

# MEMO

**TO:** Neil Cocks (Northern Beaches Council)  
**FROM:** Ryan Miller  
**SUBJECT:** Dee Why Town Centre – Paramics Modelling  
**OUR REF:** 2196793A-ITP-MEM-006.docx  
**DATE:** 19 April 2017

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Hi Neil,

Please find below the scope of works required to address Roads and Maritime Services (RMS) and Transport for NSW (TfNSW) request for a clear and concise reporting of the Paramics modelling outcomes for the Dee Why Town Centre.

The scope of works includes:

- preparation of a letter which clearly and concisely explains the outcomes of the traffic modelling undertaken based upon Council's preferred option and other options regarding the future road network layout
- modelling context, options assessed, revised road layouts
- a summary of intersection performance, traffic impacts and identified areas where congestion is likely
- discussion on why SIDRA modelling will not be required for the Howard Road and Pittwater Road intersection (as requested by RMS).

## 1. STUDY CONTEXT

Parsons Brinckerhoff were commissioned by Warringah Council in association with Tract Consultants to undertake the Investigations & Design of Public Infrastructure for the Dee Why Town Centre in 2014. As part of the traffic and transport related component of this project, Parsons Brinckerhoff continued the previously prepared Paramics modelling for the Dee Why Town Centre.

The main aims of the study from a traffic and transport perspective were to analyse the proposed road network design and determine if the road network was suitable to accommodate future development proposed with the Town Centre. Several options for road networks were tested, varying increases in development floor space ratios (FSRs) as well as the future consideration of the Dee Why Transport Interchange. The following section provides further detail on the Paramics traffic modelling undertaken from 2007.

## 2. PREVIOUS PARAMICS MODELLING

### 2.1 Dee Why Town Centre Traffic Study – GTA Consultants (2007)

The 2007 GTA study determined the capability of the existing road network to accommodate the additional traffic that would be generated by the proposals for Key Sites A and B. It also provided advice on the level of overall development that could be accommodated in Dee Why as a whole under Warringah Local Environmental Plan 2000. This was undertaken in consultation with the then Roads and Traffic Authority (RTA) and State Transit Authority (STA).

The study took into consideration development arising from recently Council approved development application (DA) sites (including the Dee Why Hotel site), Council pending DA sites (including Sites A and B), and future potential development sites within Dee Why.

The study recommended modest infrastructure changes including a one-way road system at Howard and Oaks Avenues to effectively accommodate future potential development under the LEP over the next 20 years.

## 2.2 Dee Why Town Centre Traffic Model Update – GHD (2014)

The 2014 GHD study is an updated traffic study based on the 2007 GTA report. It determined the level of development in the Dee Why Town Centre that could be accommodated under the Option 2A2 scenario road network under a revised set of land use assumptions reflecting likely market take up. These assumptions included changes in land use mix of some developments and adoption of the updated trip generation rates prescribed by Roads and Maritime Services (RMS) in 2013.

A sensitivity analysis in the town centre found that the floor spaces for 28 developable sites within the town centre could be increased by 5 percent before the road network was affected.

FSRs have been introduced to ensure that the overall floor space and/or density in the town centre do not exceed the capacity identified in sensitivity analysis testing by GHD.

## 2.3 WSP | Parsons Brinckerhoff – 2016

The 2016 WSP | Parsons Brinckerhoff report provided updated traffic modelling for the Dee Why Town Centre. The purpose of this report was to investigate whether a two-way road system could be accommodated as an alternative infrastructure upgrade for future growth.

WSP | Parsons Brinckerhoff reviewed the revised model undertaken by GHD and undertook model optimisation. The methodology included, amongst other things, removing traffic generated sites already developed, revised traffic generations for certain key sites and removal of double counting or incorrectly applied traffic generations.

The results concluded that the two-way road system could be accommodated and would have greater benefits in terms of infrastructure requirements, costs and local community impacts.

## 3. ROAD NETWORK OPTIONS

Several options for the road network in Dee Why Town Centre were analysed with the primary focus being on the road configuration on Oaks Avenue, Howard Avenue, the proposed connecting road between Oaks Avenue and Howard Avenue (through an existing Council car park), St David Avenue and Pittwater Road from Sturdee Parade to Howard Avenue.

Some of these road network options were analysed previously, with additional variations or sensitivities undertaken as well as new options tested.

The following sub sections describes the proposed road networks and scenarios analysed.

### 3.1 Road Network

Road network options and considerations are discussed further below. These changes are directly related to the scenarios analysed.

#### One-way loop system

The introduction of a one-way loop system will require the implementation of the following:

- One-way eastbound on Oaks Avenue between Pittwater Road and New Link Road
- One-way westbound on Howard Avenue between New Link Road and Pittwater Road

- One-way northbound on New Link Road
- Two-way on Woolworths Lane
- Right turn bay extension on Pittwater Road into Oaks Avenue
- Implementation of No Left Turn from Fisher Road into Pittwater Road
- New intersection layout for the St David Avenue and Fisher Road intersection.

#### Two-way system

Comprises the existing road network plus a revised Pittwater Road, Howard Avenue and St David Avenue intersection layout.

The Pittwater Road, Howard Avenue and St David Avenue intersection modifications would include:

- Increasing the number of lanes on Howard Avenue westbound from two to three at the stop line and reducing the number of eastbound lanes to one.
- No Left Turn for larger vehicles from Pittwater Road onto Howard Avenue
- Revising the lane/turn allocations on both Howard Avenue and St David Avenue at the intersection
- Two-way on New Link Road
- One-way northbound or two-way on Woolworths Lane
- No left turn from Fisher Rod into Pittwater Road
- Right turn bay extension on Pittwater Road into Oaks Avenue.

#### 139 space car park

The inclusion of a 139 space car park at the same location as per the existing Council owned car park situated between Howard Avenue and Oaks Avenue, as the number of public car parking spaces to be provided as part of future redevelopment of the site.

#### New links

Woolworths Lane - this is a proposed one-way northbound or two-way two lane that runs north-south between Oaks Avenue and Pacific Parade to the west of the existing Woolworths site. Under the one-way loop system, the Woolworths Lane and Oaks Avenue intersection would become signalised and the Pacific Parade intersection, priority controlled. Under the two-way system, all Woolworths Lane intersections would be priority controlled.

New Link Road - this is a proposed link road that runs north-south between Howard Avenue and Oaks Avenue through the existing Council car park. This link road has been assessed as a one-way northbound under the proposed one-way loop system and two-way under the two-way system. Under the one-way loop system, all New Link Road intersections would be signalised. Under the two-way system, all New Link Road intersections would be priority controlled.

### 3.2 Scenarios

The following five modelling scenarios have been assessed based upon the most recent requirements from Warringah Council:

- Existing two-way system – disaggregated and model extended (“PB Base” Model)
- One-way loop system – Oaks Avenue to Howard Avenue (“1WAY” Model)
- Revised two-way system with improvements to Howard Avenue / Pittwater Road intersection plus Woolworths Lane two-way plus New Link Road two-way (“2WAY” Model), also referred to as Opt1
- Revised two-way system with improvements to Howard Avenue / Pittwater Road intersection plus Woolworths Lane two-way plus New Link Road two-way plus extended right turn lane on Pittwater Road into Oaks Avenue (“2WAYext” Model), also referred to as Opt2

- Revised two-way system with improvements to Howard Avenue / Pittwater Road intersection plus Woolworths Lane one-way northbound plus New Link Road two-way plus extended right turn lane on Pittwater Road into Oaks Avenue ("2WAYextW1" Model), also referred to as Opt3.

**Figure 3.1 Existing two-way system network ("GHD Base" Model 2013)**

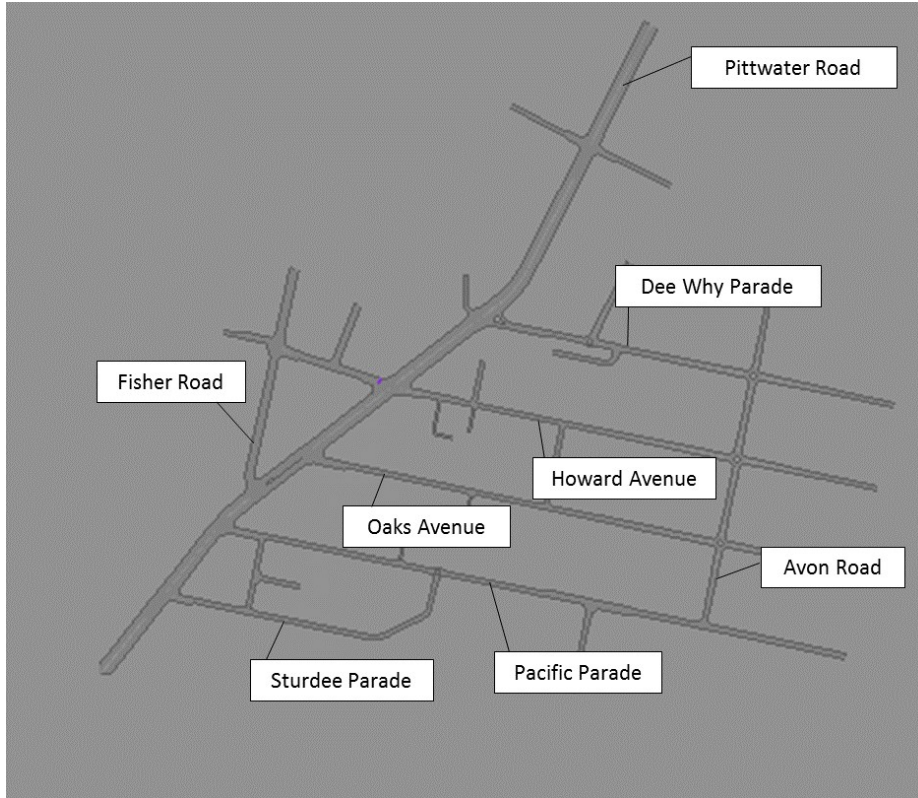


Figure 3.2 Proposed one-way loop system design (“GHD 1W” Model)



Figure 3.3 Existing Two-way System Network (extended network, disaggregated zones) [“Base” Model]



Figure 3.4 One-way Scheme – Oaks Avenue to Howard Avenue (“1W” Model)

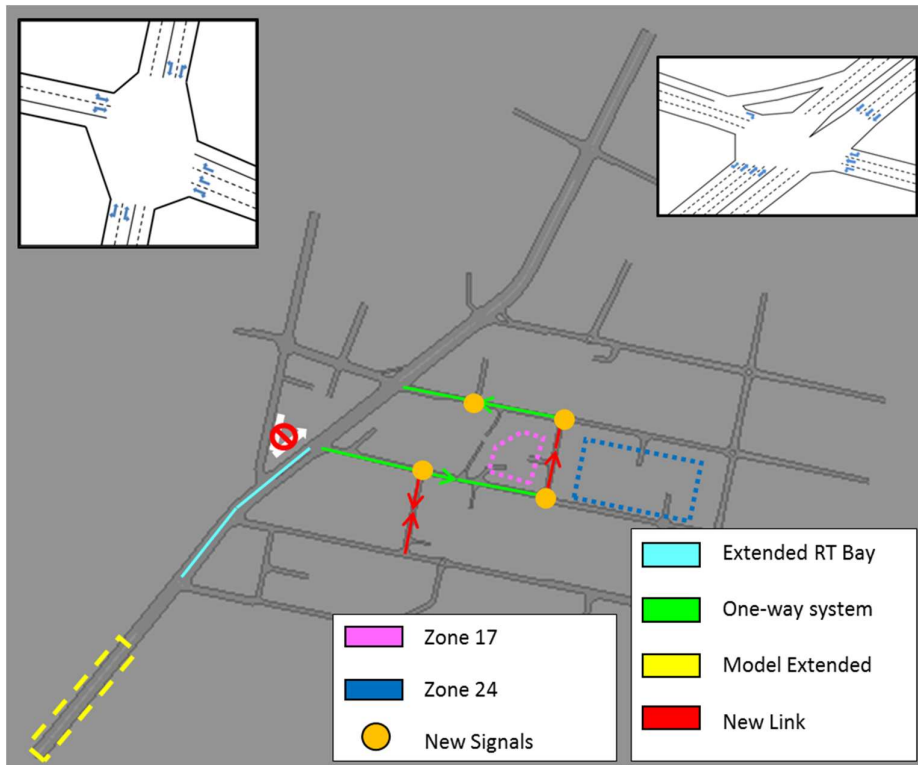


Figure 3.5 Revised Two-way System with improvements to Howard / Pittwater Intersection [“2W-Opt1” Model]





Figure 3.6 Revised Two-way System with improvements to Howard / Pittwater Intersection (extended right turn bay to Oaks and barred turns) ["2W-Opt2" Model]

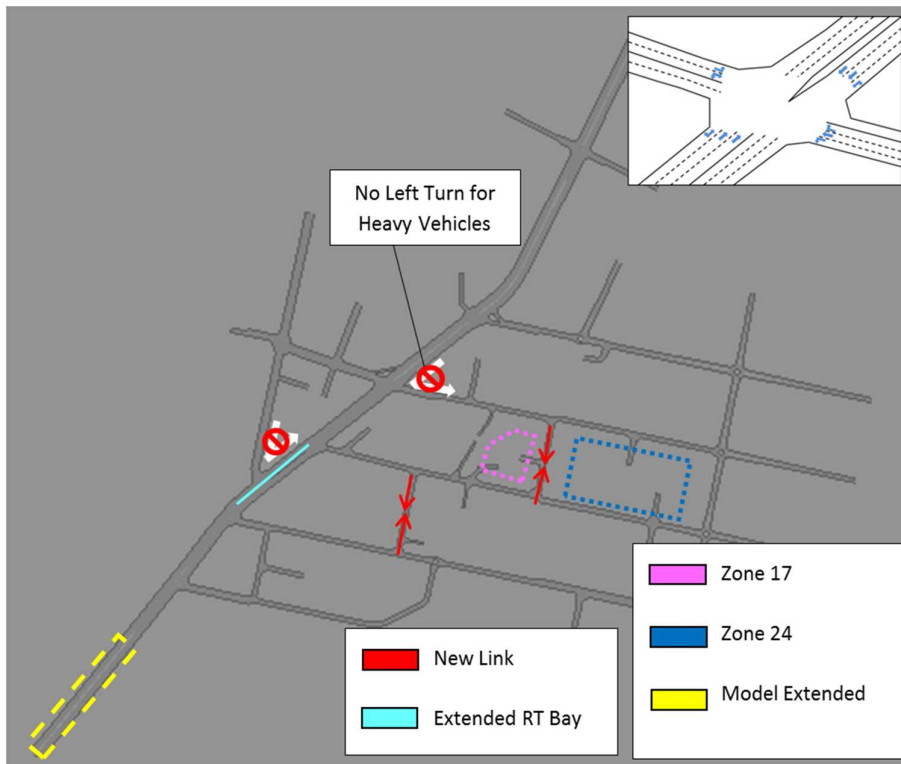
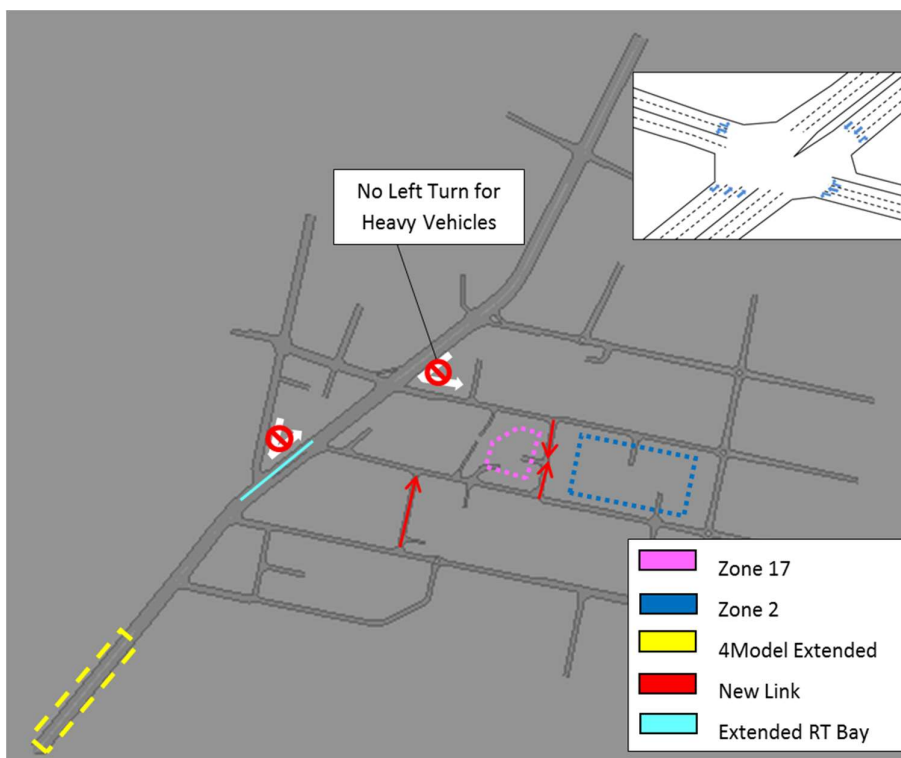


Figure 3.7 Revised Two-way System with improvements to Howard / Pittwater Intersection (extended right turn bay to Oaks, barred turns and one-way northbound Woolworth link) ["2W-Opt3" Model]



## 4. PREFERRED ROAD NETWORK

Council's preferred layout includes:

- a two-way New Link Road
- one way northbound Woolworths Lane
- upgrades to the Pittwater Road, Howard Avenue and St David Avenue intersection including three westbound lanes and one eastbound lane on Howard Avenue
- banned left turn out of Fisher Road into Pittwater Road
- banned left turn from Pittwater Road into Howard Avenue for heavy vehicles
- retaining right turn out of Pacific Parade into Pittwater Road
- Extending the right turn bay on Pittwater Road into Oaks Avenue further south to Pacific Parade.

## 5. PARAMICS MODELLING RESULTS

Given the number of scenarios analysed in Paramics and varying results which are not totally conclusive or highly favourable to one option or another, please find below a brief summary of the modelling outcomes.

The results have been based upon the road network statistics which include:

- trips completed and incomplete
- total trips
- distance travelled
- total travel time
- travel speed
- total vehicle stops
- average delay.

Intersection performance which includes:

- level of service and average vehicle day (in seconds) for:
  - individual movements
  - by approach
  - overall for the various road option scenarios.

Results are analysed with and without dynamic feedback. With dynamic feedback in operation vehicles become more dynamic and move to alternate routes and decision paths based upon congestion patterns.

### 5.1 Road network statistics

The following is a summary of the road network statistics:

Without dynamic feedback

- During the weekday AM peak, the best performing scenario is the 2 Way Option 2 (2W Opt 2). The two way variants performs better the one way system.
- During the weekday PM peak, the best performing scenarios is the 1 Way Option (1W). Of the two way variants, all perform very similarly.



- During the Saturday peak, the best performing scenario is the 2 Way Option 2 (2W Opt 2).

With dynamic feedback

- During the weekday AM peak, the best performing scenario is the 2 Way Option 3 (2W Opt 3). This is marginally better than the 2 Way Option 2 (2W Opt 2). The two way variants performs better the one way system.
- During the weekday PM peak, the best performing scenarios is the 1 Way Option (1W). Of the two way variants, all perform very similarly.
- During the Saturday peak, the best performing scenario is the 2 Way Option 2 (2W Opt 2).

## 5.2 Intersection performance

The following is a summary of the intersection performance:

Without dynamic feedback

- Overall, all scenarios perform adequately based upon overall intersection level of service for all three peak periods.
- During the weekday AM peak, the two way variants perform the best for overall intersection level of service
- During the weekday PM peak, the one way options performs better than the two way variants for overall intersection level of service
- During the Saturday peak, the one way options performs better than the two way variants for overall intersection level of service
- Pittwater Road intersection approaches perform at satisfactory levels of service for all scenarios with the one way option performing the best.

With dynamic feedback

- Two way variants perform much better and are more closely aligned with the one-way option where it performed better without dynamic feedback on.

## 6. SIDRA INTERSECTION MODELLING REQUEST

A request from the RMS to model the intersection of Pittwater Road, Howard Avenue and St David Avenue has not been undertaken. This request was made based upon land use changes proposed to property number 697-701 Pittwater Road (referred to as Site F in the Dee Why Town Centre Masterplan) located at the south-western corner of Pittwater Road and St David Avenue. This site could potentially be subjected to an increase in Floor Space Ratio (FSR) from 4:1 to 5.86:1, resulting in 34 additional dwellings on the site.

Based on a trip generation rate of 0.19 vehicle trips per residential unit (RMS, 2013), it is envisaged that an additional 7 vehicle trips in the peak hours would result from the potential increase in FSR of Site F. This increase is considered to have a negligible impact to the intersection performance as to require a re-assessment of the Paramics model.

## 7. SUMMARY

The traffic modelling undertaken thus far including varying road network systems, option testing and sensitivity testing indicates that both the one-way system and variants of the two-way system perform very similarly traffic operation wise.

When comparing the performance measures of both one and two-way systems it is evident each will have slightly varying locations where the road network will perform only satisfactorily, but in the main, general good performance for intersection overall LoS is achieved. Having said this, there are several

locations where certain approaches at intersections perform poorly whilst still maintaining a good level of service overall.

Under the dynamic feedback application, where vehicles are provided more route choice in the model, improved results are recorded for the two-way system when compared to the one-way system. The two-way system offers better accessibility, route choice, reduced travel times, reduced stops and very similar travel speeds.

In terms of infrastructure requirements, costs, local community impacts, the two-way system will have far greater benefits when compared to the one-way system. The one-way system will require an additional four sets of traffic signals, requires bus re-routing, complex intersections, lack of flexibility for traffic routes, reduced accessibility, not to mention construction impacts/construction duration and implementation logistics.

Based on the marginal difference in performance of the two schemes, the two way system with the addition of the following modifications is the preferred layout:

- a two-way New Link Road
- one way northbound Woolworths Lane
- upgrades to the Pittwater Road, Howard Avenue and St David Avenue intersection including three westbound lanes and one eastbound lane on Howard Avenue
- banned left turn out of Fisher Road into Pittwater Road
- banned left turn from Pittwater Road into Howard Avenue for heavy vehicles
- retaining right turn out of Pacific Parade into Pittwater Road
- Extending the right turn bay on Pittwater Road into Oaks Avenue further south to Pacific Parade.

If you have any questions or require clarifications on the above reporting please don't hesitate to contact me on (02) 9272 5324.

Yours sincerely,

Ryan Miller  
Principal Traffic Engineer

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