

Traffic Impact Assessment

Cardno

- Calderwood Project – Stage 1 PPR Addendum Traffic Impact Statement Update 8 February 2011
- Calderwood Urban Development Project Stage 1 Project Application Traffic Impact Assessment 4 March 2010





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Our Ref FR110026

Date 4 March 2010

TECHNICAL NOTE

Calderwood Urban Development Project Stage 1 Project Application Traffic Impact Assessment

INTRODUCTION

This note provides an assessment of the traffic and transport impacts that the proposed Calderwood Urban Development Project (CUDP) Stage 1 Project Application (PA) development yields would have on the operation of the existing transport system.

An analysis of the traffic and transport impacts of the full development of the CUDP Concept Plan was provided in the CUDP Concept Plan Transport Management & Accessibility Plan (TMAP) (Cardno, February 2010) herein referred to as the CUDP TMAP. For clarity, duplicate information is not reproduced here rather a reference to their location within the CUDP TMAP is included.

SITE LOCATION

The location of the CUDP development site, the proposed stage 1 subdivision boundary and the broader regional road network are shown in Figure 1. Figure 2 shows the proposed subdivision layout.

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Figure 1 CUDP Site location



Figure 2 Proposed CUDP Stage 1 PA Subdivision Layout



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EXISTING CONDITIONS

A full description of the existing roads and transport facilities/public transport services within the vicinity of the site are provided in Section 4 of the Concept Plan TMAP.

Of importance to note are:

- > The Illawarra Highway provides the main state road access to the site. It provides a two lane two way undivided roadway in the vicinity of the site. East of the subject site the Illawarra Highway connects to the Princes Highway which is also a state road and provides the main north-south route through the area connecting to Wollongong (via the F6 Freeway) and Dapto to the north and Shellharbour to the south.
- > The existing rural road network located within the CUDP Concept plan area includes Marshall Mount Road and Calderwood Road. Both are of narrow width although they are generally appropriate for the volume and composition of traffic they currently accommodate.
- > Public transport provision and facilities for pedestrians and cyclists in the area reflect the current low population numbers within the area.

Existing road network performance was assessed using the Wollongong and Shellharbour (WOLSH) TRACKS traffic model. Wollongong Council supplied a 2006 traffic model which was updated with recent traffic count data to reflect 2009 observed traffic operating conditions with an agreed 'area of influence' (this was agreed to by the RTA).

Details of the traffic model development and calibration process are contained within Section 6 of the CUDP TMAP.

A study area for this assessment was considered to comprise the road links and key intersections along the Illawarra Highway between the subject site and the Illawarra Highway / Tongarra Road intersection to the east. This included the following intersections:

- > Illawarra Highway / Yellow Rock Road priority controlled intersection.
- > Illawarra Highway / Broughton Avenue roundabout.
- > Illawarra Highway / Church Street priority controlled intersection.
- > Illawarra Highway / Calderwood Road / Macquarie Street traffic signals.
- > Illawarra Highway / Tongarra Road traffic signals.

The 2009 traffic model outputs were used to determine the existing road and intersection operating characteristics.

The assessment criteria for road network performance is detailed in Section 4.1.5 of the CUDP TMAP. In urban situations, intersections and arterial/ sub-arterial roads operating at LoS D are considered adequate. It is acceptable to provide road capacity at Level of Service 'D' in the peak hour since overprovision of road capacity is not conducive to promoting alternative transport modes to the car.

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Table 1 provides a summary of the existing mid block traffic volumes along the Illawarra Highway and provides an assessment of their level of service in accordance with AUSTRROADS traffic capacities.

Table 1 2009 Modelled Mid Block Capacity Analysis

Location			Peak Period	Peak Flow (Veh/hr)			Level Of Service	
Street	Between	And		Eastbound	Westbound	Total	Eastbound	Westbound
Illawarra Highway	Terry St	Calderwood Rd	AM	474	377	851	A	A
			PM	123	155	278	A	A
	Calderwood Rd	Church St	AM	299	255	554	A	A
			PM	155	169	324	A	A
	Church St	Broughton Ave	AM	121	155	276	A	A
			PM	314	373	687	A	A
	Broughton Ave	Yellow Rock Rd	AM	75	86	161	A	A
			PM	491	632	1,123	A	A

Table 1 indicates that the existing road network currently accommodates traffic volumes with significant spare capacity.

Intersection analysis of the key intersections along the Illawarra Highway within the local study area has been carried out. Table 2 provides a summary of the weekday peak hour intersection operational performance.

Table 2 - 2009 Intersection Analysis

Intersection	AM Peak			PM Peak		
	Degree of Saturation	Delays (s)	Level Of Service	Degree of Saturation	Delays (s)	Level Of Service
Illawarra Hwy/Tongarra Rd/Terry St	0.805	29.5	C	0.793	29.1	C
Illawarra Hwy/Calderwood Rd/Macquarie St	0.393	12.7	A	0.431	10.5	A
Illawarra Hwy/Church St	0.142	12.2	A	0.184	15.0	B
Illawarra Hwy/Broughton St	0.154	8.3	A	0.004	11.6	A
Illawarra Hwy/Yellow Rock Rd	0.044	15.5	B	0.013	15.7	B

Table 2 shows that all the modelled intersections currently provide satisfactory levels of operation.

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PROPOSED DEVELOPMENT

Delfin Lend Lease (DLL) are committed to achieving sustainable design outcomes. DLL have experience of successfully implementing travel demand managements measures in a number of comparable master planned communities. Further information detailing the range of successfully implemented travel demand management techniques and urban design outcomes are provided within Chapter 3.1 of the TMAP.

Objectives incorporated into these successfully implemented master planned communities include:

- > Establish an urban form to maximise use of and access to public transport.
- > Concentrate high trip generating uses adjacent to major public transport routes and nodes.
- > Provide public transport infrastructure and services to achieve higher public transport use.
- > Provide public transport and services early in the development to establish use pattern.
- > Incorporate a range of uses within the site to minimise demand for travel outside the area.
- > Establish high quality and efficient pedestrian and cycle routes to encourage travel by these modes.
- > Incorporate fibre to the home or premises in an early stage.
- > Community education to support public transport initiatives.

The CUDP Stage 1 PA seeks approval for a range of use on the site. For the purpose of this traffic impact statement, the following land uses are relevant:

- > Approx. 442 residential dwellings.
- > Construction of a Sales and Information Centre comprising a café and a temporary community centre.
- > Use of approximately 9,000m² gross floor area (GFA) for a range of use permissible under the B4 zone. This will be contained within the mixed use lots and the developments will be subject to future planning approvals.

It is proposed to provide the principal vehicular access to the site by constructing a four arm roundabout intersection at the location of the current Illawarra Highway / Yellow Rock Road intersection.

The benefits of providing a roundabout intersection to provide the primary access to the development site at this location are considered to be:

- > The proposed roundabout will be located at an existing intersection on the Illawarra Highway. Drivers travelling along the Highway will already have expectations of potential turning traffic at this location.
- > A roundabout intersection will provide a consistent intersection treatment along this portion of the Illawarra Highway (at Broughton Avenue) to avoid motorist confusion in travelling through successive different intersection types.
- > The Tullimbar development opposite the CUDP provides a smaller residential yield than that contemplated for CUDP. However, the Tullimbar development has recently achieved the provision of a roundabout intersection to provide site access.

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- > Roundabouts have a good safety performance and can assist in reducing through traffic speeds to a level more appropriate to the extension of the urban environment which the CUDP will create.
- > A roundabout treatment will minimize delays and queues to side road entering traffic.

A secondary point of access will be provided by the addition of a northern arm to the existing Illawarra Highway / Broughton Avenue roundabout. This secondary access will enable bus and cyclist permeability through the southeastern portion of the development.

PROPOSED PEDESTRIANS AND CYCLIST FACILITIES

An important element in the sustainable transport strategy for the proposed CUDP is the need to provide appropriate footpath/cycle provision to encourage and facilitate safe access for these modes. Connections are needed to integrate both the facilities for local travel (within the precinct) and to integrate into the wider active transport network.

Shellharbour Local Government Area Shared Use Path Strategy 2008 proposes off road shared use paths along Illawarra Highway to the west of Terry Street. A small section of off road shared use path is provided along the southern side of Illawarra Highway in the vicinity of Broughton Avenue. It may be possible to connect into this existing facility by constructing cycle paths associated with the internal road layout. Such a facility could also link to public open space adjacent to Stage 1 with the existing crossing point over Hazleton Creek.

PROPOSED PUBLIC TRANSPORT PROVISION

To help establish sustainable transport patterns and support transit usage a suitable level of public transport provision should be provided from the outset of the development. The establishment of public transport services for new development is the responsibility of the NSW Government Transport & Infrastructure Department.

The Department may consider the possibility of extensions or diversions to existing services to service the first stages of the development. It is noted that the Premier Illawarra currently operate service numbers 70, 73 & 76 which route along Tongarra Road / Church Street and route between Albion Park and Shellharbour. There may be the possibility to extend these services to include the initial stage of the CUDP although initial discussions with the local bus operator have indicated that services to Calderwood would be implemented as new routes, rather than as an extension of existing routes.

The long term public transport strategy for development is indicated in section 9.5 of the CUDP TMAP.

The proposed road network for Stage 1 has been designed to accommodate bus services and provide appropriate bus stop infrastructure. The layout also enables buses to turn within the site and enables penetration of the site to accord with the service planning guideline requirements to ensure 90% of dwellings are within a 400m straight line distance from a bus route.

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TRAFFIC ASSESSMENT

The TRACKS traffic model was used to determine the impact that the additional traffic related to the CUDP Stage 1 PA would have on the operation of the existing road network.

The CUDP Stage 1 PA was represented as a single zone in the traffic model with connections to Illawarra Highway at the locations of the existing Yellow Rock Road and Broughton Avenue intersections.

Assessments were undertaken for the year of 2016 for both 'with' and 'without' CUDP Stage 1.

A comparison of the modelled mid-block traffic volumes for both the 'with' and 'without' CUDP Stage 1 is shown in Table 3.

Table 3 2016 Mid Block Traffic Analysis With and Without CUDP Stage 1

Location			Peak Period	2016 Without CUDP Stage 1					2016 With CUDP Stage 1				
				Peak Flow (Veh/hr)			Level Of Service		Peak Flow (Veh/hr)			Level Of Service	
Street	Between	And		Eastbound	Westbound	Total	Eastbound	Westbound	Eastbound	Westbound	Total	Eastbound	Westbound
Illawarra Highway	Terry St	Calderwood Rd	AM	680	511	1,191	A	A	824	747	1,571	B	A
			PM	621	886	1,507	A	C	753	1,037	1,790	A	D
	Calderwood Rd	Church St	AM	499	396	895	A	A	669	574	1,243	A	A
			PM	469	676	1,145	A	A	628	845	1,473	A	B
	Church St	Broughton Ave	AM	378	310	688	A	A	600	555	1,155	A	A
			PM	410	614	1,024	A	A	624	824	1,448	A	B
	Broughton Ave	Yellow Rock Rd	AM	80	90	170	A	A	265	312	577	A	A
			PM	125	118	243	A	A	338	306	644	A	A

Table 3 shows that the road network will accommodate traffic volumes which are within their capacities both with and without CUDP Stage 1.

A comparison of the intersection analysis results both 'with' and 'without' CUDP Stage 1 is shown in Table 4.

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Table 4 -2016 Intersection Analysis With and Without CUDP Stage 1

Intersection	Peak Period	2016 Without CUDP Stage 1			2016 With CUDP Stage 1		
		Degree of Saturation	Delays (s)	Level Of Service	Degree of Saturation	Delays (s)	Level Of Service
Illawarra Hwy/Tongarra Rd/ Terry St	AM	0.866	34.7	C	0.970	34.7	C
	PM	0.903	42.0	C	0.914	43.1	D
Illawarra Hwy/ Calderwood Rd/ Macquarie St	AM	0.360	5.6	A	0.464	7.7	A
	PM	0.467	8.0	A	0.565	8.1	A
Illawarra Hwy/ Church St	AM	0.151	15.8	B	0.246	16.4	B
	PM	0.265	21.3	B	0.364	23.2	B
Illawarra Hwy/ Broughton St	AM	0.030	13.2	A	0.089	14.1	A
	PM	0.126	12.8	A	0.078	14.9	B
Illawarra Hwy/ Yellow Rock Rd	AM	0.006	20.2	B	0.007	20.4	B
	PM	0.006	16.0	B	0.007	20.4	B

Table 4 shows that all the intersections would continue to operate with satisfactory levels of operation with the addition of traffic related to CUDP Stage 1.

Overall, it is demonstrated that the traffic related to CUDP Stage 1 can be satisfactorily accommodated on the existing road network without requiring any infrastructure upgrades.

Parking

Parking provision rates for new development are provided in Shellharbour City Council Car Parking Policy dated 6 July 1992.

Assessment has been made of the parking requirements of the proposed sales office and information centre and is shown in Table 5. It is noted that the DCP does not provide specific categories for the nature of the land uses proposed. Therefore the following assumptions have been made as the basis on which to assess the potential parking provision:

- > Sales office is assessed on the basis of a retail shop although it would not normally be classified as retail. However the use of a retail parking rate is more conservative than the commercial parking rate and should serve as a useful proxy.
- > The proposed cafe is a small facility and its function will largely be ancillary to the adjacent uses. Patronage is likely to be drawn from the adjacent sales and office uses operation. The application of the DCP restaurant parking rate at 1 space per 4 m² is not considered appropriate since it will not function as a restaurant drawing patronage, and hence requiring parking accommodation, from a wide catchments. Hence, it is proposed to provide only space for staff parking in accordance with DCP requirements and two staff are assumed to be on site at any one time.
- > The community facility is also a small order and its parking demands can be accommodated as dual usage since its times of peak parking demand are likely to be outside of the sales office and info centre opening times. However, for the purposes of this

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assessment it is assessed separately. N It is assessed by assuming that all the floorspace is available as 'body of the hall'.

- > The project office and sales office are likely to be staffed by the same people. However this assessment calculates parking provision separately to be conservative.

Table 1 – Proposed Parking Provision

Land Use	Floorspace (m ²)	DCP parking rate	Number of Parking spaces
Project Office	203	1 space per 40 m ² (Office & commercial)	5.1
Sales office	184	1 space per 35 m ² (retail)	5.3
Cafe	42 public area + 28 (deck) = 70	1 per 4 m ² public area plus 1 space per 2 staff	1
Community Centre	32	1 space per 4 m ² body of hall	8
		Total	20

Based upon Table 1 the minimum number of spaces would therefore be 19.4 or 20 spaces. The proposal to provide some 33 spaces would therefore provide an acceptable amount of parking. In addition a number of bicycle stands are proposed to provide bicycle parking.

The residential and commercial elements of the Stage 1 development should be provided in accordance with the DCP parking provisions and taking into account the sustainable transport objectives outlined with the Concept Plan TMAP. The layout of the parking spaces should conform to the requirements of AS1890.1:2002.

Summary & Conclusions

This traffic impact assessment is summarized as follows:

- > This traffic impact assessment has examined the transport impacts of the Stage 1 Project Application.
- > A Calderwood Urban Development Project (CUDP) Concept Plan Transport Management & Accessibility Plan (Cardno February 2010) examined the transport impacts of the Concept Plan for full development at Calderwood.
- > Delfin Lend Lease are committed to the implementation of a range of sustainable transport measures to reduce reliance on the private vehicle and promote alternative forms of sustainable transport. This is demonstrated in their commitment at other successfully implemented master planned communities.

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- > Pedestrian and cycle paths are proposed as part of the Calderwood development internal road network to tie into the existing/proposed external facilities.
- > The potential for the early timing of public transport services to serve Stage 1 will be discussed with NSW Government Transport & Infrastructure Department.
- > Traffic modelling for the CUDP Stage 1 PA development yields was undertaken using the WOLSH TRACKS traffic model.
- > The traffic modelling results indicated that the existing road network and its intersections would operate at satisfactory levels of operation with the addition of traffic related to the CUDP Stage in 2016.
- > A parking provision of 33 spaces is proposed for the sales and info centre with associated cafe and temporary community facility. This level of parking provision is compliant to the intent of Council's parking DCP for parking.

Overall, it is concluded that the proposed CUDP Stage 1 will not create any adverse transport impacts. There is no requirement for road infrastructure upgrades associated with the Stage 1 PA.

FR110026
Anissa Levy

8 February 2011

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Dear Rob,

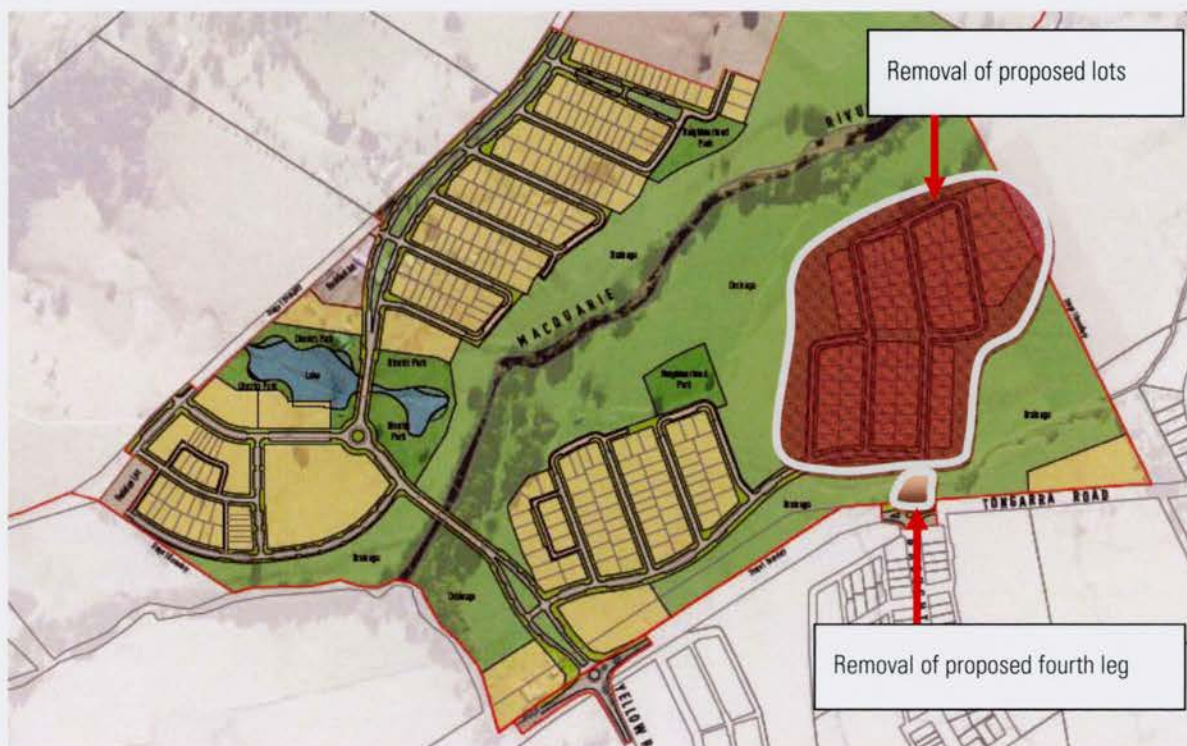
CALDERWOOD PROJECT – STAGE 1 PPR ADDENDUM TRAFFIC IMPACT STATEMENT UPDATE

In accordance with your request, a review has been undertaken to determine the potential impact on the road network of the following changes to the Calderwood Urban Development Stage 1 Project Application as part of the Preferred project Report (PPR):

- Removal of land (refer to Figure 1) from the Stage 1 project application resulting in a reduction in the number of lots / dwellings.
- Removal of the proposed northern leg of the intersection of Illawarra Highway with Broughton Avenue/Illawarra Highway roundabout (refer to Figure 1), which would provide access to dwellings within Stage 1 of the Calderwood Urban Development area.

The removal of land and subsequent reduction in number of lots will reduce the traffic generating potential of the Stage1 site and hence will have no overall negative impact on the road network.

The Calderwood Urban Development Concept Plan modelling and traffic assessment includes a northern leg at the intersection of Illawarra Highway with Broughton Avenue. In Stage 1 this leg was proposed to provide access to new dwellings in the south-eastern area of the development site only. No connections to the east were proposed. The principal vehicular access to the Stage 1 site is proposed to be provided by constructing a four arm roundabout at the location of the current Illawarra Highway / Yellow Rock Road priority controlled intersection. This proposed northern leg of the intersection of Broughton Avenue/Illawarra Highway would have connected to the Illawarra Highway / Yellow Rock Road northern leg via the internal road network.

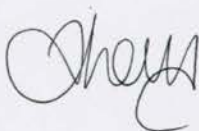
FIGURE 1 PROPOSED CHANGES


In future year scenarios the fourth leg to the Illawarra Highway/Broughton Avenue roundabout will form a part of the proposed Tripoli Way bypass. It is assumed that the fourth leg would be constructed by Council when the Tripoli Way Bypass is deemed to be required by the authorities and in accordance with the Calderwood Traffic Management and Access Plan.

This review has considered the impact of removing the proposed northern leg from the intersection for the purpose of providing access to the proposed Stage 1 dwellings, as these dwellings will no longer be developed. The outcome of this review is that there will be no impact on the road network if this access is removed from Stage 1. The northern leg can be constructed at a time when the Tripoli Way bypass is required.

I trust that the above information is sufficient for your purposes. However, if you require any further information please do not hesitate to contact us on 9496 7700.

Yours sincerely



Anissa Levy
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 Principal Transport Engineer
 for **Cardno Traffic & Transport**