would be undertaken by council officers in day-to-day roles.

5.7 Removal of existing traffic calming prior to Tivoli Drive duplication

In addition to the NOM items which include Option 1-5, the City has also requested a review of the impact of removing any remaining speed humps along Tivoli Drive. The following is provided separately to the above options assessment, primarily as a sensitivity assessment.

Speed humps were placed within Tivoli Drive following traffic surveys which demonstrated high volumes of speeding traffic. Speed humps, when implemented at the correct and regular intervals, are an effective traffic management tool in reducing instances of speeding vehicles, overall speeds, and non-local through traffic.

Following further community feedback relating to noise, one speed hump was removed from Tivoli Drive and this may have reduced the effectiveness of the traffic calming devices.

Table 3.2 outlined in Section 3.3 of this report shows the 85th percentile traffic speeds (i.e. the speed at which 85% of motorists travel at or below) in August / September 2020, and March / April 2021. These dates roughly align with the post-opening of the Tivoli Drive extension, and post-implementation of further traffic management measures.

The 85th percentile traffic speeds for the two time periods were 57.9 km/h and 54.7 km/h respectively, demonstrating an approximate 5-6% reduction in traffic speeds after the speed humps were installed.

On the basis of the above, the removal of the existing temporary speed humps would likely have the following effects on Tivoli Drive:

- An increase in the 85th percentile speeds of approximately 5-6% and hence an increase also in the number of speeds exceeding the 50km/h speed limit;
- Increased volumes of vehicles which may have changed their direction of traffic to avoid the inconvenience of travelling over speed humps whether by preference or choice;
- Reduction in number of complaints received regarding impacts associated with accelerating, braking, and travelling over speed humps.

The removal of speed humps along Tivoli Drive prior to the duplication of the road would ultimately return the road to a condition close to when it was opened to traffic from Portarlington Road.

Based on the issues, constraints and options assessed throughout this report, we would not recommend the removal of speed humps within Tivoli Drive and instead consider the implementation of further traffic management (e.g. as outlined in Option 5 / Section 5.6 above).

6 Summary and Recommendations

It is highlighted that many of the current issues within Tivoli Drive could be considered to be temporary in nature and may be resolved with the duplication of the existing road cross section to create a boulevard style road, similar to Centennial Drive.

A number of key issues, opportunities and constraints were identified through this assessment, including (but not limited to):

- Poor driver behaviour;
- Excessive and illegal speeds; and
- Presence of significant vegetation, underground and above ground utilities.

Noting the current cross section of Tivoli Drive, and the ability to support two-way traffic flow due to the car parking ban on the western side, an acceptable volume of traffic is approximately 4,000 – 5,000 vehicles per day.

Furthermore, any issues and respective options should be viewed in context of the Jetty Road Urban Growth Plan, which sets out the future road network and its function. In this regard there is the potential that options would be implemented on a temporary basis only and will need to be rolled back once Tivoli Drive is duplicated into its ultimate form.

The options assessed responded directly to those listed in the Notice of Motion, including:

1. *Potentially continuing with the status-quo conditions;*
2. *Indented car parking along Tivoli Drive between the Bellarine Rail Trail and Greenvale Drive;*
3. *Closure of Tivoli Drive at Portarlinton Road;*
4. *Upgrading and encouraging traffic to use Hermsley Road and Coriyule Road for access; and*
5. *Implementation of further traffic calming and other measures.*

Option 1 which maintains the status quo would potentially see an increase in traffic volumes due to undeveloped lots in the Jetty Road UGP Stage 1 area and may further exacerbate existing issues created by driver behaviour.

Options 3, 4 would have varying traffic calming or reduction outcomes, and they would result in significant impacts and costs and potentially create issues at other locations, which could negatively impact other residents.

It is noted that under Option 2 (indented car parking) that traffic speeds and volumes may increase as the route becomes more attractive for through traffic due to widened trafficable lanes. Option 2 would also come at a significant cost, both financially and environmentally.

Option 5 considers continuing the current strategy of addressing local area traffic management issues through education, enforcement, engagement and infrastructure. This option results in benefits for local residents while minimising the impacts identified in other options. It is duly noted that this is the current process being undertaken by the City in Tivoli Drive, and represents best practice in resolving local area traffic management issues.

On the basis that the issues are considered temporary, short term and restricted to a single section of Tivoli Drive, from a benefits, impacts, and cost perspective, it is suggested to implement some or all of the recommendations outlined in Option 5 which include:

- Education – installing fixed speed radar displays for passing motorists;
- Enforcement – continuing to advocate to Victoria Police for increased enforcement;
- Traffic management infrastructure – such as raised intersection treatments or further speed humps; and
- Engagement with the community – continuing to seek input from the community for both the current issues and any proposed changes.

Undertaking further detailed modelling, design, costings and community engagement works will be required to confirm the benefits, costs and impacts of the preferred, or multiple preferred options.