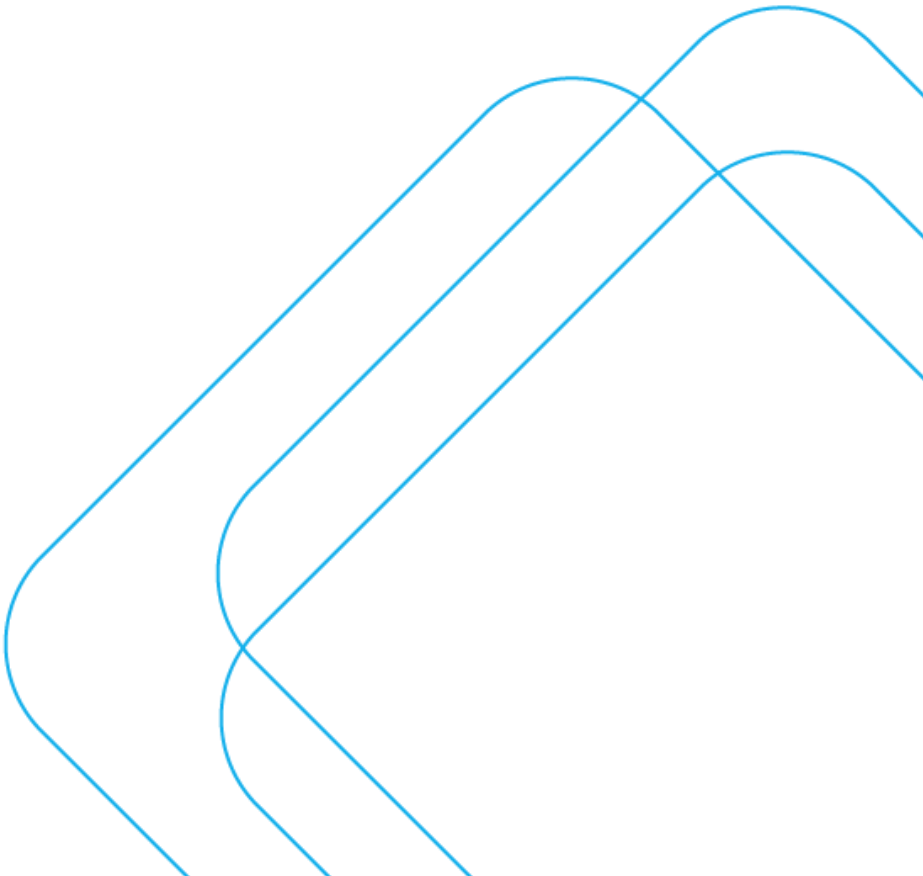
SCT Consulting

20 & 20A CANTWELL ROAD DEVELOPMENT APPLICATION

Transport Impact Assessment

11 FEBRUARY 2025

SCT Consulting acknowledges
the traditional owners of the lands
on which we work.
We pay our respects to Elders
past, present and emerging.



Quality Assurance

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5.0	11 February 2025	Updated final report

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Appendices

Executive Summary

The proposed development

The Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle has commissioned SCT Consulting to prepare a transport impact assessment to support a Development Application for a proposed subdivision 20 & 20A Cantwell Road in Lochinvar, Maitland City Local Government Area.

The site comprises the two existing lots (Lot 1 DP 1299958 and Lot 2 DP 1299958), and the proposed subdivision will create approximately 138 residential lots and new roads. It is proposed that the site be subdivided for residential development, with associated roads and services. Completion of the proposed lots would be expected in 2026.

Road widening to Cantwell Road (along the subdivision frontage) and the introduction of a left turn slip lane from Cantwell Road to New England Highway (to facilitate heavy vehicle access) is proposed as part of the proposed subdivision, as well as a road reserve to facilitate a new east-west link between Cantwell Road and Wyndella Road as part of the Lochinvar Structure Plan. The internal road network's cross-section configurations will be provided in accordance with Maitland City Council's requirements.

Previous planning

The site is located within the Lochinvar Urban Release Area (URA), which is identified in the Lower Hunter Regional Strategy as a priority area to accommodate regional population growth. In October 2007, the Lochinvar Structure Plan (LSP) was approved by Maitland City Council. The LSP provides a logical framework for the development and planning of the area with consideration of its natural elements, the needs of the community, and infrastructure requirements. The LSP aims to achieve an urban structure based on a walkable, mixed-use town, with a capacity for up to 5,000 residential dwellings.

The nearest development to the site is the Wyndella Road subdivision, which would deliver 258 residential lots (an increase of 250 lots compared to the current 8 lots) to the east of the site. Lots would be opening indicatively in 2025 and approximately 50 lots per year would be released, with completion by 2031.

Impact assessment

Road network

Traffic counts for the intersection of New England Highway / Station Lane / Cantwell Road (as the key access of this subdivision) were collected in February 2024 and were used to establish base level (2024) traffic conditions. SIDRA 9.1 modelling based on the existing flows shows that the 2024 intersection performance Level of Service (LoS) A and B for movements on the New England Highway and left-turning traffic from the intersecting side streets. LoS F was however observed on Cantwell Road right turn movement, which is a result of three to four vehicles having difficulty finding gaps to enter into New England Highway.

The proposed subdivision will, at full development, generate an additional 98 and 108 trips in the AM and PM peak hours respectively. The traffic modelling assumptions used were confirmed with TfNSW and Council on 16 May 2024.

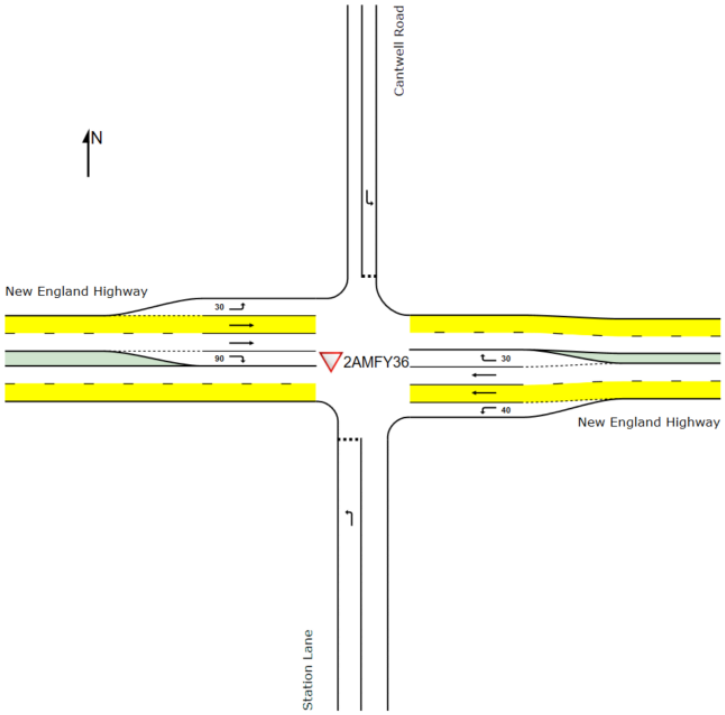
For future year scenario testing, Cantwell Road has been reconfigured to a left turn only, with traffic wanting to turn right being reassigned to take alternate routes. The analysis showed that in 2026 with the proposal trips added to the intersection, there is a minor increase in DoS compared to the base year, indicating there is still capacity. The 2036 base year performance (without the subject development) however indicates that there will be capacity constraints and high delays, due to significant traffic growth on the New England Highway and neighbouring developments in Lochinvar. This indicates that the New England Highway will likely require road upgrades before 2036, independent of the proposal.

The 2036 performance analysis was therefore undertaken with an additional through lane in each direction on the New England Highway, in addition to the right turn ban from Cantwell Road, as seen in **Figure ES**.

The analysis showed that introducing an additional through lane in each direction along the New England Highway improves intersection performance drastically, in both the AM and PM peak hours. With the upgrades, the maximum queue lengths of 22m from right turn movements on the New England Highway in the PM peak hour are contained within the current turning bays. All other movements on each approach will operate at a LOS A, with considerable spare network capacity.

The actual impact as a result of 138 dwellings is limited with minimal additional delays to the intersection.

Figure ES Proposed infrastructure upgrades (yellow lanes are additional)



Active transport

The proposed active transport facilities, including a 2.5m wide shared path along Cantwell Road (to development frontage) and along the new east-west link road, are expected to provide good walking and cycling accessibility from New England Highway to the site, as well as within the site.

The proposed shared path along the site's frontage along with the east-west linkage through the new distributor road will facilitate the pedestrian and cycleway connectivity between Wyndella Road and Cantwell Road, consistent with the DCP. The proposal includes adequate walking and cycling infrastructure to cater for the additional 48 (AM) and 24 (PM) person trips generated by the development.

Public transport

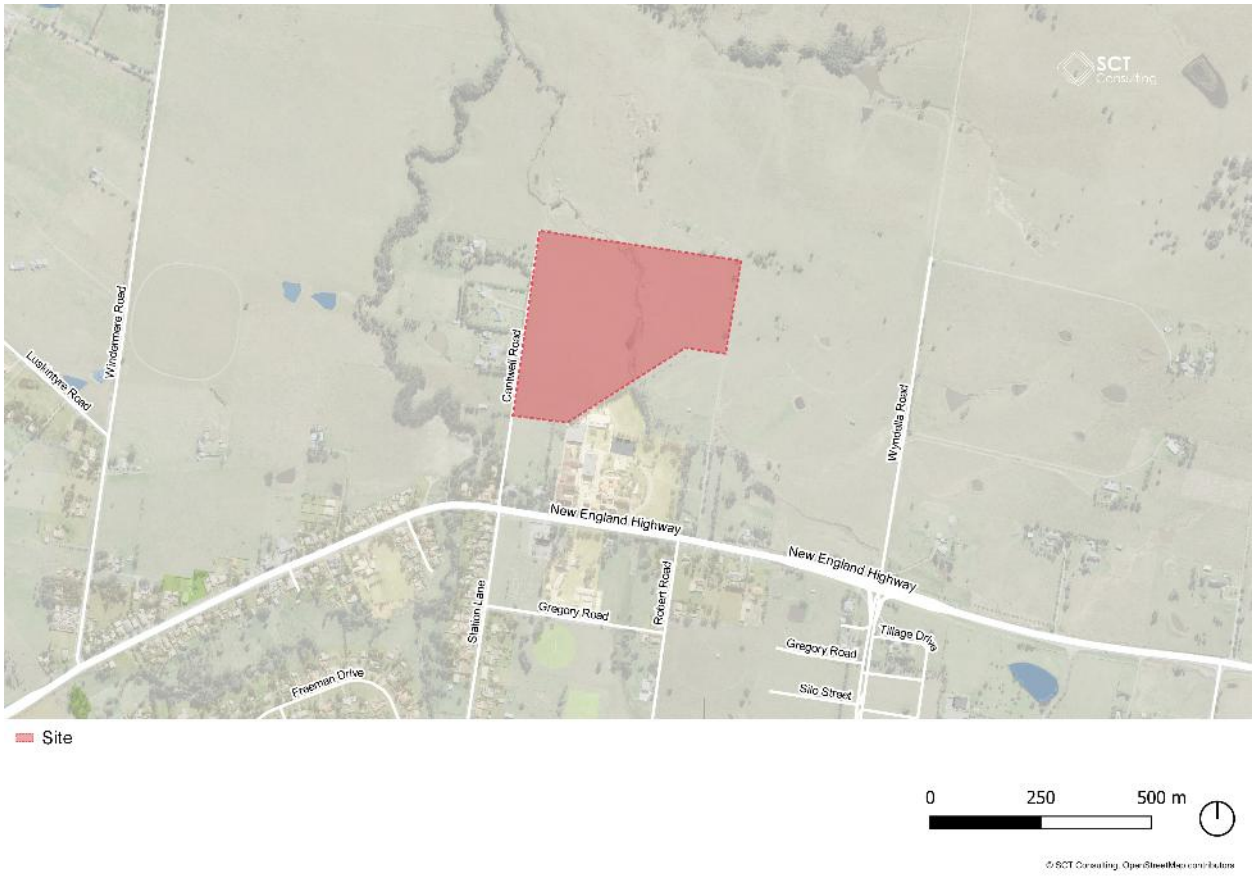
The site is within a walkable distance of the bus stops on New England Highway, which provides connectivity to school bus services, to Maitland and Stockland Green Hills as well as other centres along the New England Highway.

1.0 Introduction

1.1 Background

The Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle is lodging a Development Application (DA) for a subdivision at 20 & 20A Cantwell Road in Lochinvar (the site), Maitland City Local Government Area (LGA) (**Figure 1-1**).

Figure 1-1 The site location



The site currently consists of two lots (Lot 1 DP 1299958 and Lot 2 DP 1299958), and the proposed subdivision will create approximately 138 residential lots and new roads. The proposed subdivision development will be primarily accessed via Cantwell Road, from the New England Highway.

The site is located within the Lochinvar Urban Release Area (URA), which is identified in the Lower Hunter Regional Strategy as a priority area to accommodate regional population growth. In October 2007, the Lochinvar Structure Plan (LSP) was approved by Maitland City Council. The LSP provides a logical framework for the development and planning of the area with consideration of its natural elements, the needs of the community, and infrastructure requirements. The LSP aims to achieve an urban structure based on a walkable, mixed-use town, with a capacity for up to 5,000 residential dwellings.

The nearest development to the site is the Wyndella Road subdivision, which would deliver 258 residential lots (an increase of 250 lots compared to the current 8 lots) to the east of the site. Lots would be opening indicatively in 2025 and approximately 50 lots per year would be released, with completion by 2031.

SCT Consulting has been commissioned by the Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle to prepare a transport impact assessment (TIA) to support the DA for the proposed subdivision.

1.2 Purpose of report and report structure

This TIA will assess the impact on the traffic and transport network surrounding the site because of the proposed subdivision at 20 & 20A Cantwell Road in Lochinvar. This report contains the following sections:

- **Section 2.0**: A description of the strategic documents that apply to the site.
- **Section 3.0**: The existing transport context surrounding the future subdivision.
- **Section 4.0**: A description of the proposed subdivision and how it complies with site-based controls.
- **Section 5.0**: Details of the impacts of the proposed subdivision and any proposed mitigations.
- **Section 6.0**: Summary of the key outcomes and conclusion of the study.

1.3 Technical requirements

Maitland City Council's technical requirements and where these are addressed in the report are outlined in **Table 1-1**.

Table 1-1 Maitland City Council requirements

Requirements	Addressed in section
Raised in pre-lodgement meeting number 1, held 26 October 2023	
15m wide pavement Primary Distributor Road linking to Wyndella Road to the east	Section 4.4
11m wide pavement Primary Collector Road (Cantwell Road) linking to the New England Highway. Cantwell Road is identified for Road widening	Section 4.4
Off Road Shared Path / On Road Commuter Path	Section 4.4 Section 4.5
A Traffic Impact Assessment is required to address access, public transport, roads and parking restrictions (see road width comments relative to Bushfire), impacts on the New England Highway and the intersection with Cantwell Road. As the development is a traffic generating development under the SEPP (Transport and Infrastructure) 2021, it will be referred to Transport for NSW.	Section 3.0 Section 4.4 Section 5.0
A Bushfire Hazard Assessment report addressing the requirements of the Planning for Bushfire Protection 2019. The development will be integrated and will be referred to the NSW Rural Fire Service. Note, requirements for the application include designation of perimeter, non-perimeter and internal roads, APZs within the development site, perimeter road widths requiring parking fronting residential lots being in addition to the minimum 8m wide carriageway with parking restrictions on the outside (non-residential lot fronting) kerb.	Section 4.4 Parking fronting residential lots are provided on Road 04.
The proposed development will put additional pressure on the Cantwell Road/NEH intersection. This intersection will require upgrading to ensure that satisfactory turning movements in/out of NEH can occur. The minimum design vehicle for the site is a semi-trailer (the road is a primary collector). Note: this is indicative only and a WAD with TfNSW will be required. Alternatively, wait for land to east to connect through to reduce traffic load on Cantwell Road (this will also require traffic assessment to be undertaken).	Section 4.4 Section 5.1
A traffic report will need to be provided with any application. It will need to address the internal site, Cantwell Road and the intersection at Cantwell Road and the NEH, intersections to the east as required.	Section 4.4 Section 5.1
Cantwell Road width will need to be addressed with any application. The road is only 4m in sections. This width is not suitable to facilitate any significant development. It is expected that temporary widening shall be provided along Cantwell Road from the New England Highway to the development site. The construction of half road widening and kerb and guttering along Cantwell Road will be required for the full frontage of the development site.	Section 4.4
A CHR(S) intersection will be required off Cantwell Road into the proposed distributor road. Council also agreed in the pre-DA No.2 meeting that basic T was acceptable and CHR not required (although not minuted by Council)	Section 4.4
Road widths will be required to be in accordance with MCC MOES- See Road Design Cl2. Note the internal distribute road is required to be 25m in widths (15m carriageway+4.5m verge + 5.5m verge for off road shared path). Only 22m have been provided on the plans.	Section 4.4
Note: the MCC URA DCP regarding provisions of shared paths.	Section 4.4 Section 5.3
Raised in pre-lodgement meeting number 2, held 18 July 2024	

The general road widening for the frontage of the site Cantwell Road as per rev 3 are supported (rev 4 is not supported). The DCP URA depicts 11m however MOES specifies that public bus routes shall be 12m and hence 3.5m travel lane is required.	Section 4.4
Heritage/ ability to widen, TfNSW, connection to the east (through CPG) and NSW RFS all dictate the required capacity of Cantwell Road. Hence without further information regarding ability to widen and expected traffic volumes council cannot confirm the specific requirements of Cantwell Road to NEH. Noting council will be relying on Austroads Part 3 compliance. The connectivity/traffic report analysis shall also consider pedestrian/cyclist safety.	Section 4.5
From the plans the internal road widths are not clear. These shall comply the URA DCP and MOES.	Section 4.4
Development Applications are to be supported by appropriate Traffic Impact Assessments in order to identify that capacity exists in the local road network to accommodate the anticipated overall development yield for the Lochinvar URA. The development application is to include an overall transport movement hierarchy showing the major circulation routes and connections to achieve a simple and safe movement system for private vehicles, public transport, pedestrians and cyclists.	Section 5.0

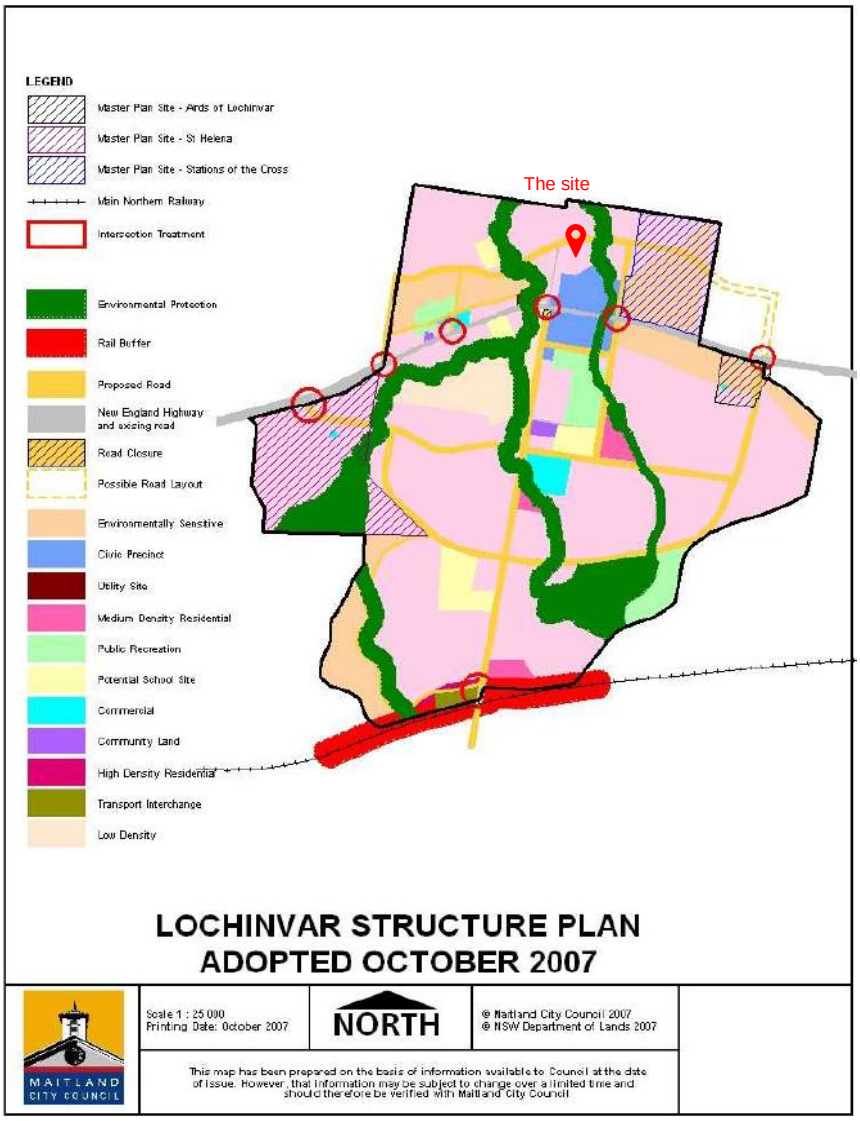
2.0 Strategic context

2.1 Lochinvar Structure Plan (Maitland Council, 2007)

Lochinvar is identified in the Lower Hunter Regional Strategy as a priority area to accommodate regional population growth. In October 2007, the Lochinvar Structure Plan (LSP) was approved by the Maitland City Council. The LSP provides a logical framework for the development and planning of the area with consideration of its natural elements, the needs of the community, and infrastructure requirements. The LSP aims to achieve an urban structure based on a walkable, mixed-use town, with a capacity for up to 5,000 residential dwellings. The subject site is located at the eastern end of the Structure Plan area.

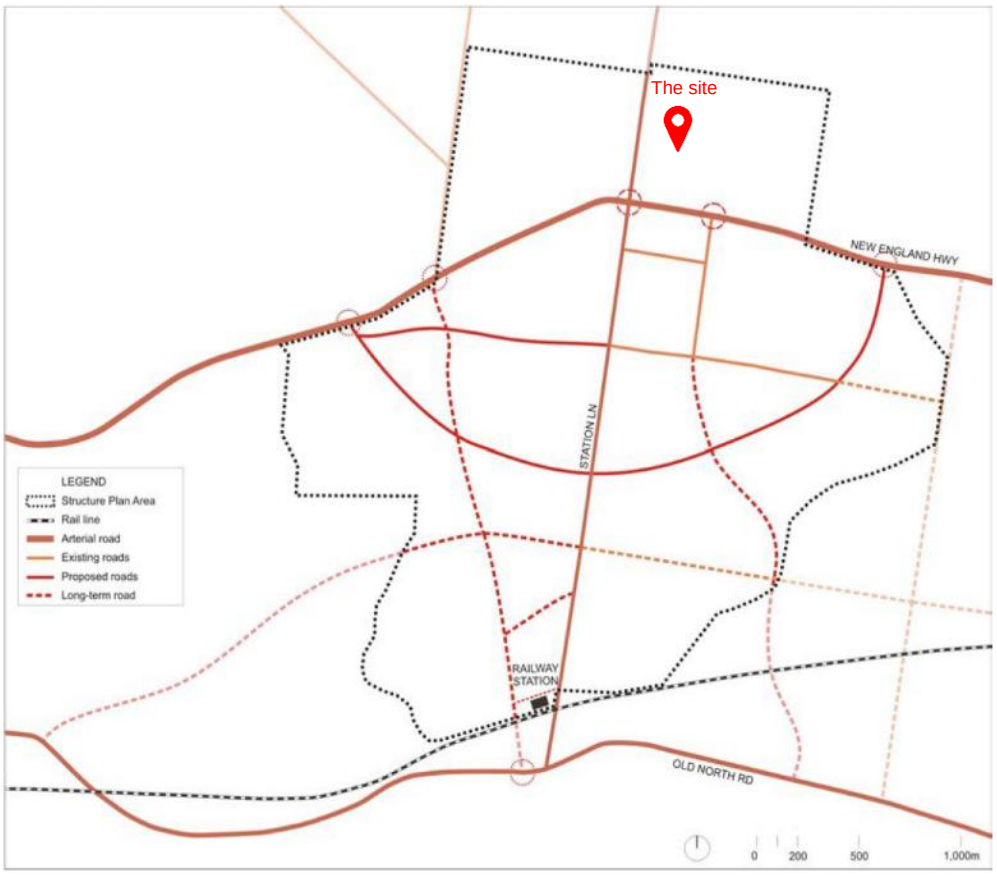
The town centre precinct serves to provide a hub for the future town linking the existing established village with the new urban development fronts. Based on an expected population of around 12,000 people, the town centre will comprise a mix of uses including community, retail, commercial, and residential uses. There will be a wide range of retail outlets including a supermarket, speciality shops, a newsagent, a medical centre, and a service station. Sufficient car parking areas will be provided to encourage local shopping. It is envisaged that an area of at least 5-10 hectares is to be provided to cater for the provision of sufficient retail / commercial facilities within the central town precinct. An additional commercial area will be required to accommodate support services and business offices associated with such precincts. The structure plan is shown in **Figure 2-1**, while the surrounding proposed road network is shown in **Figure 2-2**.

Figure 2-1 Lochinvar Structure Plan



Source: Maitland City Council, 2007

Figure 2-2 Lochinvar Structure Plan road network



Source: Maitland City Council, 2007

2.2 Maitland Development Control Plan updates (2016)

The Lochinvar URA comprises a total of 650 hectares of land, with an approximate residential yield of 5,000 lots. The Lower Hunter Regional Strategy (Dept of Planning, 2006) identifies the Lochinvar URA as a regionally significant development area and as a key site to achieve the dwelling targets for population growth in the Lower Hunter. The proximity of the Lochinvar URA to regional transport systems, including the Main Northern Railway Line, the New England Highway and the Hunter Expressway, are key elements to the identification of this area for urban development. A Structure Plan was adopted by Council in 2007 for the Lochinvar URA, while a specific Section 94 Contributions Plan has also been prepared for this URA.

After the publication of the Lochinvar studies, Maitland City Council produced an update to their Development Control Plan (DCP) with proposed road network, active transport and public transport layouts, as seen in **Figure 2-3**. Objectives for Transport and Movement outlined in the DCP include:

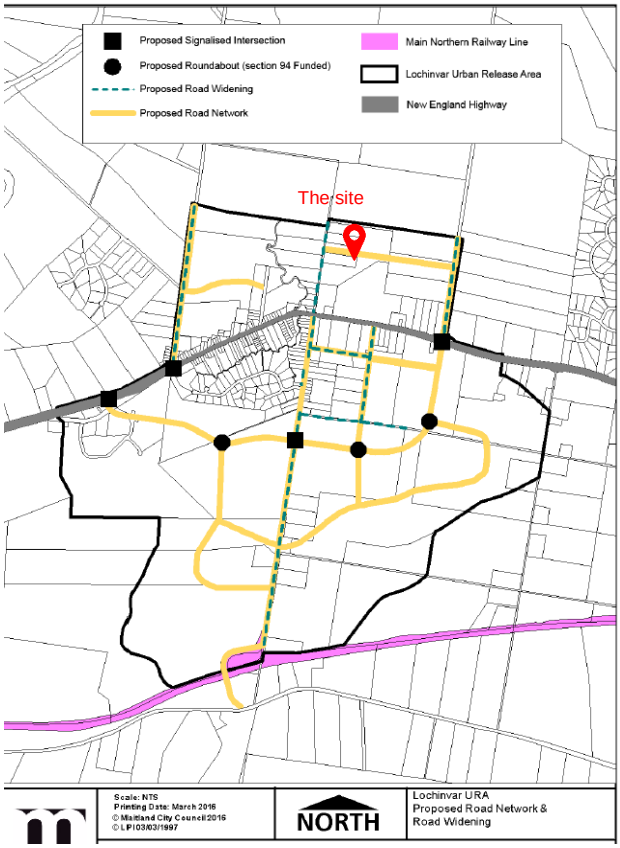
– To achieve a simple and safe movement system for private vehicles, public transport, pedestrians and cyclists.

– To provide walkable neighbourhoods with convenient access to neighbourhood shops, community facilities and other services, with less dependence on cars for travel.

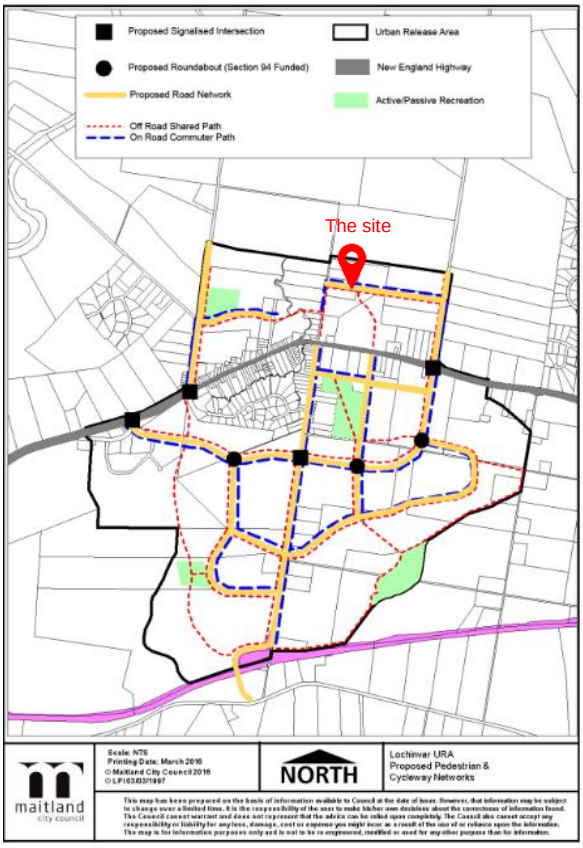
– To provide for access generally by way of an interconnected network of streets and paths which facilitate safe, efficient and pleasant walking, cycling and driving.

– To facilitate new development which supports the efficiency of public transport systems, and provides safe, direct access to the system for residents.

Figure 2-3 The Lochinvar URA proposed road network and Active transport network



Proposed road network and widening



Proposed pedestrian and cycle network

Source: Maitland Council, 2016

2.3 Street cross-section requirements

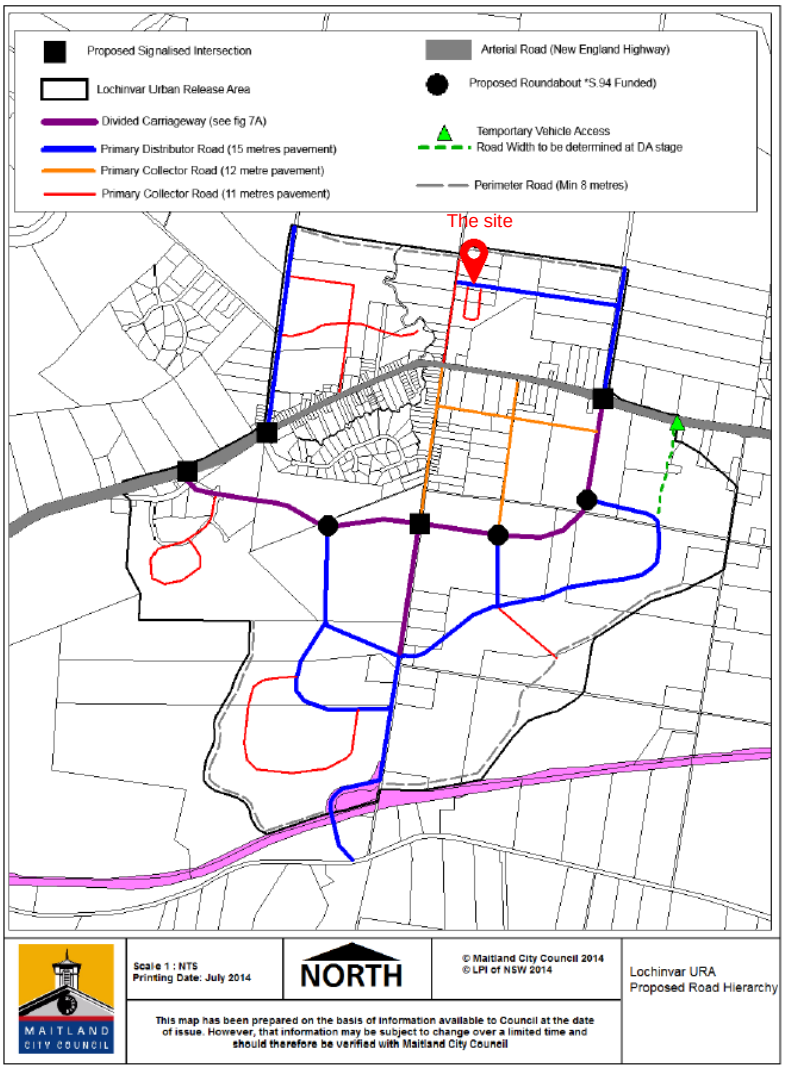
The Maitland City Council | Manual of Engineering Standards – Road Design defines the requirements for street cross sections (**Figure 2-4**). The higher-order roads are defined by **Figure 2-5**. Lochinvar URA Proposed Road Hierarchy and Bus Routes of Part F – Urban Release Areas.

Figure 2-4 Street cross sections for different road types

ROAD TYPE	MAX NO. LOTS	RESERVE WIDTH (m) [a]	CARRIAGEWAY / KERB-KERB (m) [b]	ON-ROAD BICYCLE FACILITY	FOOTWAY VERGE (m) [c]	KERB [d]	FOOTPATH (1.5m WIDE) [e]	DESIGN ESA [f]
Local – Place [i]	10	17	8	Mixed	4.5	Rolled	As Required	1×10^5
Local – Access [i]	20	17	8	Mixed	4.5	Rolled	One side	1×10^5
Local – Secondary [i]	50	17	8	Mixed	4.5	Rolled	One side	2×10^5
Local - Primary [i]	100	17	8	Mixed	4.5	Rolled	One side	5×10^5
Collector - Secondary [i]	200	17	8	Mixed (Parking)	4.5	Upright	One side	1×10^6
Collector - Primary [iv]	300	20	11	Mixed (Parking) [p]	4.5	Upright	One side	1.5×10^6
Distributor –Secondary [v]	400	23	14	Mixed (Parking) [p]	4.5	Upright	Both sides	2×10^6
Distributor - Primary [m v]	500	24	15 [q]	1.5m Lane	4.5	Upright	Both sides	5×10^6
Sub-Arterial [n]	3500	24.4	15.4 [r]	1.7m Lane [s]	4.5	Upright	Both sides	1×10^7 min
Industrial - Secondary	10 [g]	22	13	Mixed	4.5	Upright	As Required	5×10^6
Industrial - Primary	> 10	22	13	Mixed	4.5	Upright	As Required	1×10^7
School Bus/Public Route [o]			9min / 12min					$2/5 \times 10^6$ min
Business / School Precinct			15.4	1.7m Lane	5.5 min [h]	Upright		1×10^7 min

Source: Maitland City Council

Figure 2-5 Cross section requirements



Source: Maitland City Council, 2014

The cross sections required for roads surrounding the site are further discussed in **Section 4.4.3**.

Traffic and transport related improvements (as outlined in the DCP) in proximity to the site include:

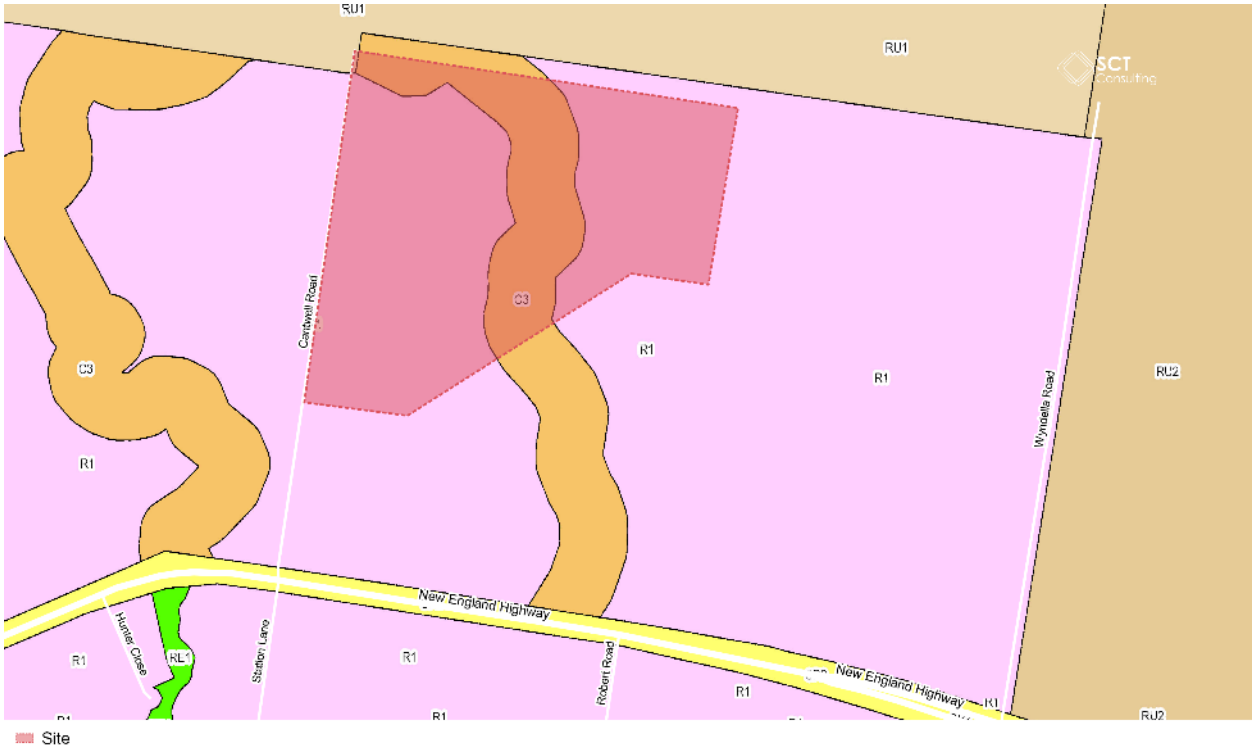
- Proposed widening along Cantwell Road and Station Lane, and a new east-west link between Cantwell Road and Wyndella Road.
- The new east-west link is identified as a primary distributor road, while Cantwell Road is identified as a primary collector road.
- An off-road shared path along Cantwell Road which connects Wyndella Road via a proposed shared path along a new east-west link to connect to the east and Windermere Road to the west.
- An off-road shared path in a north-south direction through the site, and along Wyndella Road.
- An on-road commuter path along the new east-west link between Cantwell Road and Wyndella Road.

3.0 Existing conditions

3.1 The site

The site is located east of Cantwell Road and north of New England Highway and is zoned R1 General Residential (**Figure 3-1**) and currently consists of Lot 1 DP 1299958 and Lot 2 DP 1299958.

Figure 3-1 Land zoning surrounding the site



3.2 Travel behaviour

The 2016 Method of travel to work data for Lochinvar was analysed to understand how existing residents in the study area currently travel to get to work. The year of 2016 was used for analysis instead of 2021, for travel patterns not to be influenced by Covid lockdowns.

The analysis suggests that a large proportion (73 per cent) either drive or is a car passenger to get to work (including taxi or car sharing), while only 1.3 per cent currently travel to work by public transport. As expected for a rural area, only a small proportion (3.4 per cent) walked only to get to work. Work from home shares about six per cent of the overall population. The car mode share is higher than the regional NSW average, indicating less developed public transport and low-density nature.

3.3 Road network

3.3.1 Road hierarchy

The site is bounded by Cantwell Road to the west, while New England Highway runs south of the site, and Wyndella Road east of the site, as shown in **Figure 3-2**.

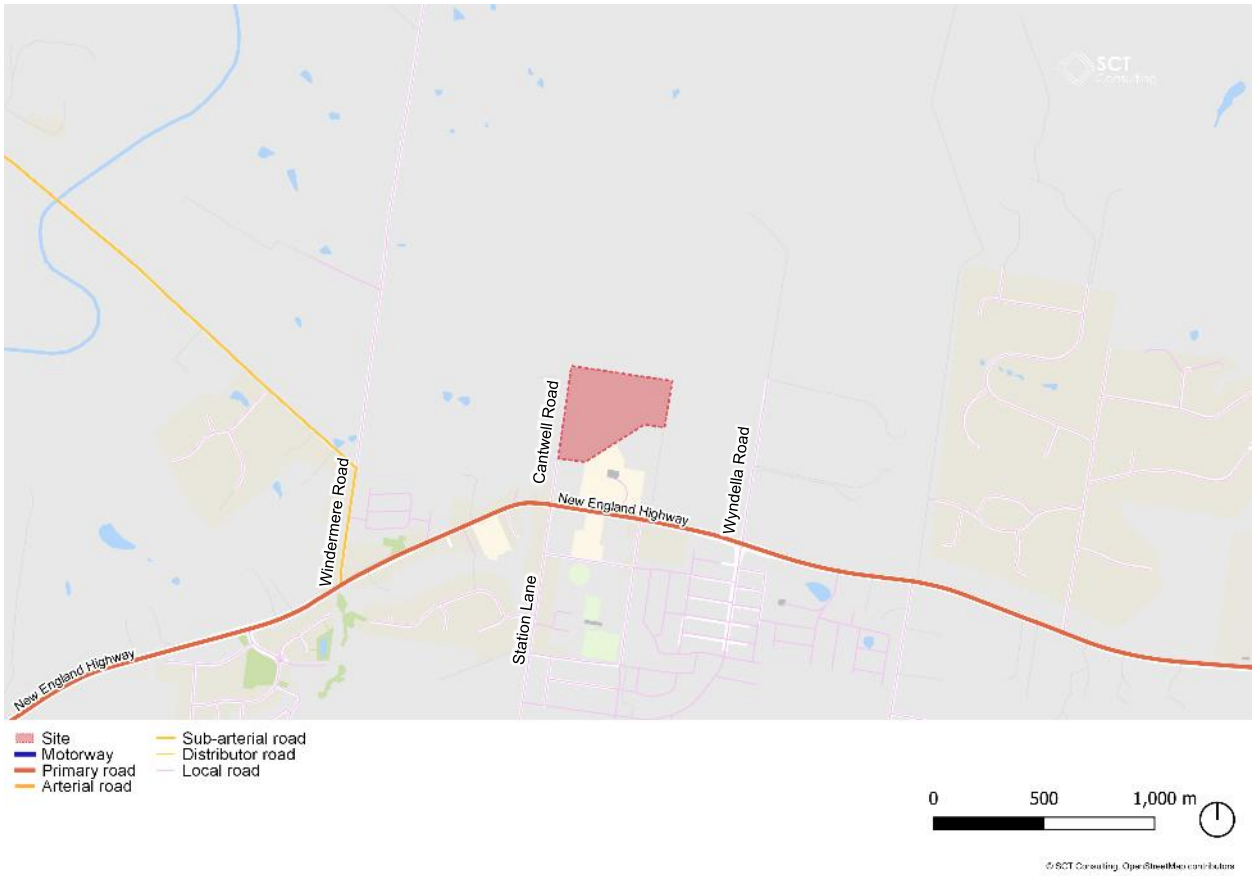
– **New England Highway** is a primary road classified as a state road and connects to Maitland and through onto Newcastle to the east, while it connects to Branxton to the west. There are interchanges with M15 Hunter Expressway via Lovedale Road at Allandale. In proximity to the site, New England Highway has one lane in each direction and a speed limit of 60km/h, except for the school zone past St Joseph's College. No Stopping restrictions are in place along the New England Highway in proximity to the site.

– The site is accessed from New England Highway via a priority-controlled intersection at **Cantwell Road**, which is a narrow two-way, two lane undivided local road that currently ends north of the site. It has a 50km/h speed limit, and a school zone close to New England Highway.

– **Wyndella Road** is a local road that runs to the east of the site and connects to New England Highway via a signalised intersection. Wyndella Road currently is a narrow, undivided road with one lane in each direction.

– **Station Lane** is a local two-way, two-lane road that runs in a north-south direction and connects the site to Lochinvar Station to the south. It connects to the intersection of the New England Highway and Cantwell Road south of the site.

Figure 3-2 Road network surrounding the site



3.3.2 Existing intersection performance

Intersection Level of Service (LoS) is a typical measure used by traffic engineers to identify when roads are congested. The LoS, as defined in TfNSW Traffic Modelling Guidelines, is provided in **Table 3-1**.

Table 3-1 Level of Service definitions

Level of Service	Average delay per vehicle	Performance explanation
A	Less than 14.5s	Good operation
B	14.5s to 28.4s	Good with acceptable delays and spare capacity
C	28.5s to 42.4s	Satisfactory
D	42.5s to 56.4s	Operating near capacity
E	56.5s to 70.4s	At capacity. At signals incidents will cause excessive delays. Roundabouts require another control method.
F	70.5s or greater	At capacity. At signals incidents will cause excessive delays. Roundabouts require another control method.

Source: Roads and Maritime Services (2002), Traffic Modelling Guidelines

In addition, the Degree of Saturation (DoS) is also used as a measure of performance to complement the LoS measure. The DoS is a measure of the volume/capacity for the worst turning movement at the intersection. A DoS of 1.0 implies the turning movement is at capacity.

Traffic counts for the intersection of New England Highway / Station Lane / Cantwell Road were collected in February 2024 and were used to establish current traffic conditions (**Appendix A**). The performance of the existing layout (as seen in **Figure 3-3**) of the New England Highway / Cantwell Road / Station Lane intersection during the AM and PM peak hours was analysed using SIDRA 9.1 and the results are presented in **Table 3-2**. Detailed results are presented in **Appendix B**.

The results show that the intersection performance for the 2024 base case contains Level of Service (LoS) A and B for movements on the New England Highway and left-turning traffic from the intersecting side streets. LoS F was observed is a result of three to four vehicles turning from Cantwell Road due to high volumes on the main road and the resultant limited gaps. The longest queue occurs at the eastbound right turn approach on New England Highway (AM peak) and Cantwell Road (PM peak).

Figure 3-3 Existing layout of the New England Highway / Cantwell Road intersection

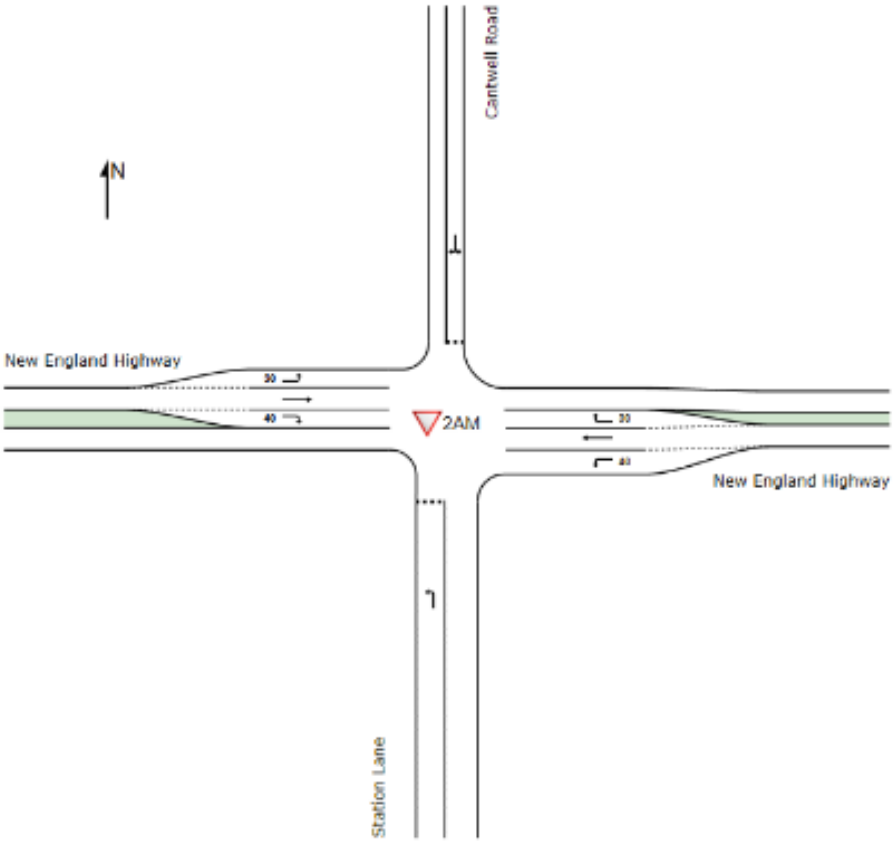


Table 3-2 Existing (2024) intersection performance

Time period	Intersection performance (Existing layout)					
	Layout	Volumes (vph)	LoS	Delay (sec)	DoS	Maximum queue length (m)
AM peak hour	Priority (existing layout)	1,566	F	117	0.46	4 (New England Highway – eastbound right turn)
PM peak hour	Priority (existing layout)	1,611	F	115	0.42	3 (Cantwell Road)

Note: Performance metrics of the worst-performing intersection movement are reported for priority-controlled intersections.

3.4 Active transport

The active transport network surrounding the site is shown in **Figure 3-4**. As seen, there are currently no footpaths along Cantwell Road or along the northern side of the New England Highway (except for a short section near the bus stop), while some footpaths (of approximately 1.5m width) are provided along the southern side of New England Highway and along the eastern side of Station Lane in proximity to the site. A shared path of approximately 2.5m width is provided along the western side of Wyndella Road, south of the New England Highway, while on-street cycle facilities are provided along the New England Highway and part of Wyndella Road.

There is no pedestrian crossing provided across New England Highway at the intersection with Cantwell Road, but a pedestrian refuge is provided at the southern leg of the intersection (across Station Lane). The closest opportunity to cross New England Highway is provided via a signalised pedestrian crossing, 140m east of Cantwell Road, outside St Joseph's College.

Figure 3-4 Active transport network surrounding the site

3.5 Public transport

The site is located north of New England Highway, which carries bus routes 179 and 180 to Maitland and Stockland Green Hills, and school bus services, as shown in **Figure 3-5**.

There is a bus stop about 80m east of the New England Highway/Cantwell Intersection on the southern side of New England Highway for westbound and the bus stop on the northern side of New England Highway for eastbound is 200m east of the New England Highway/Cantwell intersection. The frequency of these services is approximately hourly from 8am to 6pm.

Lochinvar Train Station, which is served by the Hunter Line with an approximate hourly frequency from 7am to 10am, is located approximately 3km to the south of the site. There are currently no feeder bus routes from the site to the station except for a school bus route that connects St Joseph's College to the train station. The Hunter Line connects Lochinvar to Newcastle Interchange.

There is some parking at Lochinvar Station which enables residents to park and ride to Newcastle CBD.

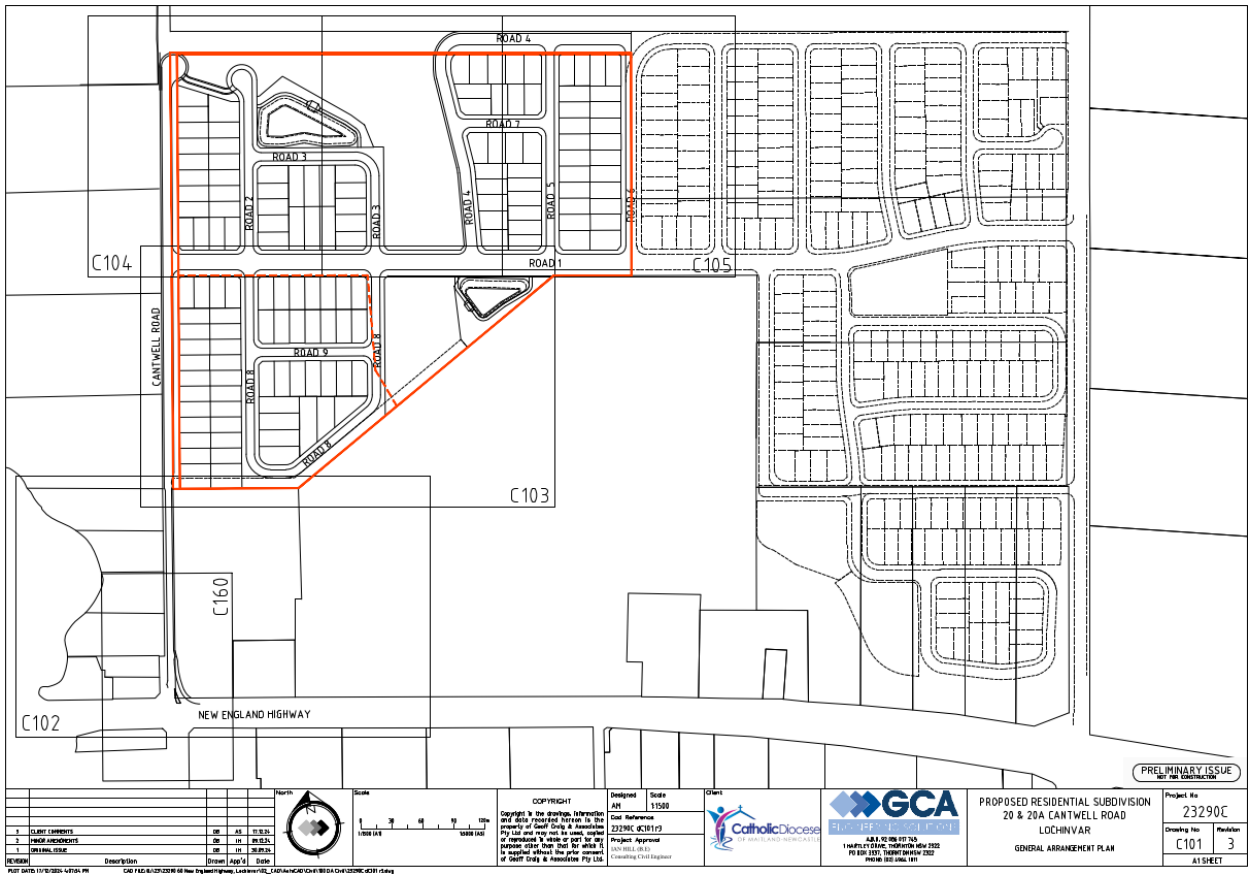
Figure 3-5 Public transport network surrounding the site

4.0 Proposed subdivision

4.1 The proposed subdivision

The Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle is lodging a Development Application (DA) for a subdivision at 20 and 20A Cantwell Road, Lochinvar (the proposal). The proposed site is zoned R1 General Residential with a corridor of C3 Conservation Management Zone and consists of Lot 1 DP 1299958 and Lot 2 DP 1299958. The subdivision will create approximately 138 residential lots (an increase of 136 lots compared to the current two lots) and new roads, as seen in **Figure 4-1** (zoned in red).

Figure 4-1 The proposed subdivision plan



Source: GCA Engineering Solutions, 2025

The development will be primarily accessed via Cantwell Road from the New England Highway until such a time that the distributor road connecting to Wyndella is completed. The subdivision includes a road reserve to facilitate a new east-west link between Cantwell Road and Wyndella Road as part of the Lochinvar Structure Plan.

4.2 Trip generation

4.2.1 Vehicle trip generation

A trip generation rate of 0.71 / 0.78 veh/ dwelling was adopted for the development as well as the surrounding developments for the AM and PM peaks respectively. This is based on the RMS' 'Low-Density dwellings in regional areas' trip rate category. A 70% / 30% direction split to/from the west and east respectively for all trips was assumed, based on early consultation with TfNSW and Council. The traffic generation rates adopted are consistent with previous studies and confirmed by TfNSW (**Appendix C** and **Appendix D**) and would result in **an additional 98 and 108 trips being generated** by the proposal in the AM and PM peak hour respectively, assuming an additional 138 dwellings compared to the existing scenario.

4.2.2 Person trip generation

The JTW data presented in **Section 3.2** suggests that the majority (73 per cent) of future residents of the site will travel to and from work by private vehicle, while only a smaller proportion will travel to and from the site via public or active transport.

The Guide to Transport Impact Assessment TS00085 (Version 1.1) outlines trip rates for low-density regional residential areas where most dwellings are on separate lots, of being 1.20 and 1.11 person trips per dwelling, per hour.

Based on a yield of 138 dwellings (assuming one dwelling per lot), the person trip generation for the proposed subdivision is expected to be **166 and 153 person trips per peak hour**. This however includes the person trips that generated by the site by car. The site's net peak hour person trip generation (without the car trips) are shown in **Table 4-1**.

Table 4-1 Net peak hour person trip generation (based on regional trip generation rates)

Future proposed activity	Yield	Person trip rates*	
		AM Peak	PM Peak
Residential	+138 dwellings	1.20	1.11
Total	**+138 dwellings**	**+166 trips**	**+153 trips**
Less people in cars		*-118 trips*	*-130 trips*
Total non-car trips		**+48 trips**	**+24 trips**

Source: The Guide to Transport Impact Assessment TS00085 (Version 1.1) and SCT Consulting, 2024
* Assuming the car occupancy for the vehicle trip generation is 1.2 person / vehicles.

Most of the **48 (AM) and 24 (PM) non-car trips** are expected to be using surrounding public transport services, and a small proportion (based on the existing JTW data) would be walking or cycling. If more public transport options are however implemented in the future, a further shift towards public and active transport away from cars could be expected. This would result in a larger number of non-car person trips to and from the site.

4.3 Parking requirements

Objectives relating to driveway access and parking for residential developments listed in the Maitland DCP include:

– To provide convenient, accessible and safe parking to meet the needs of residents and visitors which does not dominate the streetscape or cause congestion in nearby streets.

– To ensure that parking areas are designed to accommodate the needs of those persons with a disability.

– To encourage the design of access and parking as part of the overall landscape design.

Guidance for off-street car parking requirements for residential developments is provided under Section 15 – 'Driveway access and car parking' of the DCP. The minimum parking requirements that would apply to the proposal are:

– One (1) space for each one- or two- bedroom dwelling

– Two (2) spaces for each dwelling containing more than two bedrooms

– A minimum of one (1) off-street parking space should be provided for each dwelling as a covered space in the form of either a garage, carport or within a secured basement parking area. The parking space(s) should be convenient and accessible to the dwelling which it services.

– Developments comprising up to two (2) dwellings may have the parking space(s) for both dwellings directly addressing and accessible from its street frontage.

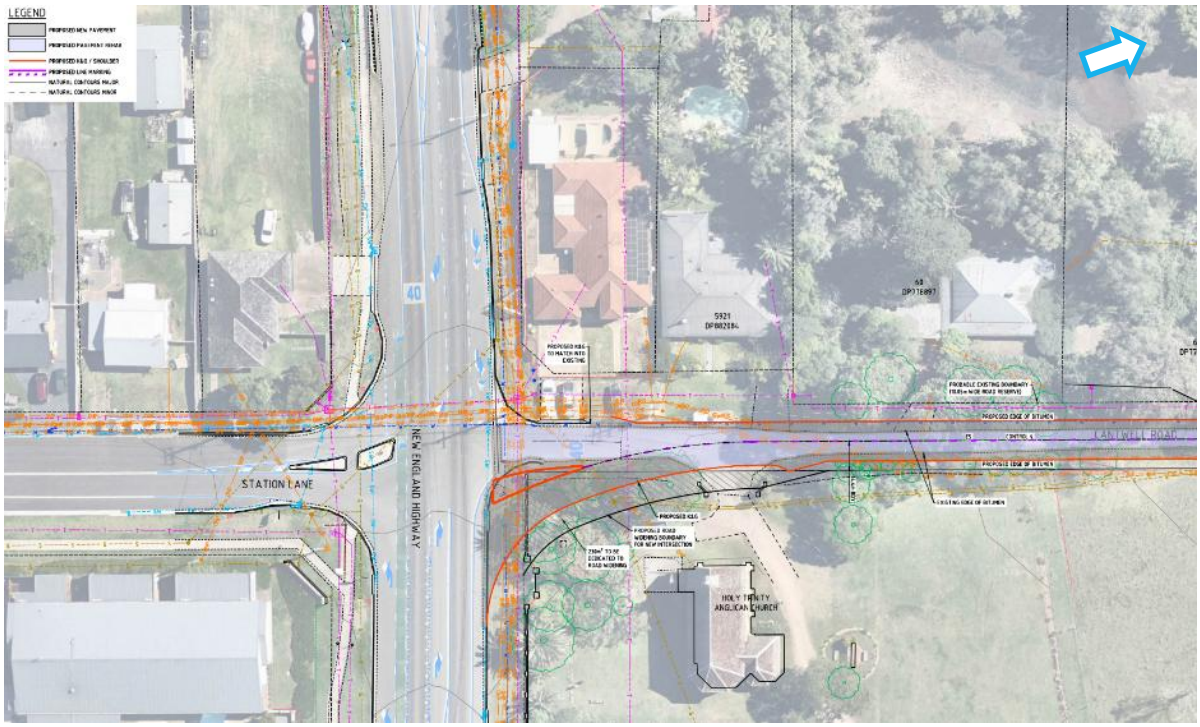
4.4 Access arrangements and proposed internal road network

As seen in **Figure 2-3**, widening along Cantwell Road and Station Lane, and a new east-west link between Cantwell Road and Wyndella Road are proposed according to Lochinvar URA DCP.

4.4.1 Proposed collector and distributor roads

As seen in **Figure 4-1**, the proposal will be accessed from the New England Highway via Cantwell Road. Cantwell Road has been identified as a primary collector road as part of the proposal and will need to be able to accommodate a semi-trailer. A left turn slip lane from Cantwell Road onto the New England Highway is therefore proposed, as shown in **Figure 4-2,** with swept paths of a 19m truck provided in **Appendix E**.

Figure 4-2 The proposed Cantwell Road / New England Highway intersection layout



Source: External Roadworks Preliminary Concept Plan (GCA Engineering Solutions, 2024)

A new east-west collector link road, that will provide direct access to approximately 18 lots (Lots 101-104, Lots 301-304, Lots 133 to 135 and Lots 327-333), will connect to Cantwell Road in the west, via a T-intersection permitting all movements (**Figure 4-3**). This link road will connect through to Wyndella Road in the east through the neighbouring subdivision.

A basic T-intersection is proposed at the intersection of Cantwell Road and the east-west link road for the following reasons:

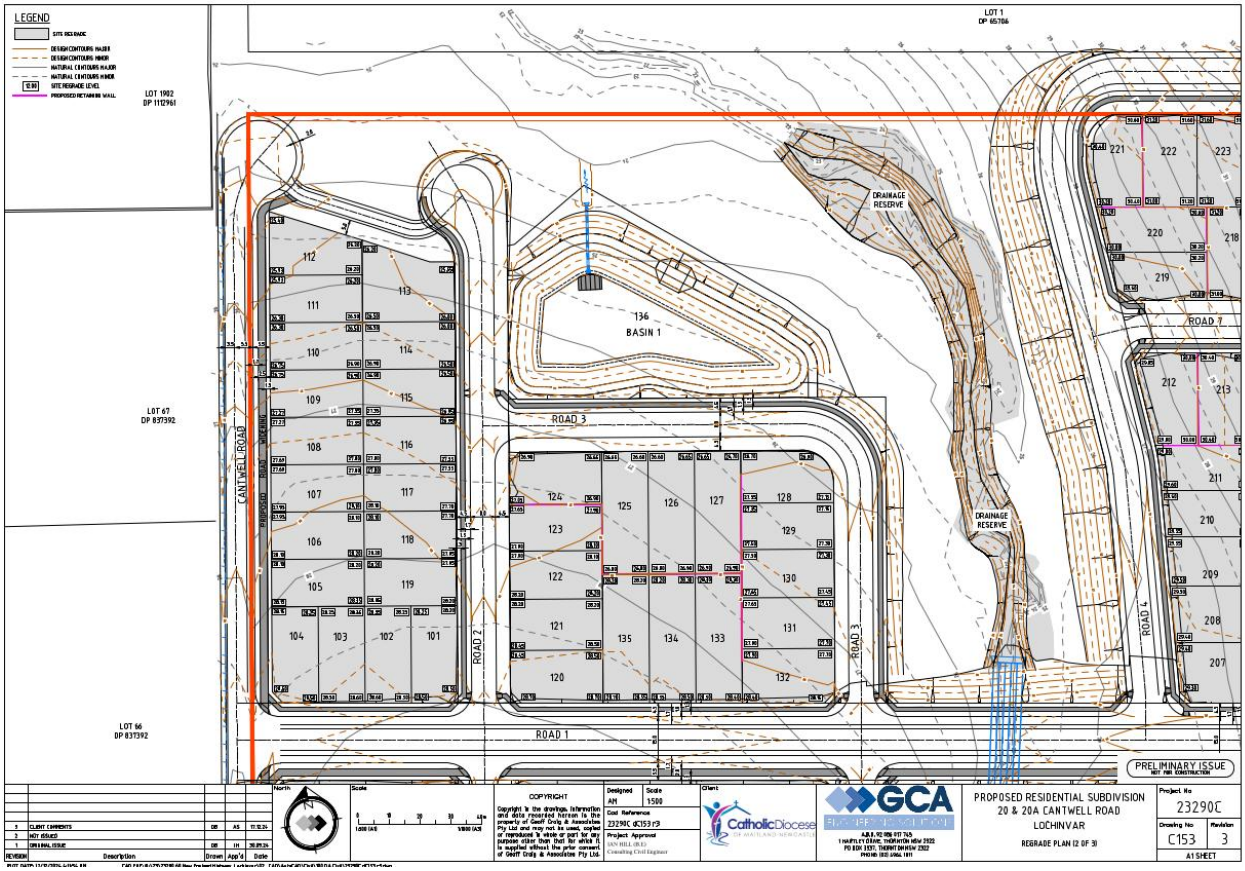
– The northern leg of Cantwell Road will serve a very small catchment of the URA hence we expect this approach will carry very low traffic volumes in the long run.

– Hence the likelihood of the right turn movement from the east-west link road being stopped by the southbound through traffic is very low and the risk of a rear-end crash for the right turn movement (with the northbound through traffic which is also low) is relatively low and should negate the need of right turn bays at this intersection.

– Council agreed with a basic T intersection and no channelised right turn is required.

The subdivision may also be bounded to the north by an east-west ‘perimeter road’ in the future. This is not within this development application. Hence, the northern end of Cantwell Road is currently proposed as a cul-de-sac (**Figure 4-3**).

Figure 4-3 The proposed Cantwell Road upgrade



Source: GCA Engineering Solutions, 2024

4.4.2 Proposed local roads

The proposed internal road network consists of eight local roads (Road 02-09), being either secondary (serving less than 50 lots) or access roads (serving less than 20 lots). The majority of lots in the proposed subdivision will be accessed from the internal local roads.

4.4.3 Street cross-section requirements

The Maitland City Council Manual of Engineering Standards – Road Design defines the requirements for street cross sections (**Figure 2-4**), while the cross-section requirements identified in the DCP for the roads surrounding the site are shown in **Figure 2-5**.

The following street cross-sections are required for the key roads surrounding the site:

– Cantwell Road is a Primary Collector Road. Although Cantell Road is not identified as a bus route in the DCP, Council's pre-lodgement advice requires bus route provisions on this road, which needs to have a kerb–kerb carriageway width of 12 metres and a reserve width of 21m on the development side. Footpaths of 1.5m width are required on one side of the road, unless a shared path is installed. On-road bicycle facilities can be mixed with parking.

– A new northern bypass road that runs east-west through the subdivision area north of the site, and connects to Cantwell Road, which is classified as a Primary Distributor Road, and needs to have a kerb – kerb carriageway width of 15 metres and a reserve width of 24m.

– Local roads, being secondary roads serving less than 50 lots or access roads serving less than 20 lots.

Table 4-2 summarises the road width requirements outlined above, and the road widths proposed under this development application. As seen, the required reserve widths for all proposed new roads have been met.

Table 4-2 Road requirements and widths

Road	Classification	Max No. of dwellings the road serves	Required reserve width	Provided reserve width	Required carriageway width (kerb – kerb)	Provided carriageway width (kerb – kerb)
Cantwell Road	Primary Collector (with public bus routes as advised by Council)	300 dw	21m	16.55m to the existing western boundary under this DA / 23m (expected in ultimate full width)	12m	6m half road under this DA. 12m in the ultimate status by future works by others
New east-west link (Road 1)	Primary Distributor	500 dw	24m	25m	15m	15m
Road 2	Local – Access	20 dw	17m	17m	8m	8m
Road 3	Local – Access	20 dw	17m	17m	8m	8m
Road 4 (Periphery road)	Local – Access	20 dw	17m	17m	8m	10.5m due to parking on residential fronting side
Road 5	Local – Secondary	50 dw	17m	17m	8m	8m
Road 6	Local – Secondary	50 dw	17m	17m	8m	10.5m due to parking on residential fronting side
Road 7	Local – Access	20 dw	17m	17m	8m	8m
Road 8	Local – Secondary	50 dw	17m	17m	8m	8m
Road 9	Local – Access	20 dw	17m	17m	8m	8m

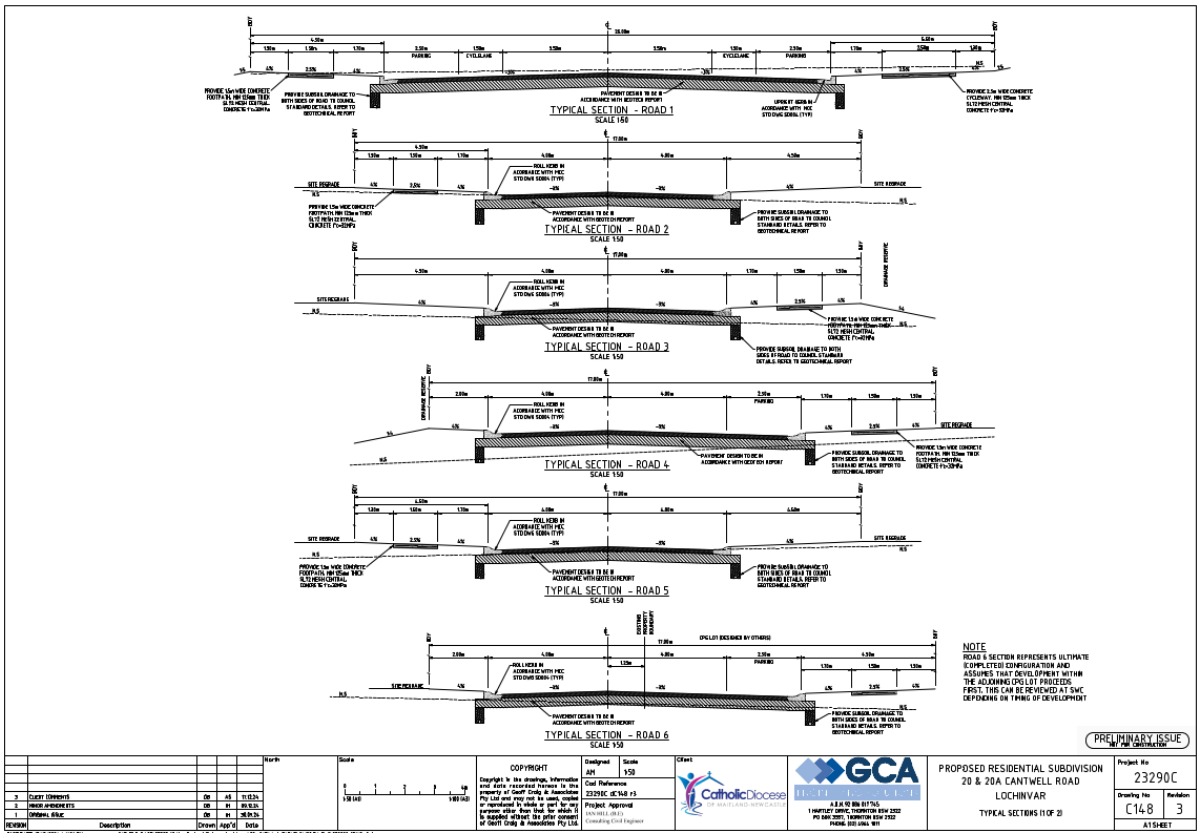
Source: GCA Engineering Solutions, SCT Consulting, 2025

This development application proposes to widen Cantwell Road to a Primary Collector Road with parking and a 2.5m wide shared path along the development frontage, on the eastern side of the road. As the widening of the remainder of the stretch towards the south is constrained by the existing heritage items, the proposed pavement widening will be limited to 6m.

Future road widening along the western side of the road is not included as part of this DA and has been identified as required by others in the future. This may include the provision of a 1.5m wide footpath and a parking lane along the western side of the road, as part of the widening, which will further increase the total reserve to 21m and carriageway width of 12m, satisfying Council's engineering standards.

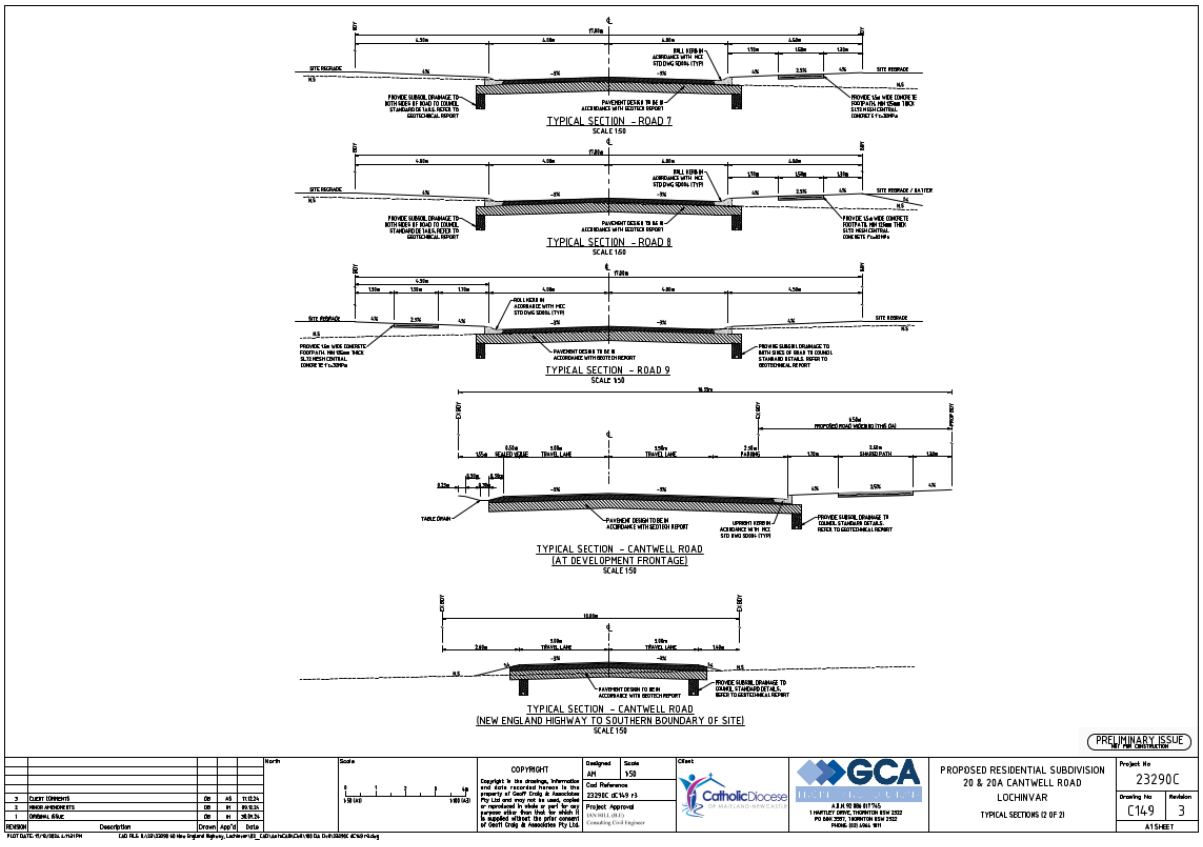
The proposed cross-sections are shown in **Figure 4-4** and **Figure 4-5**.

Figure 4-4 Typical cross-sections of the proposal (a)



Source: GCA Engineering Solutions, 2024

Figure 4-5 Typical cross-sections of the proposal (b)



Source: GCA Engineering Solutions, 2024

4.5 Active transport network

The proposed pedestrian and cycle networks for the Lochinvar URA is shown in **Figure 2-3**. The proposed active transport improvements in proximity to the site include:

– An off-road shared path along Cantwell Road, which connects Wyndella Road via a proposed shared path along a new east-west link to connect to the east and Windermere Road to the west.

– An on-road commuter path along the new east-west link between Cantwell Road and Wyndella Road.

The required local road cross sections also have footpaths or cycle lanes on at least one side of the road.

The proposed active transport improvements surrounding the site will significantly improve cycle and walking access to the site in the future.

5.0 Transport Impact Assessment

5.1 Road network performance

As outlined in **Section 4.2**, the proposal will, at full development, generate an additional **98 and 108 trips in the AM and PM peak hours, respectively**. The performance of the New England Highway / Cantwell Road intersection with these trips added to the road network was analysed in SIDRA, as described in the following sections.

5.1.1 Traffic modelling assumptions

Assumptions used as part of the assessment were confirmed with TfNSW and Maitland City Council on 16 May 2024 and are:

- Completion of the 138 proposed lots as part of the development is assumed to be in 2026, with a lot release rate of 300 dwellings per year for the surrounding development in Lochinvar URA.
- SIDRA modelling included a development scenario that provides for the 10-year development horizon (sensitivity) following the anticipated release of all lots.
- A trip generation rate of 0.71 / 0.78 veh/dw was adopted for the development, resulting in an additional 98 and 108 trips added to the road network in the AM and PM peak hours respectively. A 70% / 30% direction split to / from the west and east respectively for all trips (based on advice from TfNSW).
- A 20% / 80% inbound and outbound directional split was used for the AM peak period which was reversed for the PM peak period.
- An additional three per cent p.a. traffic growth rate on New England Highway (based on advice from Regional Planning and Transport for New South Wales).
- The right turn from Cantwell Road to the New England Highway has been banned (as described further below).

5.1.2 Road mitigation measures

Right turn ban from Cantwell Road

Currently, right turn and through movements are permitted from Cantwell Road on to the New England Highway. However, as presented in **Section 3.2**, although the existing intersection performance (2024 base case) is overall acceptable, the right turn movement of Cantwell Road operates at LoS F because of three to four vehicles turning out from the side road. For future year 2026 scenario testing, Cantwell Road has therefore been reconfigured to a left turn only, with traffic wanting to turn right being reassigned to take alternate routes, as seen in the left image of **Figure 5-1**. By 2036, connecting access roads are anticipated to be completed, and the future development traffic will likely use these available alternative routes.

The results of the future (2026 and 2036) SIDRA intersection performance without and with the proposed development are shown in **Table 5-1** for the AM and PM peak hours respectively, with detailed results in **Appendix B**.

Figure 5-1 Assumed vehicle routes from the site in 2026 and 2036

Table 5-1 Future (2026 and 2036) intersection performance

Scenario	Intersection performance					
	Layout	Volumes (vph)	LoS	Delay (sec)	DoS	Queue length (m)
AM peak						
Future year base 2026 + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned)	1,964	C	30.8	0.52	21 (Cantwell Road– left turn out)
Future year base 2036*	Priority left in / left out north leg (Cantwell Rd right turn banned)	2,875	F	1,783	2.88	299 (Station Lane – left turn out)
Future year base 2036* + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned)	3,034	F	4,584	5.90	380 (Station Lane – left turn out)
PM peak						
Future year base 2026 + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned)	1,978	A	12.2	0.47	3 (Station Lane – left turn out)
Future year base 2036*	Priority left in / left out north leg (Cantwell Rd right turn banned)	3,055	F	735	0.91	13 (New England Highway – westbound right turn)
Future year base 2036* + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned)	3,172	F	2,294	3.19	>1,000 (New England Highway – westbound through)

Note: Performance metrics of the worst-performing intersection movement are reported for priority-controlled intersections.
* Includes the development of 3,600 lots of Lochinvar URA (based on a release rate of 300 lots per year)

The analysis showed that in 2026 with the proposal trips added to the intersection, there is a minor increase in DoS compared to the base year, indicating there is still capacity. The intersection is performing at LoS C (AM) and a LoS A (PM), indicating that the proposal will have minimal impact on intersection performance once a left-out rule is enforced from Cantwell Road. The LoS C is a result of the development traffic turning left from Cantwell Road to travel east.

The 2036 base year performance (without the subject development) indicates that there will be capacity constraints and high delays, due to significant traffic growth on the New England Highway and neighbouring developments in Lochinvar. The high DoS and delay are a result of queuing from left turners on Station Lane during the AM peak. This indicates that the New England Highway will likely require road upgrades before 2036, independent of the subject development.

Hence, the addition of the development traffic will further worsen the intersection performance, resulting in excessive delays and oversaturation. However, it should also be noted that the development trips in fact only represent seven per cent of the total traffic growth (2024 to 2036).

Additional through lanes along New England Highway

Due to the intersection performance results presented in **Table 5-1**, performance analysis was undertaken with an additional through lane in each direction on the New England Highway, as seen in **Figure 5-2**. The results are presented in **Table 5-2** for the AM and PM peak hours respectively.

Figure 5-2 Proposed infrastructure upgrades (yellow lanes are additional)

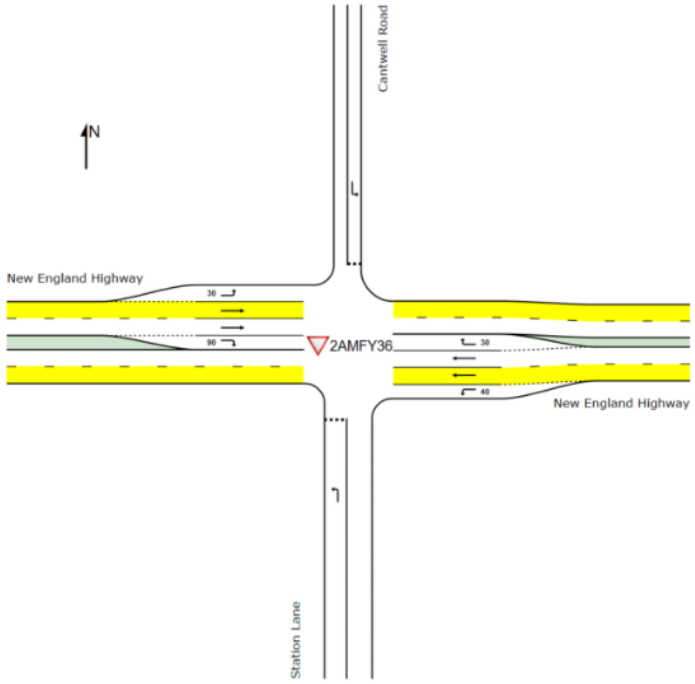


Table 5-2 Future (2036) intersection performance – additional lane on NEH

Scenario	Intersection performance					
	Layout	Volumes (vph)	LoS	Delay (sec)	DoS	Queue length (m)
AM Peak						
Future year base 2036* + NEH upgrades	Priority left in / left out north leg (Cantwell Rd right turn banned) + 2 NEH through lanes	2,875	F	99	0.41	4 (Station Lane – left turn out)
Future year base 2036* + NEH upgrades + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned) + 2 NEH through lanes	3,034	F	151	0.44	5 (Station Lane – left turn out)
PM Peak						
Future year base 2036* + NEH upgrades	Priority left in / left out north leg (Cantwell Rd right turn banned) + 2 NEH through lanes	3,055	F	175	0.45	4 (New England Highway – westbound right turn)
Future year base 2036* + NEH upgrades + the proposal	Priority left in / left out north leg (Cantwell Rd right turn banned) + 2 NEH through lanes	3,172	F	188	0.87	22 (New England Highway – westbound right turn)

Note: Performance metrics of the worst-performing intersection movement are reported for priority-controlled intersections.
* Includes the development of 3,600 lots of Lochinvar URA (based on a release rate of 300 lots per year)

The analysis showed that introducing an additional through lane in each direction along the New England Highway improves intersection performance drastically, decreasing the DoS to below 1, in both the AM and PM peak hours. With the upgrades, the maximum queue lengths of 22m from right turn movements on the New England Highway in the PM peak hour are contained within the current turning bays. All other movements on each approach will operate at a LOS A, with considerable spare network capacity.

Although the intersection performance is still unacceptable, this is irrelevant to the development but the outcome of the background traffic growth. The actual impact as a result of 138 dwellings is still limited as seen in additional delay.

5.2 Parking impacts

Off-street parking for the site can be provided in accordance with the Maitland DCP requirements for residential developments. The provision of off-street parking will reduce the need for drivers to park on the road and hence minimise the impact of parking on the surrounding local road network.

5.3 Active transport impact

As discussed in **Section 4.2**, the proposal would generate an additional 48 (AM) and 24 (PM) non-car trips to the active transport facilities surrounding the site.

The required local road cross sections have footpaths or cycle lanes on at least one side of the road. A 2.5m wide shared path is also proposed along the eastern side of Cantwell Road fronting the development and along the new east-west link road. These active transport facilities are expected to provide good walking and cycling accessibility from New England Highway to the site, as well as within the site.

The site-specific DCP indicates off-road shared paths along the periphery and the internal roads through the URA with connections to New England Highway only at signalised intersections. The proposed shared path along the site's frontage along with the east-west linkage through the new distributor road will facilitate the pedestrian and cycleway connectivity between Wyndella Road and Cantwell Road, consistent with the DCP. The proposal includes adequate walking and cycling infrastructure to cater for the additional 48 (AM) and 24 (PM) person trips generated by the development.

5.4 Public transport impact

The site is within a walkable distance of the bus stops on New England Highway, which provides connectivity to school bus services, to Maitland and Stockland Green Hills as well as other centres along the New England Highway. Lochinvar Station also provides some nearby parking which enables residents to park and ride to Newcastle CBD.

A future cycle route from the site to the Station, approximately 3km south of the site is expected to improve the connectivity to future public transport. The proposal is not expected to have a significant impact on the public transport facilities surrounding the site.

6.0 Summary and conclusion

This transport impact assessment shows that:

- The proposed 138 lots will generate an additional 98 and 108 trips on the surrounding road network, in the AM and PM peak hours, respectively. The development trips represent only seven per cent of the total traffic growth (2024 to 2036) at the intersection of New England Highway and Cantwell Road.
- The cross-section requirements per Maitland Development Control Plan *Lochinvar URA Proposed Road Hierarchy and Bus Routes of Part F – Urban Release Areas* are all met.
- Based on JTW data, the majority of future residents would use private vehicles to travel to work, but the proposal would generate an additional 48 (AM) and 24 (PM) non-car trips (active or public transport trips).
- With the proposed left-out configuration for Cantwell Road at the intersection with the New England Highway, the intersection performance will be satisfactory in 2026 when the proposal is completed.
- Surrounding development and traffic growth on the New England Highway will likely result in road upgrades on the New England Highway by 2036 being required, independent of the implementation of the proposal.
- An additional through lane in each direction of the New England Highway improves the performance of the New England Highway / Cantwell Road intersection drastically. The maximum queue lengths of 22m from right turn movements on the New England Highway in the PM peak hour are contained within the current turning bays. All other movements on each approach will operate at LoS A, with considerable spare network capacity. Although the intersection performance is still unacceptable, this is irrelevant to the development but the outcome of the background traffic growth. The actual impact as a result of 138 dwellings is still limited as seen in additional delay.
- Off-street parking for the site can be provided in accordance with the Maitland DCP requirements for residential developments. The provision of off-street parking will reduce the need for drivers to park on the road and hence minimise the impact of parking on the surrounding local road network.
- The proposed active transport facilities, including a 2.5m wide shared path along Cantwell Road (fronting the development) and the new east-west link road, are expected to provide good walking and cycling accessibility from New England Highway to the site, as well as within the site.
- The site is within a walkable distance of the bus stops on New England Highway, which provides connectivity to school bus services, to Maitland and Stockland Green Hills as well as other centres along the New England Highway.
- The proposed shared path along the site's frontage along with the east-west linkage through the new distributor road will facilitate the pedestrian and cycleway connectivity between Wyndella Road and Cantwell Road, consistent with the DCP. The proposal includes adequate walking and cycling infrastructure to cater for the additional 48 (AM) and 24 (PM) person trips generated by the development.

APPENDIX A

TRAFFIC SURVEY DATA

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of New England Hwy and Cantwell Rd, Lochinvar

GPS	-32.699038, 151.454825
Date:	Thu 22/02/24
Weather:	Overcast
Suburban:	Lochinvar
Customer:	SCT

North:	Cantwell Rd
East:	New England Hwy
South:	Station Ln
West:	New England Hwy

Survey Period	AM:	7:30 AM-9:30 AM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	7:45 AM-8:45 AM
	PM:	4:00 PM-5:00 PM

All Vehicles

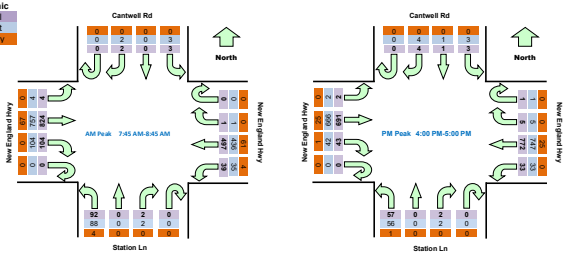
Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:30	7:45	0	0	0	0	0	0	133	4	0	0	0	10	0	22	175	0	1482	
7:45	8:00	0	1	0	1	0	1	109	6	0	1	0	15	0	15	232	2	1568	Peak
8:00	8:15	0	0	0	0	0	0	110	12	0	0	0	12	0	20	218	0	1537	
8:15	8:30	0	0	0	1	0	0	137	9	0	0	0	21	0	26	189	0	1450	
8:30	8:45	0	1	0	1	0	0	141	12	0	1	0	44	0	43	185	2	1295	
8:45	9:00	0	0	0	1	0	0	99	20	0	0	0	32	0	13	187	0		
9:00	9:15	0	0	0	0	0	0	106	10	0	0	0	8	0	11	150	0		
9:15	9:30	0	0	0	0	0	0	83	5	0	1	0	8	0	8	123	0		
15:00	15:15	0	0	0	1	0	1	180	9	0	2	0	27	0	19	155	1	1555	
15:15	15:30	0	1	0	4	0	0	196	5	0	0	0	33	0	10	147	3	1540	
15:30	15:45	0	0	0	2	0	1	196	7	0	0	0	10	0	14	163	0	1564	
15:45	16:00	0	0	0	0	0	1	180	5	0	0	0	19	0	9	153	1	1604	
16:00	16:15	0	1	0	2	1	0	196	7	0	0	0	10	0	9	154	0	1614	Peak
16:15	16:30	0	1	0	0	0	2	201	6	0	1	0	17	0	11	183	1	1614	Peak
16:30	16:45	0	1	1	1	0	1	206	11	0	0	0	14	0	11	186	1	1580	
16:45	17:00	0	1	0	0	0	2	169	9	0	1	0	16	0	12	168	0	1495	
17:00	17:15	0	0	0	1	0	1	195	3	0	0	0	13	0	15	151	1	1392	
17:15	17:30	0	0	0	1	0	0	202	9	0	0	0	11	0	12	154	0		
17:30	17:45	0	0	0	0	0	1	166	6	0	0	0	12	0	9	154	0		
17:45	18:00	0	0	0	2	0	2	120	3	0	0	0	9	0	5	134	0		

Peak Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:45	8:45	0	2	0	3	0	1	497	39	0	2	0	92	0	104	824	4	1568
16:00	17:00	0	4	1	3	1	5	772	33	0	2	0	57	0	43	691	2	1614

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Light Vehicles

Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
7:30	7:45	0	0	0	0	0	0	119	4	0	0	0	8	0	19	162	0
7:45	8:00	0	1	0	1	0	1	100	6	0	1	0	12	0	15	215	2
8:00	8:15	0	0	0	0	0	0	100	11	0	0	0	12	0	20	203	0
8:15	8:30	0	0	0	1	0	0	119	8	0	0	0	21	0	26	170	0
8:30	8:45	0	1	0	1	0	0	117	10	0	1	0	43	0	43	169	2
8:45	9:00	0	0	0	1	0	0	86	12	0	0	0	32	0	12	175	0
9:00	9:15	0	0	0	0	0	0	95	8	0	0	0	8	0	10	142	0
9:15	9:30	0	0	0	0	0	0	71	4	0	1	0	7	0	8	113	0
15:00	15:15	0	0	0	1	0	1	170	9	0	2	0	27	0	19	149	0
15:15	15:30	0	1	0	4	0	0	183	5	0	0	0	31	0	10	132	3
15:30	15:45	0	0	0	2	0	1	186	7	0	0	0	10	0	13	152	0
15:45	16:00	0	0	0	0	0	1	171	5	0	0	0	16	0	9	143	1
16:00	16:15	0	1	0	2	1	0	189	7	0	0	0	9	0	9	145	0
16:15	16:30	0	1	0	0	0	2	195	6	0	1	0	17	0	10	176	1
16:30	16:45	0	1	1	1	0	1	199	11	0	0	0	14	0	11	181	1
16:45	17:00	0	1	0	0	0	2	164	9	0	1	0	16	0	12	164	0
17:00	17:15	0	0	0	1	0	1	194	3	0	0	0	13	0	15	140	1
17:15	17:30	0	0	0	1	0	0	198	9	0	0	0	11	0	12	150	0
17:30	17:45	0	0	0	0	0	1	162	6	0	0	0	12	0	9	151	0
17:45	18:00	0	0	0	2	0	2	119	3	0	0	0	9	0	5	133	0

Peak Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:45	8:45	0	2	0	3	0	1	436	35	0	2	0	88	0	104	757	4	1432
16:00	17:00	0	4	1	3	1	5	747	33	0	2	0	56	0	42	666	2	1562

Heavy Vehicles

Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
7:30	7:45	0	0	0	0	0	0	14	0	0	0	0	2	0	3	13	0
7:45	8:00	0	0	0	0	0	0	9	0	0	0	0	3	0	0	17	0
8:00	8:15	0	0	0	0	0	0	10	1	0	0	0	0	0	0	15	0
8:15	8:30	0	0	0	0	0	0	18	1	0	0	0	0	0	0	19	0
8:30	8:45	0	0	0	0	0	0	24	2	0	0	0	1	0	0	16	0
8:45	9:00	0	0	0	0	0	0	13	8	0	0	0	0	0	1	12	0
9:00	9:15	0	0	0	0	0	0	11	2	0	0	0	0	0	1	8	0
9:15	9:30	0	0	0	0	0	0	12	1	0	0	0	1	0	0	10	0
15:00	15:15	0	0	0	0	0	0	10	0	0	0	0	0	0	0	6	1
15:15	15:30	0	0	0	0	0	0	13	0	0	0	0	2	0	0	15	0
15:30	15:45	0	0	0	0	0	0	10	0	0	0	0	0	0	1	11	0
15:45	16:00	0	0	0	0	0	0	9	0	0	0	0	3	0	0	10	0
16:00	16:15	0	0	0	0	0	0	7	0	0	0	0	1	0	0	9	0
16:15	16:30	0	0	0	0	0	0	6	0	0	0	0	0	0	1	7	0
16:30	16:45	0	0	0	0	0	0	7	0	0	0	0	0	0	0	5	0
16:45	17:00	0	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0
17:00	17:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	11	0
17:15	17:30	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4	0
17:30	17:45	0	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0
17:45	18:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0

Peak Time		North Approach Cantwell Rd				East Approach New England Hwy				South Approach Station Ln				West Approach New England Hwy				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:45	8:45	0	0	0	0	0	0	61	4	0	0	0	4	0	0	67	0	136
16:00	17:00	0	0	0	0	0	0	25	0	0	0	0	1	0	1	25	0	52

APPENDIX B

SIDRA RESULTS

MOVEMENT SUMMARY

Site: 2AM [NEW_STA_24_AM_BY (Site Folder: Base Year)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	97	4.3	97	4.3	0.109	7.2	LOS A	0.4	3.0	0.52	0.71	0.52	40.5
Approach			97	4.3	97	4.3	0.109	7.2	LOS A	0.4	3.0	0.52	0.71	0.52	40.5
East: New England Highway															
4	L2	All MCs	41	10.3	41	10.3	0.023	3.5	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	523	12.3	523	12.3	0.285	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
6	R2	All MCs	1	0.0	1	0.0	0.003	10.4	LOS A	0.0	0.1	0.71	0.69	0.71	35.4
Approach			565	12.1	565	12.1	0.285	0.4	NA	0.0	0.1	0.00	0.03	0.00	39.8
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.085	8.6	LOS A	0.2	1.4	0.93	0.96	0.93	27.9
9	R2	All MCs	2	0.0	2	0.0	0.085	117.6	LOS F	0.2	1.4	0.93	0.96	0.93	25.3
Approach			5	0.0	5	0.0	0.085	52.2	LOS D	0.2	1.4	0.93	0.96	0.93	26.8
West: New England Highway															
10	L2	All MCs	4	0.0	4	0.0	0.002	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	867	8.1	867	8.1	0.461	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
12	R2	All MCs	109	0.0	109	0.0	0.150	9.0	LOS A	0.6	4.0	0.56	0.79	0.56	46.9
Approach			981	7.2	981	7.2	0.461	1.2	NA	0.6	4.0	0.06	0.09	0.06	57.8
All Vehicles			1648	8.7	1648	8.7	0.461	1.4	NA	0.6	4.0	0.07	0.11	0.07	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PM [NEW_STA_24_PM_BY (Site Folder: Base Year)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	60	1.8	60	1.8	0.099	8.2	LOS A	0.3	2.4	0.65	0.81	0.65	36.3
Approach			60	1.8	60	1.8	0.099	8.2	LOS A	0.3	2.4	0.65	0.81	0.65	36.3
East: New England Highway															
4	L2	All MCs	35	0.0	35	0.0	0.018	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	813	3.2	813	3.2	0.419	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
6	R2	All MCs	5	0.0	5	0.0	0.009	8.2	LOS A	0.0	0.2	0.61	0.68	0.61	39.4
Approach			853	3.1	853	3.1	0.419	0.4	NA	0.0	0.2	0.00	0.02	0.00	39.8
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.185	11.3	LOS A	0.5	3.2	0.95	0.99	0.98	23.1
8	T1	All MCs	1	0.0	1	0.0	0.185	108.0	LOS F	0.5	3.2	0.95	0.99	0.98	23.1
9	R2	All MCs	4	0.0	4	0.0	0.185	115.2	LOS F	0.5	3.2	0.95	0.99	0.98	23.1
Approach			8	0.0	8	0.0	0.185	75.3	LOS F	0.5	3.2	0.95	0.99	0.98	23.1
West: New England Highway															
10	L2	All MCs	2	0.0	2	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	727	3.6	727	3.6	0.376	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
12	R2	All MCs	45	2.3	45	2.3	0.099	10.3	LOS A	0.3	2.4	0.70	0.84	0.70	35.5
Approach			775	3.5	775	3.5	0.376	0.8	NA	0.3	2.4	0.04	0.05	0.04	39.6
All Vehicles			1696	3.2	1696	3.2	0.419	1.2	NA	0.5	3.2	0.05	0.07	0.05	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AMFY26 [NEW_STA_26_AM_FY (Site Folder: 2026 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	164	2.6	164	2.6	0.234	9.4	LOS A	0.9	6.5	0.62	0.84	0.66	44.2
Approach			164	2.6	164	2.6	0.234	9.4	LOS A	0.9	6.5	0.62	0.84	0.66	44.2
East: New England Highway															
4	L2	All MCs	42	10.0	42	10.0	0.023	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	696	9.8	696	9.8	0.374	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
6	R2	All MCs	4	0.0	4	0.0	0.012	12.2	LOS A	0.0	0.3	0.76	0.82	0.76	34.8
Approach			742	9.7	742	9.7	0.374	0.5	NA	0.0	0.3	0.00	0.03	0.00	40.1
North: Cantwell Road															
7	L2	All MCs	98	68.5	98	68.5	0.521	30.8	LOS C	1.9	21.3	0.91	1.12	1.31	32.3
Approach			98	68.5	98	68.5	0.521	30.8	LOS C	1.9	21.3	0.91	1.12	1.31	32.3
West: New England Highway															
10	L2	All MCs	11	0.0	11	0.0	0.006	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	941	7.9	941	7.9	0.500	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
12	R2	All MCs	109	0.0	109	0.0	0.197	11.1	LOS A	0.7	5.1	0.66	0.86	0.66	45.7
Approach			1062	7.0	1062	7.0	0.500	1.4	NA	0.7	5.1	0.07	0.09	0.07	57.4
All Vehicles			2067	10.6	2067	10.6	0.521	3.1	NA	1.9	21.3	0.13	0.18	0.15	47.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AMFY36N [NEW_STA_36_AM_FB (Site Folder: 2036 Base - NO 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	97	4.3	97	4.3	2.875	1783.0	LOS F	41.2	299.4	1.00	3.12	9.51	2.0
Approach			97	4.3	97	4.3	2.875	1783.0	LOS F	41.2	299.4	1.00	3.12	9.51	2.0
East: New England Highway															
4	L2	All MCs	48	8.8	48	8.8	0.026	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	1559	5.6	1559	5.6	0.816	1.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.0
6	R2	All MCs	1	0.0	1	0.0	0.009	32.3	LOS C	0.0	0.2	0.92	0.96	0.92	29.2
Approach			1608	5.7	1608	5.7	0.816	1.3	NA	0.0	0.2	0.00	0.02	0.00	39.1
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.019	23.4	LOS B	0.1	0.4	0.90	0.95	0.90	35.7
Approach			3	0.0	3	0.0	0.019	23.4	LOS B	0.1	0.4	0.90	0.95	0.90	35.7
West: New England Highway															
10	L2	All MCs	4	0.0	4	0.0	0.002	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1310	7.3	1310	7.3	0.693	0.5	LOS A	0.0	0.0	0.00	0.00	0.00	59.1
12	R2	All MCs	4	0.0	4	0.0	0.108	87.8	LOS F	0.3	1.9	0.98	0.99	0.98	23.3
Approach			1318	7.3	1318	7.3	0.693	0.8	NA	0.3	1.9	0.00	0.00	0.00	58.7
All Vehicles			3026	6.3	3026	6.3	2.875	58.1	NA	41.2	299.4	0.03	0.11	0.31	26.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AMFY36 [NEW_STA_36_AM_FY (Site Folder: 2036 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	97	4.3	97	4.3	5.897	4584.2	LOS F	52.3	379.9	1.00	2.05	5.37	0.8
Approach			97	4.3	97	4.3	5.897	4584.2	LOS F	52.3	379.9	1.00	2.05	5.37	0.8
East: New England Highway															
4	L2	All MCs	48	8.8	48	8.8	0.026	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	1688	5.2	1688	5.2	0.881	2.0	LOS A	0.0	0.0	0.00	0.00	0.00	38.3
6	R2	All MCs	4	0.0	4	0.0	0.036	32.1	LOS C	0.1	0.7	0.92	0.96	0.92	29.2
Approach			1740	5.3	1740	5.3	0.881	2.1	NA	0.1	0.7	0.00	0.02	0.00	38.5
North: Cantwell Road															
7	L2	All MCs	31	0.0	31	0.0	0.190	25.6	LOS B	0.6	3.9	0.92	0.97	0.96	35.0
Approach			31	0.0	31	0.0	0.190	25.6	LOS B	0.6	3.9	0.92	0.97	0.96	35.0
West: New England Highway															
10	L2	All MCs	11	0.0	11	0.0	0.006	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1310	7.3	1310	7.3	0.693	0.5	LOS A	0.0	0.0	0.00	0.00	0.00	59.1
12	R2	All MCs	4	0.0	4	0.0	0.243	206.9	LOS F	0.6	4.1	0.99	1.00	1.02	13.2
Approach			1326	7.2	1326	7.2	0.693	1.2	NA	0.6	4.1	0.00	0.01	0.00	58.2
All Vehicles			3194	6.0	3194	6.0	5.897	140.9	NA	52.3	379.9	0.04	0.08	0.17	16.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PMFY26 [NEW_STA_26_PM_FY (Site Folder: 2026 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	73	1.5	73	1.5	0.138	9.8	LOS A	0.5	3.3	0.70	0.85	0.70	38.4
Approach			73	1.5	73	1.5	0.138	9.8	LOS A	0.5	3.3	0.70	0.85	0.70	38.4
East: New England Highway															
4	L2	All MCs	46	0.0	46	0.0	0.024	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	888	3.1	888	3.1	0.458	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
6	R2	All MCs	36	0.0	36	0.0	0.095	12.2	LOS A	0.3	2.2	0.76	0.88	0.76	37.8
Approach			970	2.9	970	2.9	0.458	0.8	NA	0.3	2.2	0.03	0.05	0.03	39.6
North: Cantwell Road															
7	L2	All MCs	19	0.0	19	0.0	0.036	10.8	LOS A	0.1	0.8	0.68	0.84	0.68	46.0
Approach			19	0.0	19	0.0	0.036	10.8	LOS A	0.1	0.8	0.68	0.84	0.68	46.0
West: New England Highway															
10	L2	All MCs	73	0.0	73	0.0	0.040	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	902	3.1	902	3.1	0.465	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
12	R2	All MCs	45	2.3	45	2.3	0.118	12.0	LOS A	0.4	2.8	0.75	0.87	0.75	35.0
Approach			1021	2.8	1021	2.8	0.465	1.0	NA	0.4	2.8	0.03	0.07	0.03	39.4
All Vehicles			2082	2.8	2082	2.8	0.465	1.3	NA	0.5	3.3	0.06	0.10	0.06	39.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PMFY36N [NEW_STA_36_PM_FB (Site Folder: 2036 Base - NO 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	60	2.5	60	2.5	0.319	24.9	LOS B	1.0	7.0	0.91	1.00	1.06	31.1
Approach			60	2.5	60	2.5	0.319	24.9	LOS B	1.0	7.0	0.91	1.00	1.06	31.1
East: New England Highway															
4	L2	All MCs	100	0.0	100	0.0	0.052	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	1268	2.8	1268	2.8	0.652	0.5	LOS A	0.0	0.0	0.00	0.00	0.00	39.6
6	R2	All MCs	5	0.0	5	0.0	0.793	734.7	LOS F	1.9	13.3	1.00	1.04	1.14	4.4
Approach			1373	2.6	1373	2.6	0.793	3.5	NA	1.9	13.3	0.00	0.04	0.00	38.3
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.297	335.8	LOS F	0.7	4.8	1.00	1.00	1.02	8.7
Approach			3	0.0	3	0.0	0.297	335.8	LOS F	0.7	4.8	1.00	1.00	1.02	8.7
West: New England Highway															
10	L2	All MCs	2	0.0	2	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1773	2.0	1773	2.0	0.907	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	37.9
12	R2	All MCs	5	20.0	5	20.0	0.075	51.3	LOS D	0.2	1.3	0.93	0.96	0.93	25.4
Approach			1780	2.1	1780	2.1	0.907	2.7	NA	0.2	1.3	0.00	0.00	0.00	37.9
All Vehicles			3216	2.3	3216	2.3	0.907	3.8	NA	1.9	13.3	0.02	0.04	0.02	37.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PMFY36 [NEW_STA_36_PM_FY (Site Folder: 2036 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	60	2.5	60	2.5	0.340	26.7	LOS B	1.0	7.4	0.92	1.01	1.08	30.7
Approach			60	2.5	60	2.5	0.340	26.7	LOS B	1.0	7.4	0.92	1.01	1.08	30.7
East: New England Highway															
4	L2	All MCs	100	0.0	100	0.0	0.052	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	1285	2.8	1285	2.8	2.494	1679.8	LOS F	594.0	4257.3	1.00	1.00	3.23	2.1
6	R2	All MCs	36	0.0	36	0.0	3.188	2293.5	LOS F	17.7	123.6	1.00	1.70	3.50	1.5
Approach			1421	2.5	1421	2.5	3.188	1577.7	NA	594.0	4257.3	0.93	0.98	3.01	2.2
North: Cantwell Road															
7	L2	All MCs	7	0.0	7	0.0	0.618	441.0	LOS F	1.5	10.3	1.00	1.02	1.10	7.0
Approach			7	0.0	7	0.0	0.618	441.0	LOS F	1.5	10.3	1.00	1.02	1.10	7.0
West: New England Highway															
10	L2	All MCs	73	0.0	73	0.0	0.040	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1773	2.0	1773	2.0	0.907	2.5	LOS A	0.0	0.0	0.00	0.00	0.00	37.9
12	R2	All MCs	5	20.0	5	20.0	0.082	55.1	LOS D	0.2	1.3	0.94	0.97	0.94	24.7
Approach			1851	2.0	1851	2.0	0.907	2.7	NA	0.2	1.3	0.00	0.02	0.00	37.9
All Vehicles			3339	2.2	3339	2.2	3.188	674.1	NA	594.0	4257.3	0.42	0.45	1.30	4.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AMFY36U [NEW_STA_36_AM_FB_IN (Site Folder: 2036 Base - NO 60 NEH + surrounding devs (No Annambah, Summit or growth zones) New Infra)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	97	4.3	97	4.3	0.154	9.4	LOS A	0.6	4.0	0.64	0.83	0.64	39.5
Approach			97	4.3	97	4.3	0.154	9.4	LOS A	0.6	4.0	0.64	0.83	0.64	39.5
East: New England Highway															
4	L2	All MCs	48	8.8	48	8.8	0.026	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	1556	5.6	1556	5.6	0.407	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
6	R2	All MCs	1	0.0	1	0.0	0.015	47.3	LOS D	0.0	0.3	0.91	0.95	0.91	26.1
Approach			1604	5.7	1604	5.7	0.407	0.4	NA	0.0	0.3	0.00	0.02	0.00	40.0
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.004	6.3	LOS A	0.0	0.1	0.54	0.57	0.54	42.9
Approach			3	0.0	3	0.0	0.004	6.3	LOS A	0.0	0.1	0.54	0.57	0.54	42.9
West: New England Highway															
10	L2	All MCs	4	0.0	4	0.0	0.002	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1310	7.3	1310	7.3	0.346	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
12	R2	All MCs	4	0.0	4	0.0	0.126	98.9	LOS F	0.3	2.2	0.96	0.98	0.96	21.8
Approach			1318	7.3	1318	7.3	0.346	0.4	NA	0.3	2.2	0.00	0.00	0.00	59.3
All Vehicles			3023	6.3	3023	6.3	0.407	0.7	NA	0.6	4.0	0.02	0.04	0.02	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2AMFY36 [NEW_STA_36_AM_FY_IN (Site Folder: 2036 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones) New INFRA)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway / Cantwell Road / Station Lane
7:45-8:45AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	97	4.3	97	4.3	0.173	10.3	LOS A	0.6	4.5	0.69	0.85	0.69	39.1
Approach			97	4.3	97	4.3	0.173	10.3	LOS A	0.6	4.5	0.69	0.85	0.69	39.1
East: New England Highway															
4	L2	All MCs	48	8.8	48	8.8	0.028	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	1688	5.2	1688	5.2	0.441	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
6	R2	All MCs	4	0.0	4	0.0	0.060	49.0	LOS D	0.2	1.1	0.92	0.96	0.92	25.8
Approach			1740	5.3	1740	5.3	0.441	0.5	NA	0.2	1.1	0.00	0.02	0.00	39.9
North: Cantwell Road															
7	L2	All MCs	31	0.0	31	0.0	0.039	6.4	LOS A	0.1	1.0	0.55	0.67	0.55	42.8
Approach			31	0.0	31	0.0	0.039	6.4	LOS A	0.1	1.0	0.55	0.67	0.55	42.8
West: New England Highway															
10	L2	All MCs	11	0.0	11	0.0	0.006	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1310	7.3	1310	7.3	0.346	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
12	R2	All MCs	4	0.0	4	0.0	0.189	151.4	LOS F	0.5	3.2	0.98	1.00	1.00	16.6
Approach			1326	7.2	1326	7.2	0.346	0.6	NA	0.5	3.2	0.00	0.01	0.00	59.0
All Vehicles			3194	6.0	3194	6.0	0.441	0.9	NA	0.6	4.5	0.03	0.04	0.03	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PMFY36U [NEW_STA_36_PM_FB_IN (Site Folder: 2036 Base - NO 60 NEH + surrounding devs (No Annambah, Summit or growth zones) New Infra)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	60	2.5	60	2.5	0.074	6.4	LOS A	0.3	2.0	0.54	0.69	0.54	37.0
Approach			60	2.5	60	2.5	0.074	6.4	LOS A	0.3	2.0	0.54	0.69	0.54	37.0
East: New England Highway															
4	L2	All MCs	100	0.0	100	0.0	0.052	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	1265	2.8	1265	2.8	0.325	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	39.9
6	R2	All MCs	5	0.0	5	0.0	0.261	175.2	LOS F	0.6	4.4	0.98	1.00	1.03	14.1
Approach			1369	2.6	1369	2.6	0.325	1.0	NA	0.6	4.4	0.00	0.04	0.00	39.5
North: Cantwell Road															
7	L2	All MCs	3	0.0	3	0.0	0.006	9.4	LOS A	0.0	0.1	0.65	0.69	0.65	39.5
Approach			3	0.0	3	0.0	0.006	9.4	LOS A	0.0	0.1	0.65	0.69	0.65	39.5
West: New England Highway															
10	L2	All MCs	2	0.0	2	0.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1773	2.0	1773	2.0	0.453	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
12	R2	All MCs	5	20.0	5	20.0	0.147	92.7	LOS F	0.3	2.3	0.94	0.98	0.96	19.8
Approach			1780	2.1	1780	2.1	0.453	0.5	NA	0.3	2.3	0.00	0.00	0.00	39.7
All Vehicles			3213	2.3	3213	2.3	0.453	0.9	NA	0.6	4.4	0.01	0.03	0.01	39.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2PMFY36 [NEW_STA_36_PM_FY_IN (Site Folder: 2036 - 60 NEH + surrounding devs (No Annambah, Summit or growth zones) New INFRA)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway / Cantwell Road / Station Lane
3:00-4:00PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Station Lane															
1	L2	All MCs	60	2.5	60	2.5	0.075	6.5	LOS A	0.3	2.0	0.55	0.70	0.55	36.9
Approach			60	2.5	60	2.5	0.075	6.5	LOS A	0.3	2.0	0.55	0.70	0.55	36.9
East: New England Highway															
4	L2	All MCs	100	0.0	100	0.0	0.052	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
5	T1	All MCs	1285	2.8	1285	2.8	0.330	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
6	R2	All MCs	36	0.0	36	0.0	0.872	188.2	LOS F	3.1	21.8	0.99	1.21	1.70	13.4
Approach			1421	2.5	1421	2.5	0.872	5.1	NA	3.1	21.8	0.03	0.06	0.04	38.0
North: Cantwell Road															
7	L2	All MCs	7	0.0	7	0.0	0.012	9.5	LOS A	0.0	0.3	0.65	0.73	0.65	39.4
Approach			7	0.0	7	0.0	0.012	9.5	LOS A	0.0	0.3	0.65	0.73	0.65	39.4
West: New England Highway															
10	L2	All MCs	73	0.0	73	0.0	0.040	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	38.1
11	T1	All MCs	1773	2.0	1773	2.0	0.453	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	39.8
12	R2	All MCs	5	20.0	5	20.0	0.158	99.5	LOS F	0.3	2.4	0.95	0.98	0.97	19.1
Approach			1851	2.0	1851	2.0	0.453	0.6	NA	0.3	2.4	0.00	0.02	0.00	39.6
All Vehicles			3339	2.2	3339	2.2	0.872	2.7	NA	3.1	21.8	0.02	0.05	0.03	38.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX C

MODELLING SCOPING REPORT

Technical Advisory Note

Quality Information			
Project:	60 New England Hwy Lochinvar		
Project Number:	SCT_00546		
Document Name:	Transport assessment scoping note		
Version:	2.0	**Date:**	11 Apr 2024
Author:	Shawn Cen	Principal Consultant	
Reviewer:	Jonathan Busch	Associate Director	
Authoriser:	Andy Yung	Associate Director	

1.0 Introduction

1.1 Report outline

This report has been structured into the following sections:

– **Section 1** introduces this report, its context, and its purpose

– **Section 2** describes the project in more details

– **Section 3** explains the traffic surveys and other input data to the models

– **Section 4** describes the modelling methodology

– **Section 5** captures the minutes of the meeting with Council and email correspondence to/from TfNSW.

1.2 Scope of work

The study area for the modelling is the intersection of Cantwell Road/ New England Highway. The traffic modelling scope is overviewed in **Table 1-1** and explained in more detail in this memo.

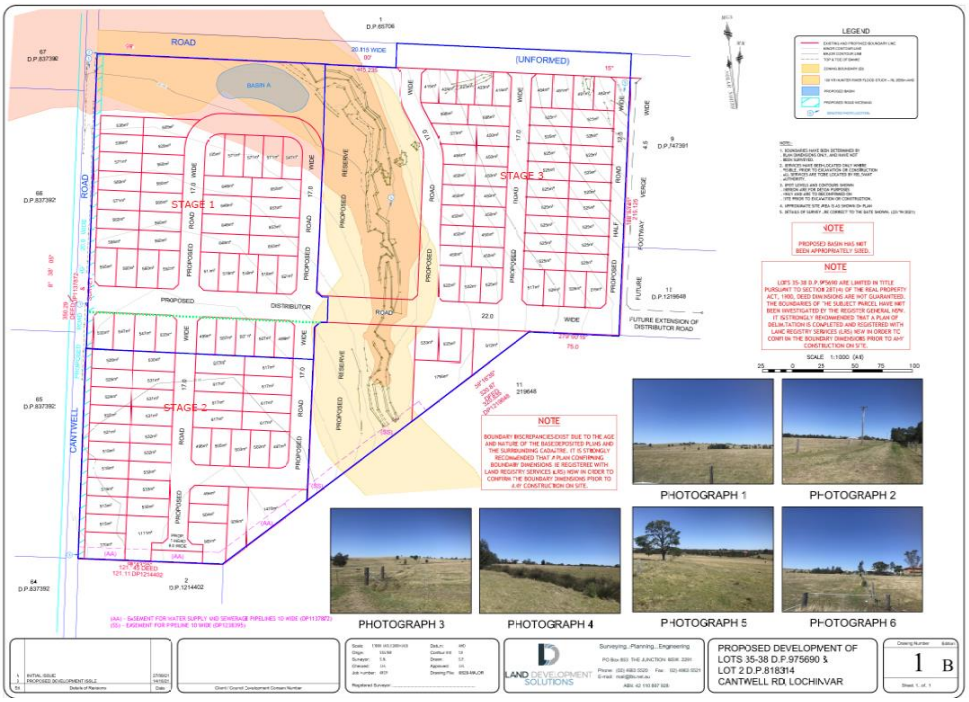
Table 1-1 Traffic modelling scope

Element	Scope
Surveys	– Turning counts and queue survey (collected on 22 February 2024) – 7.30-9.30 am and 3.00-6.00 pm on a typical weekday – Queue length by approach
Base year model	– 2024 model calibrated and validated to the queue lengths occurring currently on-site
Future year model	– Future 2030 with cumulative background growth only – Future 2030 with background growth and development traffic (138 lots)

1.3 Background

Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle are the proponent of a residential subdivision at 60 New England Highway, Lochinvar. The proposed site consists of Lot 2 DP 818314 and Lots 35 to 38 DP 975690, which will create approximately 138 residential lots and new roads (**Figure 1–1**).

Figure 1–1 60 New England Highway subdivision



Source: Land development solutions, 2024

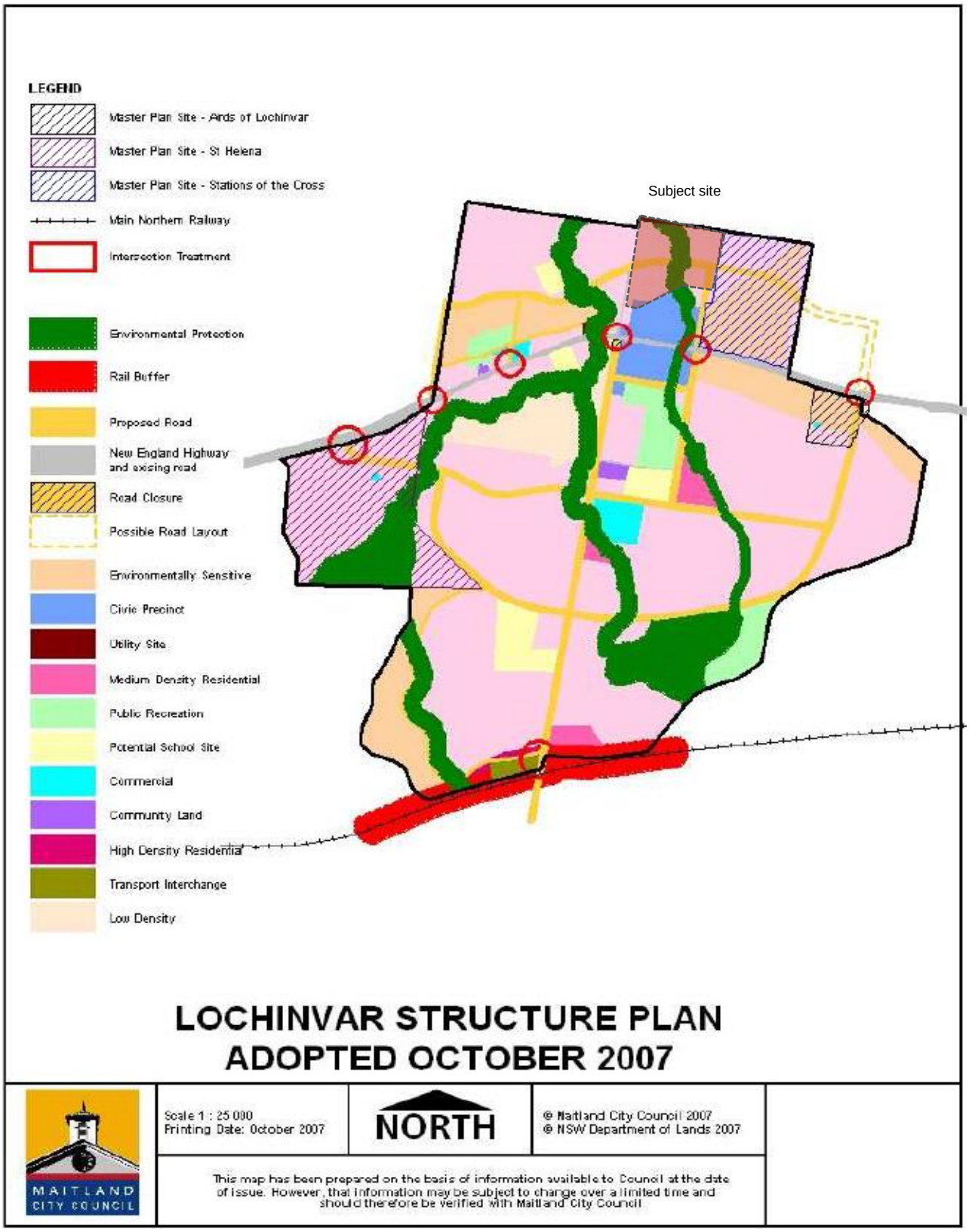
The proposed development will be primarily accessed via Cantwell Road from the New England Highway. Currently, Cantwell Road aligns with Station Lane at the intersection of New England Highway. The right turn from Station Lane to New England Highway is prohibited whereas there are no restrictions for other movements at this intersection. According to Maitland Development Control Plan (DCP), Cantwell Road will be widened to a carriageway cross-section of 11m. A proposed east-west distributor road will be delivered within the site to connect to the east and Wyndella Road.

1.3.1 Lochinvar Structure Plan (Maitland Council, 2007)

Lochinvar is identified in the Lower Hunter Regional Strategy as a priority area to accommodate regional population growth. In October 2007, the Lochinvar Structure Plan (LSP) was approved by Maitland City Council. The LSP provides a logical framework for the development and planning of the area with consideration of its natural elements, the needs of the community, and infrastructure requirements. The LSP aims to achieve an urban structure based on a walkable, mixed-use town, with a capacity for up to 5,000 residential dwellings. The subject site is located at the northern end of the Structure Plan area.

The town centre precinct serves to provide a hub for the future town linking the existing established village with the new urban development fronts. Based on an expected population of around 12,000 people, the town centre will comprise a mix of uses including community, retail, commercial, and residential uses. There will be a wide range of retail outlets including a supermarket, speciality shops, a newsagent, a medical centre, and a service station. Sufficient car parking areas will be provided to encourage local shopping. It is envisaged that an area of at least 5-10 hectares is to be provided to cater for the provision of sufficient retail/commercial facilities within the central town precinct. An additional commercial area will be required to accommodate support services and business offices associated with such precincts. (URaP – TTW, 2012). The structure plan is shown in **Figure 1-2**.

Figure 1-2 Lochinvar Structure Plan



Source: Maitland Council, 2007

The land use areas of the structure plan are outlined in **Table 1-2**.

Table 1-2 Lochinvar Structure Plan development areas

Land Use	Area (ha)
Commercial	6.4
Recreation	20.6
Medium Density	8.8
High Density	1.0
Transport Interchange	2.1
Community Land	1.6
Civic Precinct	17.3
Low Density	18.8
Environmentally Sensitive	72.6
Potential School Sites	16.6
Residential (single dwellings)	480.0
Total	**645.8**

Source: URap – TTW, 2012

The proposed road network is shown in **Figure 1-3**.

Figure 1-3 Lochinvar Structure Plan road network

Source: Maitland Council, 2007

The original road network concept shows a new southern link road that connects from a new intersection west of Windermere Road (now Terriere Drive) to a new intersection east of Wyndella Road ("Aird's intersection upgrade"). Road upgrades are proposed at:

- New England Highway / Terriere Drive
- New England Highway / Windemere Road
- New England Highway / Cantwell Road
- New England Highway / Wyndella Road
- New England Highway / Airds intersection
- New England Highway / St Helena Close.

1.3.2 Maitland Development Control Plan updates (2016)

Maitland City Council produced an update to their Development Control Plan with a proposed road network layout (**Figure 1-4**).

The Lochinvar URA comprises a total of 650 hectares of land, with an approximate residential yield of 5,000 lots. The *Lower Hunter Regional Strategy (Dept of Planning, 2006)* identifies the Lochinvar URA as a regionally significant development area and as a key site to achieve the dwelling targets for population growth in the Lower Hunter.

The proximity of the Lochinvar URA to regional transport systems, including the Main Northern Railway Line, the New England Highway and the Hunter Expressway, are key elements to the identification of this area for urban development.

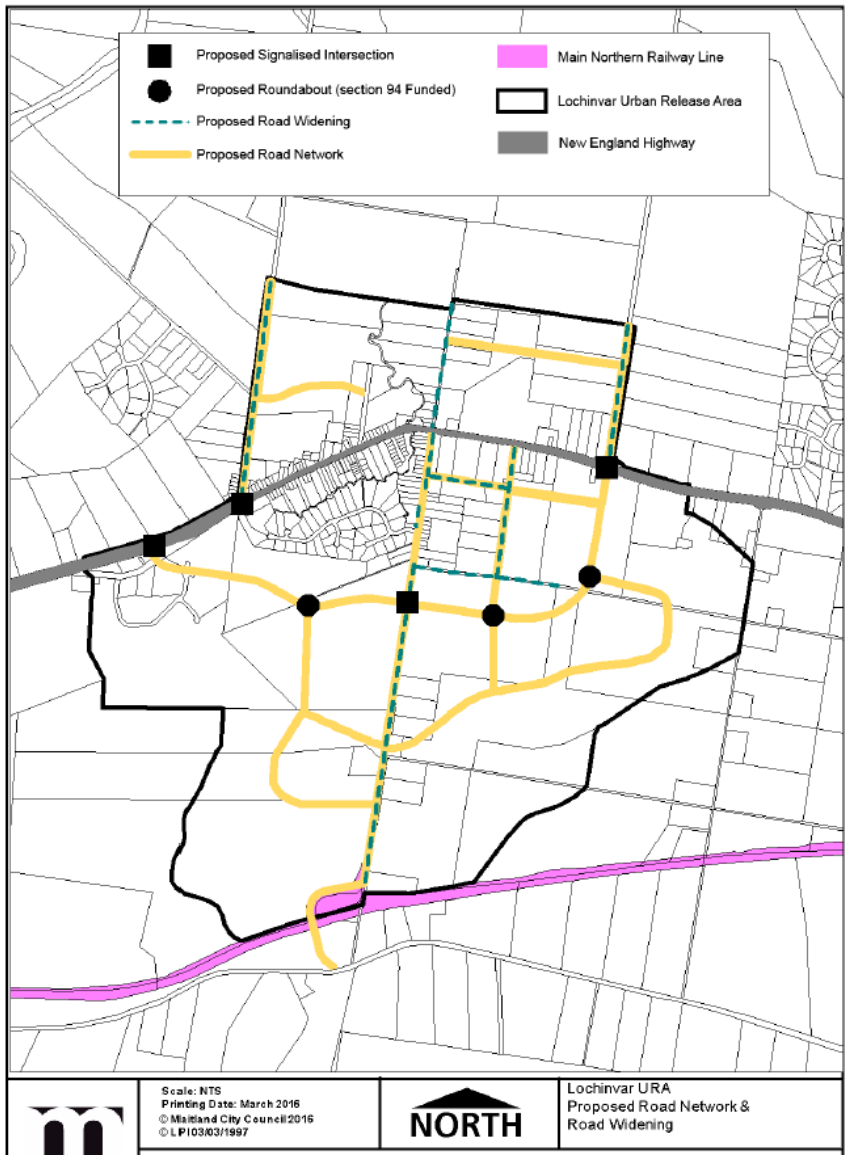
This plan shows that the northern road would no longer be a full bypass but only terminate at Cantwell Road, which also bisects the subject development.

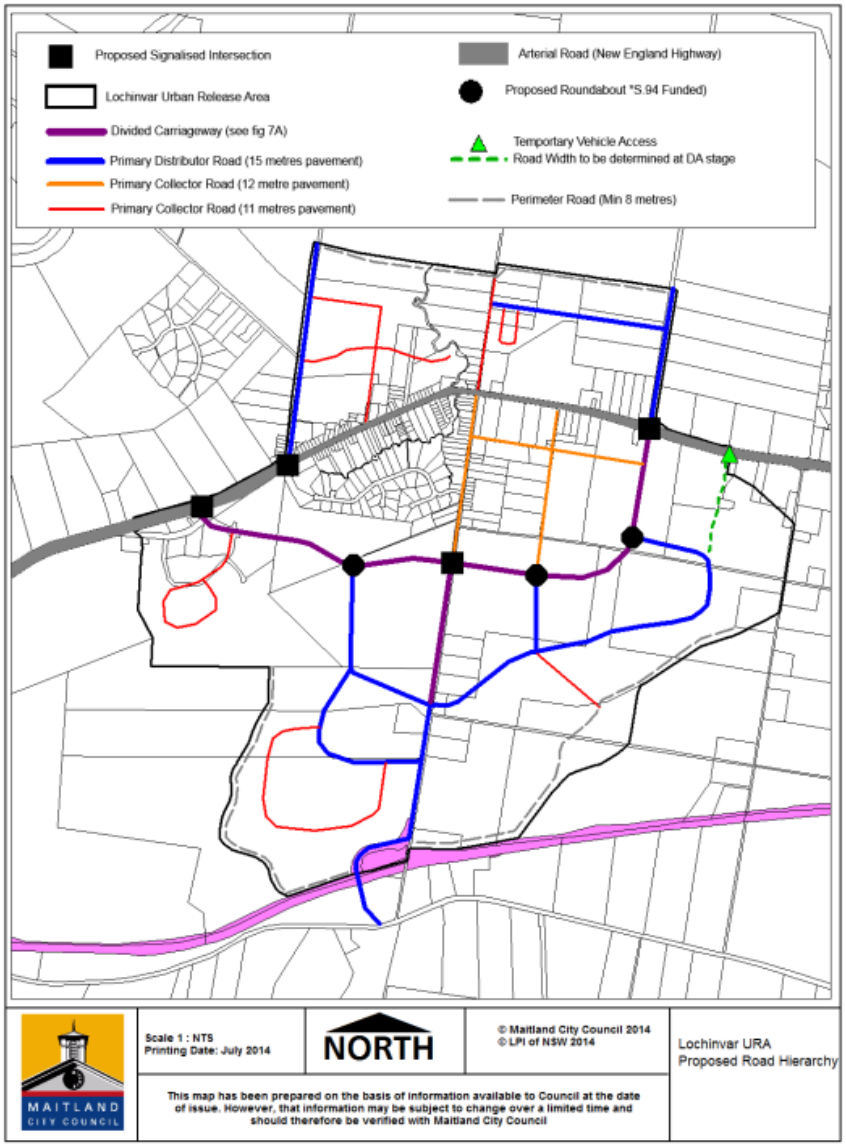
Further observations: The change in the northern bypass route to no longer provide a full connection would lower the amount of strategic traffic using this route compared with previous modelling.

1.3.3 Current planning status

The land zoning and the minimum lot size have been updated to reflect the land uses previously proposed in the Lochinvar Structure Plan (**Figure 1-5**).

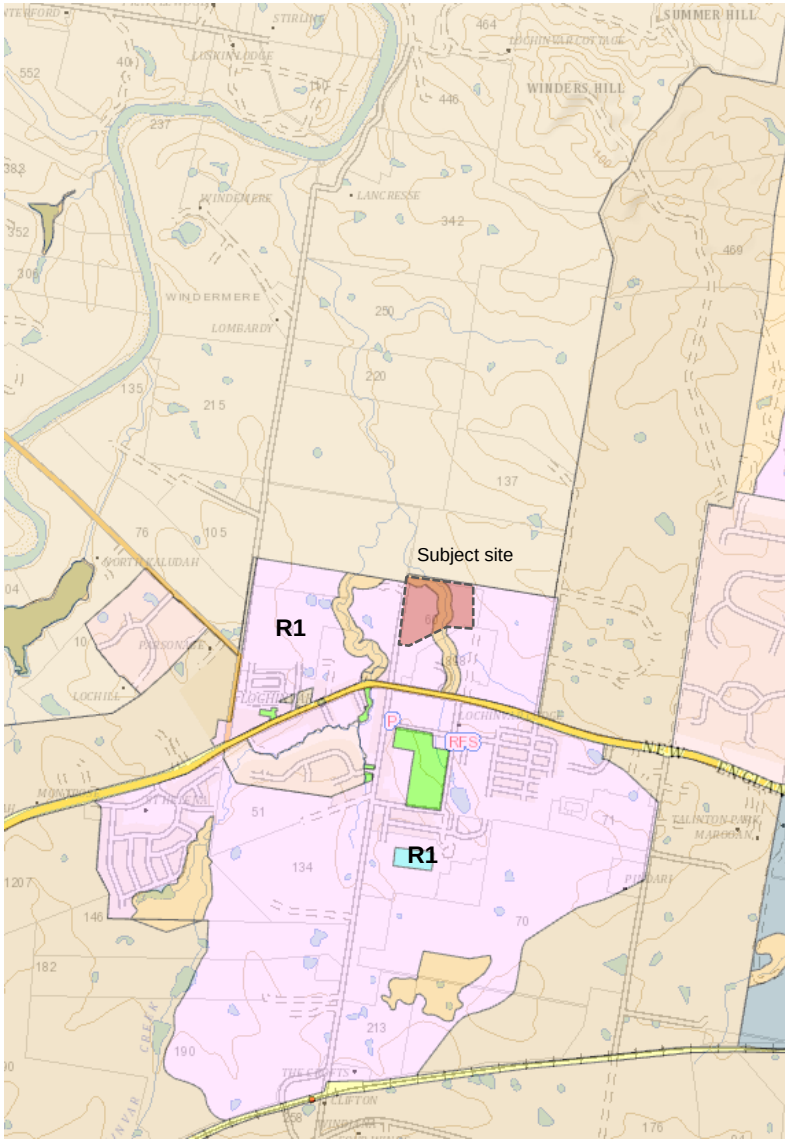
Figure 1-4 Lochinvar Urban Renewal Area Proposed Road Network and Road Hierarchy

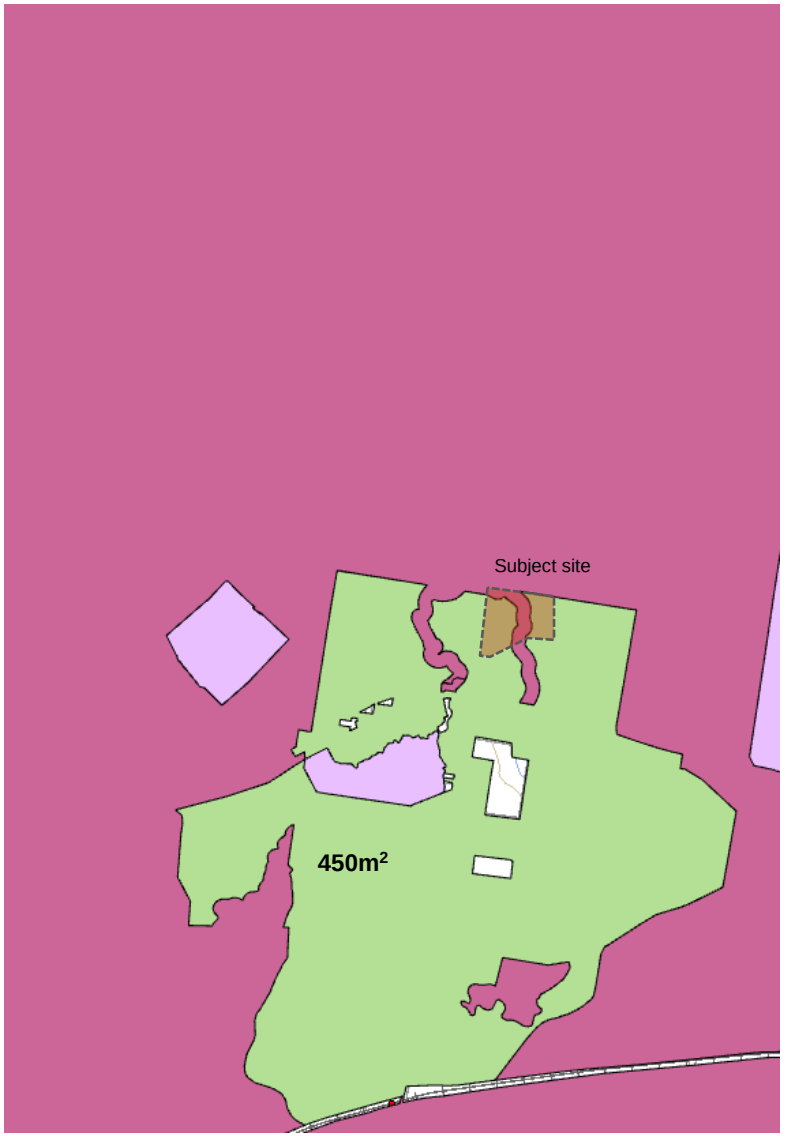




Source: Maitland Council DCP, 2016

Figure 1-5 Local Environment Plan zoning and Lot size map





Source: Department of Planning & Environment, 2023

1.4 Project objective

TfNSW would like to see coordinated assumptions and modelling for the area. The key focus is the capacity of the intersection of Cantwell Road/Station Lane/New England Highway with consideration being given to the cumulative traffic impact of approved developments in this area that require access to this intersection. The focus of this work is to investigate the intersection capacity for the subdivision development application and to confirm any infrastructure if needed.

1.5 Stakeholders

The key stakeholders are:

– Maitland City Council

– Transport for NSW

– Trustee of the Roman Catholic Church for the Diocese of Maitland Newcastle (the proponent).

2.0 Project description

2.1 Study area

The site is located in the Local Government Area (LGA) of Maitland Council. It sits north of New England Highway and east of Cantwell Road (refer to **Figure 1–1** earlier). The existing land use is R1 general residential. The proposal is to subdivide the existing site into 138 lots. The land is zoned residential with a minimum lot size of 450m^2.

Per **Section 1.3**, there are various residential precincts in the area that have not yet been fully developed. These are mainly in the Lochinvar URA. Planning Proposals for these precincts have been gazetted and they are now in the Development Application stage.

2.2 Transport infrastructure

2.2.1 Walking and cycling infrastructure

The walking and cycling infrastructure around the site is shown in **Figure 2–1**.

Figure 2–1 Walking and cycling infrastructure – New England Highway/ Cantwell Road

Pedestrian facility (footpath, signalised crossing, zebra or refuge island)

Cyclist facility (on road cycle lane/wide shoulder)

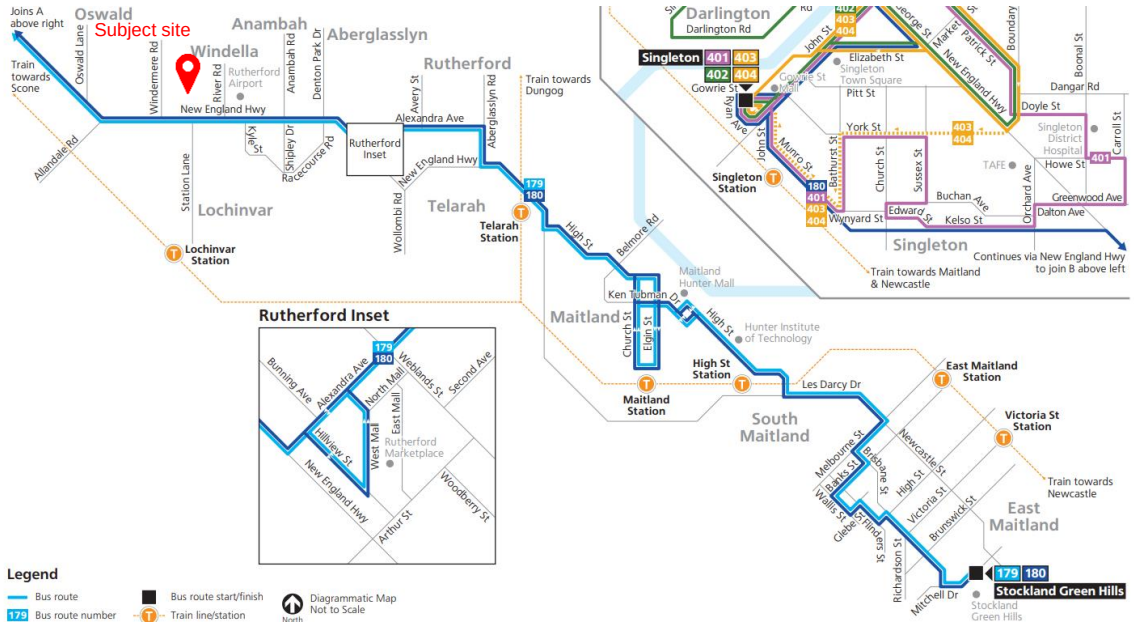
Source: Nearmap, SCT Consulting, 2024

There is footpath on the southern side of New England Highway and eastern side of Station Lane. A signalised pedestrian crossing outside St Joseph's College and a refuge island is available on Station Lane. There are wide shoulders along New England Highway that would be suitable for experienced cyclists.

2.2.2 Public transport network

The site is located north of New England Highway, which carries bus services to Maitland and Stockland Green Hills, as shown in **Figure 2-2**. Bus routes 179 and 180 follow a similar route towards Maitland.

Figure 2-2 Public transport network



Source: Transport for NSW, 2023

The closest bus stops are 200m to the east of Cantwell Road outside St Joseph's College (eastbound & westbound) and 100m to the east of Cantwell Road (westbound). The frequency of these services is approximately hourly from 8 am to 6 pm.

Lochinvar Station is 4.8km to the southwest of the intersection of New England Highway / Station Lane. There are no feeder bus routes to this station. Lochinvar Station is served by the Hunter Line, which has an approximately hourly frequency from 7 am to 10 pm. The Hunter Line connects Lochinvar to Newcastle Interchange and Scone.

2.2.3 Road network and classification

The site sits east of Cantwell Road and north of New England Highway. New England Highway is classified as a state road (per the Roads Act), shown in **Figure 2-3**, and connects to Maitland and through onto Newcastle to the east. To the west, it connects to Branxton. There are interchanges with M15 Hunter Expressway via Lovedale Road at Allandale.

Figure 2-3 Classified state and regional road network

Source: NSW Road Network Classifications, 2023

2.3 Assessment years and periods

The assessment year for the proposed subdivision is suggested to be 2030 when the development is fully completed and taken by residents.

Given the proposal is for a residential subdivision, the key focus of modelling is the weekday commuter morning and evening peak. Traffic count data has been collected at the intersection of New England Highway and Cantwell Road during a typical weekday during the school term. As the model is proposed to be SIDRA Network, there is no need for warm-up and cool-down periods.

3.0 Input data

3.1 Traffic surveys

The traffic survey included the intersection of Cantwell Road/ New England Highway (**Table 3-1**).

Table 3-1 Traffic surveys proposed at Cantwell Road/ New England Highway

Element	Details	Time period
Intersection turning counts (conducted on 22 Feb 2024)	– Classified to light and heavy traffic	– 7.30-9.30 am and 3.00-6.00 pm – Occurred on a typical weekday during the school term
Queue length surveys	– Queue length in vehicles	

Intersection turning count surveys and queue length surveys are to develop a calibrated SIDRA site that reflects local conditions.

3.2 Assumptions

The assumptions used will be in line with the *TfNSW Traffic Modelling Guidelines (2013)*. Parameters will be consistent unless they are required to be changed to meet calibration/validation requirements, such as queue lengths or Degree of Saturation <1.0. **Table 3-2** identifies the hierarchy of intervention that will be used to meet calibration/validation requirements.

Table 3-2 Calibration and validation intervention hierarchy

Priority intersections	
Use first	Adjustment of gap acceptance parameters within the range identified in TfNSW Traffic Modelling Guidelines Appendix E
Use last	Capacity adjustment

3.3 Background traffic growth

Given the short time frame of the study, no substantial strategic modelling is warranted. The background traffic growth will include

– An annual release rate of 300 lots for Lochinvar Urban Release Area (URA) only from 2024

– Background traffic growth based on STFM (minus growth associated with Lochinvar).

3.4 Trip rates and trip distribution

The proposed trip rates for the study are provided in **Table 3-3**.

Table 3-3 Trip rates

Trip rates	The proposed development*	Rest of the Lochinvar URA
AM peak	0.71 car trips/ dwelling/ hour	0.66 car trips/ dwelling/ hour
PM peak	0.78 car trips/ dwelling/ hour	0.66 car trips/ dwelling/ hour

*This is on the northern side of the NEH, so there will be limited opportunities for contained trips.

A 50%: 50% split is assumed for Lochinvar URA given the location closer to Allandale Road and further with Hunter Expressway. It is noted that inbound and outbound ratio will be 10%: 90% for the AM peak hour and the inversed for the PM peak hour.

4.0 Methodology

4.1 Base model

4.1.1 Modelling Platform

The base modelling platform will be SIDRA 9.1. SIDRA is considered an appropriate tool for the following reasons:

– SIDRA provides an accurate estimation of capacity at the intersection level, which is typically the most constrained part of the traffic network in urban areas.

– SIDRA supports rapid turnaround of sensitivity tests, enabling stakeholders to evaluate alternatives quickly.

4.1.2 Traffic demand

Traffic demand will be developed using a spreadsheet model of existing turning count data, classified by turn into light and heavy vehicles.

4.1.3 Traffic zones/input

There are no zones in a SIDRA network model.

4.1.4 Traffic profile

The peak flow factor traffic profile will be set using turning count data at a whole-of-network level.

4.1.5 Road type

SIDRA does not employ road types, jam densities etc. Roads will be coded to their posted speed limit at each period.

4.1.6 Driving behaviour and speed profile

No speed profiles are included in SIDRA. Gap acceptance behaviour will be per TfNSW Traffic Modelling Guidelines, except where required for calibration/validation (refer to **Section 3.2**).

4.1.7 Public transport

Existing public transport services will be coded as heavy vehicle class.

4.1.8 Pedestrians and cyclists

Pedestrian volumes are expected to be low and not proposed to be included.

Cyclist volumes are expected to be low and are not proposed to be included.

4.1.9 Assignment type

There is no assignment type in a SIDRA model.

4.2 Future year modelling

4.2.1 Scenario testing

To better understand the impact of the traffic growth, 2030 is selected to be the future year when the development is expected to be completed and taken. The scenarios will be developed and tested as below:

– Future 2030 with cumulative background growth only (reflecting the staged release of Lochinvar URA and background traffic growth)

– Future 2030 with background growth and development traffic (consider an additional 138 lots).

4.2.2 Traffic demand/growth

Per **Section 3.3**.

4.2.3 Traffic profile

There will be no change to the traffic profile.

4.2.4 Public transport

It is expected that there not be any changes to the public transport network in the future.

4.2.5 Assignment type

There is no assignment type in SIDRA.

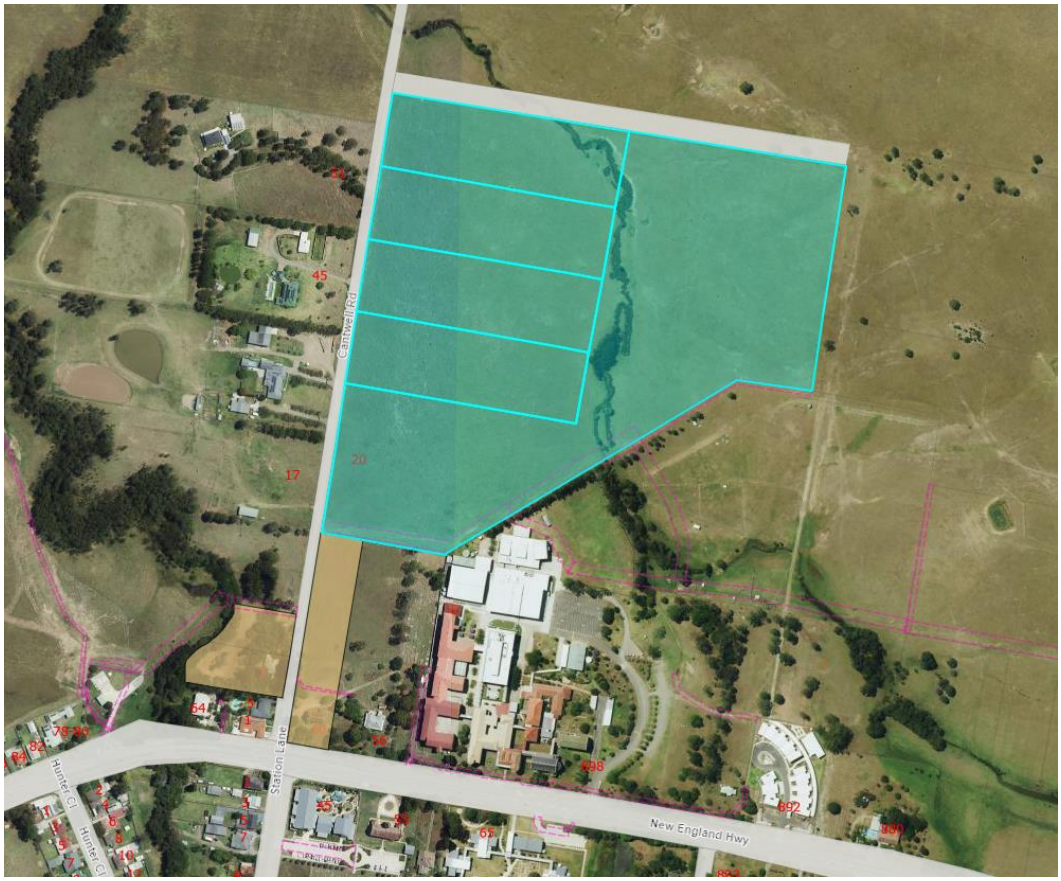
5.0 Previous consultation

See Appendix A for pre-lodgement meeting minutes from Maitland Council and Appendix B email correspondence with TfNSW.

Appendix A – Pre-lodgement meeting minutes from Maitland Council

Pre-Lodgement Meeting Minutes

MEETING DETAILS:	
Meeting Date:	Thursday 26/10/2023
Commenced & Completed:	9.30am 10.30am
Proposed Development:	The proposed development includes the following: • 138 Lot Staged Residential Subdivision • Roads
Attendee(s):	*Name, Position, Contact No.*
Council Officers:	Brian Gibson (Principal Planner) Sam Dart (Senior Subdivision & Development Engineer) Maree Watt (Business Support Officer)
Applicant/ Proponent(s):	Paul Murdoch (Catholic Diocese) Chad Beecham (Monteath Powys) Lachlan Sims (Monteath Powys)
Attachments and Plans:	Draft Subdivision Layout, Drawing Number 1, Revision B Pre-DA Meeting Application – Issues for discussion
PROPERTY DETAILS:	
Property Address:	60 New England Highway LOCHINVAR
Lot and DP:	Lot 2 in DP818314 and Lot 35, 36, 37 and 38 in DP975690
Zoning:	The subject site is zoned R1 General Residential and C3 Environmental Management pursuant to the Maitland Local Environmental Plan (MLEP) 2011. The proposed development is defined as Subdivision which is permissible in the R1 zone for a minimum lot size of 450m², and in the C3 zone for a minimum lot size of 40 hectares.
Site Constraints:	Contours – 42m AHD in the north-east corner and 24m AHD in the north (central), 30m AHD in the south-west corner The site is mapped as being affected by Acid Sulfate soils (class 5). A (3rd order) water course runs from the south-east to the north-west through the development site, with some limited riparian vegetation. The water course is also mapped as Key Fish Habitat. The development site has access to Cantwell Road to the west and a road reserve to the north. Cantwell Road connects with the New England Highway to the south. The site is mapped as bushfire mapped land, Vegetation Category 3.

	A locally listed heritage item (I104) directly adjoins to the south, and a State listed heritage item (I101, Nowland's Lochinvar Coach House and Setting) fronts Cantwell Road to the south west. An AHIMS search identified 7 sites are located within 1 km.
Aerial Map:	
STATUTORY CONSIDERATIONS:	

Legislation/ Policy/ Guidelines Applicable – (including, but not limited to):	• *Environmental Planning & Assessment Act 1979;*
	• *Environmental Planning & Assessment Regulation 2000;*
	• *SEPP (Biodiversity and Conservation) 2021;*
	• *SEPP (Planning Systems) 2021;*
	• *SEPP (Resilience & Hazards) 2021;*
	• SEPP (*Transport* and Infrastructure) 2021;
	• *Maitland Local Environmental Plan 2011 (MLEP**);***
	• *Maitland Development Control Plan 2011:*
	  o *A4 – Community Participation,*
	  o *B6 – Waste Not – Site Waste Minimisation and Management,*
	  o *C10 – Subdivision, C11 Vehicular Access & Traffic and C12 – Crime Prevention through Environmental Design.*
	  o *F9 – Lochinvar Urban Release Area*
	• *Sections 7.11 – Maitland Wide Development Contributions Plan (Lochinvar Contributions Plan 2014) OR alternative could be to look at via a Planning Agreement*
	• *Maitland +10 Community Strategic Plan, the Maitland Local Strategic Planning Statement 2040+, the Hunter Regional Plan 2041 & Greater Newcastle Metropolitan Plan 2036*

Additional MLEP Clauses:	• Clause 2.6 – Subdivision • Clause 4.1 – Minimum subdivision lot size • Clause 4.2C – Minimum subdivision lot sizes for split zones

	• Clause 5.3 – Development near zone boundaries • Clause 5.10(5) & (8) – Heritage Conservation • Clause 5.21 – Flood planning • Clause 6.1 – Arrangement for designated State public infrastructure • Clause 6.2 – Public utility infrastructure • Clause 7.1 – Acid Sulfate soils • Clause 7.2 – Earthworks • Clause 7.4 – Riparian land and watercourses
Development Classification:	1. The proposed development may be classed as integrated development, noting the proposal is to subdivide the land for residential purposes. GTAs may be required from the: • DPE - Water (CAA under Section 91 of the Water Management Act 2000 – development within 40m of a watercourse). • Department of Primary Industries (S.219 of the Fisheries Act 1994 – works impacting a river/creek) • NSW Heritage – Section 90 of the National Parks & Wildlife Act, 1974 • NSW Heritage – Section 58 of the Heritage Act 1977 2. The proposed development may be classified as Regional Development should the value exceed $30 million, thus requiring assessment by Maitland City Council and determination by the Hunter & Central Coast Regional Planning Panel. 3. The proposed development may be required to be advertised and notified, noting the provisions of clauses 6 & 8 under section 4.2.2 of Part A of the Maitland DCP 2011. Should the application be integrated development in relation to a Controlled Activity Approval under the Water Management Act 2000, advertising for an extended period of 28 days is required.
Capital Investment Value/ Cost of Works	Any DA lodged with Council must clearly state the estimated cost of works (COW) of the proposed development. Please refer to the Department of Planning, Industry and Environment's Planning Circular PS 10-008 which describes what items must be included and excluded when calculating the COW/Capital Investment Value (CIV) for development. Depending upon the COW/CIV, the DA may be determined by the Hunter Central Coast Regional Planning Panel (HCCRPP) or reported to a full Council meeting should it exceed the delegations of Council officers.

Proposal

1. The subdivision proposal is to construct a distributor road and release in stages.
2. The subject land recently was approved for a 5 into 2 lots.
3. The land is owned by the Catholic Diocese of Newcastle.
4. The Diocese has been discussing the shared road with CPG who have the land holding to the east.
5. A revised footprint to address flooding has been submitted, can Council confirm what the approved study is here.
6. Interested to know the 1 in 100 v PMF for the lots fronting the riparian zone and potential retaining walls and road widening requirements to allow for future development for this side of the future development.
7. Is there potential for condition to be put in place to build distributor road early.

Planning Advice

1. Lochinvar Urban Release Area Plan –
    - Land is identified as Stage 2 (western portion) and Stage 3 (eastern portion)
    - 15m wide pavement Primary Distributor Road linking to Wyndella Road to the east
    - 11m wide pavement Primary Collector Road (Cantwell Road) linking to the New England Highway. Cantwell Road is identified for Road widening
    - Off Road Shared Path / On Road Commuter Path
    - Environmental Considerations (watercourse)

2. Site analysis – appropriate analysis is required to inform the layout of the subdivision, with particular consideration of the 3rd order watercourse and site levels.

3. The site is mapped as being flood affected and a flood study is required to address impacts on the proposed development. The flood study shall have regard to the ADW Johnson Flood Study Lochinvar Urban Release Area dated 16 October 2015 and the WMA Lochinvar Flood Study dated July 2019.

4. Permissibility – the C3 zoned land has a minimum lot size of 40 hectares, where this cannot be achieved clause 4.2C of the MLEP2011 should be considered. Note, no residential subdivision works (roads, detention basins, etc) should occur within the C3 zone with the exception of the crossing of the water course.

5. Council may consider dedication of the riparian corridor once it has been upgraded to an acceptable standard. A Vegetation Management Plan (VMP) would be required as part of the rehabilitation of the corridor. The application is to be referred to DPE - Water for further advice/GTAs.

6. An Urban Design report is required to address the proposed Subdivision, its layout and response to environmental requirements as well as transportation and access to facilities and amenities. This report should also address bus links & stops, cycleways, pedestrian access /footpaths and way finding.

7. Discussion regarding economic and social impacts are to be included in the application, and should be included in the SoEE and referenced in the Urban Design report.

8. A Traffic Impact Assessment is required to address access, public transport, roads and parking restrictions (see road width comments relative to Bushfire), impacts on the New England Highway and the intersection with Cantwell Road.

    As the development is a traffic generating development under the SEPP (Transport and Infrastructure) 2021 , it will be referred to Transport for NSW.

9. A Landscape plan is required (riparian area, street trees and throughout the subdivision).

10. A Bulk earthworks plan is required, detailing the extent (cut & fill), net import or export of material for the site.

11. Clarification of the Road Reserve to the north – Council's understanding is the road reserve is a private road and is subject to a possessory title application. An application for subdivision involving the private road cannot be determined until the possessory title application has been resolved and owner's consent can be provided.

12. An Aboriginal Cultural Heritage Assessment will be required noting the development site is within the vicinity (1 km buffer) of 7 registered AHIMS sites. The application will be notified to the Aboriginal Community for a period of 28 days as required under Clause 5.10(8) of the MLEP2011.

13. Consideration of road construction/widening impacts on heritage items located to the south of the development site along Cantwell Road. This notes the road widening would impact on the curtilage/setting of a locally listed heritage item and state listed item and consequently a Heritage Impact Statement (HIS) may be required.

    Further, a HIS having regard to other heritage considerations may be required.

14. A Bushfire Hazard Assessment report addressing the requirements of the Planning for Bushfire Protection 2019. The development will be integrated and will be referred to the NSW Rural Fire Service. Note, requirements for the application include designation of perimeter, non-perimeter and internal roads, APZs within the development site, perimeter road widths requiring parking fronting residential lots being in addition to the minimum 8m wide carriageway with parking restrictions on the outside (non-residential lot fronting) kerb.

15. A servicing strategy is required with the development application, and is to include advice from Hunter Water as to the servicing of the development. Note the requirements of Part F.9 of the DCP stating out of sequence subdivisions shall only be supported where there is only a minor upgrade to Hunter Water's infrastructure.

16. Council requires details of utility infrastructure to be identified up front and incorporated into the subdivision plans.

17. An ecological assessment of the development site and the impacts of the proposed works is required. This shall include consideration of the water courses mapped as Key Fish Habitat.

Engineering Advice

General

1. Staging plan will be required with any DA lodgement.

2. Compliance with Planning for Bushfire Protection is to be addressed in the application – please see Bushfire Handout with these PL minutes.

3. Riparian corridor offsets are to be considered, with an approval by DPE-Water (NRAR) required with any DA.

4. Preliminary civil plans shall be provided with the development application.

5. A geotechnical report shall be provided with the development application.

Road Design, Traffic & Transport

1. Council will send the traffic studies to TfNSW to determine if upgrade of the traffic signals are required.

2. The proposed development will put additional pressure on the Cantwell Road/NEH intersection. This Intersection will require upgrading to ensure that satisfactory turning movements in/out of NEH can occur. The minimum design vehicle for the site is a semi Trailor (the road is a primary collector) . Note: this is indicative only and a WAD with TfNSW will be required. Alternatively, wait for land to east to connect through to reduce traffic load on Cantwell Road (this will also require traffic assessment to be undertaken).

3. A traffic report will need to be provided with any application. It will need to address the internal site, Cantwell Road and the intersection at Cantwell Road and the NEH, intersections to the east as required.

4. Cantwell Road width will need to be addressed with any application. The road is only 4m is sections. This width is not suitable to facilitate any significant development. It is expected that temporary widening shall be provided along Cantwell Road from the New England Highway to the development site. The construction of half road widening and kerb and guttering along Cantwell Road will be required for the full frontage of the development site.

5. A CHR(S) intersection will be required off Cantwell Road into the proposed distributor road.

6. Road widths will be required to be in accordance with MCC MOES- See Road Design Cl2. Note the internal distribute road is required to be 25m in widths (15m carriageway+4.5m verge + 5.5m verge for off road shared path). Only 22m have been provided on the plans.

7. Note: the MCC URA DCP regarding provisions of shared paths.

Stormwater Management

1. Stormwater detention basin is required. This is required to be an offline basin and shall be out of the 100 year flood level. Water quality shall also be provided (typically GPT/bio basin treatment train).

2. A stormwater report shall be provided addressing water quality and water quantity.

3. All development lots shall be filled to 500mm above the 100 year flood event (where reasonable).

4. A flood study is required and it shall address any proposed fill within the 1% AEP event. If no fill proposed in flood zone, WMA report flood extents are suitable and no further flood report required.

Geotech & Earthworks

1. Geotechnical report/information addressing:
    a. Pavement design
    b. Basin design
    c. Contamination
    d. Suitability of site for residential development (slope stability etc)]
    e. Cut/fill volumes (or provided in civil plans)
    f. How settlement for fill over 2m will be addressed
    g. Deconstruction of any farm dams

Utilities/Services

1. Provisions of services and utilities including showing any major infrastructure

2. How services will be located on Cantwell Road. These shall be provided in the correct locations.

Land Titles

1. Address all restrictions and easements on site as required.

Environmental Health Advice

1. A Preliminary Site Investigation report for the development site is required for review under SEPP (Resilience & Hazards) 2021.

External Referrals

1. The application may be referred to the following external agencies for comment:
    - NSW DPE – Water - as works are proposed within 40m of a defined water course (3rd order)
    - Transport for NSW – noting access via the intersection of Cantwell Road and the New England Highway
    - NSW Rural Fire Service – the land being mapped as bushfire prone and the proposed development being a residential subdivision
    - NSW Department of Primary Industries – noting the proposal may impact Key Fish Habitat
    - NSW Heritage – works impacting aboriginal sites and artefacts, works impacting State Heritage listed items

SUMMARY	
Plans:	Any development application lodged for a proposed subdivision of the land should include but not limited to; • Development Plans including: o Survey Plan to investigate the existing site boundaries and any infrastructure restrictions, o Detailed site analysis that identifies constraints, prevailing characteristics of the locality and an understanding of the site and context, o Subdivision plan, sections, etc o Landscaping Plan with detail regarding plantings height at maturity, pot size and include details of retaining walls and fencing, o Erosion and Sedimentation Control Plan, o Bulk Earthworks Plan, o Stormwater Management Plan, o waste management plan, • Arborist/Ecological report, • Preliminary Site Investigation contamination assessment, • Geotechnical report, • Aboriginal archaeology, • Notification plan with subdivision layout/plan.
General	• Owners Consent from all owners of the property is required. • Discussion with neighbouring properties regarding the proposed development should be undertaken. • Section 7.11 – A quote can be obtained upon request for approximate Section 7.11 fees when the concept is closer to finalisation.

	• Note: If any submissions are received during the notification/exhibition period, it will be determined at full Council.
Advice Note:	This advice is based on the proposed development as described by the applicant. Should the development or any relevant planning policy change in any way prior to the lodgement of a development application (DA) then this advice may no longer be fully accurate or complete. Please note that this advice is preliminary in nature and that no detailed assessment of the site or proposed development has been undertaken. Following lodgement of the DA and a detailed assessment, additional issues may arise that are not detailed in this correspondence that may require the proposed development to be modified or additional information to be provided. Council may also determine that the proposed development cannot be supported on the site.

Chairperson

NOTE: ANY ADVICE PROVIDED BY THE DCU SHOULD NOT BE CONSTRUED AS GRANTING APPROVAL, IN PRINCIPLE OR OTHERWISE, TO ANY PROPOSED ACTIVITY OR DEVELOPMENT. THE DETERMINATION OF ANY PROPOSAL CAN ONLY BE MADE ONCE A DEVELOPMENT APPLICATION HAS BEEN LODGED WITH THE COUNCIL AND THIS APPLICATION COMPREHENSIVELY ASSESSED AGAINST ALL RELEVANT LEGISLATION AND COUNCIL POLICY.

MGA

MM

NORTH MAGNETIC

LEGEND

- EXISTING AND PROPOSED BOUNDARY LINE
- MINOR CONTOUR LINE
- MAJOR CONTOUR LINE
- TOP & TOE OF BANKS
- ZONING BOUNDARY (E3)
- 100 YR HUNTER RIVER FLOOD STUDY – RL 25.85m AHD
- PROPOSED BASIN
- PROPOSED ROAD WIDENING
- (5) DENOTES PHOTO LOCATION.

NOTE:-

1. BOUNDARIES HAVE BEEN DETERMINED BY
   . PLAN DIMENSIONS ONLY, AND HAVE NOT
   . BEEN SURVEYED.
2. SERVICES HAVE BEEN LOCATED ONLY WHERE
   . VISIBLE, PRIOR TO EXCAVATION OR CONSTRUCTION
   . ALL SERVICES ARE TO BE LOCATED BY RELEVANT
   . AUTHORITY.
3. SPOT LEVELS AND CONTOURS SHOWN
   . HEREON ARE FOR DESIGN PURPOSES
   . ONLY AND ARE TO BE CONFIRMED ON
   . SITE PRIOR TO EXCAVATION OR CONSTRUCTION.
4. APPROXIMATE SITE AREA IS AS SHOWN ON PLAN
5. DETAILS OF SURVEY ARE CORRECT TO THE DATE SHOWN. (23/09/2021)

NOTE

PROPOSED BASIN HAS NOT BEEN APPROPRIATELY SIZED.

NOTE

LOTS 35-38 D.P.975690 ARE LIMITED IN TITLE PURSUANT TO SECTION 28T(4) OF THE REAL PROPERTY ACT, 1900, DEED DIMENSIONS ARE NOT GUARANTEED. THE BOUNDARIES OF THE SUBJECT PARCEL HAVE NOT BEEN INVESTIGATED BY THE REGISTER GENERAL NSW. IT IS STRONGLY RECOMMENDED THAT A PLAN OF DELIMITATION IS COMPLETED AND REGISTERED WITH LAND REGISTRY SERVICES (LRS) NSW IN ORDER TO CONFIRM THE BOUNDARY DIMENSIONS PRIOR TO ANY CONSTRUCTION ON SITE.

SCALE 1:1000 (A1)

25 0 25 50 75 100

NOTE

BOUNDARY DISCREPANCIES EXIST DUE TO THE AGE AND NATURE OF THE BASE DEPOSITED PLANS AND THE SURROUNDING CADASTRE. IT IS STRONGLY RECOMMENDED THAT A PLAN CONFIRMING BOUNDARY DIMENSIONS BE REGISTERED WITH LAND REGISTRY SERVICES (LRS) NSW IN ORDER TO CONFIRM THE BOUNDARY DIMENSIONS PRIOR TO ANY CONSTRUCTION ON SITE.

(AA) - EASEMENT FOR WATER SUPPLY AND SEWERAGE PIPELINES 10 WIDE (DP1137872)
(SS) - EASEMENT FOR PIPELINE 10 WIDE (DP1238395)

PHOTOGRAPH 1

PHOTOGRAPH 2

PHOTOGRAPH 3

PHOTOGRAPH 4

PHOTOGRAPH 5

PHOTOGRAPH 6

Ed.	Details of Revisions	Date
A	INITIAL ISSUE	27/09/21
B	PROPOSED DEVELOPMENT ISSUE	14/10/21

Client / Council Development Consent Number

Scale: 1:1000 (A1),1:2000 (A3)
Origin: SS4168
Surveyor: S.N.
Checked: J.H.
Job Number: 6829
Datum: AHD
Contour Int: 1.0
Drawn: S.F.
Approved: J.H.
Drawing File: 6829-MAJOR

Registered Surveyor: .....

LAND DEVELOPMENT SOLUTIONS
Surveying...Planning...Engineering
PO Box 853 THE JUNCTION NSW. 2291
Phone: (02) 4963 5520 Fax: (02) 4963 5521
E-mail: mail@lds.net.au
ABN: 42 110 897 928

PROPOSED DEVELOPMENT OF
LOTS 35-38 D.P.975690 &
LOT 2 D.P.818314
CANTWELL RD, LOCHINVAR

Drawing Number	Edition
1	B

Sheet. 1.. of.. 1

Appendix B – Previous email correspondence with TfNSW

Shawn Cen

From: Development North <Development.North@transport.nsw.gov.au>
Sent: Friday, 12 May 2023 11:23 AM
To: Chad Beecham
Cc: Liz Smith; Marg Johnston
Subject: RE: 220064 Lochinvar - Catholic Diocese - Cantwell Road - Proposed Development Access

Hi Chad,

I refer to your email seeking TfNSW advice about the proposed staged development (Sporting complex and approximately 100 residential lots) and its access.

New England Highway is a classified (State) road and Cantwell is a local road. Council is the roads authority for these roads and all other public roads in the area, in accordance with Section 7 of the Roads Act 1993. Council is responsible for setting standards, determining priorities and carrying out works on local roads.

TfNSW have reviewed the information supplied and offer the below preliminary advice/comments:

- It appears from the aerial map that the existing Cantwell Road does not have adequate road width to allow two-way movement and is currently unsealed. Also, it is noted that there are concerns about the potential road widening due to the presence of the existing heritage items. Therefore, it is recommended that the proponent investigates the feasibility of utilising the existing Cantwell Road and Cantwell Road/New England Highway intersection to accommodate the development traffic and concurrent two-way movement. The proponent may wish to seek further comment/feedback from Council for the potential road widening and access/movement via Cantwell Road.

- Provided that satisfactory access/movement can be achieved on Cantwell Road, the proposed development will have impact upon the capacity of Cantwell Road/New England Highway intersection. In this regard, Traffic Impact Assessment (TIA)/ modelling are required to assess the impacts of the proposed development on the road network, identify intersection capacity that may be available to cater for the additional traffic from the proposed staged development and/or any potential intersection upgrade required. TfNSW request a scoping report for the modelling/TIA be prepared prior to undertaking any modelling. It is suggested that the scoping paper should identify the assumptions and methodology, including but not limited to traffic generation/distribution/background growth/modelling scenarios etc. Consideration should also be given for the cumulative traffic impact of approved developments in this area that require access to Cantwell Road/Station Lane/New England Highway intersection.

TfNSW would be happy to meet with you once the scoping report is prepared to agree on the way forward for the modelling/TIA.

I note these comments are preliminary and based on the information available to us at the time of investigation. They are not to be interpreted as binding upon TfNSW and may change following formal assessment of a submitted development application from the appropriate consent authority.

Please feel free to reach out if you have any questions.

Regards,

Shengxi Lin
Development Services Case Officer
Development Services

Regional and Outer Metropolitan
Transport for NSW

T 1300 207 783 **M** 0476 505 715 **E** development.north@transport.nsw.gov.au

W transport.nsw.gov.au

Newcastle Regional Office, Region North
6 Stewart Avenue, Newcastle NSW 2302
Locked Bag 2030, Newcastle NSW 2302

Transport for NSW

From: Chad Beecham <c.beecham@monteathpowys.com.au>
Sent: Thursday, 20 April 2023 4:36 PM
To: Marg Johnston <Marg.Johnston@transport.nsw.gov.au>
Cc: Development North <Development.North@transport.nsw.gov.au>
Subject: 220064 Lochinvar - Catholic Diocese - Cantwell Road - Proposed Development Access

Hi Marg,

Monteath & Powys have been engaged by the Catholic Diocese of Maitland Newcastle to assist in progressing the preparation of options for the staged development of land on Cantwell Road Lochinvar, situated behind St Joseph's College.

The preparation of options for the proposed development is in the initial planning phase, and we would like to consult with TfNSW regarding the options, including discussion regarding the Cantwell Road, Station Lane and New England Highway intersection.

Subject Land: The land the Diocese own is Lot 2 DP818314 and Lots 35 – 38 DP975690 as shown below.

Proposed Development: the Diocese propose to develop the land with two distinct land uses. Part of the land is proposed to be acquired by St Joseph's College for a sporting complex including athletics track and associated parking, which is proposed to be made available for use by the community on a co-shared arrangement with the school. Initial discussions have occurred with Maitland City Council regarding the sporting complex being a co-shared facility. The remaining land is proposed for residential development with an estimated yield of approximately 100 dwellings.

A concept landscape plan of the sporting complex and residential development is provided below.

Context:

Hunter Regional Plan 2041 (HRP 2041): the HRP 2041 identifies Lochinvar as part of Western Maitland and one of the largest growth areas in the Hunter. The subject land is also adjacent to the identified New England Growth Corridor.

Maitland Local Government Area: The Maitland Urban Settlement Strategy 2012 identified Lochinvar as a major growth corridor for residential development.

Maitland LEP 2011: the subject land is part of the Lochinvar Urban Release Area (URA) and is predominately zoned R1 General Residential.

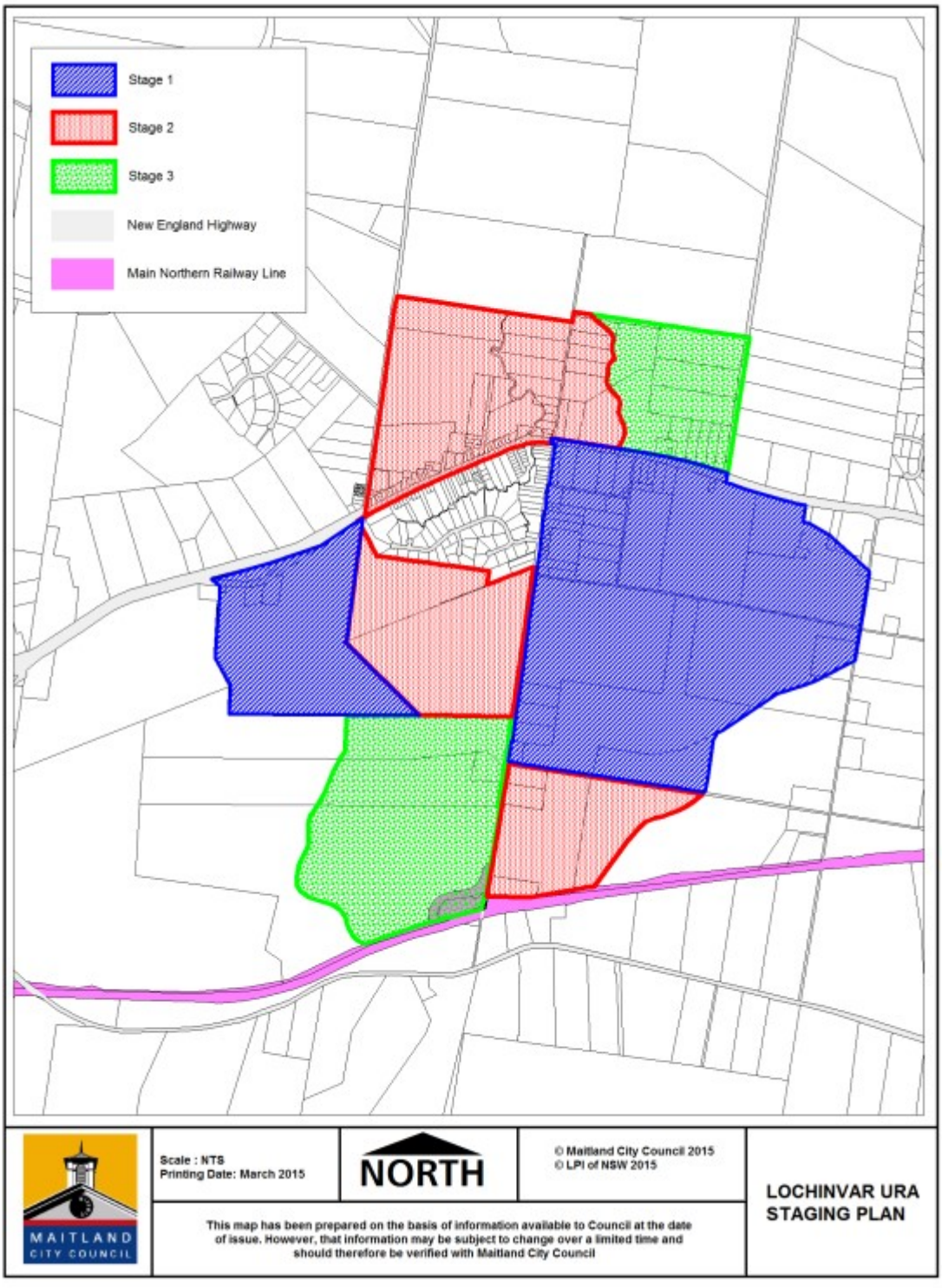
Lochinvar Structure Plan – October 2007: Section 5.4.3 of the Lochinvar Structure Plan identifies the key intersections with the New England Highway and the associated road upgrades as being Wyndella Road and Windemere Road for the Northern links, and the Airds intersection upgrade and St Helena Close for the Southern links.

The Structure Plan states "*the existing intersection at Station Lane / Cantwell Road with the New England Highway is proposed to be closed to the south and temporarily remain open to the north. Alternatively, future traffic studies may identify the intersection as remaining open but is not likely to be considered for any upgrading due its visually sensitive location within the heritage precinct of the existing village. It is likely to be limited to left in and left out in this location and as such, local roads should be designed to direct traffic flows away from Station Lane north of Christopher Road.*"

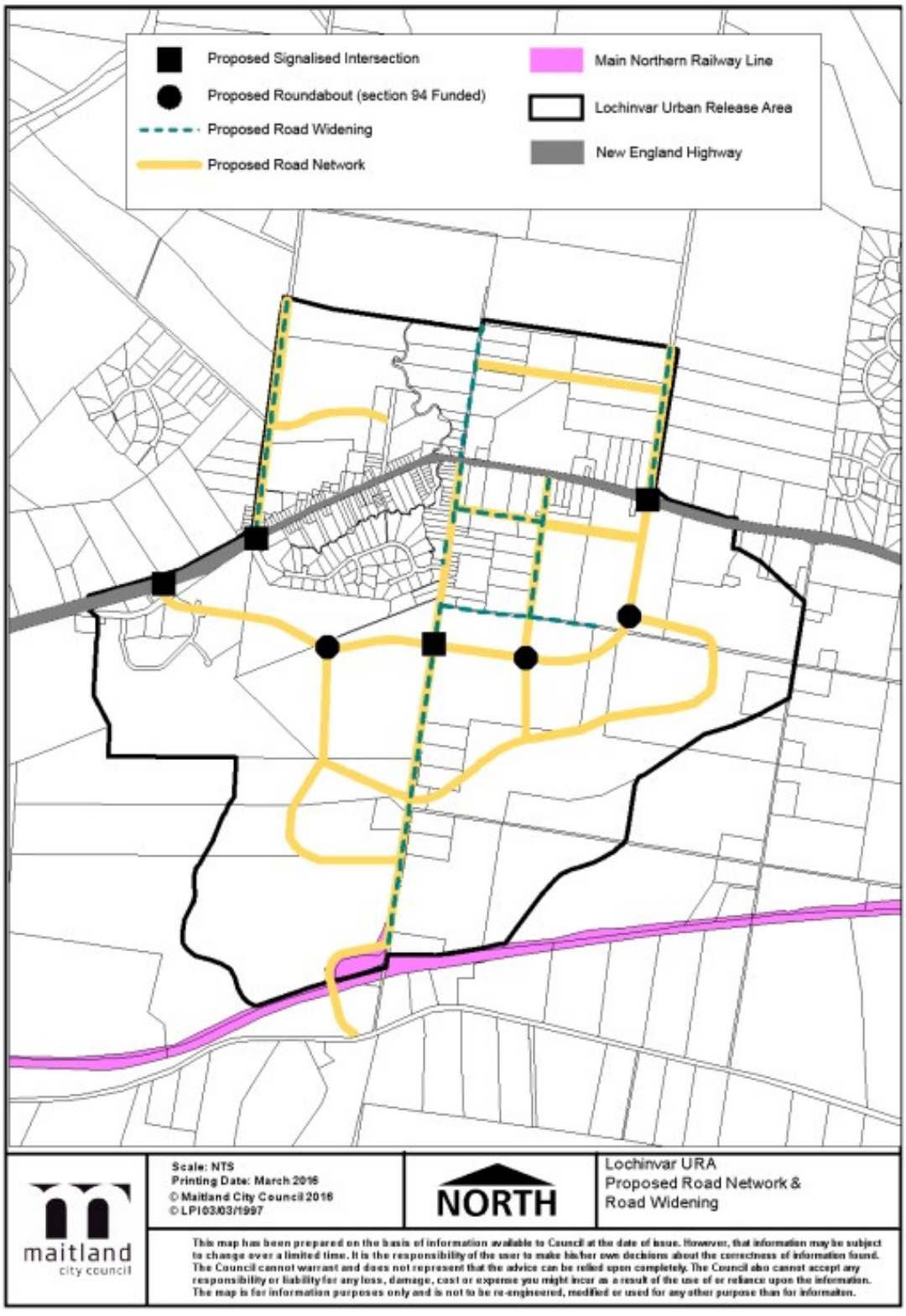
Cantwell Road runs through the existing European Heritage listed items Victoria House and Holy Trinity Church.

Maitland Development Control Plan – Part F.9 – Lochinvar Urban Release Area (December 2011):

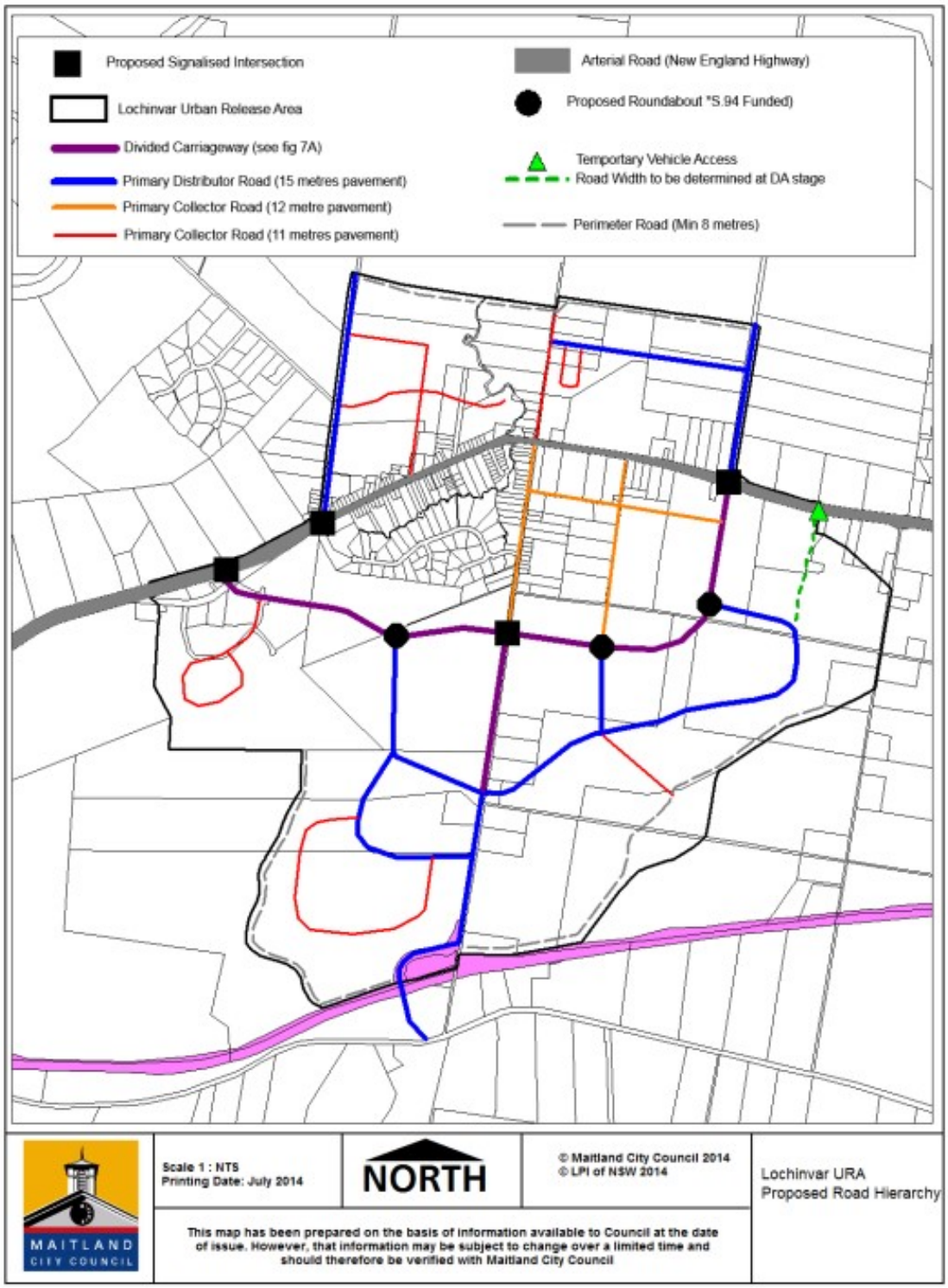
The Lochinvar URA Staging Plan (below) identifies the subject land being within part Stage 2 and part Stage 3 of the URA, however ultimately is reliant on the development of Stage 3 land to the east for the reasons explained below.



The Lochinvar URA Proposed Road Network & Road Widening Plan (below) identifies Cantwell Road as providing access to the subject land and is designated for road widening. A further access link is shown through the subject land and adjoining Stage 3 land to the east via Wyndella Road. The land to the east is separately owned and therefore reliant on others to develop.



The Lochinvar URA Proposed Road Hierarchy Plan (below) identifies Cantwell Road as a Primary Collector Road (11m pavement), however there are concerns about this proposed road widening as it significantly conflicts with the adjoining heritage items mentioned above.



Cantwell Road currently has no access restrictions as shown in the below aerial image. The recent intersection upgrade works carried out for developments along Station Lane (opposite) and Christopher Road, provides a dedicated left-turn in from the west and right-turn in from the east.

Although access for the full development of the Diocese land will likely be reliant on the construction of the Primary Distributor Road through the subject land and the adjoining Stage 3 development to Wyndella Road and the New England Highway, we would like to discuss the potential development of the sporting complex and release of residential lots using the existing Cantwell Road and Station Lane intersection with New England Highway.

I look forward to hearing from you once you have had the chance to consider the above.

Regards,

Chad Beecham
Project Manager

P (02) 4926 1388 | M 0432 084 633
E c.beecham@monteathpowys.com.au **monteathpowys.com.au**

PLANNING PROJECT MANAGEMENT SURVEYING 3D SPATIAL

APPENDIX D

MODELLING ASSUMPTION CONFIRMATION FROM TFNSW

Shawn Cen

From: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Sent: Thursday, 16 May 2024 3:22 PM
To: Shawn Cen
Cc: Brian Gibson; Jonathan Busch
Subject: RE: 220064 RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Shawn,

I confirm the 2 assumptions below are to be applied.

Regards,

Masa Kimura
Development Services Case Officer
Regional and Outer Metropolitan
Development Services
Transport for NSW

T 1300 207 783 **M** 0407 707 999 **E** masa.kimura@transport.nsw.gov.au

transport.nsw.gov.au

6 Stewart Avenue, Newcastle NSW 2302
Locked Bag 2030, Newcastle NSW 2302

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Transport for NSW

OFFICIAL

From: Shawn Cen <shawn.cen@sctconsulting.com.au>
Sent: Thursday, May 16, 2024 1:07 PM
To: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>; Jonathan Busch <jonathan.busch@sctconsulting.com.au>
Subject: RE: 220064 RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi Masa,

Thanks for your email.
Can TfNSW confirm the below:

1. 3% p.a. on NEH, plus
2. release from LURA of 300 dwellings per year (based on what SCT Consulting was advised on the 25 Wyndella Road Lochinvar - CPG Estates project modelling assumptions)

Thanks

Shawn Cen
Principal Consultant

shawn.cen@sctconsulting.com.au | 0416 292 374

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060

SCT Consulting

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OFFICIAL

From: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Sent: Thursday, May 16, 2024 10:46 AM
To: Shawn Cen <shawn.cen@sctconsulting.com.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>; Jonathan Busch <jonathan.busch@sctconsulting.com.au>
Subject: RE: 220064 RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi Shawn,

Thanks for our telephone discussion this morning. I confirm that following significant internally discussions, a background growth rate of 3% along the New England Highway is to be applied for this development.

Regards,

Masa Kimura
Development Services Case Officer
Regional and Outer Metropolitan
Development Services
Transport for NSW

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From: Shawn Cen <shawn.cen@sctconsulting.com.au>
Sent: Thursday, May 16, 2024 8:45 AM
To: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>
Subject: RE: 220064 RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi Masa,

Hope you are well.
Wondering if there is any feedback in relation to the growth rate assumptions as shown in the below email?

Thanks

Shawn Cen
Principal Consultant

shawn.cen@sctconsulting.com.au | 0416 292 374
Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060

SCT Consulting

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SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.

OFFICIAL

From: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Sent: Thursday, May 2, 2024 1:48 PM
To: Shawn Cen <shawn.cen@sctconsulting.com.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>
Subject: RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi Shaun,

Thanks for reaching out to TfNSW seeking input towards a traffic assumptions paper.

TfNSW provides the following comments as you progress towards a Traffic Impact Assessment (TIA):

- Council's input must also be sought to this assumptions paper.
- Two (2) intersections along the State Road network are of interest to TfNSW. These are identified as L22 - NEH / Cantwell Road / Station Lane (restricted 4-way intersection) & L26 - NEH / Wyndella Road / Springfield Drive (existing TCS) in Council's Lochinvar S94 Contributions Plan. Modelling scenarios should consider traffic splits between the two intersections based on timing of the connection through CPG land to Wyndella Road. TfNSW notes that Council's DCP identifies the Northern Link Road. A discussion with Council will assist in identifying when this is likely to occur.
- In addition to the 50 / 50 west / east trip distribution along NEH, 70 / 30 west / east should also be provided.
- The use of proposed trip rates of 0.71 AM and 0.78 PM is acceptable. Please remove reference the comment that "the rest of the Lochinvar URA has adopted a 0.66 car trips / dwelling / hour figure" – this is incorrect.
- SIDRA analysis must include a development scenario which provides for the 10 years development horizon (sensitivity) following the anticipated release of all lots.
- Active transport facilities and connections should be considered, noting residential proposed and attractors on other side of NEH including commercial centre and schools.

General comment on background traffic growth has been provided in the scoping report. TfNSW is currently determining a reasonable growth figure with SCT Consulting as part of an adjoining residential subdivision development – 22 Wyndella Road Lochinvar. We hope to provide some direction in the upcoming weeks.

Apologies for the delayed response.

Regards,

Masa Kimura
Development Services Case Officer
Regional and Outer Metropolitan
Development Services
Transport for NSW

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Transport
for NSW

OFFICIAL

From: Shawn Cen <shawn.cen@sctconsulting.com.au>
Sent: Thursday, April 18, 2024 8:11 AM
To: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>
Subject: RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Thank you very much, Masa!

Shawn Cen
Principal Consultant

shawn.cen@sctconsulting.com.au | 0416 292 374

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060

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We pay our respects to Elders past, present and emerging.

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From: Masa Kimura <Masa.Kimura@transport.nsw.gov.au>
Sent: Wednesday, April 17, 2024 3:53 PM
To: Shawn Cen <shawn.cen@sctconsulting.com.au>
Cc: Brian Gibson <Brian.Gibson@maitland.nsw.gov.au>
Subject: RE: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi Shawn,

Thanks for the submission of this Scoping Report.

Your enquiry has been assigned to me due to my background in this URA.

I'm going on leave shortly and will return Mon 29/4 (school holidays). I'll endeavour to have a response for you upon my return.

Regards,

Masa Kimura
Development Services Case Officer
Regional and Outer Metropolitan
Development Services
Transport for NSW

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transport.nsw.gov.au

6 Stewart Avenue, Newcastle NSW 2302
Locked Bag 2030, Newcastle NSW 2302

Working days Monday to Friday, 8:00am – 3:30pm

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for NSW

OFFICIAL

From: Shawn Cen <shawn.cen@sctconsulting.com.au>
Sent: Tuesday, April 16, 2024 10:00 AM
To: Development North <Development.North@transport.nsw.gov.au>
Cc: Holly Taylor <Holly.Taylor2@transport.nsw.gov.au>; Liz Smith <Liz.Smith@transport.nsw.gov.au>; Marg Johnston <Marg.Johnston@transport.nsw.gov.au>
Subject: Proposed Subdivision at 60 New England Hwy Lochinvar - consultation with TfNSW

Hi TfNSW,

I refer to the captioned site seeking TfNSW advice about the proposed staged development and its access.
Please find the attached modelling scoping note we prepared and let us know if there is any issue. Happy to set up a meeting to go through and discuss.

Thanks

Shawn Cen
Principal Consultant

shawn.cen@sctconsulting.com.au | 0416 292 374

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060

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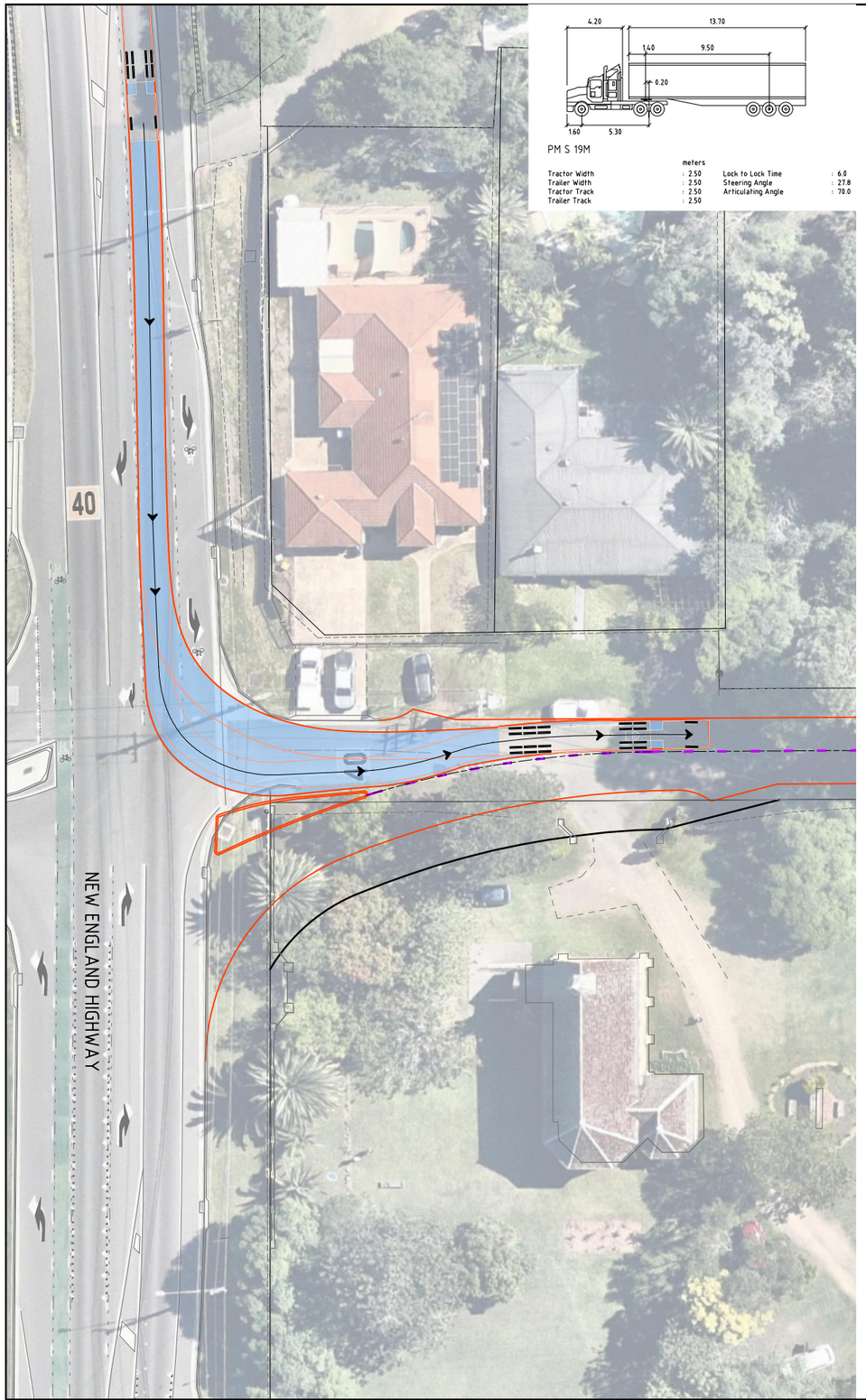
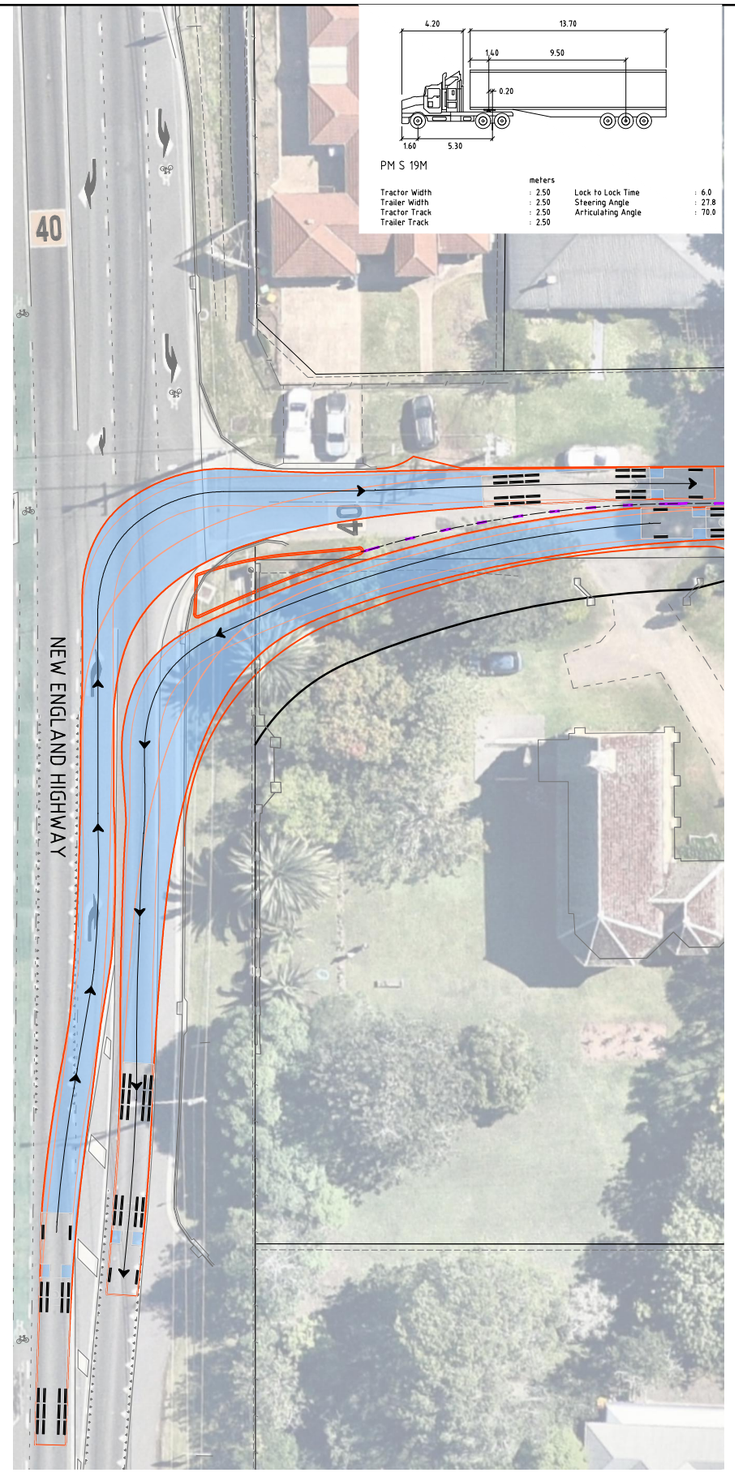
APPENDIX E

SWEPT PATH ANALYSIS



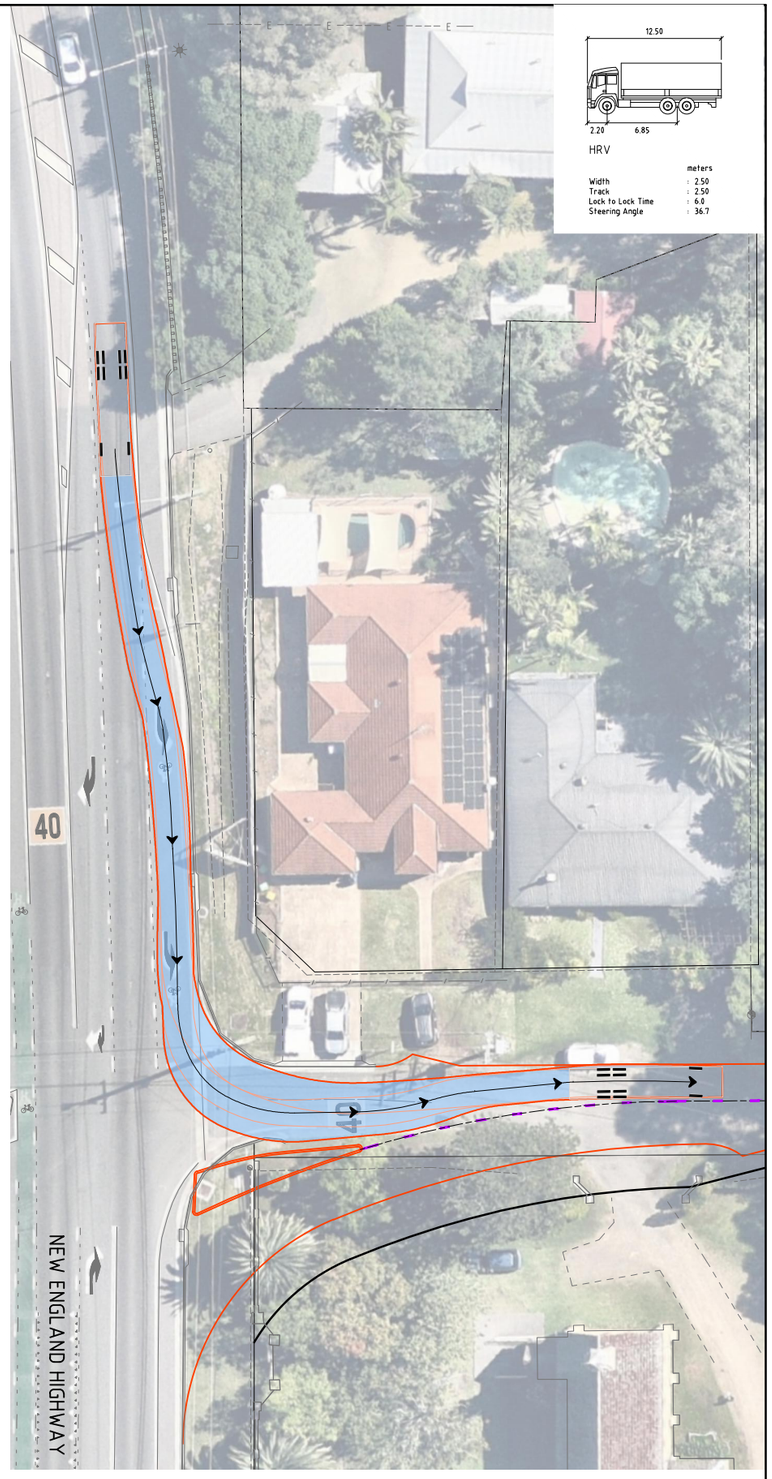
PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		



PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		



HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.7

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REVISION	Description	Drawn	App'd	Date
3	CLIENT COMMENTS	DB	AS	17.12.24
2	NOT ISSUED			
1	NOT ISSUED			

North

Scale
0 5 10 15 20m
1:250 (A1) 1:500 (A3)

Designed: AM
Scale: 1:250
Cad Reference: 23290C dC161 r3
Project Approval: IAN HILL (B.E) Consulting Civil Engineer

Client: Catholic Diocese of Maitland-Newcastle

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PO BOX 3337, THORNTON NSW 2322
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PROPOSED RESIDENTIAL SUBDIVISION
20 & 20A CANTWELL ROAD
LOCHINVAR
NEW ENGLAND HIGHWAY INTERSECTION
TURNING MOVEMENT PLAN

Project No: 23290C
Drawing No: C161
Revision: 3
A1 SHEET

PLOT DATE: 17/12/2024 4:13:51 PM
CAD FILE: Q:\23\23290 60 New England Highway, Lochinvar\02_CAD\AutoCAD\Civil\100 DA Civil\23290C dC161 r3.dwg

Thoughtful Transport Solutions

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