



TRAFFIC IMPACT ASSESSMENT

Vallances Road, Mullumbimby

Prepared for Byron Shire Council
By Planit Consulting Pty Ltd

August 2022

Job No. J7574

Version B



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Document Control

Version	Date	Document Type	Assessed and Authored By	QA Review By
A	28/07/2022	Draft TIA	AB	SM
B	08/08/2022	Draft TIA for Committee Meeting	AB	SM

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Executive Summary

This Traffic Impact Assessment (TIA) report has been prepared by Planit Consulting Pty Ltd on behalf of Byron Shire Council (BSC) to assist in the options study into potential new uses for the land referred to as Vallances Road (the site). The site includes seven (7) land parcels classified as operation land and are owned and managed by BSC.

The site is accessed from Coolamon Scenic Drive via Vallances Road and is located in Mullumbimby on the northern side of the Brunswick River, approximately 1 kilometre northeast of the Mullumbimby Town Centre. The site is approximately 113 hectares in area and comprises 7 land parcels including Lot 1 DP 952598, Lot 1 DP 129374, Lot 14 DP 251938, Lot 15 DP 251938, Lot 17 DP 251938, Lot 18 DP 251938 and Lot 19 DP 251938. This area of land is currently classified as operational land under provisions of the Local Government Act 1993 and Environmental Planning and Assessment Act 1979.

BSC is currently investigating development options for the following land uses:

- Plant Nursery;
- Natural Burial Ground;
- Affordable Housing;
- Sustainability Centre (education); and
- Sewer Treatment Plant duplication and transfer from Ocean Shores, including constructed wetland.

It is understood each option may be undertaken separately or in conjunction with any of the other uses. It is also understood that there is uncertainty around the operation of the Plant Nursery, which could operate as a Retail Garden Centre (open to public) or a Wholesale Nursery (not open to the public). Accordingly, traffic volumes, internal circulation requirements and parking demands have been estimated for all possible (24) scenarios, each with a different combination of the proposed development uses.

The development site does not currently have adequate access to alternative modes of transportation, including public transport and pedestrian / cycling facilities. In addition, concerns were raised regarding the feasibility of facilitating these access modes. The developments may need to consider facilities if the encouragement of green travel is needed.

To ensure adequate provisions are made for each considered use, Planit have assessed each of the development uses, assumed an expected largest vehicle, and provided recommended internal circulation roadway, access driveway and carparking dimensions based on the DCP, AS2980 and NSW Rural Fire Service requirements. A further traffic assessment, including a swept path analysis, will need to be carried out as part of design development of the facilitated associated with each of the proposed use.

Given the variety of expected traffic impacts for the development scenarios (ranging from 50.2 to 206.6 AADT), the upgrade requirements of Vallances Road and the Old Nursery Access Road were assessed against three (3) separate design standards, as follows:

- <75 AADT: Austroads Table 4.5 Rural Single Carriageway;
- 75 - 150 AADT: NRLG D1 – Minor Road up to 150 AADT; and
- 150+ AADT: NRLG D1 – Minor Road up to 500 AADT.

The intersection of Coolamon Scenic Drive / Vallances Road is considered the most critical intersection in relation to the development. This intersection provides the sole means of connection to the subject site and is located on a sharp corner with poor site distance. Existing issues with the intersection are acknowledged,

and several constraints have been identified as potential to cause issues with the road network improvements / upgrades to accommodate the proposed development uses estimated traffic volumes. Similarly to the road upgrade requirements, four (4) options upgrade options were identified depending on the expected increase in peak hour traffic (vehicles / hour), as follows:

- Vehicles / hour (v/h) < 10 trips / hour: Option 1 - Do nothing;
- $10 < v/h < 50$ trips / hour: Option 2 - Prohibit right-hand turns into Vallances Road, provide a median strip blocking this movement and upgrade the existing unused U-Turn Bay to the North;
- $50 < v/h < 90$ trips / hour: Option 3 - Widening of Coolamon Scenic Drive to improve curve radius by cutting the up-slope embankment and clearing vegetation;
- $v/h > 90$ trips / hour: Option 4 - Widening of Coolamon Scenic Drive to improving curve radius by cutting the up-slope embankment and clearing vegetation and providing turning lanes; and

This TIA has identified the following when assessing the interaction of the proposed development uses:

- The increase in daily traffic generated by the proposed Retail Garden Centre triggers the most significant road upgrade requirements and would therefore satisfy the requirements of all other proposed uses if it was included in the final development;
- Similarly, the increase in peak hour traffic by the Retail Garden Centre also triggers the requirements for the most substantial upgrades to the Coolamon Scenic Drive / Vallances Road intersection, being Option 4 in most cases or Option 3 depending on the scenario;
- Limiting the operation of the Plant Nursery to a Wholesale Plant Nursery reduces the traffic generated by the development significantly and therefore reduces the required infrastructure upgrades;
- The low increase in daily traffic and peak hour generated by the STP, Natural Burial Ground and the Affordable Housing can be accommodated by the existing infrastructure with no upgrades to the intersection, and minor improvements to the road network;
- The following scenarios can be accommodated by the existing single carriageway, but will require the right-hand turns into Vallances Road to be prohibited along with the provision of a median strip and upgrade of the U-Turn bay to the north:
 - Scenario 18 – Natural Burial Ground, Sustainability Centre and STP; and
 - Scenario 23 – Sustainability Centre and STP.

Along with the above, this TIA has identified following staged approach which may minimise upfront infrastructure upgrade requirements and provide the most efficient development construction.

- Stage 1: Upgrades to Compliant Single Carriageway – STP, Natural Burial Ground and Affordable Housing;
- Stage 2 Upgrade of Vallances Road / Old Nursery Road to a 2 lane / 2-way road with 6m wide seal and 1m shoulders, Prohibit right-hand turns into Vallances Road and Upgrade U-turn Bay – Addition of the Sustainability Centre and Wholesale Nursery; and
- Stage 3: Widening of Coolamon Scenic Drive / Vallances Road intersection to improve curve radius and provide turning lanes – Addition of the Retail Garden Centre.

Based on the findings of this TIA, it is recommended that the development proposal considers the traffic increases and thresholds noted in this report when assessing the site as suitable location for the proposed development use. A further traffic impact assessment will need to be undertaken as part of the future design development to confirm the traffic impact presented within this report.

1 Introduction

1.1 Background

This Traffic Impact Assessment (TIA) report has been prepared by Planit Consulting Pty Ltd on behalf of Byron Shire Council (BSC) to assist in the options study into potential new uses for the land referred to as Vallances Road (the site). The site includes 7 land parcels classified as operation land and are owned and managed by BSC.

BSC is currently investigating development options for the following land uses:

- Plant Nursery;
- Natural Burial Ground;
- Affordable Housing;
- Sustainability Centre (education); and
- Sewer Treatment Plant duplication and transfer from Ocean Shores, including constructed wetland.

It is understood that any or each of these options may be undertaken separately or in conjunction with any of the other uses. In addition, multiple options may be adopted using a staged approach.

1.2 Scope

This Traffic Impact Assessment (TIA) is based on the requirements of Chapter B4 of the BSC DCP and includes:

- Description of the site, locality and development proposal;
- Review of the existing road network directly adjacent to the site;
- Assessment of traffic volumes generated by the development;
- Analysis of parking demand and review of proposed parking;
- Assessment of road and intersection infrastructure requirements;
- Identification of options for parking and road upgrades, including a proposed staging strategy;
- Provisions for alternative modes of transport (including green travel); and
- Conclusion and recommendations.

2 Project Details

2.1 Site Description

The site is located in Mullumbimby on the northern side of the Brunswick River, approximately 1 kilometre northeast of the Mullumbimby Town Centre. The site is approximately 113 hectares in area and comprises seven (7) land parcels including Lot 1 DP 952598, Lot 1 DP 129374, Lot 14 DP 251938, Lot 15 DP 251938, Lot 17 DP 251938, Lot 18 DP 251938 and Lot 19 DP 251938 (refer to Figure 2-1). This area of land is currently classified as operational land under provisions of the *Local Government Act 1993* and *Environmental Planning and Assessment Act 1979*.

The site currently contains the Brunswick Valley Sewage Treatment Plant (BVSTP), located within Lot 1 DP 129374 towards the east of the site and a cluster of buildings located on Lot 1 DP 952598 including two dwellings and a disused nursery. The site is predominantly cleared and has historically been used for cattle grazing.

The site is accessed from Coolamon Scenic Drive via Vallances Road. Within the site, Vallances Road forks off with the main section of the road linking into the BVSTP via a narrow sealed road formation with passing bays. The second road section off Vallances Road links into the former nursery with a narrow gravel formation.

Topographic levels across the site vary from approximately 2m AHD at the banks of the Brunswick River (south) to 48m AHD at the hill top east of the former nursery (centre).

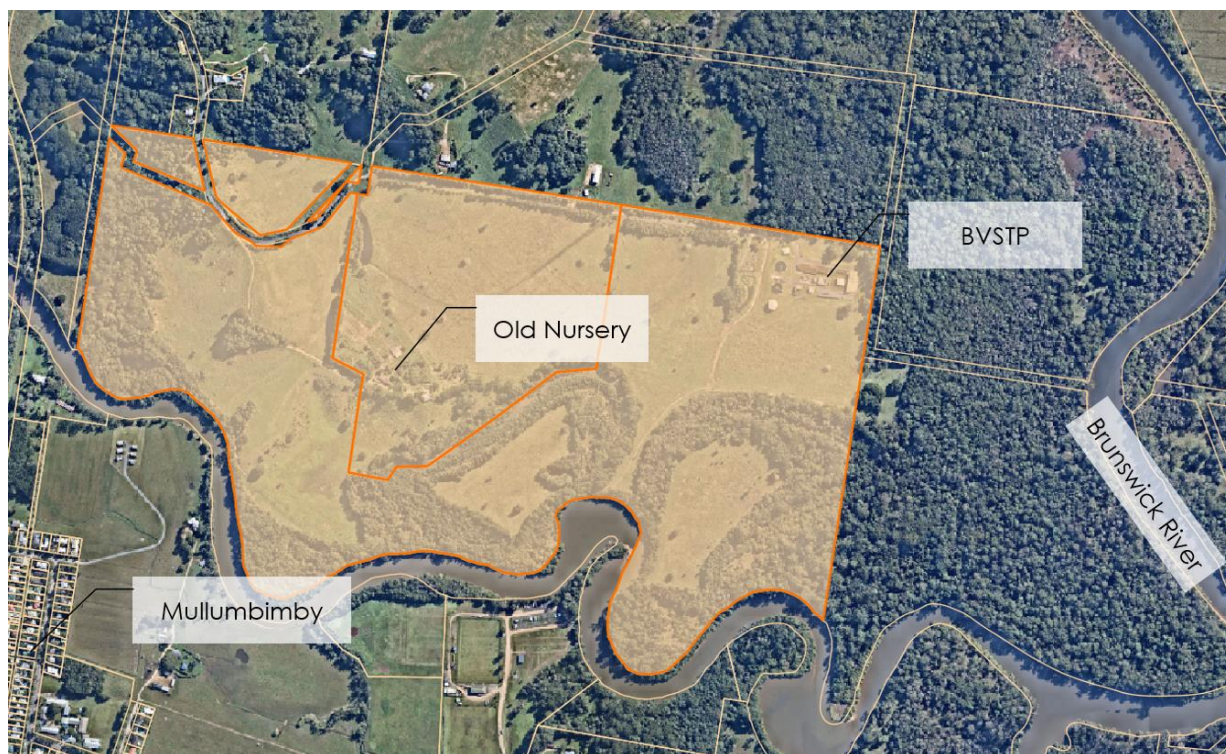


Figure 2-1 Project Site.

2.2 Development Options

BSC is currently investigating development options for the following land uses:

- Nursery;
- Natural Burial Ground;
- Affordable Housing;
- Sustainability Centre (education); and
- Sewer Treatment Plant duplication and transfer from Ocean Shores, including constructed wetland.

It is understood that each option may be undertaken in full or possibly in a staged approach. Refer to Figure 2-2 below for approximate locations for proposed development options.

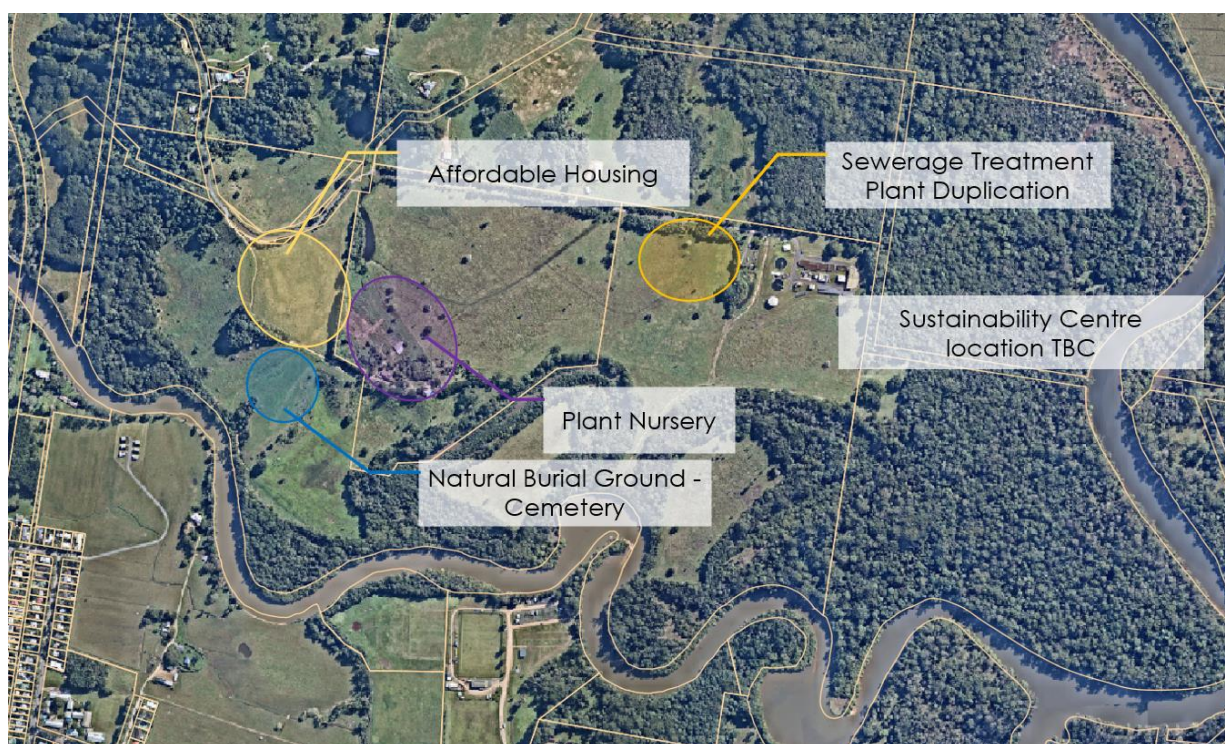


Figure 2-2 Proposed Locations for Development Options.

2.3 Relevant Standards

This TIA is based on the guidelines and requirements of:

- RMS Guide to Traffic Generating Developments (2002), including the additional technical direction (2013);
- AS2890 Parking Facilities: All Parts;
- Austroads Guide to Road Design;
- RFS Specification 'Planning for Bushfire Protection' (November 2019);
- Northern Rivers Local Government Development Design Specifications D1; and
- Chapter B4 of the Byron Shire Council DCP.

3 Existing Road and Access Infrastructure

3.1 Existing Road Network

The site is accessed from Coolamon Scenic Drive via Vallances Road. Within the site, Vallances Road forks off linking into the BVSTP. The other road (noted as Old Nursery Access Road) off Vallances Road links into the former nursery.

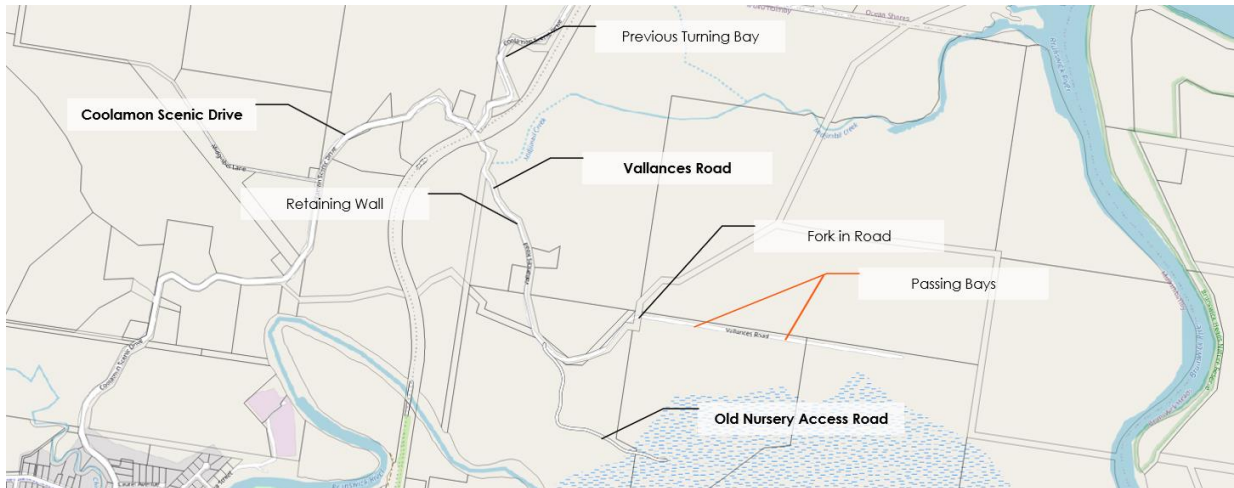


Figure 3-1 Existing Road Network near Proposed Development.

3.1.1 Coolamon Scenic Drive

Coolamon Scenic Drive connects the site to Mullumbimby via Murwillumbah Road. Coolamon Scenic Drive is a windy, sealed two-way road. The first 200m (approximate) of the road from Mullumbimby is delineated by a double dividing line, concrete kerb and guttering in sections and has a 6.5m wide seal. The remaining 1.9km (approximate) of the road generally has no line marking and a 4.7 – 5.4m wide sealed formation. The road has a derestricted speed limit with 'Reduce Speed to Conditions' signage. It has been noted that regular local traffic are known to drive in excess of 100 km/hr even though the road is narrow, windy and has poor site distances around curves.

Previously, right turns into Vallances Road from Coolamon Scenic Drive were restricted, and access to the development site was available via left-hand turn only, with a U-Turn / turning bay approximately 300m to the North of the entrance to Vallances Road. Right-hand turns into Vallances Road are now allowed, with a safety mirror provided, and this U-Turn Bay has been fenced off and no longer used.



Figure 3-2 Typical Road section of Coolamon Scenic Drive near the entrance to Vallances Road.

3.1.2 Vallances Road

Vallances Road is contained within the proposed development site and has a 3.7m wide sealed formation with a total of six (6) passing bays and no line-marking. The first 1km of road is relatively windy but straightens out between the fork in the road and the BVSTP. The first four (4) passing bays from Coolamon Scenic Drive are located on bends with poor site distance within this windy section to enable two vehicles to pass safely. The following two (2) passing bays are located on the straight section of road to the BVSTP. All passing bays are non-compliant with the current RFS passing bay requirements.

The longitudinal drainage for the road is in the form of vegetated / rock lined table drains, which outlet via mitre drains into the adjacent properties. A large three-cell culvert crossing is located on the straight section of road 300m west of the BVSTP and a cattle grate across the road is located 150m north of the Old Nursery Access Road. Currently, the road is used for operational traffic of the BVSTP and property access. There are approximately a dozen property accesses along the road, most of which are formalised with a seal and culverts. A 50m long retaining wall is located on one of the cuttings near the first residential lot.



Figure 3-3 Typical Section of first 1km of Vallances Road.



Figure 3-4 Typical Section of Straight Section of Vallances Road at Culvert Crossing.

3.1.3 Old Nursery Access Road

The Old Nursery Access Road is a 2-3m wide gravel road in fair condition. There is no formal longitudinal drainage or formal passing bays along the road. A significant blind corner is located on the road, with heavy vegetation on either side.



Figure 3-5 Typical Section of Old Nursery Access Road at Blind Corner.

3.2 Existing Access Infrastructure

3.2.1 Coolamon Scenic Drive / Vallances Road Intersection

The T-Intersection of Coolamon Scenic Drive / Vallances Road is located on a sharp corner and has poor site distance due to the heavily vegetated cutting. Previously, right turn movements onto Vallances Road were not permitted, with vehicles directed to a U-Turn bay 300m from the intersection. A Safety Mirror has been placed to allow for vehicles completing the right-hand turn to see oncoming traffic and the U-Turn bay is not used.



Figure 3-6 Coolamon Scenic Drive / Vallances Road Intersection – from Vallances Road.



Figure 3-7 Coolamon Scenic Drive / Vallances Road Intersection – from Coolamon Scenic Drive, showing poor site distances for entrance into Vallances Road.



Figure 3-8 Previous U-Turn Bay 300m from Coolamon Scenic Drive / Vallances Road Intersection (2010 Google Street View).



Figure 3-9 Current View of Previous U-Turn Bay.

3.2.2 BVSTP Access off Vallances Road

Access to the existing BVSTP is provided at the end of Vallances Road. The road at the entrance to the site widens for the internal vehicular movements of the service / maintenance vehicles.



Figure 3-10 Current Aerial View of BVSTP.

3.2.3 Vallances Road / Old Nursery Access Road Intersection

The T-Intersection of Vallances Road / Old Nursery Access Road is a basic intersection with approximately 10m of seal into the Old Nursery Access Road which runs parallel to Vallances Road for 70m along the crest of the hill.



Figure 3-11 Vallances Road / Old Nursery Access Road intersection.

3.3 Existing Parking

The existing developments on the site are limited to the BVSTP and the old plant nursery. Currently there are three (3) car parking spaces and one (1) accessible parking space provided at the entrance to the BVSTP, and no designated service vehicle parking space. There are no formal car parking spaces provided at the old nursery, however it is assumed that when the nursery was operational, cars would have parked informally on the grassed areas within the site.

3.4 Assessment of Existing Network

The existing network is considered to be sufficient given the current low traffic volume on the roads. However, there are potential upgrades which would improve users' safety, most notably:

- Intersection improvements for Coolamon Scenic Drive / Vallances Road;
- Compliance with RFS requirements, including road width, vegetation removal requirements;
- Compliance with passing bay requirements; and
- Improvements to shoulders or widening of pavement along Vallances Road for safer passing opportunities.

The above upgrade options would reduce the risk (and impact) of conflict between road users.

4 Traffic Generation

4.1 Existing Traffic

The existing traffic within the vicinity of the proposed development site is limited to local residential traffic and operational / maintenance vehicles accessing the BVSTP.

Table 4-1 Existing Traffic Generation.

Component	Rate	Existing Condition	Traffic Volume
Residential			
Daily Trips	7.4 trips / dwelling ⁽¹⁾	6 dwellings ⁽²⁾	44.4 trips / day
Peak Hour	0.78 trips / h / dwelling		4.68 trips / hr
BVSTP Staff			
Daily Trips	2 trips / staff	3 staff	6 trips / day
Peak Hour	1 trips / hr / staff		3 trips / hr

⁽¹⁾ Based on low density residential dwellings in regional areas.

⁽²⁾ Assumed maximum number of current dwellings.

4.2 Post-Development Traffic

Traffic volumes generated by the site for the considered uses have been estimated using the 2002 TfNSW 'Guide to Traffic Generating Development' including the 2013 update (Technical Direction 2013/04a) and are presented in the following sections. Where the proposed land use is not discussed in the guidelines, an alternative assessment was undertaken to estimate the traffic generation using assumptions as discussed in this section of the report.

4.2.1 Plant Nursery

The proposed operation of the plant nursery is unknown at the time of developing this document. Accordingly, two operational scenarios have been assessed, Retail Garden Centre and Wholesale Plant Nursery. The traffic generated for these two operational scenarios are noted in Table 4-2 and Table 4-3. Either the Retail Garden Centre or Wholesale Nursery option has been considered in the post-development scenarios to provide a comparison of the two operational options.

4.2.1.1 Retail Garden Centre

The below values are based on the TfNSW Guide to Traffic Generating Developments (2002).

Table 4-2 Retail Garden Centre Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	2 trips / 100 m ² ⁽¹⁾	19,000 m ² total area 4,500 m ² assumed display area ⁽²⁾	90 trips / day
Weekend	5 trips / 100 m ² ⁽¹⁾		225 trips / day
Weekday Peak Hour ⁽³⁾	-		11.25 trips / hr
Weekend Peak Hour	57 trips / hr + 0.7 trips / hr per 100m ²		88.5 trips / hr

⁽¹⁾ Assumed weekday and weekend traffic rates based on peak hour rate.

⁽²⁾ The display area of the Plant Nursery has been used for the assessment of traffic generation.

⁽³⁾ Estimated based on weekday traffic.

It is expected that traffic generated by the plant nursery will be visitors in Light Vehicles (LV) and LV + trailer, however intermittent service vehicles and stock deliveries by trucks are also expected.

4.2.1.2 Wholesale Nursery

The below values are based on the Trip Generation Manual, 9th Edition (2012).

Table 4-3 Wholesale Nursery Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	19.5 trips / acre	19,000 m ² (4.7 acres) total area	91.65 trips / day
Weekend	3.11 trips / acre		14.6 trips / day
Weekday Peak Hour	0.45 trips / hr / acre		2.1 trips / hr
Weekend Peak Hour	0.58 trips / hr / acre		2.7 trips / hr

It is expected that traffic generated by the plant nursery will be employees in Light Vehicles (LV) and stock delivery vehicles which could range from small rigid vehicles (SRV) to medium rigid vehicles (MRV).

From Table 4-2 and Table 4-3 above, it is clear that the plant nursery operating as a Wholesale Nursery reduces the generated traffic significantly.

4.2.2 Natural Burial Ground – Cemetery

The following values are based on the Institute of Transportation Engineers Trip Generation Manual.

Table 4-4 Natural Burial Ground Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	4.73 trips / acre	2,250 m ² 0.56 acres	2.65 trips / day
Weekend	6.78 trips / acre		3.8 trips / day
Weekday Peak Hour ⁽¹⁾	-		0.56 trips / hr
Weekend Peak Hour	8 trips / hr / acre		4.48 trips / hr

⁽¹⁾ Estimated based on weekday traffic.

It is expected that traffic generated by the natural burial ground will be visitors in LV and hearses. Given the nature of natural burial sites, regular landscaping and maintenance vehicles may be required. It should also be noted that funeral progressions are likely, resulting in multiple vehicles entering the site in progression.

4.2.3 Affordable Housing

The following values are based on the TfNSW Technical Direction to the Guide to Traffic Generating Developments (2013).

Table 4-5 Affordable Housing Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	7.4 trips / dwelling	2 dwellings	14.8 trips / day
Weekend	7.4 trips / dwelling		14.8 trips / day
Weekday Peak Hour	0.78 trips / hr / dwelling		1.56 trips / hr
Weekend Peak Hour	0.71 trips / hr / dwelling		1.42 trips / hr

Given the current lack of public transport in the area, it is considered inappropriate to adopt reduced trip rates as per the affordable housing SEPP and it is expected that all trips will be via private vehicle. However,

based on future infrastructure, traffic generation may be reduced if service by public transport is provided to the development site.

4.2.4 Sustainability Centre (Education)

The following values have been estimated based on the anticipated student and staff allocation.

Table 4-6 Sustainability Centre Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	2 trips / staff	6 staff 2 coaches / day 260 m ²	12 trips / day
Weekend	0		0
Weekday Peak Hour	1 trips / hr / staff + 1 trips / hr / coach + 1 trip / hr / 100m ² (visitors)		11 trips / hr
Weekend Peak Hour ⁽¹⁾	-		0

⁽¹⁾ Estimated based on weekend traffic.

It is expected that traffic generated by the sustainability centre will be LV for staff and visitors, and coaches for school excursions.

4.2.5 Sewer Treatment Plant (STP)

The following values have been estimated based on the staff allocation.

Table 4-7 Sewer Treatment Plant (STP) Traffic Generation.

Component	Rate	Provision in Development	Traffic Volume
Weekday	2 trips / staff	3 staff	6 trips / day
Weekend	2 trips / staff		6 trips / day
Weekday Peak Hour	1 trips / hr / staff		3 trips / hr
Weekend Peak Hour	1 trips / hr / staff		3 trips / hr

It is expected that traffic generated by the sewerage treatment plant will be LV for staff and potentially a service / maintenance vehicle when necessary.

4.3 Combined Traffic Impact

A register of potential scenarios for development on the site and the combined traffic impacts is provided in Table 4-8. It should be noted that it is Planit's understanding that the upgrade of the STP is imminent and accordingly, the traffic impact has been included in each scenario.

Table 4-8 Combined Traffic Volumes Generated by the Proposed Development.

	Retail Garden Centre	Wholesale Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Weekday (trips / day)	Weekend (trips / day)	Weekday Peak Hour (trips / hr)	Weekend Peak Hour (trips / hr)
Weekday trips	90.00	91.65	2.65	14.80	12.00	6.00				
Weekend trips	225.00	14.60	3.80	14.80	0.00	6.00				
Weekday peak	11.25	2.10	0.56	1.56	11.00	3.00				
Weekend peak	88.50	2.70	4.48	1.42	0.00	3.00				
Scenario 1	✓		✓	✓	✓	✓	125.45	249.60	27.37	97.40
Scenario 2		✓	✓	✓	✓	✓	127.10	39.20	18.22	11.60
Scenario 3	✓		✓	✓		✓	113.45	249.60	16.37	97.40
Scenario 4		✓	✓	✓		✓	115.10	39.20	7.22	11.60
Scenario 5			✓	✓	✓	✓	35.45	24.60	16.12	8.90
Scenario 6	✓			✓	✓	✓	122.80	245.80	26.81	92.92
Scenario 7		✓		✓	✓	✓	124.45	35.40	17.66	7.12
Scenario 8	✓		✓		✓	✓	110.65	234.80	25.81	95.98
Scenario 9		✓	✓		✓	✓	112.30	24.40	16.66	10.18
Scenario 10	✓		✓			✓	98.65	234.80	14.81	95.98
Scenario 11		✓	✓			✓	100.30	24.40	5.66	10.18
Scenario 12			✓	✓		✓	23.45	24.60	5.12	8.90
Scenario 13				✓	✓	✓	32.80	20.80	15.56	4.42
Scenario 14	✓				✓	✓	108.00	231.00	25.25	91.50
Scenario 15		✓			✓	✓	109.65	20.60	16.10	5.70
Scenario 16	✓			✓		✓	110.80	245.80	15.81	92.92
Scenario 17		✓		✓		✓	112.45	35.40	6.66	7.12
Scenario 18			✓		✓	✓	20.65	9.80	14.56	7.48
Scenario 19	✓					✓	96.00	231.00	14.25	91.50
Scenario 20		✓				✓	97.65	20.60	5.10	5.70
Scenario 21			✓			✓	8.65	9.80	3.56	7.48
Scenario 22				✓		✓	20.80	20.80	4.56	4.42
Scenario 23					✓	✓	18.00	6.00	14.00	3.00
Scenario 24						✓	6.00	6.00	3.00	3.00

5 Parking Requirements

5.1 Post-Development Parking Demands

Parking demand for the site for the proposed uses has been determined in accordance with TB4.1 of Chapter B4 of the Byron Shire Council DCP and is presented in the following sections.

Table 5-1 Parking Demand for Proposed Development Uses.

Component	Car Parking Requirement	Provision in Development	Demand
Retail Garden Centre	0.5 per 100m ² as per TfNSW guide to traffic generation	19,000 m ² total area 4,500 m ² assumed display area	23 spaces ⁽¹⁾⁽²⁾
Wholesale Nursery	1 per employee + 2 spaces ⁽⁶⁾	10 staff ⁽⁷⁾	12 spaces
Natural Burial Ground	1 per 100m ² ⁽³⁾	2,250 m ²	23 spaces
Affordable Housing	2 spaces per dwelling	2 dwellings	4 spaces
Sustainability Centre	1 per staff + 1 per 100m ² for visitors + 2 coach parking spaces ⁽⁴⁾	6 staff 260 m ²	6 spaces 3 spaces 2 coach spaces
Sewerage Treatment Plant	1 per staff ⁽⁵⁾ + 1 visitor space	3 staff ⁽⁵⁾	4 spaces

⁽¹⁾ It is recommended to include car / trailer parking provisions.

⁽²⁾ When considering the remoteness of the site, it is recommended to use the TfNSW Guide to Traffic Generating Developments rather than the DCP recommendations.

⁽³⁾ Estimated based on Funeral Home requirements, the required number of car parks can be reduced if funeral processions are prohibited. However, this would be difficult to police.

⁽⁴⁾ Estimated based on site assessment.

⁽⁵⁾ Estimated based on existing STP requirements.

⁽⁶⁾ Based on landscape material supplies requirement of the DCP.

⁽⁷⁾ Estimated number of staff based on size.

⁽⁸⁾ Based on business premises of the DCP.

5.2 Service Vehicle / Loading Bay Demands

Parking demand for the site for the proposed uses has been determined in accordance with TB4.2 of Chapter B4 of the Byron Shire Council DCP and is presented in the following sections.

Table 5-2 Service Vehicle / Loading Bay Demands for Proposed Development Uses.

Component	Provision in Development	Demand
Retail Garden Centre ⁽¹⁾	4,500 m ² assumed display area	1 SRV 1 MRV
Wholesale Nursery ⁽²⁾	19,000 m ² total area	2 SRV 1 MRV
Natural Burial Ground ⁽³⁾	2,250 m ²	1 SRV
Affordable Housing ⁽³⁾	2 dwellings	1 SRV

Component	Provision in Development	Demand
Sustainability Centre ⁽⁴⁾	260 m ²	1 MRV
Sewerage Treatment Plant ⁽⁵⁾	Duplication of existing	1 MRV

⁽¹⁾ Based on a business premise, the values for retail premises were deemed excessive.

⁽²⁾ Based on a business premise, the values for retail and industry premises were deemed excessive.

⁽³⁾ Estimated based on development assessment.

⁽⁴⁾ Based on a tourist premise.

⁽⁵⁾ Estimated based on existing STP, however it is anticipated that service vehicles will park on roads and do not need a designated parking space.

5.3 Accessible Parking Demands

Accessible parking demand for the site for the proposed uses has been determined in accordance with Section D3.5 of the Building Code of Australia.

Table 5-3 Accessible Parking Demand for Proposed Development Uses.

Component	Accessible Parking Requirement	Provision in Development	Demand
Retail Garden Centre	1 space per 100 carparks	23 spaces	1 space
Wholesale Nursery	1 space per 100 carparks	12 spaces	1 space
Natural Burial Ground	1 space per 50 carparks	23 spaces	1 space
Affordable Housing	Not required, unless accessible housing is provided.		
Sustainability Centre	1 space per 100 carparks	11 spaces	1 space
Sewerage Treatment Plant	1 space per 100 carparks	4 spaces	1 space

5.4 Combined Parking Requirements

A register of potential scenarios for development on the site and the combined parking requirements is provided in Table 5-4. It should be noted that it is Planit's understanding that the upgrade of the STP is imminent and accordingly, the traffic impact has been included in each scenario.

Table 5-4 Combined Parking Requirements by the Proposed Development.

	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Carparks	Coach Parks	Accessible Parking
Car Parks	23	12	23	4	9	4			
Coach Parks	0	0	0	0	2	0			
Accessible Parks	1	1	1	0	1	1			
Scenario 1	✓		✓	✓	✓	✓	63	2	4
Scenario 2		✓	✓	✓	✓	✓	52	2	4
Scenario 3	✓		✓	✓		✓	54	0	3
Scenario 4		✓	✓	✓		✓	43	0	3
Scenario 5			✓	✓	✓	✓	40	2	3
Scenario 6	✓			✓	✓	✓	40	2	3
Scenario 7		✓		✓	✓	✓	29	2	3
Scenario 8	✓		✓		✓	✓	59	2	4
Scenario 9		✓	✓		✓	✓	48	2	4
Scenario 10	✓		✓			✓	50	0	3
Scenario 11		✓	✓			✓	39	0	3
Scenario 12			✓	✓		✓	31	0	2
Scenario 13				✓	✓	✓	17	2	2
Scenario 14	✓				✓	✓	36	2	3
Scenario 15		✓			✓	✓	25	2	3
Scenario 16	✓			✓		✓	31	0	2
Scenario 17		✓		✓		✓	20	0	2
Scenario 18			✓		✓	✓	36	2	3
Scenario 19	✓					✓	27	0	2
Scenario 20		✓				✓	16	0	2
Scenario 21			✓			✓	27	0	2
Scenario 22				✓		✓	8	0	1
Scenario 23					✓	✓	13	2	2
Scenario 24						✓	4	0	1

6 Infrastructure Requirements

This section of the TIA presents a discussion of Planit's assessment of the requirements for the internal circulation, parking area and surrounding roads and intersections for the proposed development uses and expected vehicles.

6.1 Internal Circulation and Parking Area

The following sections have been based on the requirements specified in AS2890 Parking Facilities Parts 1 and 2, and the Northern Rivers Local Government Development and Design Manuals.

6.1.1 Plant Nursery

As noted in Section 5.2, the largest vehicle expected by either of the Retail Garden Centre or Wholesale Nursery is a Medium Rigid Vehicle (MVR) and has therefore been adopted as the critical design vehicle. The requirements for the circulation roadways, access driveways and parking are noted in Table 6-1.

Table 6-1 Plant Nursery Internal Circulation, Access Driveway and Parking Requirements.

Component	Element	Value	Existing
Circulation Roadways ⁽¹⁾	Width (Single Lane)	4.2m (25 - 39m curve radius)	2-3m
	Width (Two-Way)	7.1m (25 - 39m curve radius, with intervisibility)	2-3m Single Lane
	Parallel Parking Width (on Circulation Roadway)	2.4m car parking	-
		3.0m truck parking	-
	Maximum Grade	1:6.5 (15.4%)	-
Access Driveways	Width	9m with 1.5m splay	7m
MRV Parking	Bay Width	3.5m	-
	Bay Length	8.8m	-
Car Parking ^{(2) (3)}	Bay Width	2.7m	-
	Bay Length	4.8m	-
RFS Access Requirement ⁽⁴⁾	Kerb Return	-	-
	Carriageway Width	-	-

⁽¹⁾ Based on the internal circulation recommendations for commercial vehicles in Table 3.1 of AS2890.2.

⁽²⁾ Assumed user class 3A (high turnover parking at shopping centres), 90° angle parking, 6.2m aisle width and allowance for 600mm overhang.

⁽³⁾ Additional parking for car / trailer combinations is also recommended.

⁽⁴⁾ Commercial nurseries are regarded as managed and the proposed nursery location is outside of the Vegetation Buffer zone, therefore the development does not need to consider the Planning for Bushfire Protection requirements.

6.1.2 Natural Burial Ground

As noted in Section 4.2.2, traffic associated with the natural burial ground will be in the form of visitors in Light Vehicles (LV), hearses and potentially small service vehicles. Therefore, allowance for a Small Rigid Vehicle (SRV) has been made for the site. The requirements for the circulation roadways, access driveways and parking are noted below in Table 6-2.

Table 6-2 Natural Burial Ground Internal Circulation, Access Driveway and Parking Requirements.

Component	Element	Value	Existing
Circulation Roadways	Width (Single Lane)	3.6m (12 – 25m curve radius)	2-3m
	Width (Two-Way)	6.9m (12 - 25m curve radius, with intervisibility)	2-3m Single Lane
	Parallel Parking Width (on Circulation Roadway)	2.4m car parking	-
		3.0m truck parking	-
	Maximum Grade	1:6.5 (15.4%)	-
Access Driveways	Width	6m with 1.5m splay	7m
SRV Parking	Bay Width	3.5m	-
	Bay Length	6.4m	-
Car Parking ⁽²⁾	Bay Width	2.6m	-
	Bay Length	4.8m	-
RFS Access Requirement ⁽³⁾	Kerb Return	6m	-
	Carriageway Width	4m	-

⁽¹⁾ Based on the internal circulation recommendations for commercial vehicles in Table 3.1 of AS2890.2.

⁽²⁾ Assumed user class 3 (short term parking), 90° angle parking, 5.8m aisle width and allowance for 600mm overhang.

⁽³⁾ The Natural Burial Ground is located within the Buffer Zone and has Category 1 Vegetation to the North and West; therefore, it is assumed that the development would be required to follow the PBP.

6.1.3 Affordable Housing

As noted in Section 4.2.3, traffic associated with the affordable housing will be limited to LV. However, an allowance for a Small Rigid Vehicle (SRV) has been made for the site. The requirements for the circulation roadways, access driveways and parking are noted below in Table 6-3.

Table 6-3 Affordable Housing Internal Circulation, Access Driveway and Parking Requirements.

Component	Element	Value	Existing
Circulation Roadways ⁽¹⁾	Width (Single Lane)	3.6m (12 – 25m curve radius)	2 - 3m
	Width (Two-Way)	6.9m (12 - 25m curve radius, with intervisibility)	2-3m Single Lane
	Parallel Parking Width (on Circulation Roadway)	2.4m car parking	-
		3.0m truck parking	-
	Maximum Grade	1:6.5 (15.4%)	-
Access Driveways	Width	6m with 1.5m splay	7m
SRV Parking	Bay Width	3.5m	-
	Bay Length	8.8m	-
Car Parking ⁽²⁾	Bay Width	2.4m	-
	Bay Length	4.8m	-
RFS Access Requirement ⁽³⁾	Kerb Return	6m	-
	Carriageway Width	4m	-

⁽¹⁾ Based on the internal circulation recommendations for commercial vehicles in Table 3.1 of AS2890.2.

⁽²⁾ Assumed user class 1A (residential parking), 90° angle parking, 5.8m aisle width and allowance for 600mm overhang.

⁽³⁾ The Affordable Housing is located outside of the Buffer Zone and has limited vegetation surrounding; however, all residential developments must include safe access and egress for emergency vehicles.

6.1.4 Sustainability Centre

As noted in Section 4.2.4, traffic associated with the sustainability centre will be in the form of LV and coaches. Therefore, a Heavy Rigid Vehicle (HRV) has been used as the critical design vehicle. The requirements for the circulation roadways, access driveways and parking are noted below in Table 6-4.

Table 6-4 Sustainability Centre Internal Circulation, Access Driveway and Parking Requirements.

Component	Element	Value	Existing
Circulation Roadways ⁽¹⁾	Width (Single Lane)	4.5m (40-49m curve radius)	2 - 3m
	Width (Two-Way)	7.4m (40 - 49m curve radius, with intervisibility)	2-3m Single Lane
	Parallel Parking Width (on Circulation Roadway)	2.4m car parking	-
		3.0m truck parking	-
Maximum Grade	1:6.5 (15.4%)	-	
Access Driveways	Width	12.5m with 1.5m splay	7m
HRV Parking	Bay Width	3.5m	-
	Bay Length	12.5m	-
Car Parking ⁽²⁾	Bay Width	2.4m	-
	Bay Length	4.8m	-
RFS Access Requirement ⁽³⁾	Kerb Return	6m	-
	Carriageway Width	4m	-

⁽¹⁾ Based on the internal circulation recommendations for commercial vehicles in Table 3.1 of AS2890.2.

⁽²⁾ Assumed user class 1A (employee parking), 90° angle parking, 5.8m aisle width and allowance for 600mm overhang.

⁽³⁾ The Sustainability Centre is considered a Special Fire Protection Purpose (SFPP) development and will require approval from the RFS. The above values may not be sufficient to obtain approval.

6.1.5 Sewer Treatment Plant (STP)

As noted in Section 4.2.5, traffic associated with the STP will be in the form of LV and a service / maintenance vehicle when necessary. Therefore, a Medium Rigid Vehicle (MRV) has been used for the design vehicle. The requirements for the circulation roadways, access driveways and parking are noted below in Table 6-5.

Table 6-5 STP Internal Circulation, Access Driveway and Parking Requirements.

Component	Element	Value	Existing
Circulation Roadways	Width (Single Lane)	4.2m (25 - 39m curve radius)	5 - 6m Increased to 8m at corners
	Width (Two-Way)	7.1m (25 - 39m curve radius, with intervisibility)	5 - 6m
	Parallel Parking Width (on Circulation Roadway)	2.4m car parking	-
		3.0m truck parking	-
Maximum Grade	1:6.5 (15.4%)	-	

Component	Element	Value	Existing
Access Driveways	Width	9m with 1.5m splay	4.5m at entrance, widens to 6m
MRV Parking ⁽¹⁾	Bay Width	3.5m	-
	Bay Length	8.8m	-
Car Parking ⁽²⁾	Bay Width	2.7m	2.6m
	Bay Length	4.8m	5.0m
RFS Access Requirement ⁽³⁾	Kerb Return	6m	-
	Carriageway Width	4m	-

⁽¹⁾ Given the nature of the maintenance work required at the STP, it is assumed the vehicle would park on the road nearby the equipment.

⁽²⁾ Assumed user class 1A (employee parking), 90° angle parking, 5.8m aisle width and allowance for 600mm overhang.

⁽³⁾ The STP is located within the Buffer Zone and has Category 1 Vegetation to the East and South, therefore it is assumed that the development would be required to follow the PBP.

6.2 Surrounding Road and Intersections

6.2.1 Criteria

The following sections have been based on the requirements specified in Austroads, the Northern Rivers Local Government Development and Design Manuals and the RFS Bush Fire Protection guidelines. The following criteria has been applied for assessing the road requirements with the noted guidelines:

- <75 AADT: Austroads Table 4.5 Rural Single Carriageway;
- 75 - 150 AADT: NRLG D1 – Minor Road up to 150 AADT; and
- 150+ AADT: NRLG D1 – Minor Road up to 500 AADT.

It should be noted that no allowance for one-lane roads is provided in the NRLG and accordingly, Austroads guidelines have been used. In addition to the above criteria, Coolamon Scenic Drive / Vallances Road upgrade requirements will be based on the requirements of Austroads, given the existing traffic on the road is over 2,000 vehicles / day. The estimated AADT for the existing scenario and each development option is shown in Table 6-6.

Table 6-6 Combined Estimated AADT for the Proposed Development Uses.

	Existing Scenario	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Total AADT	Design Requirements
AADT	50.4	128.5	69.7	3.0	14.8	8.6	6.0		
Scenario 1	✓	✓		✓	✓	✓	✓	211.2	Minor Road up to 500
Scenario 2	✓		✓	✓	✓	✓	✓	152.5	Minor Road up to 500
Scenario 3	✓	✓		✓	✓		✓	202.6	Minor Road up to 500
Scenario 4	✓		✓	✓	✓		✓	143.9	Minor Road up to 150
Scenario 5	✓			✓	✓	✓	✓	82.8	Minor Road up to 150
Scenario 6	✓	✓			✓	✓	✓	208.2	Minor Road up to 500
Scenario 7	✓		✓		✓	✓	✓	149.5	Minor Road up to 150
Scenario 8	✓	✓		✓		✓	✓	196.4	Minor Road up to 500
Scenario 9	✓		✓	✓		✓	✓	137.7	Minor Road up to 150
Scenario 10	✓	✓		✓			✓	187.8	Minor Road up to 500
Scenario 11	✓		✓	✓			✓	129.1	Minor Road up to 150
Scenario 12	✓			✓	✓		✓	74.2	Rural Single Carriageway
Scenario 13	✓				✓	✓	✓	79.8	Minor Road up to 150
Scenario 14	✓	✓				✓	✓	193.4	Minor Road up to 500
Scenario 15	✓		✓			✓	✓	134.7	Minor Road up to 150
Scenario 16	✓	✓			✓		✓	199.7	Minor Road up to 500
Scenario 17	✓		✓		✓		✓	140.9	Minor Road up to 150
Scenario 18	✓			✓		✓	✓	68.0	Rural Single Carriageway
Scenario 19	✓	✓					✓	184.9	Minor Road up to 500
Scenario 20	✓		✓				✓	126.1	Minor Road up to 150
Scenario 21	✓			✓			✓	59.4	Rural Single Carriageway
Scenario 22	✓				✓		✓	71.2	Rural Single Carriageway
Scenario 23	✓					✓	✓	65.0	Rural Single Carriageway
Scenario 24	✓						✓	56.4	Rural Single Carriageway

6.2.2 Vallances Road and Old Nursery Access Road

Using the guidelines as noted in the previous section, the following carriageway widths are recommended.

As only the STP traffic will not use the Old Nursery Road, the differences in AADT for Vallances Road and the Old Nursery Road are minor. Accordingly, the carriageway requirements are the same for both the first 700m section of Vallances Road and the Old Nursery Access Road. As noted previously, the following 1km section of Vallances Road from the intersection with the Old Nursery Access Road can remain in its existing condition.

Table 6-7 Carriageway Requirements for Each Criteria / Guideline.

AADT Criteria	Guideline	Road Width (m)	Shoulder Width (m)	Total Carriageway (m)
<75	Austrroads Table 4.5 Rural Single Carriageway	3.7 (1 x 3.7) (sealed) ⁽²⁾	2.5 (as per Austrroads, unsealed) ⁽¹⁾ 0.5 (recommended, unsealed)	8.7 ⁽¹⁾ 4.7 with passing bays at regularly spaced intervals
75-150	NRLG D1 – Minor Road up to 150 AADT	6 (2 x 3) (sealed)	0.5 (sealed)	7
150+	NRLG D1 – Minor Road up to 500 AADT	6 (2 x 3) (sealed)	1 (sealed)	8

⁽¹⁾ The unsealed shoulder width recommended by Austrroads is considered excessive and therefore can be reduced to 0.5m if necessary, but adequate passing opportunities need to be present. Passing bays will need to be provided at 200m intervals, and at blind corners.

⁽²⁾ There is no sealed or unsealed requirement for rural single carriageways however it is recommended to provide a sealed pavement.

Table 6-8 Combined Carriageway Requirements for Each Scenario.

	Existing Scenario	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Total AADT	Road Width (m)	Shoulder Width (m)
AADT	50.4	128.5	69.7	3.0	14.8	8.6	6.0			
Scenario 1	✓	✓		✓	✓	✓	✓	211.2	6m	1m
Scenario 2	✓		✓	✓	✓	✓	✓	152.5	6m	1m
Scenario 3	✓	✓		✓	✓		✓	202.6	6m	1m
Scenario 4	✓		✓	✓	✓		✓	143.9	6m	0.5m
Scenario 5	✓			✓	✓	✓	✓	82.8	6m	0.5m
Scenario 6	✓	✓			✓	✓	✓	208.2	6m	1m
Scenario 7	✓		✓		✓	✓	✓	149.5	6m	0.5m
Scenario 8	✓	✓		✓		✓	✓	196.4	6m	1m
Scenario 9	✓		✓	✓		✓	✓	137.7	6m	0.5m
Scenario 10	✓	✓		✓			✓	187.8	6m	1m
Scenario 11	✓		✓	✓			✓	129.1	6m	0.5m
Scenario 12	✓			✓	✓		✓	74.2	3.7m	2.5m or 0.5m
Scenario 13	✓				✓	✓	✓	79.8	6m	0.5m
Scenario 14	✓	✓				✓	✓	193.4	6m	1m
Scenario 15	✓		✓			✓	✓	134.7	6m	0.5m
Scenario 16	✓	✓			✓		✓	199.7	6m	1m
Scenario 17	✓		✓		✓		✓	140.9	6m	0.5m
Scenario 18	✓			✓		✓	✓	68.0	3.7m	2.5m or 0.5m
Scenario 19	✓	✓					✓	184.9	6m	1m
Scenario 20	✓		✓				✓	126.1	6m	0.5m
Scenario 21	✓			✓			✓	59.4	3.7m	2.5m or 0.5m
Scenario 22	✓				✓		✓	71.2	3.7m	2.5m or 0.5m
Scenario 23	✓					✓	✓	65.0	3.7m	2.5m or 0.5m
Scenario 24	✓						✓	56.4	3.7m	2.5m or 0.5m

The upgrade to Vallances Road is limited to the first ~700m section of road, up to the intersection with the Old Nursery Road. No upgrade is required for the following ~1km section of road to the BVSTP, as all the proposed development uses, bar the STP, are accessed from the Old Nursery Access Road. Additionally, all upgrade treatments are applied to both Vallances Road and the Old Nursery Access Road.

As per Section 7.9 of Austroads Part 3, pavements may be widened on curves to maintain lateral clearance between vehicles on two-lane roads. As noted in Table 6-7, a development scenario with > 75 AADT will require an upgrade to a two-lane road. This additional lane will also result in pavement widening (~1.0m) on horizontal curves for the proposed design vehicle, a MRV or HRV depending on the other proposed uses of the development. Improvements of horizontal curves can also be achieved by increasing the radius of curves but will likely result in significant earthworks. Similarly on the Old Nursery Access Road, curve improvements will be necessary for the blind corner located in the heavily vegetated section.

6.2.3 Coolamon Scenic Drive / Vallances Road Intersection

As discussed in Section 3.2.1, the existing intersection of Coolamon Scenic Drive / Vallances Road is located on a sharp corner with a heavily vegetated upslope embankment, resulting in poor site distance for vehicles turning right into the proposed development site. This intersection is considered a significant access constraint for any of the proposed developments, as any increased traffic volume would reduce the functionality and safety of the intersection.

Currently a safety mirror is provided on the corner to allow drivers to view oncoming traffic and make safe turns onto Vallances Road. Previously right-hand turn in movements were prohibited and a U-Turn Bay provided 300m north of the intersection so vehicles could enter the development site by left-hand turns only.

With the increased traffic volume expected by the proposed developments, it is recommended to improve or upgrade the intersection before developments are operational. Consideration will also need to be given to the intersection during the construction of the developments, however this is considered outside the scope of this report.

Four (4) options have been identified as potential improvements to the intersection, including:

- Option 1: Do nothing - for an increase in peak hour traffic of vehicles / hour (v/h) < 10 trips / hour;
- Option 2: Prohibit right-hand turns into Vallances Road, provide a median strip blocking this movement and upgrade the existing unused U-Turn Bay to the North - for $10 < v/h < 50$ trips / hour;
- Option 3: Widening of Coolamon Scenic Drive to improve curve radius by cutting the up-slope embankment and clearing vegetation - for $50 < v/h < 90$ trips / hour;
- Option 4: Widening of Coolamon Scenic Drive to improving curve radius by cutting the up-slope embankment and clearing vegetation and providing turning lanes - for $v/h > 90$ trips / hour; and

Using the above options along with the expected increase in peak hour traffic estimated in Section 4.2, the following upgrade options are recommended. The recommended upgrade option is based on the highest of the weekend and weekday peak hour value.

Table 6-9 Combined Intersection Upgrade Requirements for Each Scenario.

	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Weekday Peak Hour (trips / hr)	Weekend Peak Hour (trips / hr)	Recommended Upgrade Option
Weekday peak	11.25	2.10	0.56	1.56	11.00	3.00			
Weekend peak	88.50	2.70	4.48	1.42	0.00	3.00			
Scenario 1	✓		✓	✓	✓	✓	27.37	97.40	Option 4
Scenario 2		✓	✓	✓	✓	✓	18.22	11.60	Option 2
Scenario 3	✓		✓	✓		✓	16.37	97.40	Option 4
Scenario 4		✓	✓	✓		✓	7.22	11.60	Option 2
Scenario 5			✓	✓	✓	✓	16.12	8.90	Option 2
Scenario 6	✓			✓	✓	✓	26.81	92.92	Option 4
Scenario 7		✓		✓	✓	✓	17.66	7.12	Option 2
Scenario 8	✓		✓		✓	✓	25.81	95.98	Option 4
Scenario 9		✓	✓		✓	✓	16.66	10.18	Option 2
Scenario 10	✓		✓			✓	14.81	95.98	Option 4
Scenario 11		✓	✓			✓	5.66	10.18	Option 2
Scenario 12			✓	✓		✓	5.12	8.90	Option 1
Scenario 13				✓	✓	✓	15.56	4.42	Option 2
Scenario 14	✓				✓	✓	25.25	91.50	Option 4
Scenario 15		✓			✓	✓	16.10	5.70	Option 2
Scenario 16	✓			✓		✓	15.81	92.92	Option 4
Scenario 17		✓		✓		✓	6.66	7.12	Option 1
Scenario 18			✓		✓	✓	14.56	7.48	Option 2
Scenario 19	✓					✓	14.25	91.50	Option 4
Scenario 20		✓				✓	5.10	5.70	Option 1
Scenario 21			✓			✓	3.56	7.48	Option 1
Scenario 22				✓		✓	4.56	4.42	Option 1
Scenario 23					✓	✓	14.00	3.00	Option 2
Scenario 24						✓	3.00	3.00	Option 1

6.3 Interaction of Uses

Refer to Table 6-10 for a summary of the infrastructure requirements discussed in the previous sections.

The following has been noted when assessing the interaction of the proposed development uses:

- The increase in daily traffic generated by the Retail Garden Centre triggers the most significant road upgrade requirements and would therefore satisfy the requirements of all other proposed uses if it was included in the final development. Similarly, the increase in peak hour traffic by this development option also triggers the requirements for the most substantial upgrades to the Coolamon Scenic Drive / Vallances Road intersection, being Option 4 in most cases or Option 3 depending on the scenario.
- Limiting the operation of the Plant Nursery to a Wholesale Plant Nursery reduces the traffic generated by the development significantly and therefore reduces the required infrastructure upgrades;

- The low increase in daily traffic and peak hour generated by the STP, Natural Burial Ground and the Affordable Housing can be accommodated by the existing infrastructure with no upgrades to the intersection, and minor improvements to the road network;
- The following scenarios can be accommodated by the existing single carriageway, but will require the right-hand turns into Vallances Road to be prohibited along with the provision of a median strip and upgrade of the U-Turn bay to the north:
 - Scenario 18 – Natural Burial Ground, Sustainability Centre and STP; and
 - Scenario 23 – Sustainability Centre and STP.
- From the two (2) scenarios above it can be noted that the minor upgrade of the intersection to Option 2 and no upgrade to the road infrastructure can accommodate a maximum of three developments, not including the Retail Garden Centre.

Table 6-10 Combined Upgrade Requirements for Each Scenario.

	Existing	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Total AADT	Peak Hour (trips / hr)	Road Width (m)	Shoulder Width (m)	Intersection Upgrade Option	
Peak Hour	-	88.50	2.70	4.48	1.56	11.00	3.00						
AADT	50.4	128.5	69.7	3.0	14.8	8.6	6						
Scenario 1	✓	✓		✓	✓	✓	✓	211.2	97.40	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 2	✓		✓	✓	✓	✓	✓	152.5	18.22	6m	1m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 3	✓	✓		✓	✓		✓	202.6	97.40	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 4	✓		✓	✓	✓		✓	143.9	11.60	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 5	✓			✓	✓	✓	✓	82.8	16.12	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 6	✓	✓			✓	✓	✓	208.2	92.92	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 7	✓		✓		✓	✓	✓	149.5	17.66	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 8	✓	✓		✓		✓	✓	196.4	95.98	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes

	Existing	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Total AADT	Peak Hour (trips / hr)	Road Width (m)	Shoulder Width (m)	Intersection Upgrade Option	
Peak Hour	-	88.50	2.70	4.48	1.56	11.00	3.00						
AADT	50.4	128.5	69.7	3.0	14.8	8.6	6						
Scenario 9	✓		✓	✓		✓	✓	137.7	16.66	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 10	✓	✓		✓			✓	187.8	95.98	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 11	✓		✓	✓			✓	129.1	10.18	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 12	✓			✓	✓		✓	74.2	8.90	3.7m	2.5m or 0.5m	Option 1	Do nothing
Scenario 13	✓				✓	✓	✓	79.8	15.56	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 14	✓	✓				✓	✓	193.4	91.50	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 15	✓		✓			✓	✓	134.7	16.10	6m	0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 16	✓	✓			✓		✓	199.7	92.92	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 17	✓		✓		✓		✓	140.9	7.12	6m	0.5m	Option 1	Do nothing

	Existing	Retail Garden Centre	Wholesale Plant Nursery	Natural Burial Ground	Affordable Housing	Sustainability Centre	STP	Total AADT	Peak Hour (trips / hr)	Road Width (m)	Shoulder Width (m)	Intersection Upgrade Option	
Peak Hour	-	88.50	2.70	4.48	1.56	11.00	3.00						
AADT	50.4	128.5	69.7	3.0	14.8	8.6	6						
Scenario 18	✓			✓		✓	✓	68.0	14.56	3.7m	2.5m or 0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 19	✓	✓					✓	184.9	91.50	6m	1m	Option 4	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes
Scenario 20	✓		✓				✓	126.1	5.70	6m	0.5m	Option 1	Do nothing
Scenario 21	✓			✓			✓	59.4	7.48	3.7m	2.5m or 0.5m	Option 1	Do nothing
Scenario 22	✓				✓		✓	71.2	4.56	3.7m	2.5m or 0.5m	Option 1	Do nothing
Scenario 23	✓					✓	✓	65.0	14.00	3.7m	2.5m or 0.5m	Option 2	Prohibit right-hand turns into Vallances Road and upgrade the U-Turn Bay
Scenario 24	✓						✓	56.4	3.00	3.7m	2.5m or 0.5m	Option 1	Do nothing

7 Provision of Infrastructure Upgrades

7.1 Currently Supported Uses

As noted in the previous section, if no upgrades to the intersection were undertaken, and only minor improvements to road network to a compliant single carriageway, the STP, the affordable housing and / or the natural burial ground (scenarios 12, 21, 22 and 24) can be accommodated.

The minor upgrade works to the intersection of Coolamon Scenic Drive / Vallances Road to left-turn in only, along with the reinstatement of the previously used U-turn Bay to the north, would support up to three (3) developments (scenario 18 - STP, Sustainability Centre and Natural Burial Ground).

7.2 Staging of Future Uses

Planit have reviewed the infrastructure requirements for the proposed development uses and have determined the following potential staging of works, which will minimise upfront infrastructure improvements. Due to the uncertainty of the operation of the Plant Nursery, two staging scenarios have been provided.

Table 7-1 Potential staging of works – including the Retail Garden Centre.

Stage	Development Uses	Infrastructure Upgrade Requirement
Stage 1	Natural Burial Ground, Affordable Housing and STP	Upgrade of Vallances Road and the Old Nursery Road to a compliant sealed single carriageway
Stage 2	Sustainability Centre	Upgrade of Vallances Road / Old Nursery Road to a 2 lane / 2-way road with 6m wide seal and 1m shoulders Prohibit right-hand turns into Vallances Road and upgrade U-turn Bay
Stage 3	Retail Garden Centre	Widening of Coolamon Scenic Drive to improve curve radius and provide turning lanes

Table 7-2 Potential staging of works – including the Wholesale Nursery.

Stage	Development Uses	Infrastructure Upgrade Requirement
Stage 1	Natural Burial Ground, Affordable Housing and STP	Upgrade of Vallances Road and the Old Nursery Road to a compliant sealed single carriageway
Stage 2	Sustainability Centre and Wholesale Nursery	Upgrade of Vallances Road / Old Nursery Road to a 2 lane / 2-way road with 6m wide seal and 1m shoulders Prohibit right-hand turns into Vallances Road and upgrade U-turn Bay

8 Alternative Modes of Transportation (Green Travel)

8.1 Public Transport

One of the proposed development uses is affordable housing. The Affordable Rental Housing State Environmental Planning Policy, 2009 (AHRSEPP) recognises the increased reliance on alternative modes of transportation for Affordable Housing residents and accordingly, recommends the need for safe and convenient access to public transport as a means of connectivity with the region.

The nearest public bus stop to the proposed development is approximately 5km away in the town centre of Mullumbimby as shown in Figure 8-1. Therefore, the development has no public transport connectivity with the nearby town centre of Mullumbimby or the wider region.

It is believed that for affordable housing to be serviceable, access to public transport should be provided. It is recommended that any further investigations into affordable housing includes a feasibility assessment. However, it is understood that the affordable housing option considered shall not be provided under the affordable housing SEPP. Access to public transport is therefore, although desired, not a legislative requirement.

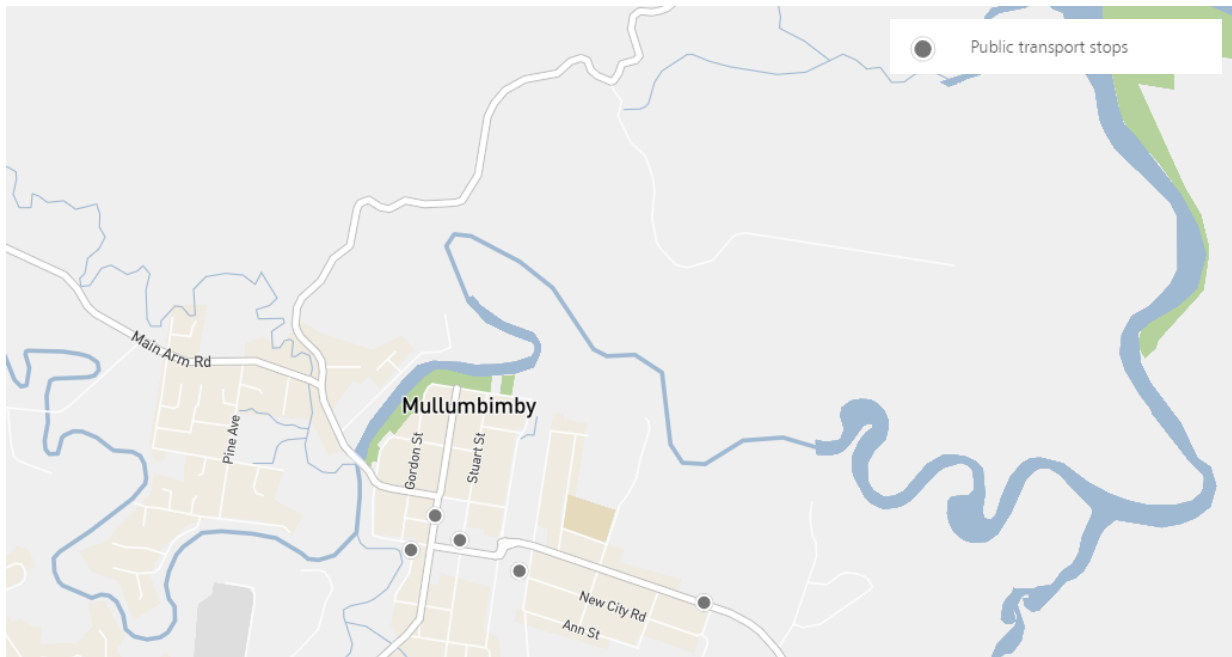


Figure 8-1 Nearby Bus Stop Locations (Transport for NSW).

8.2 Pedestrian / Cycling

There are currently no designated pedestrian pathways or bike paths adjacent to any of the roads considered in this report. The nearest designated pathways are located within the town centre of Mullumbimby, as shown in Figure 8-2. Any pedestrian / cyclist activity on the roads to and within the development would be considered unsuitable due to the multiple blind corners. Accordingly, should

provisions for cyclists and pedestrians be desired, it is recommended to upgrade the existing road network to include pedestrian pathways / shared cycleways, or provide separate access route to town, if the development is to encourage walking and cycling as alternative modes of transport.

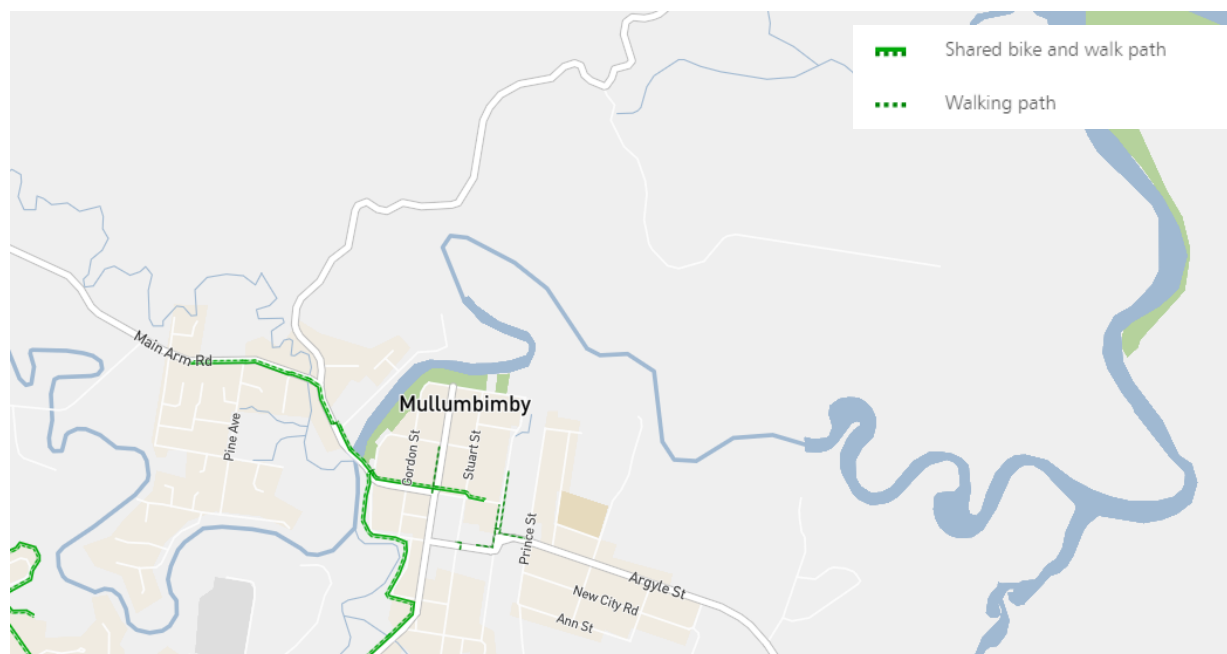


Figure 8-2 Nearby Walking and Bike Paths (Transport for NSW).

8.3 Rideshare

Ridesharing or carpooling is the sharing of cars between drivers and passengers. This green travel option is considered when public transport and / or active travel is not viable at a development site. Ridesharing ultimately reduces environmental impact by reducing the traffic generated by developments.

In order to make ridesharing an appealing green travel option, appropriate incentives need to be provided within the development, which are generally in the form of dedicated ridesharing carparks near building entrances. From the proposed development uses, the staff of the following uses could potentially benefit from the inclusion of ridesharing facilities:

- STP (3 staff);
- Plant Nursery (up to 10 staff); and
- Sustainability Centre (6 staff).

Therefore, a total of 19 staff could potentially benefit from rideshare facilities within the development site.

9 Conclusions and Recommendations

Based on the Traffic Impact Assessment (TIA) undertaken by Planit, it was found that the total increase of traffic onto the surrounding road network as a result of the proposed development uses are estimated as per the below table.

Development Use	AADT	Peak Hour (trip / hour)
Retail Garden Centre	128.5	88.5
Wholesale Nursery	69.7	91.65
Natural Burial Ground	3.0	4.48
Affordable Housing	14.8	1.56
Sustainability Centre	8.6	11
STP	6.0	3

The developments will be required to provided sufficient parking to meet its estimate demand, as per the below.

Development Use	Car Parks	Coach Parks	Accessible Parking	Service Vehicle Parking
Retail Garden Centre	23	0	1	1 SRV 1 MRV
Wholesale Nursery	12	0	1	2 SRV 1 MRV
Natural Burial Ground	23	0	2	1 SRV
Affordable Housing	4	0	0	1 SRV
Sustainability Centre	9	2	1	1 MRV
STP	4	0	1	1 MRV

Planit have reviewed the estimated traffic increases and existing road network and identified thresholds in terms of traffic impact which trigger infrastructure upgrade requirements. These thresholds are as follows:

- Vallances Road and the Old Nursery Access Road thresholds:
 - <75 AADT: Rural Single Carriageway - (1 x 3.7m lane);
 - 75-150 AADT: Minor Road (2 x 3m lanes, 0.5m shoulders); and
 - 150+ AADT: Minor Road (2 x 3m lanes, 1m shoulders).
- Coolamon Scenic Drive / Vallances Road Intersection thresholds:
 - < 10 trips / hour: Option 1 - Do nothing;
 - 10 < v/h < 50 trips / hour increase: Option 2 - Prohibit right-hand turns into Vallances Road, provide a median strip blocking this movement and upgrade the existing unused U-Turn Bay to the North;
 - 50 < v/h < 90 trips / hour: Option 3 - Widening of Coolamon Scenic Drive to improve curve radius by cutting the up-slope embankment and clearing vegetation; and
 - v/h > 90 trips / hour: Option 4 - Widening of Coolamon Scenic Drive to improving curve radius by cutting the up-slope embankment and clearing vegetation and providing turning lanes.

The increase in daily traffic generated by the Retail Garden Centre triggers the most significant road upgrade requirements and would therefore satisfy the requirements of all other proposed uses if it was

included in the development. Similarly, the increase in peak hour traffic by this development option also triggers the requirements for the most substantial upgrades to the Coolamon Scenic Drive / Vallances Road intersection. However, limiting the operation of the Plant Nursery to a Wholesale Plant Nursery reduces the traffic generated by the development significantly and therefore reduces the required infrastructure upgrades.

The low increase in daily traffic and peak hour generated by the STP, Natural Burial Ground and the Affordable Housing can be accommodated by the existing infrastructure with minor upgrades to the road infrastructure to a compliant single carriageway.

The proposed upgrades to Vallances Road are limited to the first ~700m of road, up to the intersection with the Old Nursery Access Road, as only the STP development is accessed from the remainder of the road. The existing condition of the following ~1km of Vallances Road is considered adequate for the purpose of accessing the STP.

If all development uses are to be accommodated on site, the following staged approach would allow for an optimised infrastructure delivery.

Stage	Development Uses	Infrastructure Upgrade Requirement
Stage 1	Natural Burial Ground, Affordable Housing and STP	Upgrade of Vallances Road and the Old Nursery Road to a compliant single carriageway
Stage 2	Sustainability Centre and Wholesale Nursery	Upgrade of Vallances Road / Old Nursery Road to a 2 lane / 2-way road with 6m wide seal and 1m shoulders Prohibit right-hand turns into Vallances Road and upgrade U-turn Bay
Stage 3	Plant Nursery	Widening of Coolamon Scenic Drive to improve curve radius and providing turning lanes

The development site does not have adequate access to alternative modes of transportation, including public transport and pedestrian / cycling facilities, these may be required to be provide adequate serviceability to the affordable housing proposal. The developments may also need to consider rideshare facilities if the encouragement of green travel is needed.

Based on the findings of this TIA, it is recommended that the future development considers the traffic increases and infrastructure upgrades thresholds noted in this report when assessing the site as suitable location for the proposed development use. A further traffic impact assessment will need to be undertaken as part of future design development to confirm the traffic impact presented in this report.



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