RoadNet

Traffic Impact Study

Proposed Woolworths Development, Tuncurry

for

Projects & Infrastructure

19th May 2011

Document Status	**FINAL**

Task	Responsibility	Signature
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Brian has a degree in Environmental Planning and has qualifications in road design and traffic engineering. He is a member of the Australian Institute of Traffic Planning and Management, the Planning Institute of Australia and is a Lead Road Safety Auditor. Brian worked for the NSW Roads and Traffic Authority for 18 years in environmental planning, design, traffic, and road safety positions and has had 16 years in consulting. He is the Managing Director of RoadNet.

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ADDENDUM

1. OVERVIEW / PURPOSE

In October 2010 RoadNet Pty Ltd was engaged to carry out a Traffic Impact Assessment ("**TIA**") for the proposed Woolworths supermarket development on Peel Street, Tuncurry. The study contains an assessment of the impact of the proposed development within the site and on the nearby road network. Our report was provided as part of the Development Application for the project. RoadNet supports the methodology and findings contained in its TIA dated 14th February 2011. The TIA identifies no traffic related reasons to refuse the Development Application for the Proposal. The purpose of this addendum is to provide additional information, and address concerns raised at the Joint Regional Planning Panel (JRPP).

The TIA was prepared in accordance with the Road and Traffic Authority's (RTA) 'Guide to Traffic Generating Developments', 2002, Version 2.2, and makes reference to appropriate Council Codes and relevant Australian Standards. Information was collected via site inspections, intersection counts and a parking survey. Traffic volumes for Manning Street were also obtained from the RTA Traffic Volumes 2004 publication.

Traffic generation by the Proposal is calculated as 339 vehicle trips during the peak hour. This has minimal impact on surrounding intersections, and only slight increases/impacts as a result of the Proposal. This is distributed to the external road network based on assumed travel paths, and assessed using SIDRA Intersection 5.0, an intersection-modelling program accepted by traffic and Local Government Authorities across Australia and as requested by the RTA.

An assessment of parking provisions was undertaken. Parking requirements for the Proposal are calculated as 115 spaces. As part of the Proposal 129 spaces will be provided (84 off-street and 45 on-street spaces). This is determined as sufficient for the project. The car parking layout was also assessed. We consider it provides adequate and safe circulation, minimising impacts on traffic flows.

Heavy vehicle turn paths were also used to determine the adequacy of the access route for service vehicles to the site. Traffic safety and access issues were discussed with Council and RTA officers prior to the submission of the report.

The service vehicle access route was assessed for adequacy for a 19.0m semi-trailer. It was determined some adjustment is required to the kerb return, along with some property acquisition, at the intersection of South Street and Manning Lane, and to facilitate access to the loading dock from Manning Lane. The TIA states detailed designs need to be completed to determine the extent of the final impacts on the existing infrastructure as well as determining the amount of property acquisition required.

Prior to submission the TIA was subject to RoadNet's current Quality Manual, internal peer review and review by RoadNet's Managing Director. The TIA was then submitted to and accepted by Great Lakes Council and the RTA. Electronic SIDRA files containing the intersection modelling were also submitted to the RTA for review as requested.

This addendum is provided to meet the additional information requested by the JRPP in regard to the following traffic issues:

- **Pedestrian Safety**
  - Impact of the Loading Dock
  - Impact of the Development Generally
- **Impact on Surrounding Road Network**
  - Impact of Heavy Vehicles on Surrounding Road Network

- Heavy Vehicle Turning Paths along the Delivery Route
- Impact on Surrounding Road Network of the Development in General

- **Car Parking**
  - Impact of the Loading Dock
  - Impact of the Development Generally

Assessment of these issues is provided in the following sections and makes reference to the original Traffic Impact Assessment dated 4th February 2011.

2. PEDESTRIAN SAFETY

2.1 Impact of the Loading Dock

All deliveries will be via the dedicated loading dock at the rear of the site and, as such will be completely separate from customer pedestrian activity. Any conflict between pedestrians on either Manning Lane or Peel Street associated with entry and exit will also be minimal due to the anticipated low and infrequent volume of service vehicles accessing the site.

Entry to the service area will be from Manning Lane. Pedestrian activity along its length is minimal. No formal footway is provided in Manning Lane. However this is intended as a service lane providing access to off-street parking and garbage collection. The majority of pedestrian activity in Manning Lane is expected to occur south of the access to the loading dock, crossing Manning Lane through the Dolphin Arcade to Manning Street, and where a footway will be provided as part of the Proposal. On this basis there is expected to minimal conflicts between pedestrians and the access to the loading dock.

Exit from the service area to Peel Street will cross the pedestrian footpath on the eastern side of Peel Street. It is also likely large delivery vehicles will need to encroach onto the footway in Peel Street to accommodate the reversing turn manoeuvre into the loading dock. To minimise the impact to pedestrians crossing the exit dropped kerbs and pedestrian markings will be provided and will be made highly visible to pedestrians.

It is recommended the exit be constructed allowing for adequate sight lines to pedestrians from vehicles exiting. This should be assessed at the detailed design stage. It is also recommended 'Trucks Crossing or Entering' warning signage be erected to warn pedestrians of the possibility of heavy vehicle activity. Heavy vehicles existing onto Peel Street should also be made aware of the possibility of pedestrians crossing the exit by way of 'Pedestrians' warning signage to be erected at the exit from the site.

2.2 Impact of the Development Generally

Existing pedestrian activity and safety as a result of the Proposal was addressed in Sections 7.10 and 10.8 of the original TIA.

The TIA identified high levels of existing pedestrian activity in Manning Street, particularly from the mid-block pedestrian crossing to South Street and at the South Street intersection. Manning Lane also had a significant cross flow of pedestrians from the passageways linking to Manning Street and the existing car park.

The TIA identified that the Proposal is expected to attract some additional pedestrian traffic, particularly from Manning Street via the Dolphin Arcade and via the private walkway beside the Medical Centre. On this basis it was recommended that provision of a marked pedestrian crossing of Manning Lane be considered. This would improve safety for pedestrians crossing Manning Lane alerting drivers of pedestrian activity.

The Proposal will provide a paved footpath, clear of the parking area, across the front of the building in Peel Street and Kent Street as well as down the side of the complex in Manning Lane. A defined pedestrian path will also be provided within the car park to the main doorway of the complex. These pathways will provide adequate routes in and around the site minimising conflicts between pedestrians and vehicles.

These provisions are considered adequate to provide safe and efficient access in and around the site for pedestrians.

3.0 IMPACT ON SURROUNDING ROAD NETWORK

3.1 Impact of Heavy Vehicles on Surrounding Road Network

The impact of heavy vehicles on the surrounding road network has been considered. Any impacts are expected to be minimal. Shopping centres do not typically generate high volumes of heavy vehicles with articulated heavy vehicle generation associated with the proposal expected to be 5 per day.

Heavy vehicle generation associated with deliveries are also expected to occur outside the peak generating times of the Proposal and peak times of the external road network. As per RTA's Guide to Traffic Generating Developments, the SIDRA intersection modelling for the Proposal was undertaken for the PM peak hour. This was done to determine the operation of external intersections during the peak traffic generating times of the Proposal and when the external traffic volumes are highest. As heavy vehicle movements associated with deliveries are expected to occur outside the peak hour periods these have not been quantified separately in the PM peak hour modelling. Traffic growth between 2010 and 2020 which was included in the modelling is expected to account for any additional heavy vehicles which may occur during the peak hours.

Even if quantified separately and included in the PM peak hour modelling, the low volumes would not have any noticeable impact on the operation of external intersections and would not change the modelling results.

Outside the peak hours, when deliveries by heavy vehicles are expected to occur, traffic generated by the Proposal and external traffic volumes will be lower. Heavy vehicles generated during these times are expected to be easily accommodated on the external road network without any noticeable impact on the operation of intersections in the vicinity. Intersection modelling outside the peak hours was therefore not considered necessary.

Therefore, as the expected deliveries are expected to occur outside the prescribed intersection modelling times and heavy vehicle generation is expected to be low, assessment of additional heavy vehicles by way of natural traffic growth is considered sufficient and it is not considered necessary quantify these separately in the intersection modelling.

3.2 Heavy Vehicle Turning Paths along the Delivery Route

Access to the loading dock by heavy vehicles will be via Manning Street, South Street, Manning Lane and into the loading dock via right turns in from Manning Lane. Exit from the loading dock will be via right turns out onto Peel Street, South Street and Manning Street.

The adequacy of Manning Lane and the loading dock was assessed in Sections 10.6.2 and 10.6.3 of the TIA.

Assessment of the route was undertaken using Autoturn swept turn path software to determine any impacts on the existing infrastructure based on a 19m long semi-trailer design vehicle.

As previously discussed heavy vehicle generation by the Proposal is expected to be low and is expected to occur outside the peak hours when external traffic volumes will be lower. On this

basis heavy vehicles are expected to be easily accommodated on the external road network without any noticeable impact on the operation of intersections in the vicinity.

3.2.1 Manning Street to South Street

The intersection is designed for and currently accommodates existing heavy vehicles. The swept paths of the design vehicle for left and right turns into South Street from Manning Street can be accommodated within the intersection without the need for road works or adjustments to the kerb returns.

3.2.2 South Street to Manning Lane

Assessment of the left turn into Manning Lane from South Street in the TIA found adjustment to the kerb return would be required along with some property acquisition at the south eastern corner of the intersection to accommodate the turn path of the design vehicle, however would be subject to further assessment and detailed design. Reassessment by Great Lakes Council shows the swept path can be accommodated by adjustments to the kerb return without the need for land acquisition.

RoadNet accepts this assessment however notes the manoeuvre will be tight and recommends investigation be made to also make adjustments to the western kerb return to provide additional space. Particular attention should be made to accommodate the swept path of the design vehicle at the detailed design phase.

3.2.3 Manning Lane to Loading Dock

Assessment of the right turn into the loading dock from Manning Lane in the TIA found heavy vehicles will be able to be accommodated without the need for land acquisition or adjustments to the proposed plans.

3.2.4 Loading Dock to Peel Street

Assessment by Great Lakes Council shows adjustments to the kerb return of the north eastern corner of the exit will need to be made to accommodate the swept paths of the design vehicle making right turns onto Peel Street. RoadNet agrees with this assessment and concurs adjustments to the design kerb return will be required to ensure adequate space is available without the need to adjust parking in the area.

3.2.5 Peel Street to South Street

Assessment by Great Lakes Council shows the swept paths of the design vehicle making right turns out of Peel Street onto South Street can be accommodated within the intersection without the need for road works, adjustments to kerb returns or loss of parking at the intersection.

RoadNet considers Council's assessment to be adequate however notes the design vehicle's swept path will encroach into the opposing travel lane in Peel Street and South Street. As discussed, the movement of these vehicles will be outside of the peak hours when traffic volumes are low and conflicts between vehicles at the intersection is expected to be minimal.

3.2.6 South Street to Manning Street

The intersection is designed for and currently accommodates existing heavy vehicles. The swept paths of the design vehicle for left and right turns out of South Street to Manning Street can be accommodated within the intersection without the need for road works or adjustments to the kerb returns.

3.3 Impact on Surrounding Road Network of the Development in General

Figure 10 of the original TIA shows the traffic assignment of the additional 339 trips associated with the Proposal. This shows the number of additional arrivals and departures at intersections in the vicinity of the site during the peak generating time of the development. The impact of this additional traffic on the surrounding road network was addressed in Section 10 of the TIA.

The additional traffic generated by the Proposal is expected to have a minimal impact on the intersections in the vicinity of the site in terms of LOS, delay and queuing as discussed in Section 10 and shown in the modelling results in Appendix C of the TIA.

3.3.1 Manning Street and South Street

The intersection was assessed in Section 10.2 of the TIA. The modelling found the intersection operates at a LOS 'C' with some individual movements operating at LOS 'D' and are the current operation of the intersection. By 2020, without additional traffic from the proposal, there will be slight increases in delays however the intersection will continue to operate at LOS 'C'.

There will be minor changes to delays and queuing as a result of the additional traffic associated with the Proposal, with some movements experiencing an increase in delays of up to 4 seconds and some movements experiencing a decrease in delays of around 1 second. These changes in delays are minimal and do not significantly affect the operation of the intersection.

The additional traffic from the Proposal is expected to increase queuing distance in South Street by approximately 20m and in Beach Street by approximately 10m. Queuing for right turning traffic from Manning Street into South Street is also expected to increase by approximately 20m. The modelling shows this additional queuing can be accommodated within the intersection.

3.3.2 South Street and Peel Street

This intersection was assessed in Section 10.3 of the TIA. The modelling found that all movements at the Peel Street and South Street intersection currently operate at a LOS 'A' with average delays of 2.2 seconds and a maximum delay for right turning traffic out of Peel Street of 8.6 seconds.

Although this intersection is on the main route for traffic accessing the supermarket, the additional traffic is not considered to adversely affect safety or create long delays for turning traffic. Modelling found the intersection will continue to operate at a LOS 'A' with average delays increased to 5.1 seconds and a maximum delay for right turning traffic out of Peel Street increased to 11.7 seconds as a result of the additional traffic from the Proposal.

As a result of the Proposal queuing in Peel Street is expected to increase by approximately 15m and very minor increase to queuing in South Street. The modelling shows this can be accommodated in the intersection and is not expected to any impact on parking, property access or adjacent intersections.

3.3.3 Manning Street and Kent Street

This intersection was assessed in Section 10.4 of the TIA. It was found the intersection currently operates with long delays to turning traffic due to high volumes in Manning Street.

It was determined a roundabout treatment would aid turning movements at the intersection and would decrease delays. However, this would also restrict flow on Manning Street and RTA requested the intersection be restricted to left turns only to maintain flow. Modelling of this configuration found acceptable delays for turning traffic and greatly reduced queuing. On this basis the restriction of left turns only at the intersection was recommended as part of the Proposal.

The TIA also considered the affect of the redistribution of existing right turning traffic if the intersection was restricted to left turns only. It was determined this traffic would be redirected to

intersections north and south on Manning Street. Due to the low volumes this traffic is expected to be easily accommodated.

3.3.4 Kent and Peel Street

This intersection was assessed in Section 10.5 of the TIA. The modelling found all movements at the Peel Street and Kent Street intersection currently operate at a LOS 'A' with average delays of 4.5 seconds and a maximum delay for right turning traffic of 7.2 seconds. With the proposed development at 2020 the intersection will continue to operate at a LOS 'A' with average delays of 5.4 seconds and a maximum delay for right turning traffic of 7.4 seconds.

The modelling also shows minimal queuing, without any major increases associated with additional traffic generated by the Proposal.

4. CAR PARKING

4.1 Impact of the Loading Dock

The loading dock is not expected to impact on parking or access to the parking area. Servicing of the site will be via a dedicated service area including the loading dock at the rear of the site, completely separate from any customer parking. All delivery and service vehicles, including semi-trailers, garbage trucks, and small utes and vans, will be via this service area. No delivery or service vehicles will be permitted to access the site through the front of the store via the customer parking area.

Access will be made from Manning Lane and exit will be to Peel Street. Entry and exit to the service area will be separate from any access to the customer parking area and there is not expected to be any conflicts between service vehicles manoeuvres and customer parking.

No on-street parking is expected to be lost along the service vehicle route to and from the site as a result of heavy vehicle turning manoeuvres or anticipated kerb works apart from 2-3 spaces at the exit from the service area to Peel Street. It is considered there will be sufficient on-street and off-street parking available to accommodate the loss of these spaces.

4.2 Impact of the Development Generally

Car parking requirements and the impact of the required car parking was assessed in section 8.0 of the TIA. It was determined the proposed provision of off-street and on-street parking would be sufficient for the Proposal without any impact to the on-street parking provision in the vicinity based on demand.

Parking requirements for the Proposal was calculated as 115 spaces. As part of the Proposal 129 spaces, made up of 84 off-street spaces and 45 on-street spaces, are proposed. This is considered more than adequate to accommodate the parking requirements of the Proposal.

The Proposal requires use of the existing off-street parking area between Manning Lane and South Street. RoadNet conducted a parking survey to determine the existing parking demand in the vicinity of the site and determine the impact of the loss of parking.

The survey revealed that the existing off-street car parking area was under-utilised, with a maximum utilisation of 75% between the hours of 11am and 2.30pm. The on-street parking in the vicinity was also noted as being readily available and underutilised throughout the day.

Based on the parking survey the existing on-street parking and proposed on-street and off-street parking is expected to accommodate the existing parking demand and requirements of the Proposal.

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1. INTRODUCTION

RoadNet Pty Ltd has been engaged to carry out a traffic study for a proposed Woolworths supermarket development on Peel Street, Tuncurry.

The study contains an assessment of the impact of the proposed development within the site and on the nearby road network. This report will support a Development Application for the project.

Appendix A contains plans of the proposed development and this traffic study is based on these plans.

2. THE PROPOSAL

The proposal is for the development of a Woolworths supermarket, including a small liquor store, and car park on an area containing an existing car park and three housing sites. Details of the proposal are shown below:

1. Supermarket — 3,087m² Gross Floor Area (GFA),
2. Specialty Retail (Supermarket Liquor Store) — 153m² GFA, and
3. Parking — 84 off-street parking spaces (including 4 designated disabled spaces), and 45 on-street parking spaces adjacent to the proposal.

Entry/Egress for the development will be via a main access point in Peel Street with an entry only point from Manning Lane.

Supermarket servicing will be via a loading dock area with entry located off Manning Lane and exit via Peel Street.

Waste collection, which would usually occur outside of normal trading hours, will be by way of waste skip bins serviced from the loading dock area.

3. STUDY METHODOLOGY

This traffic assessment has been prepared in accordance with the RTA's 'Guide to Traffic Generating Developments', 2002, Version 2.2, and makes reference to appropriate Council Codes and relevant Australian Standards.

The study makes an assessment of the impact of the proposed development on the nearby road network. The site has been inspected and details of road and traffic characteristics collected for use in the traffic and safety analysis. Traffic volumes for Manning Street, Main Road 111, have been obtained from the RTA Traffic Volumes 2004 publication.

RoadNet has also carried out intersection counts for a typical day and has added traffic that would be generated by the proposal.

Using these volumes, intersections have been assessed and any required upgrades have been checked using Austroads Guidelines.

Traffic safety and access issues have been discussed with Council and RTA officers.

4. CONSULTATION

Great Lakes Council had sought comments from the RTA as part of the developments planning proposal with respect to public authority consultation. The RTA's Manager for Land Use Development (Hunter Region) Mr David Young, in letters dated 16 September 2010, and 14 January 2011, provided the following comments for future traffic assessment requirements:

- Identify all relevant vehicular traffic routes and intersections for access to and from the subject area.
- Current traffic counts for all of the above traffic routes and intersections.
- The anticipated additional vehicular traffic generated from the proposed development.
- Consideration of the traffic impacts on the existing intersections and the capacity to safely and efficiently cater for the additional vehicular traffic generated.
- Any other impacts on the State road network including consideration of pedestrian, cyclist and public transport facilities and provision for service vehicles.
- Traffic analysis including:
  - i) Current traffic counts and 10 year traffic growth projections,
  - ii) With and without development scenarios considered,
  - iii) 95th percentile back of queue lengths,
  - iv) Delays and level of service on all legs for the relevant intersections,
  - v) Use of SIDRA or similar traffic model, and
  - vi) Electronic input/output data files for RTA review
- RTA would prefer movements at the intersection of Manning Street and Kent Street be restricted to left turns only.

The above requirements have been incorporated into this traffic impact assessment.

Discussions on the proposal were also held with Council's Traffic Engineer Wade Holmes regarding heavy vehicle access into Manning Lane and the general car parking arrangement for the development.

RoadNet has also provided design review comments for the on-street and off-street parking requirements, along with necessary adjustments to the kerb alignment in Manning Lane for heavy vehicle access, to the project architect.

5. LOCATION

The site is located on Peel Street at the corner with Kent Street, in the village of Tuncurry. Access is also available to the east of the site via Manning Lane.

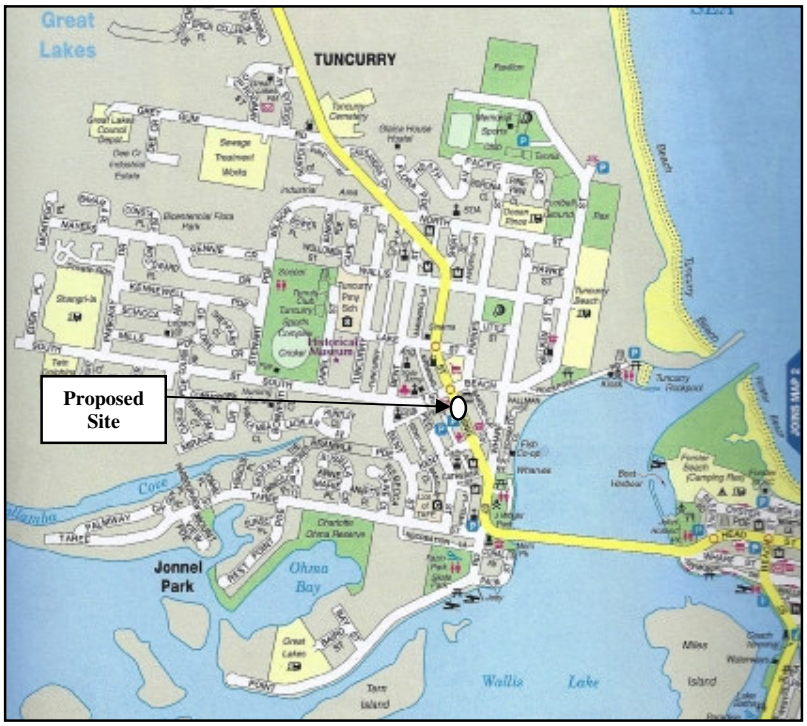


Figure 1: – Locality Plan.

Figure 2: - Aerial View.

6. PLANNING ISSUES

The land proposed for use is being re-zoned to accommodate such development.

7. EXISTING TRAFFIC CONDITIONS

7.1. General

The site is located on Peel Street, north of Kent Street and incorporates a vacant block, four residential style buildings and an existing car park. Manning Lane is the eastern boundary and also services the buildings fronting Manning Street. Both Kent Street and Peel Street frontages have been designated for 90º angle parking.

Photo 1: - Vacant block north of existing car park.

Photo 2: - Existing car park, looking south west from Manning Lane.

The existing car park currently has two accesses:

- one entry and exit on the eastern side from Manning Lane, and
- one entry and exit on the western side from Peel Street.

Parking and manoeuvring in the existing carpark is erratic and unregimented, with parking spaces not fully line marked, merely spotted for future line marking. Pedestrian movements through the parking area cause concern and present a real safety issue.

Photo 3: - Existing car park, looking north east from Peel St.

7.2. Peel Street

Peel Street is a two-way, two-lane road, running north-south between South Street and Kent Street. The road formation is approximately 11m wide with kerb and gutter on both sides. A paved footpath runs beside a grassed verge on the eastern footway just south of South Street for the first building block and also on the western side south for two building blocks from Bent Lane. The grassed footway continues down the street being 10m wide. Parking is parallel and generally unrestricted.

The roadway is level and straight. Sight lines at the street junctions are good in both directions.

Photo 4: - Peel St., from South St. looking south

Photo 5: - Peel St., from Kent St. looking north.

Photo 6: - Peel St. looking north from the existing car park exit.

A bus stop exists on the eastern side of Peel Street, just north of the existing car park exit. It is proposed to relocate this bus stop to the south, clear of the proposed entry/exit.

7.3. Kent Street

Kent Street is a two-way, two-lane road, running east west between Manning Street and Bent Street. The road formation is approximately 11m wide with kerb and gutter on both sides. A paved footpath runs beside a grassed verge on the both footways west of Manning Street to Peel Street and on the southern side west from Peel Street. The footways are 10m wide. Parking is parallel and unrestricted. The roadway is straight and slopes slightly downhill, westward from Manning Lane. Sight lines at the street junctions are good in both directions.

Photo 7: - Kent St. looking west from Manning St.

Photo 8: - Kent St. looking east from Peel St.

Photo 9: - Kent St. looking east from Manning Lane.

7.4. Manning Lane

Manning Lane is a one-way 5m wide service lane running north/south from South Street to Kent Street, with kerb and gutter on both sides. The footway is 2m wide on each side but generally unformed. The lane provides access to those properties fronting Manning Street, access to the existing car park and limited 45º angle parking adjacent to the block of flats in Peel Street. 'No Stopping' signs prohibit parking along the remainder of the lane. 'Give Way' signs control access onto Kent Street at the southern end.

Photo 10: - Manning Lane looking south from South St.

Photo 11: - Manning Lane looking south from Bent Lane.

Photo 11: - Manning Lane looking north from behind the flats.

Photo 12: - Manning Lane looking north from behind the flats.

Two private walkways link Manning Lane through to Manning Street, one at the Medical Centre and the second at Dolphin Arcade.

Photo 13: - Manning Lane looking east through the Medical Centre to Manning St.

Photo 14: - Manning Lane looking east through Dolphin Arcade.

Photo 15: - Manning Lane looking south to Kent St.

Photo 16: - Manning Lane looking south from Kent St.

7.5. Manning Street

Manning Street, which also forms part of the Lakes Way or Main Road 111 (MR111), is the major collector road carrying traffic from the Pacific Highway through Tuncurry into the Forster CBD. The road is a two-way, four-lane median-divided carriageway, with a dedicated parking lane provided on both sides. Kerb and gutter exists on both sides and a paved footpath runs beside a grassed verge on both sides of the roadway. The median is kerbed and landscaped, of varying width, with a turn bays for vehicles turning right into and out of South Street. The South Street intersection is controlled by traffic lights.

Photo 17: - Manning St. looking south from South St.

Photo 18: - South St looking west from Manning St.

At Kent Street 'Give Way' signs control access onto Manning Street. Council have indicated plans to convert this intersection to a roundabout. However, Manning Street has since become a classified (State) road under the control of the RTA. The RTA have indicated they would prefer this intersection be restricted to left turns only. Assessment of traffic impacts from the proposal has assumed the intersection would be restricted to left turns only.

Photo 19: - Manning St looking north from Kent St.

Photo 20: - Manning St looking south from Kent St.

Parking is restricted with various limits and signage along the street on both sides.

A traffic light controlled pedestrian crossing is provided 73m north of Kent Street, adjacent to Dolphin Arcade.

Photo 21: - Manning from Kent St towards the pedestrian crossing.

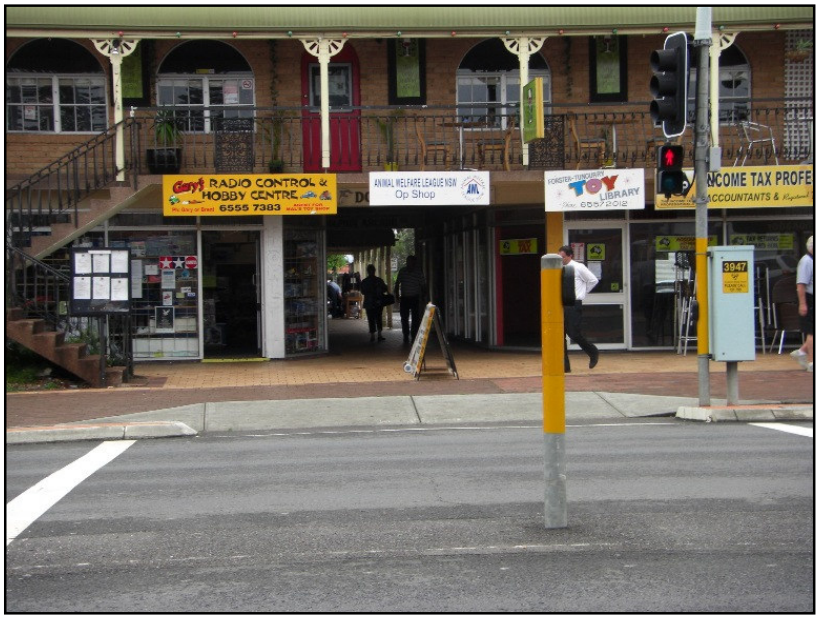


Photo 22: - Pedestrian lights adjacent to Dolphin Arcade.

7.6. South Street

South Street is a major two-way, two-lane road running east west between Manning Street and the Bent Street. The road formation is approximately 11m wide with kerb and gutter on both sides. A paved footpath runs beside a grassed verge on both sides of the roadway. Parking is parallel where permitted.

Photo 23: - South St from Manning St.

Photo 24: - South St looking east from Peel St.

7.7. Traffic Volumes

The following table contains an extract from the RTA's Traffic Volume Data 2004 publication:

STATION	LOCATION	MAP	Km	1980 AADT	1982 AADT	1984 AADT	1986 AADT	1988 AADT	1990 AADT	1992 AADT	1995 AADT	1998 AADT	2001 AADT	2004 AADT
09.928	E OF SH10,PACIFIC HWY	39	87.6	930	--	--	1391	--	1476	--	1622	1647	1277	1169
09.927	BUNGWAHL-1.6KM W OF P.O.	39	62.8	1020	--	--	1400	--	--	--	--	--	--	--
09.926	BUNGWAHL-3.2KM N OF P.O.,MINNOW ST	39	58.0	880	--	--	1452	--	1593	--	--	--	--	--
09.925	WALLIS LAKE-9.7KM S OF FORSTER P.O.	39	30.3	1850	--	--	2720	--	--	--	3018	4046	2765	4245
09.924	FORSTER-0.3KM S OF ANGEL CL	39	20.9	5650	--	--	5771	--	--	--	--	--	--	--
V09.923	FORSTER-AT WALLIS LAKE BR	32	20.6	11220	--	--	13025*	14985*	17192*	--	17970V	19124V	20278V	21991V
09.405	TUNCURRY-0.2KM N OF CHAPMANS RD	32	18.8	--	6310	--	6750	--	8750	--	--	11503	9800	11214

Table 1: - Historic Traffic Volumes on The Lakes Way.

The location closest to the development is 09.923 Forster – at Wallis Lake Bridge, approximately 660m south of Kent Street. Average daily traffic volumes of 21,991 are shown in 2004, having increased from 17,970 in 1995.

Note that the Figures in Table 1 are passenger car equivalents.

RoadNet also undertook traffic counts on Thursday 2nd December 2010, for the am and pm peaks, as shown below. Full results are contained in Appendix B.

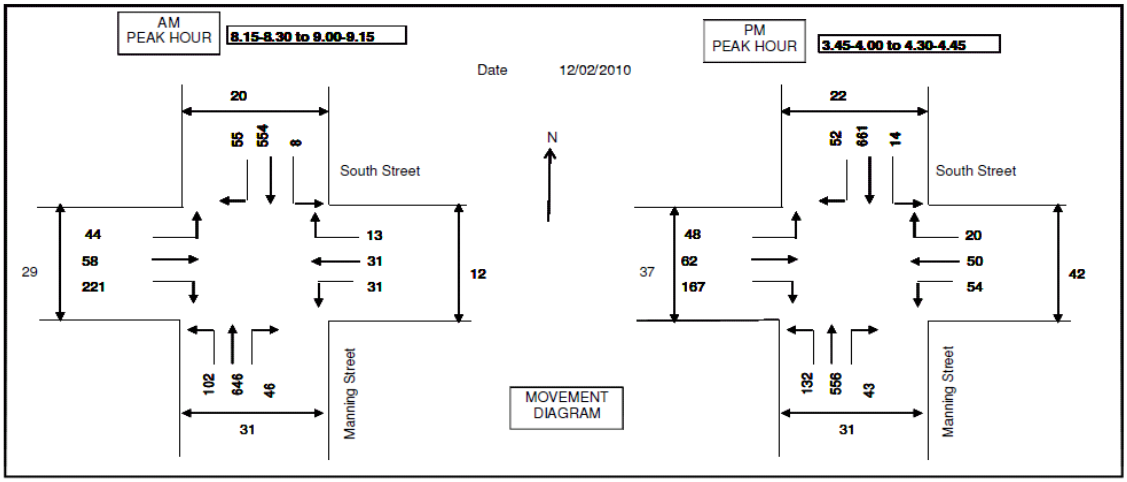


Figure 3: - Intersection counts Manning St & South St.

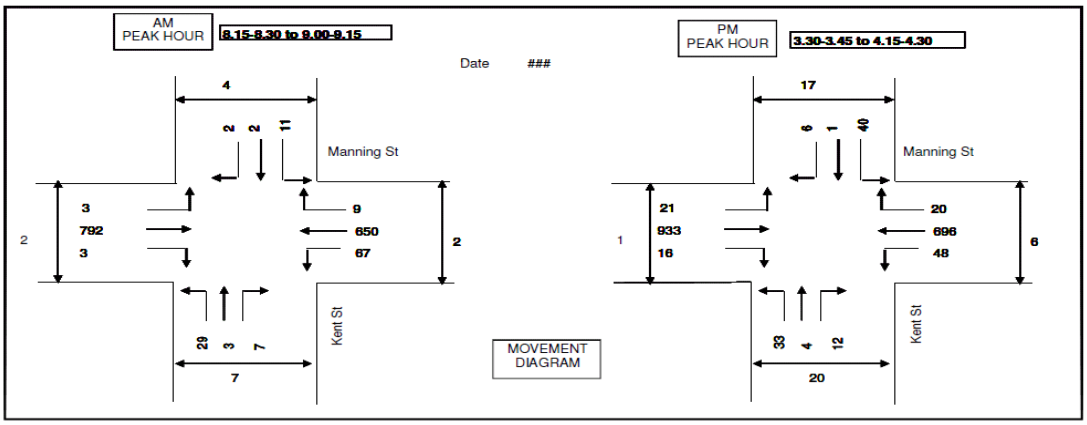


Figure 4: - Intersection counts Manning St & Kent St.

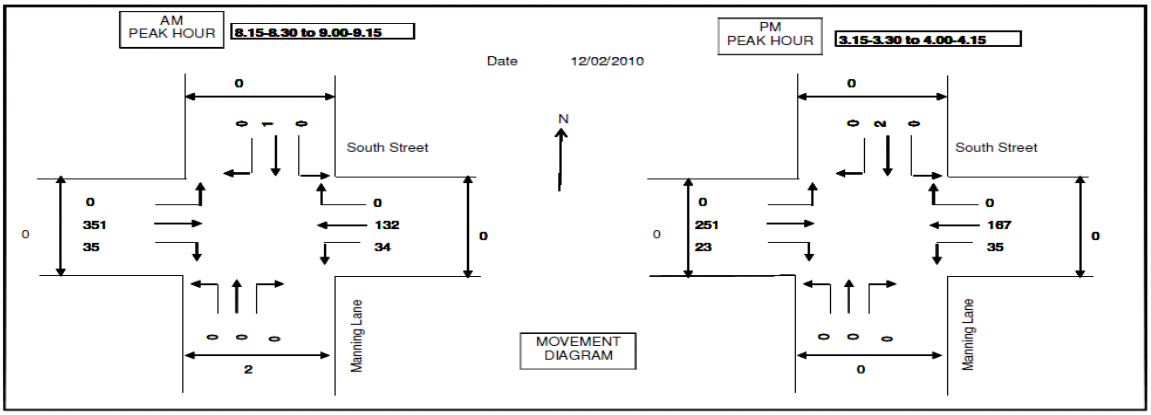


Figure 5: - Intersection counts South St & Manning Lane.

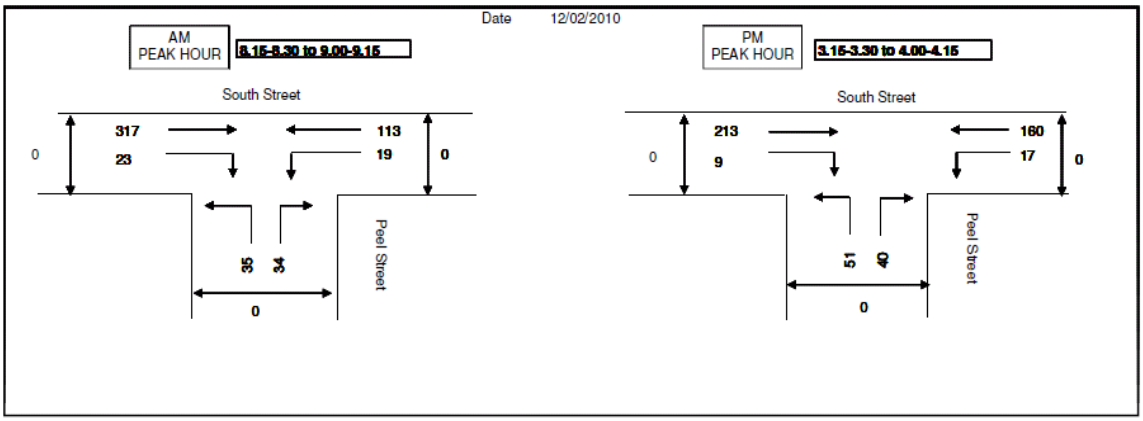


Figure 6: - Intersection counts South St & Peel St.

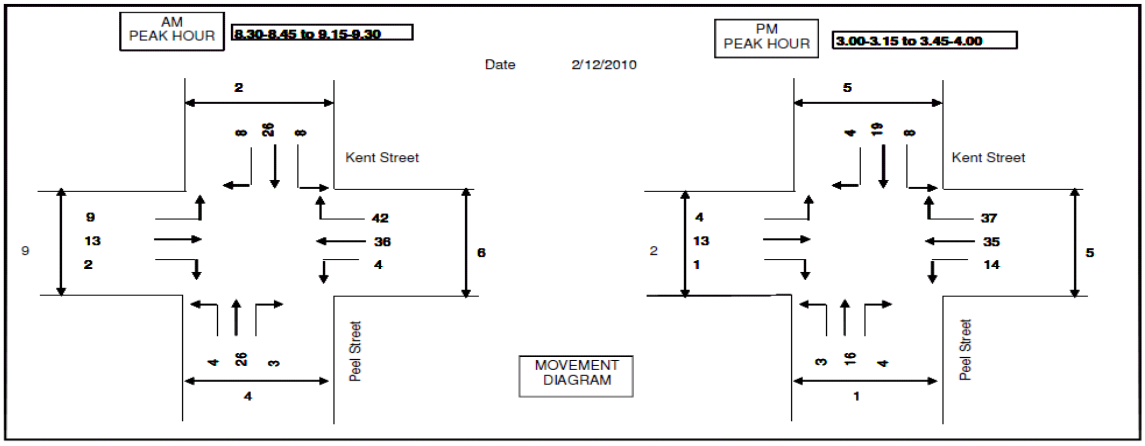


Figure 7: - Intersection counts Peel St & Kent St.

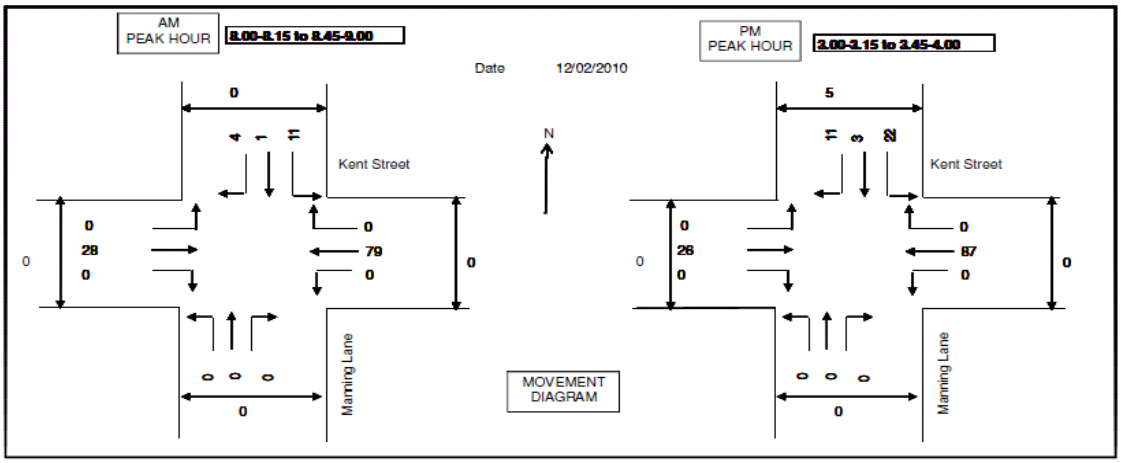


Figure 8: - Intersection counts Kent St & Manning Lane.

Peak hour volumes, in urban areas, usually fall between 8 and 12% of daily flow. A value of 10% is usually adopted as a 'rule of thumb'. In this instance daily traffic volumes for 2010 are assessed as:

Street	vpd
Manning	18,250
South	5,410
Peel	1,320
Kent	1,460
Manning Lane	690

Table 2: - Daily traffic volumes (vpd).

The figure for The Lakes Way is the correct order of magnitude, but appears high. A figure of 18,250vpd at Manning Street has been counted and, therefore, assessed as a more appropriate determination to be used in this report for the 2010 figure.

7.8. Traffic Growth

Population details, obtained from Council's website indicate an estimated residential population in 2009 of 35,487, with a growth rate of 1.37% over the previous year. Traffic growth is expected to reflect the general growth rate in the area and a conservative figure of 1.5% linear per annum has been adopted for this report. A conservative approach relates traffic growth to a firm numerical basis and makes reasonable allowance for growth that is unlikely to be exceeded.

In the year 2020;

- the ADT on Manning Street at Kent Street is estimated to be 20,990
- the ADT on South Street is projected to be 6,222
- the ADT on Peel Street is projected to be 1,518
- the ADT on Kent Street is projected to be 1,482, and
- the ADT on Manning Lane is projected to be 794.

7.9. Travel Speeds

The posted speed on all streets around the proposed development is 50kph.

7.10. Pedestrians & Cyclists

High levels of pedestrian activity were noted in Manning Street, particularly from the mid-block pedestrian crossing to South Street and at the South Street intersection. Manning Lane had a significant cross flow of pedestrians from the passageways linking to Manning Street and the existing car park.

No bicycle traffic was witnessed during the inspection, although adequate provision is made by way of the designated bike lane in Manning Street.

8. PARKING ASSESSMENT

8.1. Parking Requirements

Council's Car Parking Policy requires 1 parking space per 20m² Gross Leaseable Floor Area (GLFA).

Therefore the GLFA for the supermarket has been calculated using the definition of GLFA from the RTA's 'Guide to Traffic Generating Developments', 2002, Version 2.2. This definition is as follows:

"The sum of the area of each floor of a building where the area of each floor is taken to be the area within the internal faces of the walls, excluding stairs, amenities, lifts, corridors and other public areas but including stock storage areas."

As per this statement, the GLFA for the supermarket has been measured as 2,292m². This includes the selling area, liquor store (151m²), stock areas, food preparation areas and mezzanine offices. Areas not included in the GLFA are the storefront corridor in the selling area (200m²), loading zone, stair cases, stock area corridors, mezzanine corridors, plant areas, toilets, change rooms, and staff areas.

The RTA's 'Guide to Traffic Generating Developments', 2002, Version 2.2 also states that:

"As a general guide, 100m² gross floor area equals 75m² gross leasable floor area".

Appling this to the GFA of the supermarket equates to a GLFA of 2,315m2, which is comparable to the measured GLFA of 2,292m². For the purposes of analysis the measured GLFA of 2,292m² will be used.

Therefore the parking spaces required for the development is calculated as:

Required parking - 2,292m² / 20 = 114.6 say **115** spaces.

The submitted plans indicate **129** total car spaces will be provided. This will be made up of 84 off-street spaces and 45 on-street spaces.

8.2. Parking Survey

RoadNet conducted a parking survey to determine the existing parking demand in the vicinity of the proposed development. The separate zones surveyed are shown below.

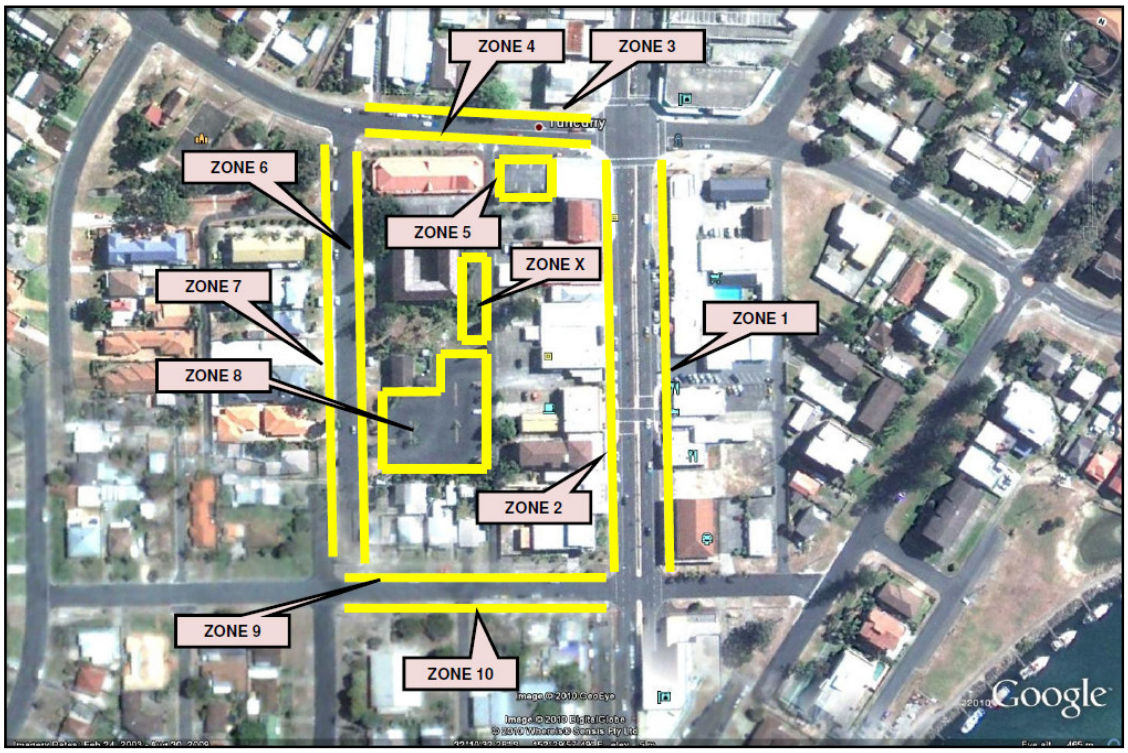


Figure 9: - Car Parking Zones.

The results of the car parking survey are shown in tabular form below.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone X		Total
Actual Spaces					**15**			**58**					
8.00 - 8.15	2	6	2	0	3	2	2	7	1	3	7		35
8.15 - 8.30	3	10	2	0	3	2	2	9	2	3	11		47
8.30 - 8.45	3	8	2	3	4	2	3	19	2	4	22		72
8.45 - 9.00	7	11	1	3	10	3	3	25	2	4	20		89
9.00 - 9.15	6	12	2	5	13	4	2	31	3	5	21		104
9.15 - 9.30	8	13											
9.30 - 9.45	9	8	7	2	11	2	4	33	3	6	19		104
9.45 - 10.00	9	12	5	6	14	2	4	32	3	6	18		111
10.00 - 10.15	14	15	3	8	10	4	3	42	2	4	21		126
10.15 - 10.30	16	10	5	7	11	4	2	41	2	4	25		127
10.30 - 10.45	11	13	4	6	14	4	3	42	3	5	24		129
10.45 - 11.00	10	14	4	5	10	3	1	39	4	6	23		119
11.00 - 11.15	13	9	4	4	12	2	6	43	3	6	27		129
11.15 - 11.30	8	16	5	3	11	3	5	39	3	8	31		132
11.30 - 11.45	8	16	3	4	7	5	6	41	4	7	32		133
11.45 - 12.00	9	17	4	4	9	5	5	36	4	5	31		129
12.00 - 12.15	11	11	2	4	14	5	4	39	5	4	28		127
12.15 - 12.30	13	14	4	5	10	3	5	44	4	4	26		132
12.30 - 12.45	12	16	3	4	6	2	4	38	4	4	27		120
12.45 - 1.00	8	15	4	7	8	2	5	41	3	4	25		122
1.00 - 1.15	13	13	4	7	6	3	4	37	3	4	30		124
1.15 - 1.30	5	13	4	6	9	3	4	34	4	4	26		112
1.30 - 1.45	7	11	4	5	8	4	3	32	4	3	29		110
1.45 - 2.00	11	16	3	6	4	4	3	32	4	4	33		120
2.00 - 2.15	7	17	4	3	5	3	3	39	5	5	24		115
2.15 - 2.30	6	15	6	5	10	4	5	44	4	5	26		130
2.30 - 2.45	7	14	4	5	8	3	4	36	3	5	23		112
2.45 - 3.00	4	14	2	4	11	3	5	37	4	5	22		111
3.00 - 3.15	5	16	2	5	8	3	4	31	4	6	24		108
3.15 - 3.30	7	12	2	4	12	2	4	29	4	4	24		104
3.30 - 3.45	8	16	3	3	9	2	3	24	4	3	20		95
3.45 - 4.00	12	9	3	5	13	0	3	23	4	3	21		96
4.00 - 4.15	12	11	4	4	7	0	4	26	4	2	20		94
4.15 - 4.30	8	12	3	0	6	1	3	22	3	2	22		82
4.30 - 4.45	7	9	4	5	6	0	3	24	3	2	22		85
4.45 - 5.00	7	12	3	4	7	0	1	21	4	2	22		83
Max 15 min	**16**	**17**	**7**	**8**	**14**	**5**	**6**	**44**	**5**	**8**	**33**		

Table 3: - Current Parking Demand

The survey revealed that the existing off-street car parking was under-utilised, with a maximum utilisation of 75% between the hours of 11am and 2.30pm. On-street parking was also noted as being readily available and underutilised throughout the day.

Based on this information, the 129 off-street and on-street parking to be provided is considered adequate for the proposal.

9. TRAFFIC GENERATION

9.1. Traffic Generation

Traffic generation rates for shopping centres contained in the RTA's 'Guide to Traffic Generating Developments', 2002, Version 2.2, recommends a prediction method using both divided floor area categories and total floor area ranges to determine a formula for Thursday peak hour vehicle trips per 1,000m² as below:

Thursday Peak Hour = 20A(S) + 51A(F) + 155A(SM) + 46A(SS) + 22A(OM).

where A(S) = Slow Trade GLFA - includes major department stores such as David Jones and Grace Brothers, furniture, electrical and whitegoods stores,

A(F) = Faster Trade GLFA – includes discount department stores such as K-Mart and Target, together with larger specialist stores such as Fosseys,

A(SM) = Supermarket GLFA – includes stores such as Franklins and large fruit markets,

A(SS) = Speciality shops, secondary retail GLFA – includes speciality shops and take-away stores. These stores are grouped, as they tend to not be primary attractors to the centre.

A(OM) = Office, medical GLFA – includes medical centres and general business offices.

As stated, the proposed GLFA has been measured as 2,292m broken up between the supermarket and liquor store:

Supermarket	2,141m²
Specialty Retail (liquor store)	151m²
Total	2,292m²

Therefore, the Thursday peak hour traffic generation is calculated as:

= (0+0+(155 x 2141) + (46 x 151) + 0)/1000

= (331855 + 6946)/1000

= 338801/1000

= 338.8 say **339** vph

9.2. Traffic Assignment

An estimation of the origin of the 339 trips to and from the proposed development, assigned on the basis of existing traffic patterns, is shown in the figure below.

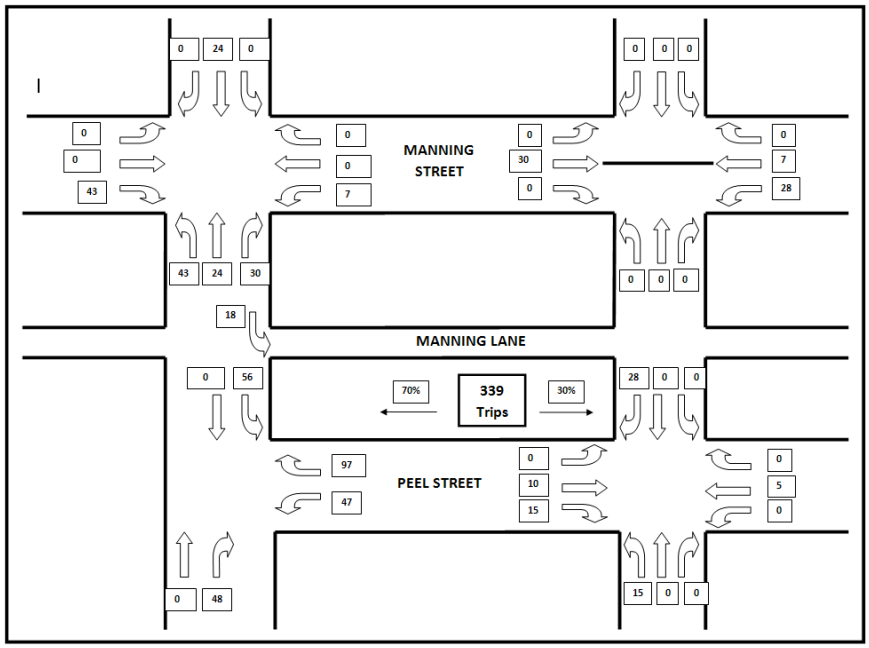


Figure 10: - Traffic Assignment from the Proposed Development.

The following figure shows volumes at 2020. This includes the 339 new trips generated by the proposal and the 1.5% per annum linear traffic growth rate. Traffic distribution has also been adjusted based on the assumption that the Manning Street and Kent Street intersection will be restricted to left turns only as per the RTA request.

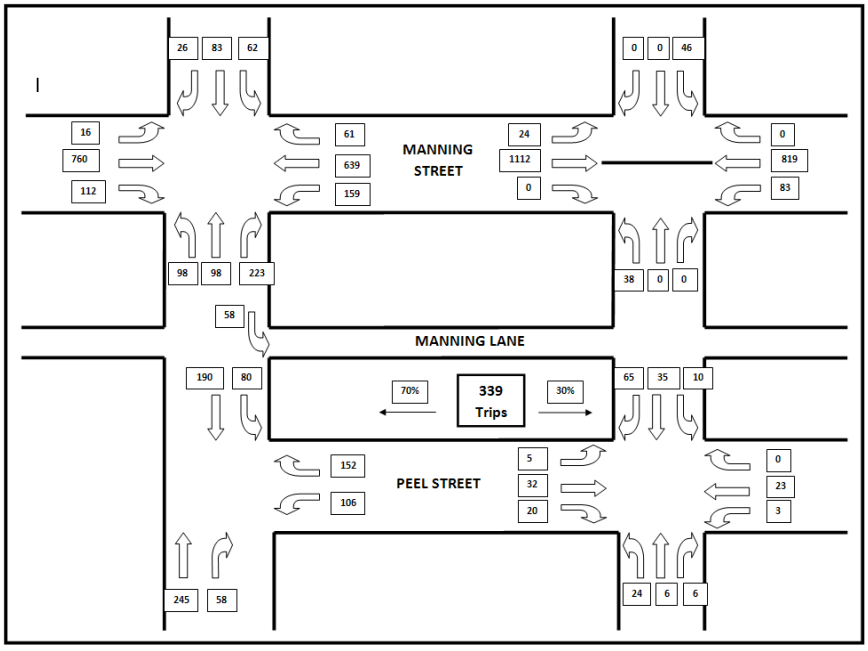


Figure 11: - Projected Traffic Volumes for 2020

10. ASSESSMENT OF TRAFFIC IMPACTS

10.1. Traffic Modelling

The operations of the intersections have been analysed using SIDRA (Version 5), an intersection-modelling program accepted by traffic and Local Government Authorities across Australia.

Intersections have been modelled for the PM peak hours for existing conditions and at full development of the proposal at both 2010 and 2020 with 1.5% per annum linear traffic growth applied to the 2020 scenario.

The scenario of full development of the proposal assumes the intersection of Manning Street and Kent Street is restricted to left turns only, as requested by the RTA, and existing traffic has been reassigned for this scenario. The no development scenarios assumes intersection configurations are as existing.

Values are based on the peak hour traffic movements and the 95th percentile figures within the peak hour. A summary of results is contained in the following table. Full results are contained in Appendix C.

Street	Movement	2010 No Development		2020 No Development		2020 Full Development	
		Delay	LOS	Delay	LOS	Delay	LOS
South St West at Manning St	Left Out	29.9	C	33.0	C	32.5	C
	Right Out	45.4	D	47.1	D	46.9	D
	Left In	29.2	C	30.4	C	32.3	C
	Right In	33.3	C	34.8	C	35.6	C
South St at Peel St	Left Out	8.2	A	8.6	A	11.3	A
	Right Out	8.6	A	8.9	A	11.7	A
	Left In	6.8	A	6.8	A	6.5	A
	Right In	7.4	A	7.5	A	7.9	A
Peel St North at Kent St	Left Out	6.8	A	6.9	A	7.1	A
	Right Out	7.1	A	7.2	A	7.5	A
	Left In	6.5	A	6.6	A	6.5	A
	Right In	6.9	A	6.9	A	6.9	A
Kent St West at Manning St	Left Out	340.3	F	602.5	F	15.2	B
	Right Out	340.2	F	602.5	F	N/A	N/A
	Left In	7.4	A	7.4	A	7.4	A
	Right In	14.4	A	17.1	B	N/A	N/A

Table 3: - Summary of Modelling Results.

Level of Service (LOS):

A Free Flows

B Stable flow with slight delays

C Stable flows with acceptable delays

D Approaching unstable flows, with tolerable delays

E Unstable flows, congestion, with intolerable delays

F Forced flows

10.2. Manning Street and South Street

Modelling indicates that the signalised intersection at Manning Street and South Street currently operates at a LOS 'C' with some individual movements operating at LOS 'D'. These being the right turn out from Beach Street, the left turn into South Street from Manning Street and the right turn out of South Street. These conditions are the current operation of the intersection. By 2020, without additional traffic from the proposal, there will be slight increases in delays however the intersection will continue to operate at LOS 'C'.

As the RTA have request the intersection of Manning Street and Kent Street be restricted to left turns only, the traffic assignment and modelling has been conducted as such. Therefore most traffic from the proposal will be directed through the Manning Street and South Street signals. As such, the modelling shows the intersection will continue to operate at LOS 'C' in 2020. There will be minor changes to delays compared to the 2020 without development scenario, with some movements experiencing and increase in delays of up to 4 seconds and some movements experiencing a decrease in delays of around 1 second. These changes in delays are minimal and do not significantly affect the operation of the intersection.

10.3. South Street and Peel Street

Modelling indicates that all movements at the Peel Street and South Street intersection currently operate at a LOS 'A' with average delays of 2.2 seconds and a maximum delay for right turning traffic out of Peel Street of 8.6 seconds.

With the proposed development at 2020 and the Manning Street and Kent Street intersection restricted to left turns (which will direct more traffic from the proposal towards the intersection), the intersection will continue to operate at a LOS 'A' with average delays increased to 5.1 seconds and a maximum delay for right turning traffic out of Peel Street increased to 11.7 seconds.

Although this intersection is on the main route for traffic accessing the supermarket (due to the intersection of Manning and Kent Street being restricted to left turns only), the additional traffic is not considered to adversely affect safety or create long delays for turning traffic at the intersection. Council have also indicated there are no accident issues associated with the intersection. Therefore no additional turning lanes or other intersection treatments are considered necessary at the intersection.

10.4. Manning Street and Kent Street

Modelling indicates that the Manning Street and Kent Street intersection currently operates at a LOS 'F' with average delays of 340.3 seconds for left turns and 340.2 seconds for right turns out of Kent Street West. These delays increase to over 600 seconds at 2020. This is due to high volumes in Manning Street restricting the right turn through vehicles from Kent Street.

A roundabout treatment would aid turning movements at the intersection and would decrease delays. However, this would also restrict flow on Manning Street. The RTA has requested the intersection be restricted to left turns only. This configuration has been modelled and shows LOS to be 'B' for left turns with delays reduced to 15.2 seconds in 2020 at full development. This is due to the removal of through traffic across Manning Street.

Existing right turning traffic would then be redirected to intersections north and south on Manning Street such as the South Street signalised intersection. These volumes are low and would be further diluted between other intersections and are not expected to adversely affect these.

10.5. Kent Street and Peel Street

Modelling indicates that all movements at the Peel Street and Kent Street intersection currently operate at a LOS 'A' with average delays of 4.5 seconds and a maximum delay for right turning traffic of 7.2 seconds.

With the proposed development at 2020, and the Manning Street and Kent Street intersection restricted to left turns (which will reduce some traffic at the intersection), the intersection will continue to operate at a LOS 'A' with average delays of 5.4 seconds and a maximum delay for right turning traffic of 7.4 seconds.

10.6. Internal Access Arrangements

10.6.1. Access Points

The vehicle access and egress arrangements have been reviewed to ensure compliance with the Australian Standard. A central median 0.6m wide has been provided, in accordance with Australian Standard AS 2890.1, for the entry/exit point off Peel Street.

The entry provided off Manning Lane is wide enough for access by cars only for which it is the intension.

10.6.2. Turning Circles and Aisle Width

Access to the loading dock area of the development will be via Manning Lane. An assessment using Autoturn swept turn path software was used to determine any impacts on the existing infrastructure of Manning Lane based on a 19m long Semi-Trailer design vehicle travelling at 20 to 30km/h. Details are shown at Appendix 'D'.

This assessment has shown there will be significant adjustment required to the kerb return along with some property acquisition at the intersection of South Street and Manning Lane for the design vehicle to be able to safely access the proposed loading dock area of the development.

Further detailed designs will need to be completed to determine the extent of the final impacts on the existing infrastructure as well as determining the amount of property acquisition required.

The aisle widths shown for the off-street car parking arrangements on the plans provided are designed in accordance with the Australian Standard. Advisory pavement markings and directional signage for circulation need to be provided to improve traffic flows and safety in the car park.

10.6.3. Service Vehicles

Delivery vehicles can adequately access the dock area from Manning Lane for goods deliveries, with a forward in/forward out manoeuvre. Trucks would enter the site from Manning Lane, stop when parallel to the northern boundary and reverse into the loading dock. Trucks would leave in a forward direction onto Peel Street.

This is however dependant on suitability of service vehicles entering Manning Lane from South Street as described above.

Refuse collection vehicles, which usually operate outside of the peak times of operation, will be able to service the proposal with side-loading or front-loading vehicles from the designated area.

10.7. Cyclists

Provision for cycle parking by way of cycle racks, has been made in the design.

10.8. Pedestrians

The complex is expected to attract some additional pedestrian traffic, particularly from Manning Street via the Dolphin Arcade and via the private walkway beside the Medical Centre. It is recommended that provision of a marked pedestrian crossing of Manning Lane be considered.

A paved footpath, clear of the parking area, is shown across the front of the building in Peel Street and Kent Street as well as down the side of the complex in Manning Lane. A defined pedestrian path is provided within the car park to the main doorway of the complex

Pedestrian safety within the complex is considered to be adequate.

10.9. Trolley Storage

Trolley storage bays are proposed within the parking area as shown on the layout plan, adjacent to the pedestrian path and in the southern corners.

10.10. Off-Street Parking

The proposed car park layout for the development has been reviewed to ensure compliance with the Australian Standard, AS2890.1 and AS2890.6 for off-street parking for People with Disabilities.

In accordance with the Australian Standard the User Class is deemed to be Class 3A (Table 1.1). Therefore the car park bay dimensions are as follows:-

User Class 3A:

Length	= 5.4m
Width	= 2.6m (nominal), End bays against kerbs = 3.0m
Aisle Width	= 6.60m

Disabled Parking

Length	= 5.4m
Width	= 2.4m
Shared Area	= In Accordance with Figure 2.3 (AS2890.6)

10.11. On-Street Parking

The frontages in Peel Street and Kent Street have been shown as available for 90º angle parking. The above design elements are to be used for the design of the on-street parking arrangement.

10.12. Public Transport

10.12.1. General

Forster Bus Service (Route 303) services the surrounding area, linking to Forster. Bus 303 provides fifteen (15) stops per weekday and eight (8) stops on Saturday.

It is envisaged that most trips to the proposed supermarket would be via private motor vehicle. Some customers and staff may use the buses.

10.12.2. Bus Stop Locations

A bus stop is proposed to be located in Peel Street, close to the main entry of the development.

The bay length for the proposed bus stop is to be 12.20m with sufficient clearance to the centreline of the road formation to be 6.0m including a bay width of 3.0m.

11. ROAD SAFETY

The additional traffic generated by the proposed redevelopment will not create an unsafe operating environment in the adjacent streets or at the intersections with Manning Street.

There are no obvious road safety issues associated with the proposal.

12. CONCLUSIONS

The proposal will generate and additional 339 vehicle trips which will be distributed around the external road network. Intersection modelling indicates this traffic will have minimal impacts on surrounding intersections with only slight increases in delays to current conditions as a result of the proposal.

However, the assessment does indicate the Manning Street and Kent Street intersection is currently operating at a Level of Service 'F'. This is due to high volumes of through travel in Manning Street with insufficient gaps in the traffic to allow turning vehicles out of Kent Street.

Great Lakes Council has indicated they have provision for the construction of a roundabout at this intersection as part of their future works program. If a roundabout were constructed as part of this development it will greatly improve traffic flows through the intersection resulting in better road safety. However, Manning Street has since become a classified (State) road under the control of the RTA. The RTA has indicated they would prefer the intersection be restricted to left turns only. The modelling indicates this intersection arrangement would operate adequately with reduced delays to left turning traffic.

Adjustments are required to the kerb return, along with some property acquisition, at the intersection of South Street and Manning Lane for the design delivery vehicle to be able to safely access Manning Lane. Similarly, this is the case for the proposed loading dock area of the development off Manning Lane. Detailed designs will need to be completed to determine the extent of the final impacts on the existing infrastructure as well as determining the amount of property acquisition required.

The proposed development will be providing 129 car park spaces, with the assessment carried out indicating a required provision of 115 spaces. The car parking layout has been provided in accordance with the relevant Australian Standard for Off-Street parking and, therefore, will provide adequate safe circulation, minimising impacts on traffic flows.

There are no traffic reasons identified in this study for Council to refuse the Development Application for the proposed development.

13. RECOMMENDATIONS

1. Adjustments to the kerb line at South Street/Manning Lane be completed in line with the turning path checks in Appendix 'D', to allow safe heavy vehicle turning into the lane and to access the development.

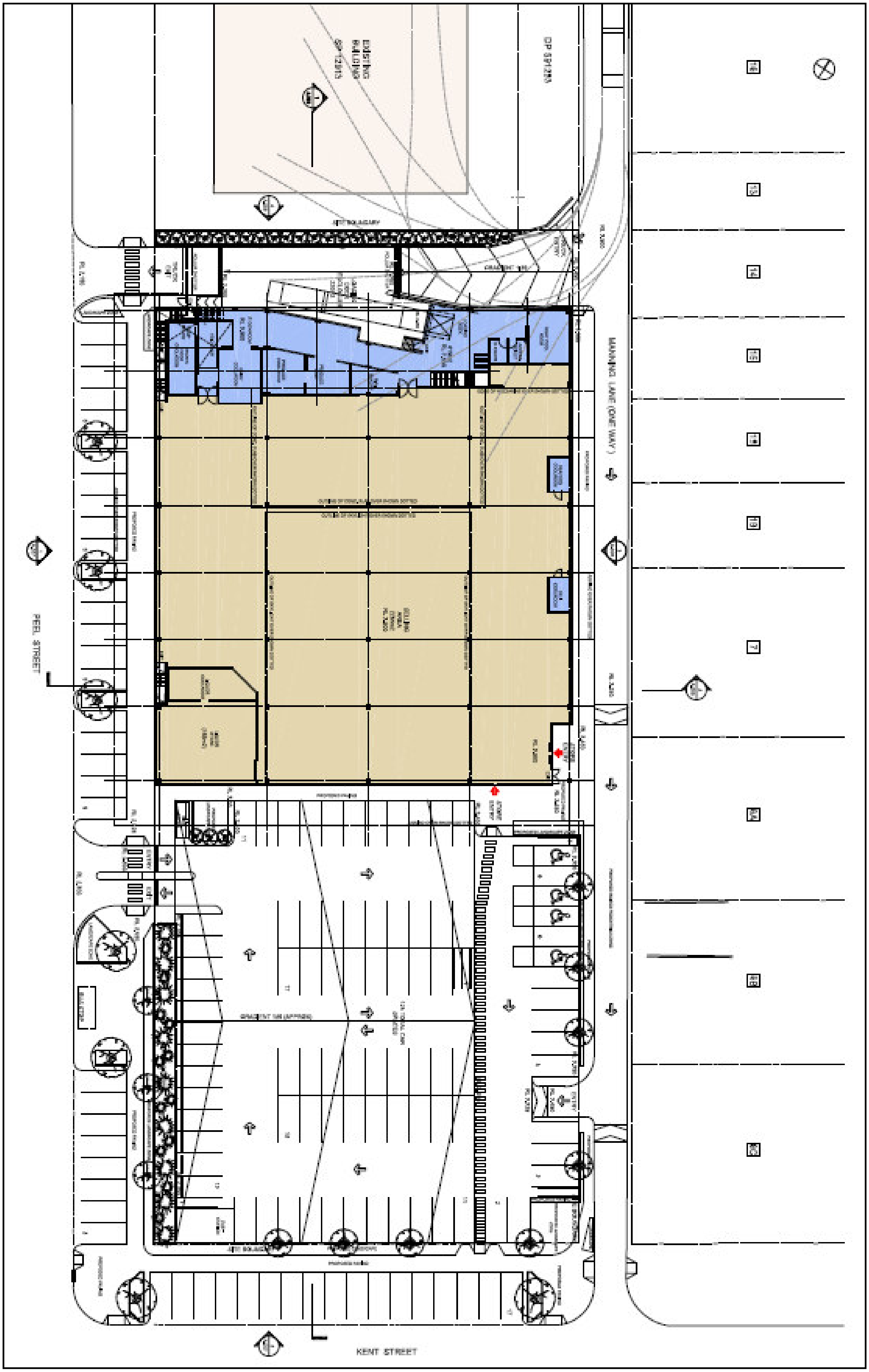
2. Consideration be given to restricting movements at the Manning Street and Kent Street intersection to left turns only as per the RTA request.

3. Construction of the car park be completed in accordance with the latest plans provided (Appendix A).

4. Provision of pavement markings and internal directional signage is to be provided for the off-street car park.

APPENDIX A

Layout Plan


PEEL STREET
MANNING LANE (ONE WAY)
KENT STREET

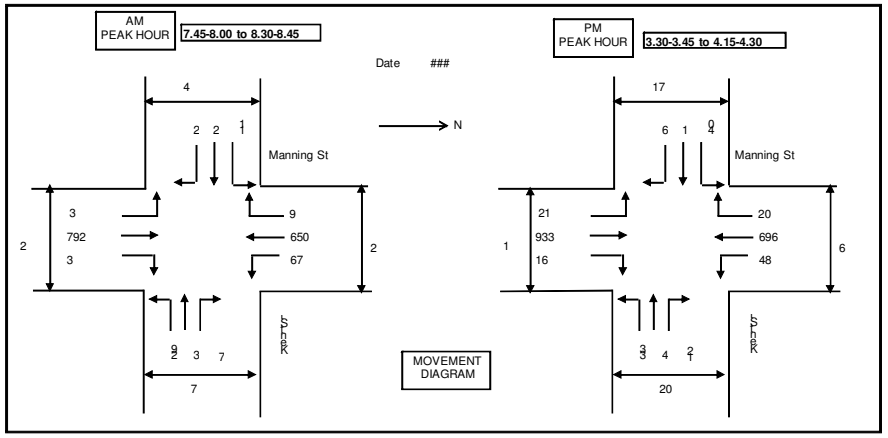
APPENDIX B

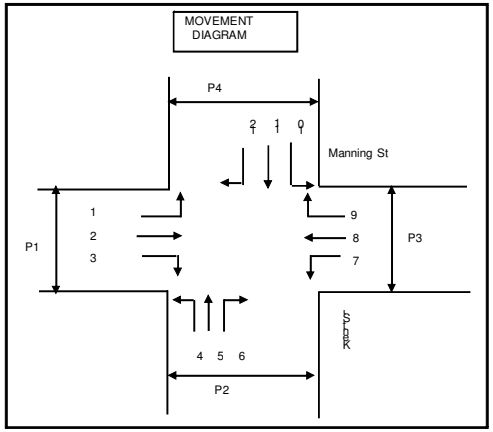
Traffic Counts

Location Manning St Street 2 Kent St Town Tuncurry
Date ######## Day Thurs

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Total	P1	P2	P3	P4	1/4h totals
7.30-7.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Incl. Hv	0	0	0	0	0
7.45-8.00	0	0	172	7	1	0	5	0		0	2	0	15	0	159	5	2	0	6	0	1	0	2	0	377		0	2	0	0	2
8.00-8.15	0	0	205	2	0	0	8	0	1	0	0	0	19	0	165	1	3	0	1	0	1	0	0	0	406		1	2	0	1	4
8.15-8.30	3	0	246	6	2	0	9	0		0	2	0	26	0	174	4	1	0	3	1	0	0		0	477	1260	0	1	0	1	2
8.30-8.45	0	0	153	1	0	0	7	0	2	0	3	0	7	0	138	4	3	0		0		0		0	318	1578	1	2	2	2	7
9.15-9.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1201	0	0	0	0	0
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	795	0	0	0	0	0
9.45-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318	0	0	0	0	0
10.00-10.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.15-10.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.45-11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	0	776	16	3	0	29	0	3	0	7	0	67	0	636	14	9	0	10	1	2	0	2	0	Max Hr	1578	2	7	2	4	15
Overall peak hour: 7.45-8.00 to 8.30-8.45																										2					
Peak total	3	0	776	16	3	0	29	0	3	0	7	0	67	0	636	14	9	0	10	1	2	0	2	0	1578		2	7	2	4	15
Light+HV	3		792		3		29		3		7		67		650		9		11		2		2								

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Total	P1	P2	P3	P4	1/4h totals
3.00-3.15	3	0	191	3	0	0	3	0	1	0	4	0	18	1	169	3	3	0	10	0		0		0	409	Incl. Hv	0	3	0	20	23
3.15-3.30	1	0	200	3	0	1	5	1	1	0	5	1		3	178	0	5	0	10	1		0	1	1	417		0	2	0	7	9
3.30-3.45	5	0	254	3	5	0	8	0		0	4	0	6	0	210	7	4	0	13	0	1	0	3	0	523		0	9	3	10	22
3.45-4.00	5	0	190	8	3	0	6	0	0	2	2	0	9	0	129	8	4	0	11	0		0	1	0	378	1727	1	2	2	1	6
4.00-4.15	6	0	217	7	3	0	7	0	0	0	3	0	11	0	149	7	7	0	12	0	0	0		0	429	1747	0	6	1	2	9
4.15-4.30	5	0	247	7	5	0	11	1	2	0	3	0	22	0	179	7	5	0	3	1		0	2	0	500	1830	0	3	0	4	7
4.30-4.45	8	0	227	5	2	0	7	0	1	0	4	0	12	0	208	4	6	0	5	0		0		0	489	1796	0	6	0	7	13
4.45-5.00	3	0	155	1	3	0	5	0	1	0	5	0	11	0	149	9	6	1	8	0	1	0		0	358	1776	0	6	3	3	12
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1347	0	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	847	0	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	358	0	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	36	0	1681	37	21	1	52	2	6	2	30	1	89	4	1371	45	40	1	72	2	2	0	7	1	Max Hr	1830	1	37	9	54	101
Overall peak hour: 3.30-3.45 to 4.15-4.30																										3					
Peak total	21	0	908	25	16	0	32	1	2	2	12	0	48	0	667	29	20	0	39	1	1	0	6	0	1830		1	20	6	17	44
Light+HV	21		933		16		33		4		12		48		696		20		40		1		6								

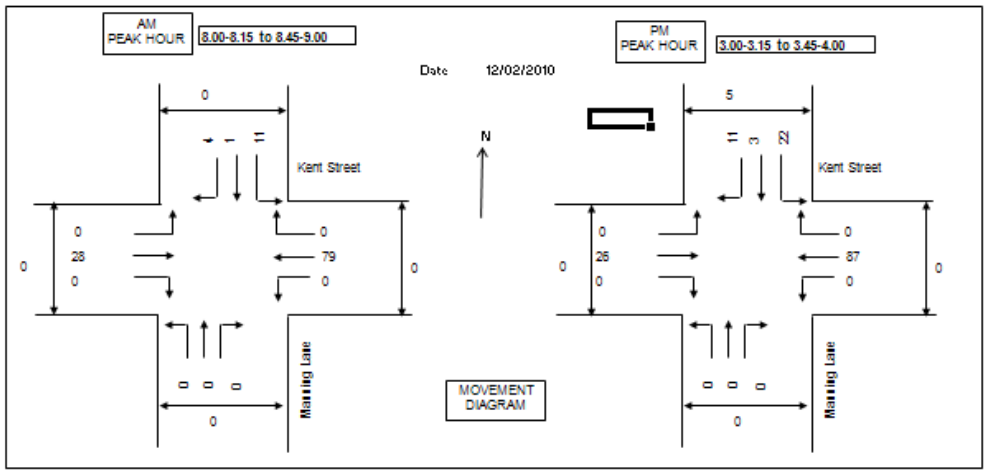


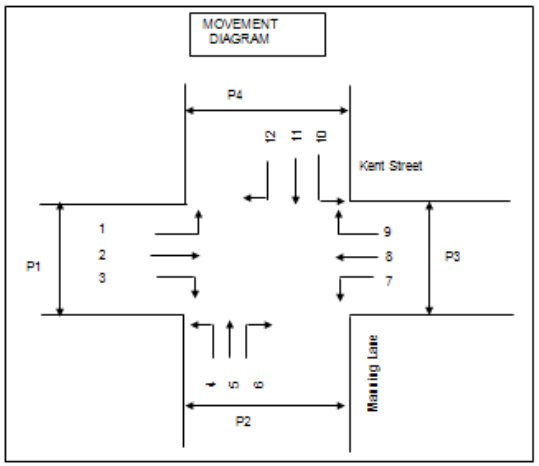


Location Kent Street Street 2 Manning Lane Town Tuncurry
Date 40221 Day Thursday

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tots	P1	P2	P3	P4	1/4h totals
7.45-8.00	0	0	4	0	0	0	0	0	0	0	0	0	0	0	7	1	0	0	7	0	0	0	0	0	19	Incl. Hvy	0	0	0	1	1
8.00-8.15	0	0	6	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	1	23		0	0	0	0	0
8.15-8.30	0	0	7	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	3	0	1	0	0	0	28		0	0	0	0	0
8.30-8.45	0	0	7	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	2	0	41	111	0	0	0	0	0
8.45-9.00	0	0	8	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	8	0	0	0	1	0	31	123	0	0	0	0	0
9.00-9.15	0	0	2	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	2	0	23	123	0	0	0	0	0
9.15-9.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	4	0	13	108	0	0	0	0	0
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	0	0	0	0	0
9.45-10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0
10.00-10.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0
10.15-10.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	34	0	0	0	0	0	0	0	0	0	0	0	105	1	0	0	26	1	1	0	9	1	Max Hr	123	0	0	0	1	1
	Overall peak hour:						8.00-8.15 to 8.45-9.00																			2					
Peak tots	0	0	28	0	0	0	0	0	0	0	0	0	0	0	79	0	0	0	11	0	1	0	3	1	123		0	0	0	0	0
Light+HV	0		28		0		0		0		0		0		79		0		11		1		4								

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tots	P1	P2	P3	P4	1/4h totals
3.00-3.15	0	0	5	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	5	0	2	0	2	0	40	Incl. Hvy	0	0	0	2	2
3.15-3.30	0	0	8	1	0	0	0	0	0	0	0	0	0	0	25	2	0	0	5	0	0	0	3	0	44		0	0	0	1	1
3.30-3.45	0	0	6	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	4	0	1	0	3	0	26		0	0	0	2	2
3.45-4.00	0	0	6	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	8	0	0	0	3	0	39	143	0	0	0	0	0
4.00-4.15	0	0	10	1	0	0	0	0	0	0	0	0	0	0	15	0	0	0	2	0	0	0	2	0	30	139	0	0	0	0	0
4.15-4.30	0	0	3	2	0	0	0	0	0	0	0	0	0	0	21	0	0	0	7	0	1	0	6	0	40	135	0	0	0	2	2
4.30-4.45	0	0	4	0	0	0	0	0	0	0	0	0	0	0	15	1	0	0	7	0	0	0	6	0	33	142	0	0	0	2	2
4.45-5.00	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	9	112	0	0	0	1	1
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	45	4	0	0	0	0	0	0	0	0	0	0	136	3	0	0	40	0	4	0	29	0	Max Hr	143	0	0	0	10	10
	Overall peak hour:						3.00-3.15 to 3.45-4.00																			1					
Peak tots	0	0	25	1	0	0	0	0	0	0	0	0	0	0	85	2	0	0	22	0	3	0	11	0	143		0	0	0	5	5
Light+HV	0		26		0		0		0		0		0		87		0		22		3		11								

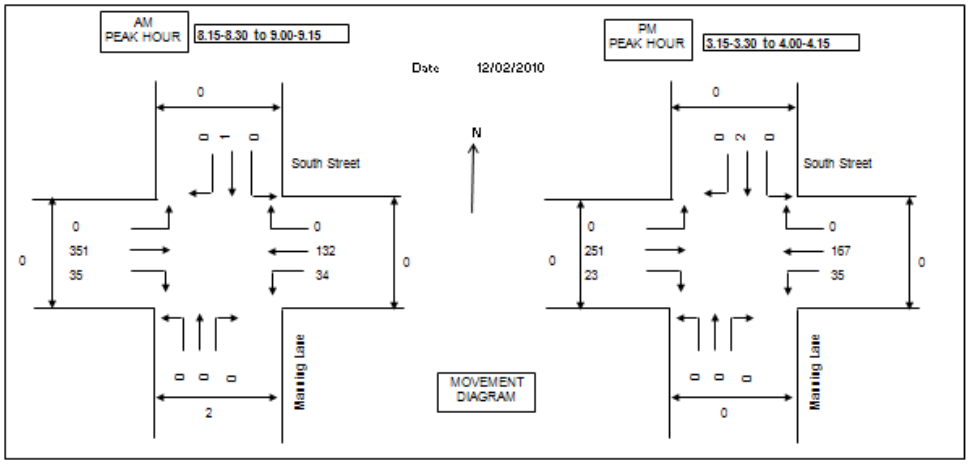


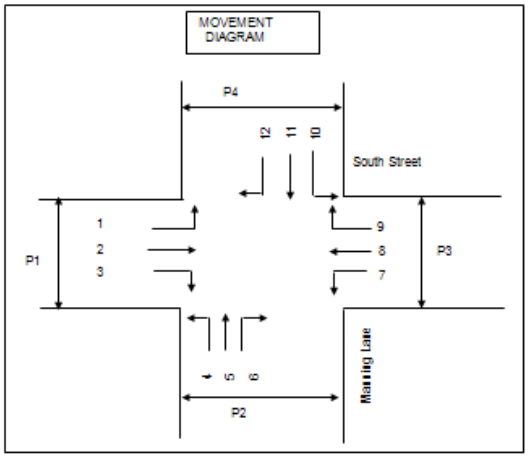


Location South Street Street 2 Manning Lane Town Tuncurry
Date 40221 Day Thursday

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tota	P1	P2	P3	P4	1/4h totals
7.45-8.00	0	0	56	1	3	1	0	0	0	0	0	0	5	0	13	0	0	0	0	0	0	0	0	0	85	Incl. Hvy	0	1	0	0	1
8.00-8.15	0	0	43	1	0	0	0	0	0	0	0	0	1	1	13	0	0	0	0	0	0	0	0	0	65		0	0	0	0	0
8.15-8.30	0	0	104	2	1	0	0	0	0	0	0	0	5	0	30	5	0	0	0	0	0	0	0	0	147		0	1	0	0	1
8.30-8.45	0	0	55	2	11	0	0	0	0	0	0	0	5	1	20	4	0	0	0	0	0	0	0	0	98	395	0	1	0	0	1
8.45-9.00	0	0	103	3	10	0	0	0	0	0	0	0	11	0	37	2	0	0	0	0	0	0	0	0	166	476	0	0	0	0	0
9.00-9.15	0	0	81	1	13	0	0	0	0	0	0	0	12	0	34	0	0	0	0	0	0	1	0	0	142	553	0	0	0	0	0
9.15-9.30	0	0	39	1	0	0	0	0	0	0	0	0	6	0	23	4	0	0	0	0	0	0	0	0	73	479	0	0	0	0	0
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	381	0	0	0	0	0
9.45-10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0
10.00-10.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0
10.15-10.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	481	11	38	1	0	0	0	0	0	0	45	2	182	15	0	0	0	0	0	1	0	0	Max Hr	553	0	3	0	0	3
	Overall peak hour:						**8.15-8.30 to 9.00-9.15**																			3					
Peak tota	0	0	343	8	35	0	0	0	0	0	0	0	33	1	121	11	0	0	0	0	0	1	0	0	553		0	2	0	0	2
Light+HV	0		351		35		0		0		0		34		132		0		0		1		0								

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tota	P1	P2	P3	P4	1/4h totals
3.00-3.15	0	0	74	1	5	0	0	0	0	0	0	0	6	0	34	1	0	0	0	0	0	0	0	0	121	Incl. Hvy	0	0	0	0	0
3.15-3.30	0	0	66	0	4	0	0	0	0	0	0	0	13	0	36	2	0	0	0	0	1	0	0	0	122		0	0	0	0	0
3.30-3.45	0	0	70	2	12	0	0	0	0	0	0	0	8	0	46	4	0	0	0	0	1	0	0	0	143		0	0	0	0	0
3.45-4.00	0	0	48	0	2	0	0	0	0	0	0	0	1	0	35	0	0	0	0	0	0	0	0	0	86	472	0	0	0	0	0
4.00-4.15	0	0	65	0	5	0	0	0	0	0	0	0	13	0	40	4	0	0	0	0	0	0	0	0	127	478	0	0	0	0	0
4.15-4.30	0	0	64	1	7	0	0	0	0	0	0	0	8	0	33	2	0	0	0	0	0	0	0	0	115	471	0	0	0	0	0
4.30-4.45	0	0	88	0	10	0	0	0	0	0	0	0	10	0	39	0	0	0	0	0	1	0	0	0	148	476	0	0	0	0	0
4.45-5.00	0	0	36	0	3	0	0	0	0	0	0	0	2	0	29	0	0	0	0	0	1	0	0	0	71	461	0	0	0	0	0
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	334	0	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219	0	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	0	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	511	4	48	0	0	0	0	0	0	0	61	0	232	13	0	0	0	0	4	0	0	0	Max Hr	478	0	0	0	0	0
	Overall peak hour:						**3.15-3.30 to 4.00-4.15**																			2					
Peak tota	0	0	249	2	23	0	0	0	0	0	0	0	35	0	157	10	0	0	0	0	2	0	0	0	478		0	0	0	0	0
Light+HV	0		251		23		0		0		0		35		167		0		0		2		0								

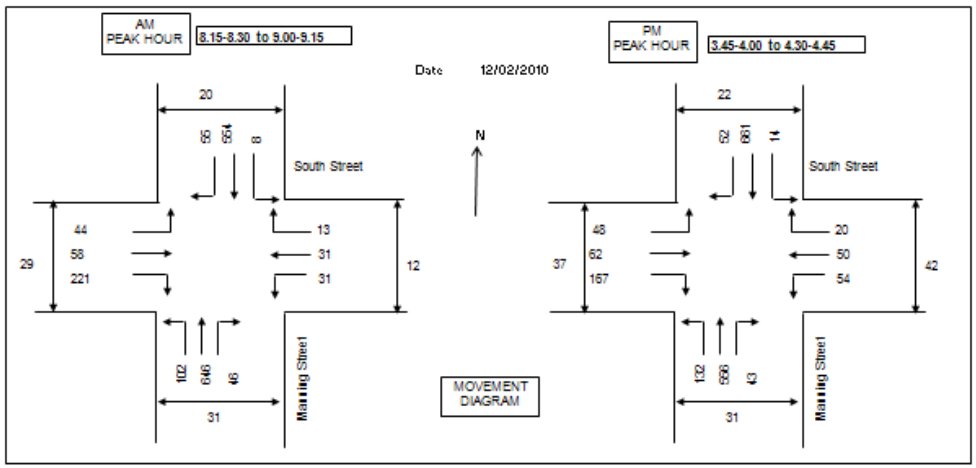


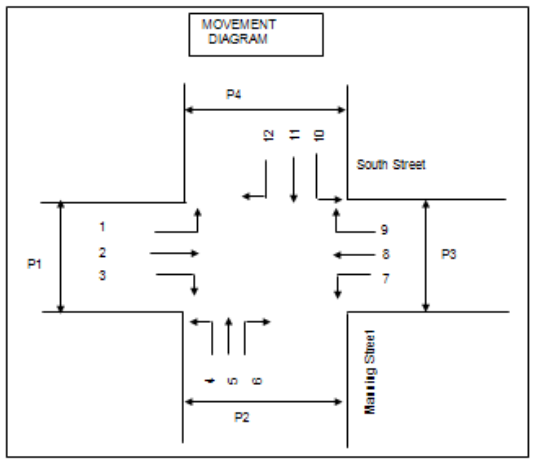


Location South Street Street 2 Manning Street Town Tuncurry
Date 40221 Day Thursday

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tots	P1	P2	P3	P4	1/4h totals
7.45-8.00	10	0	11	1	24	0	14	0	113	3	4	0	3	1	10	0	1	0	0	0	112	10	4	0	321	Incl. Hvy	4	4	3	4	15
8.00-8.15	10	0	1	0	32	0	17	1	114	6	5	0	2	0	2	0	1	2	0	0	114	3	2	1	313		4	3	3	4	14
8.15-8.30	11	0	14	1	45	1	11	4	148	2	6	0	3	1	8	0	2	0	2	0	177	8	13	0	457		5	5	1	5	16
8.30-8.45	14	0	18	0	64	0	25	0	147	2	12	0	3	0	3	2	1	0	1	0	131	6	13	3	451	1548	3	11	4	5	23
8.45-9.00	9	2	15	0	59	0	28	1	184	3	17	1	7	1	9	0	4	0	4	0	110	4	16	0	474	1701	6	7	1	6	20
9.00-9.15	8	0	9	1	52	0	33	0	153	7	10	0	9	1	9	0	6	0	1	0	115	3	10	0	427	1809	15	8	6	4	33
9.15-9.30	11	1	9	0	48	0	31	0	146	0	10	0	11	0	5	3	4	0	5	1	125	3	19	0	432	1784	22	7	7	8	44
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1333	0	0	0	0	0
9.45-10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	853	0	0	0	0	0
10.00-10.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	432	0	0	0	0	0
10.15-10.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	73	3	77	3	324	1	153	6	1005	23	64	1	44	4	46	5	19	2	13	1	884	43	77	4	Max Hr	1809	59	45	25	36	165
	Overall peak hour:						8.15-8.30 to 9.00-9.15																			3					
Peak tots	42	2	56	2	220	1	97	5	632	14	45	1	28	3	29	2	13	0	8	0	533	21	52	3	1809		29	31	12	20	92
Light+HV	44		58		221		102		646		46		31		31		13		8		554		55								

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tots	P1	P2	P3	P4	1/4h totals
3.00-3.15	15	0	6	0	53	1	28	0	157	5	10	1	3	0	10	0	4	1	4	2	141	5	12	0	464	Incl. Hvy	8	6	7	8	29
3.15-3.30	12	0	8	0	47	0	33	1	141	1	17	0	16	1	3	0	8	0	3	0	167	1	14	1	480		6	5	6	3	20
3.30-3.45	13	1	10	0	40	0	43	0	143	1	16	0	15	0	11	1	7	0	3	0	178	1	11	2	436		15	10	6	13	44
3.45-4.00	8	0	11	0	33	0	34	0	118	5	10	1	3	1	10	0	3	0	5	0	150	2	16	0	416	1856	3	11	23	2	45
4.00-4.15	12	0	16	0	52	0	27	0	113	3	3	1	20	1	17	3	5	0	1	0	156	4	15	0	455	1847	3	13	5	5	32
4.15-4.30	12	0	8	1	41	0	38	0	143	5	15	0	3	1	7	0	3	0	3	0	168	4	12	0	476	1843	7	3	10	8	28
4.30-4.45	16	0	26	0	41	0	33	0	158	5	7	0	13	0	13	0	8	1	5	0	172	5	8	1	512	1859	12	4	4	7	27
4.45-5.00	9	0	10	0	29	0	13	1	129	3	14	0	13	0	16	0	5	1	4	0	125	1	9	0	388	1831	8	4	5	0	17
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1376	0	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	900	0	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	388	0	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	97	1	95	1	336	1	249	2	1108	28	98	3	110	4	93	4	43	3	28	2	1257	23	97	4	Max Hr	1859	74	56	66	46	242
	Overall peak hour:						3.45-4.00 to 4.30-4.45																			4					
Peak tots	48	0	61	1	167	0	132	0	538	18	41	2	51	3	47	3	19	1	14	0	646	15	51	1	1859		37	31	42	22	132
Light+HV	48		62		167		132		556		43		54		50		20		14		661		52								

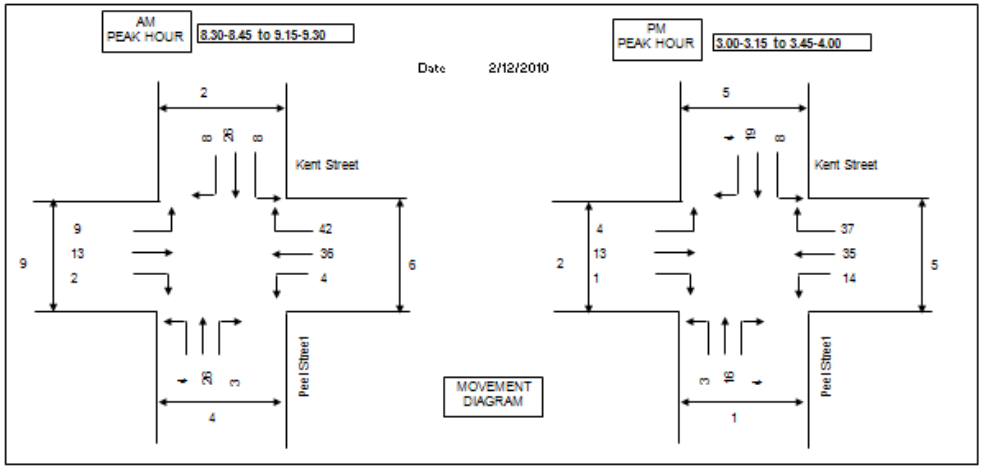


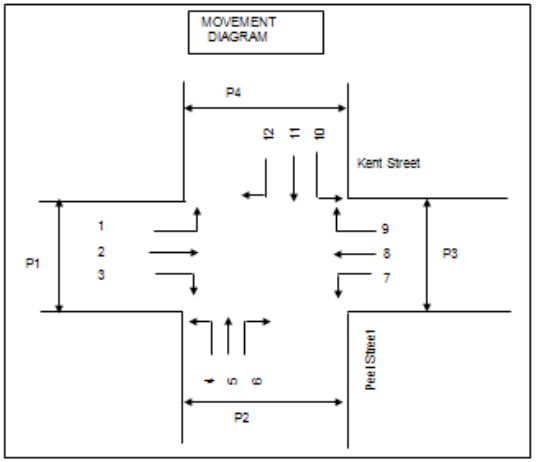


Location Kent Street Street 2 Peel Street Town Tuncurry
Date 40514 Day Thursday

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tota	P1	P2	P3	P4	1/4h totals
8.00-8.15	0	0	3	0	0	0	2	0	1	0	0	0	0	0	2	0	5	1	1	0	3	0	0	0	18	Incl. Hvy	0	0	1	0	1
8.15-8.30	5	0	3	0	0	0	2	0	8	0	0	0	3	0	8	0	5	0	3	0	7	0	0	0	44		0	0	0	0	0
8.30-8.45	1	0	5	0	1	0	1	0	2	0	1	0	2	0	6	0	9	0	1	0	5	1	1	0	36		1	2	3	0	6
8.45-9.00	4	0	2	0	0	0	1	0	7	0	2	0	2	0	13	0	17	0	3	0	4	0	5	0	60	158	1	2	1	1	5
9.00-9.15	2	0	5	0	1	0	0	0	7	1	0	0	0	0	6	0	8	0	3	0	4	0	0	0	37	177	5	0	2	1	8
9.15-9.30	2	0	1	0	0	0	0	2	9	0	0	0	0	0	11	0	8	0	1	0	11	1	2	0	48	181	2	0	0	0	2
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	0	0	0	0	0
9.45-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0
10.00-10.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0
10.15-10.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.45-11.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	14	0	19	0	2	0	6	2	34	1	3	0	7	0	46	0	52	1	12	0	34	2	8	0	Max Hr	181	9	4	7	2	22
	Overall peak hour:						**8.30-8.45 to 9.15-9.30**																			3					
Peak tota	9	0	13	0	2	0	2	2	25	1	3	0	4	0	36	0	42	0	8	0	24	2	8	0	181		3	4	6	2	21
Light+HV	9		13		2		4		26		3		4		36		42		8		26		8								

Time	1	H	2	H	3	H	4	H	5	H	6	H	7	H	8	H	9	H	10	H	11	H	12	H	1/4h totals	Hrly Tota	P1	P2	P3	P4	1/4h totals
3.00-3.15	1	0	1	0	0	0	1	0	4	0	1	0	3	0	9	0	14	0	2	0	5	0	0	0	41	Incl. Hvy	0	0	1	0	1
3.15-3.30	1	0	3	1	0	0	1	0	5	0	1	0	8	1	9	0	8	1	4	0	5	0	0	0	48		0	0	3	2	5
3.30-3.45	1	0	6	0	0	0	0	0	3	0	0	0	1	0	7	0	4	0	0	0	5	1	2	0	30		0	0	0	0	0
3.45-4.00	1	0	2	0	1	0	1	0	4	0	2	0	1	0	10	0	10	0	2	0	3	0	2	0	39	158	2	1	1	3	7
4.00-4.15	1	0	4	1	1	0	1	0	2	0	3	0	2	0	6	0	7	0	3	0	2	2	1	0	36	153	2	1	1	0	4
4.15-4.30	1	0	1	0	0	0	1	0	3	0	1	0	5	0	9	0	7	0	1	2	1	0	1	0	33	138	0	0	4	2	6
4.30-4.45	0	0	2	0	0	0	2	0	5	0	1	0	4	0	4	0	7	1	1	0	6	0	0	0	33	141	0	0	2	0	2
4.45-5.00	3	0	2	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	1	0	5	0	0	0	14	116	0	0	1	2	3
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	0	21	2	2	0	8	0	28	0	9	0	24	1	54	0	57	2	14	2	32	3	6	0	Max Hr	158	4	2	13	9	28
	Overall peak hour:						**3.00-3.15 to 3.45-4.00**																			1					
Peak tota	4	0	12	1	1	0	3	0	16	0	4	0	13	1	35	0	36	1	8	0	18	1	4	0	158		2	1	5	5	13
Light+HV	4		13		1		3		16		4		14		35		37		8		19		4								

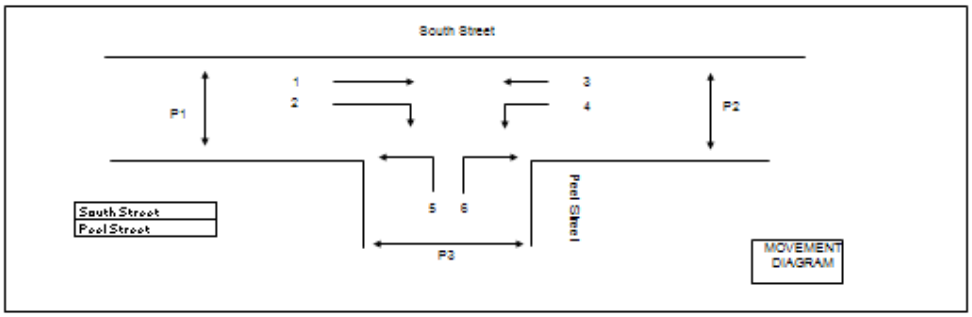


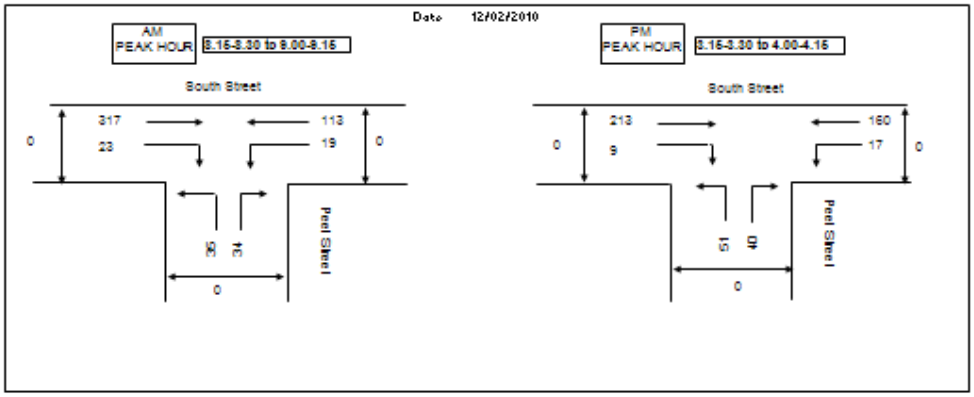


Location South Street Street 2 Peel Street Town Tuncurry
Date 12/02/2010 Day Thursday

Time	1	H	2	H	3	H	4	H	5	H	6	H	1/4h total	Hrly Tots	P1	P2	P3	1/4h totals
7.45-8.00	51	1	3	0	15	0	4	0	6	0	5	0	85	Incl. Hvy	0	0	0	0
8.00-8.15	41	1	1	0	15	1	4	0	3	0	2	2	70		0	0	0	0
8.15-8.30	94	2	5	0	29	3	1	2	7	0	10	0	153		0	0	0	0
8.30-8.45	48	1	8	1	15	4	5	0	5	0	7	1	95	403	0	0	0	0
8.45-9.00	95	3	4	0	30	2	7	0	10	0	8	0	159	477	0	0	0	0
9.00-9.15	73	1	5	0	30	0	4	0	13	0	8	0	134	541	0	0	0	0
9.15-9.30	28	1	1	0	17	2	6	2	7	0	11	0	75	463	0	0	0	0
9.30-9.45	0	0	0	0	0	0	0	0	0	0	0	0	0	368	0	0	0	0
9.45-10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	209	0	0	0	0
10.00-10.15	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0	0	0	0
10.15-10.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.30-10.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	430	10	27	1	151	12	31	4	51	0	51	3	Max Hr	541	0	0	0	0
	Overall peak hour: 8.15-8.30 to 9.00-9.15													3				
Peak total	310	7	22	1	104	9	17	2	35	0	33	1	540		0	0	0	0
Light+HV	317		23		113		19		35		34							

Time	1	H	2	H	3	H	4	H	5	H	6	H	1/4h total	Hrly Tots	P1	P2	P3	1/4h totals
3.00-3.15	66	1	4	0	28	1	6	0	13	0	8	0	127	Incl. Hvy	0	0	0	0
3.15-3.30	56	0	2	0	41	2	5	0	14	1	10	0	131		0	0	0	0
3.30-3.45	56	2	3	0	43	3	3	1	10	0	14	0	135		0	0	0	0
3.45-4.00	35	0	2	0	32	0	3	0	9	0	13	0	94	487	0	0	0	0
4.00-4.15	63	1	2	0	37	2	3	2	17	0	2	1	130	490	0	0	0	0
4.15-4.30	57	1	1	1	31	1	2	1	4	0	7	0	106	465	0	0	0	0
4.30-4.45	73	0	2	0	38	0	1	0	13	0	15	0	142	472	0	0	0	0
4.45-5.00	31	0	5	0	28	0	1	0	6	1	5	0	77	455	0	0	0	0
5.00-5.15	0	0	0	0	0	0	0	0	0	0	0	0	0	325	0	0	0	0
5.15-5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	219	0	0	0	0
5.30-5.45	0	0	0	0	0	0	0	0	0	0	0	0	0	77	0	0	0	0
5.45-6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	437	5	21	1	278	9	24	4	86	2	74	1	Max Hr	490	0	0	0	0
	Overall peak hour: 3.15-3.30 to 4.00-4.15													2				
Peak total	210	3	9	0	153	7	14	3	50	1	39	1	489		0	0	0	0
Light+HV	213		9		160		17		51		40							





APPENDIX C

Modelling Summary

Manning St & Kent Street – Existing Layout

MOVEMENT SUMMARY

Site: Manning St / Kent St
2010 PM

Manning Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
1	L	51	0.0	0.231	7.4	LOS A	0.0	0.0	0.00	1.07	48.6
2	T	733	4.2	0.230	4.7	LOS A	4.6	33.4	0.43	0.00	51.1
3	R	21	0.0	0.231	17.5	LOS B	4.6	33.4	0.90	1.04	42.7
Approach		804	3.8	0.230	5.2	LOS B	4.6	33.4	0.41	0.09	50.7
East: Kent St E											
4	L	42	2.5	0.413	45.8	LOS D	1.7	12.2	0.91	1.04	24.7
5	T	1	0.0	0.351	43.7	LOS D	1.7	12.2	0.91	1.01	24.1
6	R	6	0.0	0.421	45.8	LOS D	1.7	12.2	0.91	1.03	24.6
Approach		49	2.1	0.413	45.8	LOS D	1.7	12.2	0.91	1.04	24.6
North: Manning Street N											
7	L	22	0.0	0.276	7.4	LOS A	0.0	0.0	0.00	1.14	48.6
8	T	982	2.7	0.276	3.3	LOS A	5.1	36.1	0.40	0.00	52.9
9	R	17	0.0	0.276	14.4	LOS A	5.1	36.1	0.82	1.06	45.4
Approach		1021	2.6	0.276	3.6	LOS A	5.1	36.1	0.40	0.04	52.7
West: Kent St W											
10	L	35	3.0	0.992	340.3	LOS F	9.6	70.4	1.00	1.55	5.7
11	T	4	50.0	1.053	339.1	LOS F	9.6	70.4	1.00	1.38	5.4
12	R	13	0.0	0.972	340.2	LOS F	9.6	70.4	1.00	1.40	5.7
Approach		52	6.1	1.000	340.2	LOS F	9.6	70.4	1.00	1.50	5.7
All Vehicles		1926	3.2	1.000	14.4	NA	9.6	70.4	0.43	0.13	41.6

MOVEMENT SUMMARY

Site: Manning St / Kent St
2020 PM

Manning Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
1	L	58	0.0	0.272	7.4	LOS A	0.0	0.0	0.00	1.07	48.6
2	T	842	4.2	0.272	6.7	LOS A	6.6	47.9	0.46	0.00	48.7
3	R	24	0.0	0.272	22.1	LOS B	6.6	47.9	1.00	1.06	39.4
Approach		924	3.8	0.272	7.1	LOS B	6.6	47.9	0.44	0.10	48.4
East: Kent St E											
4	L	48	2.5	0.897	169.9	LOS F	5.1	36.3	0.98	1.36	10.2
5	T	1	0.0	1.053	167.8	LOS F	5.1	36.3	0.98	1.29	9.8
6	R	7	0.0	0.921	169.9	LOS F	5.1	36.3	0.98	1.29	10.2
Approach		57	2.1	0.892	169.9	LOS F	5.1	36.3	0.98	1.35	10.2
North: Manning Street N											
7	L	24	0.0	0.319	7.4	LOS A	0.0	0.0	0.00	1.15	48.6
8	T	1129	2.7	0.320	4.6	LOS A	7.4	53.0	0.46	0.00	51.1
9	R	19	0.0	0.321	17.1	LOS B	7.4	53.0	0.95	1.09	43.3
Approach		1173	2.6	0.320	4.9	LOS B	7.4	53.0	0.45	0.04	50.9
West: Kent St W											
10	L	40	3.0	1.000[4]	602.5	LOS F	14.4	106.6	1.00	1.73	3.4
11	T	5	50.0	1.053	601.4	LOS F	14.4	106.6	1.00	1.52	3.2
12	R	15	0.0	0.982	602.5	LOS F	14.4	106.6	1.00	1.54	3.4
Approach		60	6.4	1.000	602.4	LOS F	14.4	106.6	1.00	1.66	3.4
All Vehicles		2214	3.2	1.000	26.3	NA	14.4	106.6	0.48	0.14	33.8

Manning St & Kent Street – Left In Left Out Only

MOVEMENT SUMMARY

Site: Manning St / Kent St 2010 PM Left Only + Full Development

Manning Street and Kent Street
Left Turns Only
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
1	L	80	0.0	0.219	7.4	LOS A	0.0	0.0	0.00	1.01	48.6
2	T	751	4.2	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		831	3.8	0.219	0.7	LOS A	0.0	0.0	0.00	0.10	58.7
East: Kent St E											
4	L	42	2.5	0.135	17.7	LOS B	0.6	3.9	0.77	0.92	36.2
Approach		42	2.5	0.135	17.7	LOS B	0.6	3.9	0.77	0.92	36.2
North: Manning Street N											
7	L	22	0.0	0.273	7.4	LOS A	0.0	0.0	0.00	1.14	48.6
8	T	1022	2.7	0.273	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1044	2.6	0.273	0.2	LOS A	0.0	0.0	0.00	0.02	59.7
West: Kent St W											
10	L	35	3.0	0.076	13.4	LOS A	0.3	2.3	0.64	0.87	39.0
Approach		35	3.0	0.076	13.4	LOS A	0.3	2.3	0.64	0.87	39.0
All Vehicles		1952	3.1	0.273	1.0	NA	0.6	3.9	0.03	0.09	57.9

MOVEMENT SUMMARY

Site: Manning St / Kent St 2020 PM Left Only + Full Development

Manning Street and Kent Street
Left Turns Only
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
1	L	87	0.0	0.250	7.4	LOS A	0.0	0.0	0.00	1.01	48.6
2	T	862	4.2	0.251	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		949	3.8	0.251	0.7	LOS A	0.0	0.0	0.00	0.09	58.8
East: Kent St E											
4	L	48	2.5	0.203	22.4	LOS B	0.8	5.9	0.84	0.95	33.6
Approach		48	2.5	0.204	22.4	LOS B	0.8	5.9	0.84	0.95	33.6
North: Manning Street N											
7	L	25	0.0	0.312	7.4	LOS A	0.0	0.0	0.00	1.14	48.6
8	T	1171	2.7	0.312	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1196	2.6	0.312	0.2	LOS A	0.0	0.0	0.00	0.02	59.7
West: Kent St W											
10	L	40	3.0	0.104	15.2	LOS B	0.4	3.1	0.70	0.89	37.8
Approach		40	3.0	0.104	15.2	LOS B	0.4	3.1	0.70	0.89	37.8
All Vehicles		2234	3.1	0.312	1.1	NA	0.8	5.9	0.03	0.09	57.8

Manning St & South St – Existing Layout (Signals)

MOVEMENT SUMMARY

Site: Manning St / South St
2010 PM

Manning Street and South Street
4 Way Signalised Intersection
Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
4	L	139	0.0	0.640	29.2	LOS C	13.8	98.0	0.91	0.85	34.5
5	T	585	3.2	0.640	21.8	LOS B	13.8	99.1	0.92	0.78	35.2
6	R	45	4.7	0.164	27.0	LOS B	1.9	14.2	0.76	0.72	34.5
Approach		769	2.7	0.640	23.4	LOS B	13.8	99.1	0.91	0.79	35.0
East: Beach Street E											
7	L	57	5.6	0.226	19.2	LOS B	1.8	13.4	0.61	0.72	39.4
8	T	53	6.0	0.247	40.5	LOS C	4.6	33.8	0.90	0.70	26.9
9	R	21	5.0	0.247	48.7	LOS D	4.6	33.8	0.90	0.79	26.5
Approach		131	5.6	0.247	32.6	LOS C	4.6	33.8	0.77	0.72	31.1
North: Manning St N											
10	L	15	0.0	0.675	44.9	LOS D	17.5	124.9	0.95	0.87	28.2
11	T	696	2.3	0.677	36.8	LOS C	17.5	125.2	0.95	0.82	28.5
12	R	55	1.9	0.175	33.3	LOS C	2.8	19.9	0.84	0.73	31.3
Approach		765	2.2	0.677	36.7	LOS C	17.5	125.2	0.94	0.81	28.7
West: South St W											
13	L	51	0.0	0.188	29.9	LOS C	4.2	29.3	0.75	0.84	33.8
14	T	65	1.6	0.187	21.7	LOS B	4.2	29.3	0.75	0.63	35.0
15	R	176	0.0	0.684	45.4	LOS D	9.4	66.1	0.91	0.88	26.7
Approach		292	0.4	0.684	37.4	LOS C	9.4	66.1	0.85	0.81	29.3
All Vehicles		1957	2.4	0.684	31.3	LOS C	17.5	125.2	0.90	0.80	31.2

MOVEMENT SUMMARY

Site: Manning St / South St
2020 PM

Manning Street and South Street
4 Way Signalised Intersection
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
4	L	160	0.0	0.704	30.4	LOS C	16.4	116.7	0.93	0.86	33.9
5	T	673	3.2	0.704	22.9	LOS B	16.4	118.1	0.94	0.80	34.5
6	R	52	4.5	0.192	27.3	LOS B	2.3	16.6	0.75	0.73	34.3
Approach		884	2.7	0.704	24.5	LOS B	16.4	118.1	0.92	0.81	34.4
East: Beach Street E											
7	L	65	5.5	0.264	19.5	LOS B	2.1	15.6	0.61	0.72	39.1
8	T	60	5.9	0.314	44.8	LOS D	5.5	40.6	0.92	0.73	25.5
9	R	24	5.0	0.313	53.0	LOS D	5.5	40.6	0.92	0.79	25.2
Approach		149	5.6	0.314	35.1	LOS C	5.5	40.6	0.79	0.74	30.0
North: Manning St N											
10	L	17	0.0	0.792	51.2	LOS D	22.3	158.7	0.99	0.93	26.1
11	T	800	2.2	0.788	43.1	LOS D	22.3	159.0	0.99	0.92	26.3
12	R	63	1.9	0.205	34.8	LOS C	3.3	23.6	0.86	0.74	30.7
Approach		880	2.2	0.788	42.6	LOS D	22.3	159.0	0.98	0.90	26.6
West: South St W											
13	L	58	0.0	0.219	33.0	LOS C	5.3	37.4	0.77	0.85	32.2
14	T	75	1.6	0.218	24.8	LOS B	5.3	37.4	0.77	0.66	33.3
15	R	202	0.0	0.845	47.1	LOS D	11.0	77.0	0.94	0.87	26.1
Approach		335	0.4	0.845	39.7	LOS C	11.0	77.0	0.87	0.82	28.4
All Vehicles		2248	2.3	0.845	34.6	LOS C	22.3	159.0	0.93	0.84	29.7

MOVEMENT SUMMARY

Site: Manning St / South St
2010 PM + Full Development

Manning Street and South Street
4 Way Signalised Intersection
Signals - Fixed Time Cycle Time = 103 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
4	L	146	0.0	0.655	29.5	LOS C	14.0	99.4	0.92	0.85	34.3
5	T	585	3.2	0.655	22.1	LOS B	14.0	100.2	0.92	0.79	35.0
6	R	56	4.7	0.199	26.7	LOS B	2.3	17.1	0.76	0.73	34.7
Approach		787	2.7	0.655	23.8	LOS B	14.0	100.2	0.91	0.79	34.8
East: Beach Street E											
7	L	57	5.6	0.217	18.5	LOS B	1.7	12.8	0.60	0.72	39.8
8	T	79	4.5	0.338	40.3	LOS C	6.1	44.7	0.91	0.73	27.0
9	R	24	5.0	0.337	48.5	LOS D	6.1	44.7	0.91	0.81	26.7
Approach		160	4.9	0.338	33.8	LOS C	6.1	44.7	0.80	0.74	30.4
North: Manning St N											
10	L	15	0.0	0.712	46.4	LOS D	17.8	126.6	0.97	0.88	27.7
11	T	696	2.3	0.713	38.2	LOS C	17.8	126.8	0.97	0.85	28.0
12	R	108	1.2	0.345	35.0	LOS C	5.3	37.8	0.90	0.77	30.6
Approach		819	2.1	0.713	37.9	LOS C	17.8	126.8	0.96	0.84	28.3
West: South St W											
13	L	96	0.0	0.293	31.4	LOS C	7.0	49.1	0.78	0.87	32.9
14	T	93	1.3	0.293	23.3	LOS B	7.0	49.1	0.78	0.68	34.0
15	R	214	0.0	0.810	47.7	LOS D	11.0	77.0	0.95	0.94	26.0
Approach		402	0.3	0.810	38.2	LOS C	11.0	77.0	0.87	0.86	29.0
All Vehicles		2168	2.2	0.810	32.5	LOS C	17.8	126.8	0.91	0.82	30.7

MOVEMENT SUMMARY

Site: Manning St / South St
2020 PM + Full Development

Manning Street and South Street
4 Way Signalised Intersection
Signals - Fixed Time Cycle Time = 103 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Manning St S											
4	L	167	0.0	0.752	32.3	LOS C	16.6	117.9	0.95	0.89	32.9
5	T	673	3.2	0.752	24.8	LOS B	16.6	118.9	0.96	0.86	33.5
6	R	64	4.5	0.229	26.8	LOS B	2.7	19.6	0.77	0.73	34.6
Approach		904	2.7	0.751	26.3	LOS B	16.6	118.9	0.95	0.86	33.4
East: Beach Street E											
7	L	65	5.5	0.249	18.6	LOS B	2.0	14.6	0.60	0.72	39.8
8	T	87	4.4	0.378	40.6	LOS C	6.8	49.3	0.92	0.74	26.8
9	R	27	5.0	0.378	48.8	LOS D	6.8	49.3	0.92	0.81	26.5
Approach		180	4.9	0.378	33.9	LOS C	6.8	49.3	0.81	0.74	30.4
North: Manning St N											
10	L	17	0.0	0.824	51.8	LOS D	21.9	156.2	1.00	0.96	25.9
11	T	800	2.2	0.820	43.7	LOS D	21.9	156.5	1.00	0.96	26.1
12	R	118	1.1	0.379	35.6	LOS C	5.8	40.9	0.92	0.77	30.3
Approach		935	2.1	0.820	42.8	LOS D	21.9	156.5	0.99	0.94	26.5
West: South St W											
13	L	103	0.0	0.322	32.5	LOS C	7.8	55.1	0.79	0.87	32.4
14	T	103	1.3	0.322	24.3	LOS B	7.8	55.1	0.79	0.70	33.4
15	R	235	0.0	0.890	46.9	LOS D	11.5	80.3	0.98	0.93	26.2
Approach		441	0.3	0.890	38.2	LOS C	11.5	80.3	0.89	0.86	29.0
All Vehicles		2460	2.2	0.890	35.3	LOS C	21.9	156.5	0.94	0.88	29.5

Peel St & South St – Existing Layout

MOVEMENT SUMMARY

Site: Peel St / South St 2010 PM

Peel Street and South Street
3 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel Street											
5	L	54	2.0	0.111	8.2	LOS A	0.5	3.7	0.34	0.59	41.7
6	R	42	2.5	0.111	8.6	LOS A	0.5	3.7	0.34	0.74	41.5
Approach		96	2.2	0.111	8.4	LOS A	0.5	3.7	0.34	0.66	41.6
East: South Street E											
4	L	18	17.6	0.099	6.8	LOS A	0.0	0.0	0.00	0.89	43.3
3	T	168	4.4	0.100	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		186	5.6	0.100	0.7	LOS A	0.0	0.0	0.00	0.09	49.3
West: South Street W											
1	T	224	1.4	0.122	0.6	LOS A	0.9	6.6	0.32	0.00	46.1
2	R	9	0.0	0.123	7.4	LOS A	0.9	6.6	0.32	0.87	43.0
Approach		234	1.4	0.122	0.9	LOS A	0.9	6.6	0.32	0.04	46.0
All Vehicles		516	3.1	0.122	2.2	NA	0.9	6.6	0.21	0.17	46.2

MOVEMENT SUMMARY

Site: Peel St / South St 2020 PM

Peel Street and South Street
3 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel Street											
5	L	62	1.9	0.136	8.6	LOS A	0.6	4.5	0.38	0.61	41.4
6	R	48	2.4	0.136	8.9	LOS A	0.6	4.5	0.38	0.77	41.2
Approach		111	2.1	0.136	8.7	LOS A	0.6	4.5	0.38	0.68	41.3
East: South Street E											
4	L	21	17.6	0.115	6.8	LOS A	0.0	0.0	0.00	0.89	43.3
3	T	194	4.3	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		215	5.6	0.115	0.7	LOS A	0.0	0.0	0.00	0.09	49.3
West: South Street W											
1	T	258	1.4	0.141	0.8	LOS A	1.1	7.8	0.36	0.00	45.7
2	R	11	0.0	0.140	7.5	LOS A	1.1	7.8	0.36	0.87	43.0
Approach		268	1.3	0.141	1.0	LOS A	1.1	7.8	0.36	0.03	45.6
All Vehicles		594	3.0	0.141	2.3	NA	1.1	7.8	0.23	0.17	46.0

MOVEMENT SUMMARY

Site: Peel St / South St 2010
PM + Full Development

Peel Street and South Street
3 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel Street											
5	L	103	1.1	0.359	10.3	LOS A	2.2	15.4	0.49	0.68	40.0
6	R	153	1.0	0.359	10.6	LOS A	2.2	15.4	0.49	0.86	39.9
Approach		256	1.1	0.360	10.5	LOS A	2.2	15.4	0.49	0.79	39.9
East: South Street E											
4	L	81	4.1	0.136	6.5	LOS A	0.0	0.0	0.00	0.79	43.3
3	T	174	4.4	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		255	4.3	0.137	2.1	LOS A	0.0	0.0	0.00	0.25	47.6
West: South Street W											
1	T	224	1.4	0.158	1.0	LOS A	1.2	8.7	0.39	0.00	45.1
2	R	60	0.0	0.158	7.7	LOS A	1.2	8.7	0.39	0.81	42.8
Approach		284	1.1	0.158	2.4	LOS A	1.2	8.7	0.39	0.17	44.6
All Vehicles		795	2.1	0.360	4.9	NA	2.2	15.4	0.30	0.40	43.8

MOVEMENT SUMMARY

Site: Peel St / South St 2020
PM + Full Development

Peel Street and South Street
3 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel Street											
5	L	112	1.1	0.409	11.3	LOS A	2.7	19.0	0.53	0.74	39.2
6	R	160	1.0	0.409	11.7	LOS A	2.7	19.0	0.53	0.90	39.1
Approach		272	1.1	0.409	11.5	LOS A	2.7	19.0	0.53	0.84	39.1
East: South Street E											
4	L	84	4.1	0.152	6.5	LOS A	0.0	0.0	0.00	0.80	43.3
3	T	200	4.3	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		284	4.2	0.152	1.9	LOS A	0.0	0.0	0.00	0.24	47.8
West: South Street W											
1	T	258	1.4	0.178	1.1	LOS A	1.4	10.2	0.42	0.00	44.8
2	R	61	0.0	0.177	7.9	LOS A	1.4	10.2	0.42	0.82	42.8
Approach		319	1.1	0.178	2.4	LOS A	1.4	10.2	0.42	0.16	44.4
All Vehicles		875	2.1	0.409	5.1	NA	2.7	19.0	0.32	0.39	43.6

Peel St & Kent St – Existing Layout

MOVEMENT SUMMARY

Site: Peel St / Kent St 2010 PM

Peel Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel St S											
4	L	3	0.0	0.023	6.9	LOS A	0.1	0.7	0.18	0.58	42.7
5	T	17	0.0	0.023	5.6	LOS A	0.1	0.7	0.18	0.48	43.6
6	R	4	0.0	0.023	7.2	LOS A	0.1	0.7	0.18	0.68	42.6
Approach		24	0.0	0.023	6.0	LOS A	0.1	0.7	0.18	0.53	43.3
East: Kent St E											
7	L	15	7.1	0.049	6.6	LOS A	0.3	2.1	0.08	0.63	43.1
8	T	37	0.0	0.049	0.0	LOS A	0.3	2.1	0.08	0.00	48.8
9	R	39	2.7	0.049	6.9	LOS A	0.3	2.1	0.08	0.73	42.8
Approach		91	2.3	0.049	4.1	LOS A	0.3	2.1	0.08	0.42	45.1
North: Peel St N											
10	L	8	0.0	0.029	6.8	LOS A	0.1	1.0	0.10	0.60	43.0
11	T	20	5.3	0.029	5.6	LOS A	0.1	1.0	0.10	0.49	44.0
12	R	4	0.0	0.029	7.1	LOS A	0.1	1.0	0.10	0.70	42.7
Approach		33	3.2	0.029	6.1	LOS A	0.1	1.0	0.10	0.54	43.6
West: Kent St W											
1	L	4	0.0	0.010	6.5	LOS A	0.1	0.5	0.15	0.68	43.1
2	T	14	7.7	0.010	0.1	LOS A	0.1	0.5	0.15	0.00	48.0
3	R	1	0.0	0.010	6.9	LOS A	0.1	0.5	0.15	0.81	42.9
Approach		19	5.6	0.010	1.9	LOS A	0.1	0.5	0.15	0.20	46.5
All Vehicles		166	2.5	0.049	4.5	NA	0.3	2.1	0.11	0.43	44.7

MOVEMENT SUMMARY

Site: Peel St / Kent St 2020 PM

Peel Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel St S											
4	L	3	0.0	0.026	6.9	LOS A	0.1	0.8	0.20	0.58	42.7
5	T	19	0.0	0.026	5.6	LOS A	0.1	0.8	0.20	0.49	43.5
6	R	5	0.0	0.026	7.3	LOS A	0.1	0.8	0.20	0.68	42.5
Approach		27	0.0	0.026	6.1	LOS A	0.1	0.8	0.20	0.54	43.2
East: Kent St E											
7	L	17	7.1	0.056	6.6	LOS A	0.3	2.5	0.09	0.63	43.1
8	T	42	0.0	0.056	0.1	LOS A	0.3	2.5	0.09	0.00	48.7
9	R	44	2.7	0.056	6.9	LOS A	0.3	2.5	0.09	0.72	42.8
Approach		103	2.3	0.056	4.1	LOS A	0.3	2.5	0.09	0.41	45.1
North: Peel St N											
10	L	9	0.0	0.035	6.9	LOS A	0.2	1.1	0.11	0.59	42.9
11	T	23	5.3	0.035	5.7	LOS A	0.2	1.1	0.11	0.49	44.0
12	R	5	0.0	0.035	7.2	LOS A	0.2	1.1	0.11	0.70	42.7
Approach		38	3.2	0.035	6.2	LOS A	0.2	1.1	0.11	0.55	43.5
West: Kent St W											
1	L	5	0.0	0.012	6.6	LOS A	0.1	0.5	0.16	0.67	43.1
2	T	16	7.7	0.012	0.2	LOS A	0.1	0.5	0.16	0.00	47.8
3	R	1	0.0	0.012	6.9	LOS A	0.1	0.5	0.16	0.80	42.9
Approach		22	5.5	0.012	2.0	LOS A	0.1	0.5	0.16	0.20	46.3
All Vehicles		191	2.5	0.056	4.5	NA	0.3	2.5	0.12	0.43	44.6

MOVEMENT SUMMARY

Site: Peel St / Kent St 2010 PM + Full Development

Peel Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel St S											
4	L	3	0.0	0.024	7.0	LOS A	0.1	0.8	0.19	0.59	42.7
5	T	22	0.0	0.025	5.7	LOS A	0.1	0.8	0.19	0.50	43.6
6	R	1	0.0	0.024	7.3	LOS A	0.1	0.8	0.19	0.70	42.6
Approach		26	0.0	0.025	5.9	LOS A	0.1	0.8	0.19	0.52	43.5
East: Kent St E											
7	L	9	7.1	0.057	6.6	LOS A	0.3	2.5	0.10	0.59	43.0
8	T	32	0.0	0.058	0.1	LOS A	0.3	2.5	0.10	0.00	48.4
9	R	63	1.6	0.058	6.9	LOS A	0.3	2.5	0.10	0.68	42.7
Approach		104	1.6	0.058	4.8	LOS A	0.3	2.5	0.10	0.47	44.3
North: Peel St N											
10	L	4	0.0	0.055	7.0	LOS A	0.2	1.7	0.17	0.56	42.7
11	T	31	4.3	0.055	5.8	LOS A	0.2	1.7	0.17	0.49	43.6
12	R	20	0.0	0.055	7.4	LOS A	0.2	1.7	0.17	0.68	42.5
Approach		55	2.4	0.055	6.5	LOS A	0.2	1.7	0.17	0.56	43.2
West: Kent St W											
1	L	24	0.0	0.019	6.5	LOS A	0.1	0.8	0.19	0.52	42.7
2	T	5	7.7	0.019	0.1	LOS A	0.1	0.8	0.19	0.00	47.1
3	R	5	0.0	0.019	6.9	LOS A	0.1	0.8	0.19	0.63	42.5
Approach		35	1.2	0.019	5.6	LOS A	0.1	0.8	0.19	0.45	43.3
All Vehicles		220	1.6	0.058	5.5	NA	0.3	2.5	0.14	0.50	43.8

MOVEMENT SUMMARY

Site: Peel St / Kent St 2020 PM + Full Development

Peel Street and Kent Street
4 Way Priority Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Peel St S											
4	L	3	0.0	0.027	7.0	LOS A	0.1	0.8	0.21	0.58	42.7
5	T	24	0.0	0.027	5.7	LOS A	0.1	0.8	0.21	0.50	43.5
6	R	1	0.0	0.027	7.4	LOS A	0.1	0.8	0.21	0.70	42.5
Approach		28	0.0	0.027	5.9	LOS A	0.1	0.8	0.21	0.52	43.4
East: Kent St E											
7	L	11	7.1	0.064	6.7	LOS A	0.4	2.8	0.11	0.59	43.0
8	T	37	0.0	0.064	0.1	LOS A	0.4	2.8	0.11	0.00	48.3
9	R	68	1.6	0.064	6.9	LOS A	0.4	2.8	0.11	0.69	42.7
Approach		116	1.6	0.064	4.7	LOS A	0.4	2.8	0.11	0.46	44.4
North: Peel St N											
10	L	5	0.0	0.060	7.1	LOS A	0.3	1.9	0.17	0.56	42.7
11	T	34	4.3	0.060	5.9	LOS A	0.3	1.9	0.17	0.49	43.6
12	R	21	0.0	0.060	7.5	LOS A	0.3	1.9	0.17	0.69	42.5
Approach		60	2.4	0.060	6.6	LOS A	0.3	1.9	0.17	0.57	43.1
West: Kent St W											
1	L	25	0.0	0.021	6.5	LOS A	0.1	0.9	0.20	0.51	42.7
2	T	6	7.7	0.021	0.1	LOS A	0.1	0.9	0.20	0.00	46.9
3	R	6	0.0	0.021	6.9	LOS A	0.1	0.9	0.20	0.63	42.5
Approach		38	1.3	0.021	5.5	LOS A	0.1	0.9	0.20	0.45	43.3
All Vehicles		242	1.6	0.064	5.4	NA	0.4	2.8	0.15	0.49	43.8

APPENDIX D

Turn Path Checks


PEEL STREET
MANNING LANE (ONE WAY)
SP 39467
DP 581283
EXISTING BUILDING SP 1291 3
PLANTER
SITE BOUNDARY
BUS STOP
BUS STATION ZONE
129 TOTAL CAR SPACES
BUILDING AREA RL 3.500
STORE ENTRY
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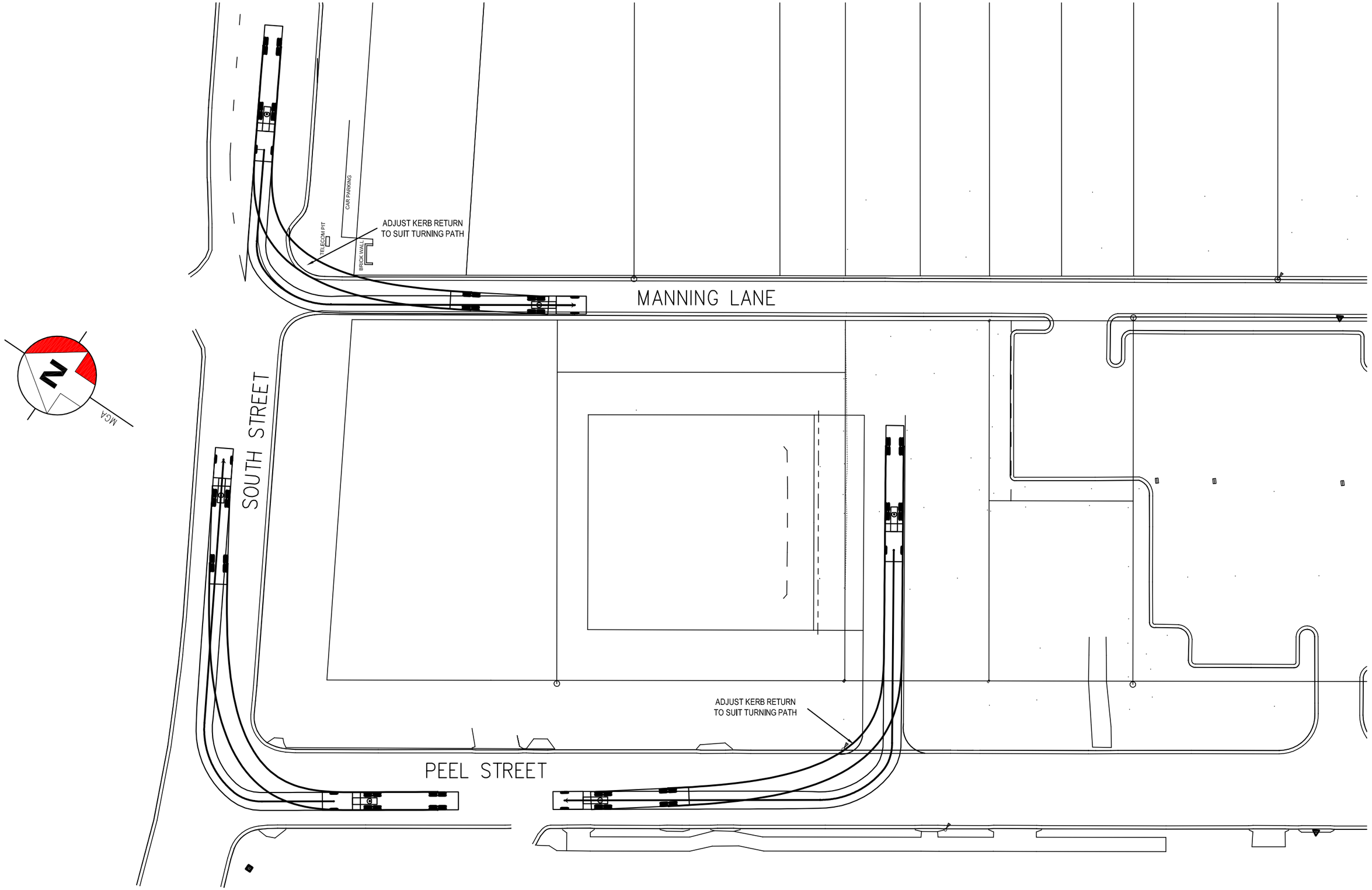

SURVEYOR T.BRODIN	THESE DRAWINGS HAVE BEEN TAKEN TO THE SITE OF THE PROPOSED WORKS, COMPARED WITH THE SITUATION AND ARE APPROVED,	AUTOCAD FILE: G:\DESIGN\AUTO\AREA 6\WOOLWORTHS TRUCK TURNING PATHS.DWG
DATE OF SURVEY JUNE 2010	DIRECTOR OF ENGINEERING	CIVILCAD FILE: 61003B01
DESIGNED P.R. / DRAWN P.R. / CHECKED S.N.		DATAWORKS PROJECT CODE: #####
DATUM A.H.D.	DATE	

NOTES / COMMENTS

DATE	AUTH	AMENDMENT	REV
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PUBLIC UTILITIES - It is the responsibility of the user of this plan to establish the existence and location of all public utility installations affecting the project whether or not they are shown on this plan, and if necessary make arrangements to have them altered (the cost invalved in these alterations is to be borne by the contractor)

CONTACT:

TELSTRA: Co-axial Cables, Telephone Cables

COUNTRY ENERGY: Electricity Cables (Underground and Overhead)

MID COAST WATER: Sewer Mains, Water Mains, Water Services

SCALES

NOT TO SCALE

Great Lakes COUNCIL

ARTICULATED TRUCK TURNING PATHS FOR WOOLWORTHS DEVELOPMENT SITE, PEEL ST, TUNCURRY

SHEET No. 1 OF 1 SHEETS | PLAN No. **6M/037_1**