Project:	**Wollongong Central and West Keira Development**	Job No:	**60219101**
Subject:	**Modification 4 - Response to Council Comments**		
Created by:	**Daniel Lee**	Date:	**22/6/2012**
Reviewed by:	**Alex Roberts**	Date:	**22/6/2012**

West Keira Redevelopment – Proposed Modification

1.0 Introduction

AECOM has been engaged by Hansen Yunken to provide Traffic and Transport input advice to the West Keira Development. This technical note addresses pedestrian and vehicle conflict as well as traffic analysis queries generated by Wollongong Council in relation to the Proposed Modification Number 4 to the Concept Plan and a Project Application for the West Keira Development.

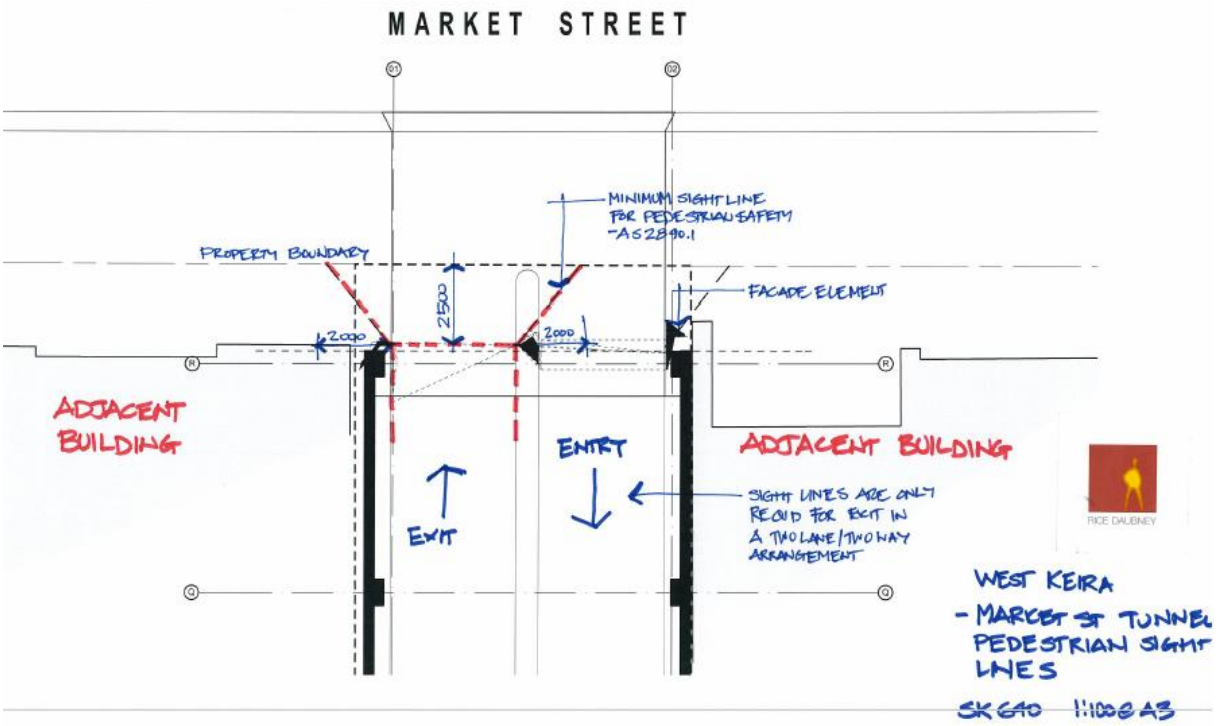
2.0 Pedestrian Visibility at the Proposed Access

Council's Comment:

The proposed new access crosses the footpath in a busy pedestrian area. Pedestrians have the right of way under these arrangements so it is important that the development provides at least minimum pedestrian sightlines for pedestrian safety in accordance with AS2890.1 Figure 3.3. However the required sight triangles do not appear to have been provided on either side of the access, and a central column is shown within the access which would also obstruct a driver's view of pedestrians.

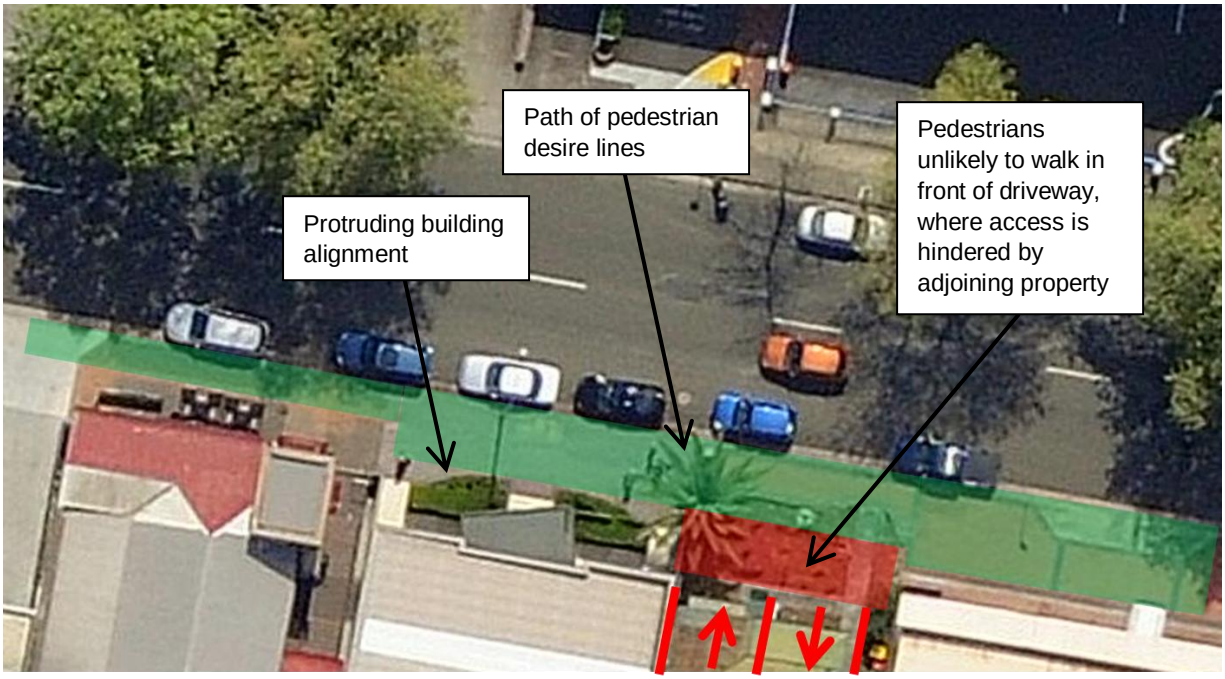
It is noted that the vehicle access point is set back from the property boundary as shown in Figure 1, by approximately 2.5m. This ensures the structural elements of the development do not obstruct the minimum required sight lines to the footpath edge.

Figure 1: Proposed Vehicle Access Building Alignment



As shown in the figure above, the sight triangle will be provided on the eastern side. On the western side, it is noted that the required sight triangle is, in part, within the adjoining property boundary. Figure 2 below further demonstrates how visibility of pedestrian movements is maximised across the access.

Figure 2: Aerial View of Adjacent Building Alignments



Source: www.nearmap.com

Given that the adjoining building alginment extends up towards the property boundary, as shown Figure 2, it is not probable for pedestrians to be walking up against the building alignments, but rather between the property boundary and the kerb, as indicated by the shaded area shown in Figure 2. Furthermore, given the protruding wall of the adjoining property, pedestrians are unlikely to walk in front of the driveway access as indicated by the red shaded area. Therefore the design and location of the proposed development's vehicle access at Market Street will maintain sufficient sight lines of pedestrians on Market Street.

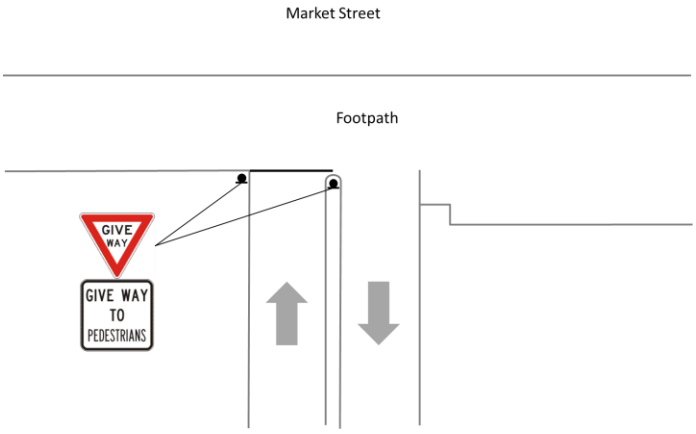
3.0 Pedestrian / Vehicle Conflict as Vehicles are Leaving the Site

Council's Comment:

Cars exiting the site, particularly right-turns, may need to wait on the footpath obstructing pedestrian flow, This would result in potential pedestrian/vehicle conflicts as pedestrians are likely to walk in front of or behind cars while drivers look for gap in traffic. Drivers may suddenly exit once a gap in traffic emerges without seeing approaching pedestrians.

Appropriate signs and linemarking would be installed at the exit onto Market Street. Cars stopped at this location would have sufficient visibility of vehicles along Market Street. The traffic facilities would be positioned as such that motorists would not need to protrude onto the footpath and the vehicle will remain positioned within the property boundary, as shown in Figure 3.

Figure 3: Proposed Traffic Facilities Adjacent to the Exit Ramps at Market Street



4.0 Pedestrian / Vehicle Conflict as Vehicles Enter the Site

Council's Comment:

In some cases drivers may already be in the process of making a right turn into the site while pedestrians are crossing. In these situations the driver would need to either wait on the road obstructing oncoming traffic or edge through pedestrians on the footpath. Drivers may also see a gap in the traffic make a sudden right turn into the site while pedestrians walking along the footpath may be unaware of this danger. Some left turning drivers are likely to try to edge through pedestrians on their way in the site.

These safety concerns exist at all driveway accesses, and as per the Australian Road Rules, it is the driver's responsibility to ensure that there is sufficient gap, of both vehicles and pedestrians, when entering a driveway. To improve vehicle compliance and maximise safety at the access, sight lines at the location will be maximised by removal of vegetation and removal of parking adjacent to the driveway.

5.0 Traffic Analysis

Council's Comment:

Council is concerned that the high (and increasing) pedestrian flows in Market Street have not been adequately considered in the traffic analysis. During peak times there is likely to be a steady continuous flow of pedestrians along the southern alignment of Market Street which would affect the movement of vehicles in and out of the access and may not be accounted for in the SIDRA analysis.

The SIDRA analysis tool cannot accurately model pedestrian effects on vehicle movements, particularly at an access such as this. However the analysis of the peak period showed that there is spare capacity at the proposed access with entry traffic operating at LoS of B and exit traffic operating at LoS of C. This indicates that even with additional delay to vehicles as they wait for pedestrians to cross, the access will still operate at an acceptable level of service.

Whilst pedestrian effects cannot be directly tested, sensitivity analysis has been undertaken by increasing traffic by 25% on the competing westbound through movement along Market Street. All movements into and out of the access must give way to this traffic flow, so by increasing it in this manner, demonstrates the ability of the intersection to cope effectively with any additional delays and capacity constraints that pedestrians may create. The results of this sensitivity analysis in Table 1, show that even with the additional competing traffic, the access would operate at a satisfactory LoS C.

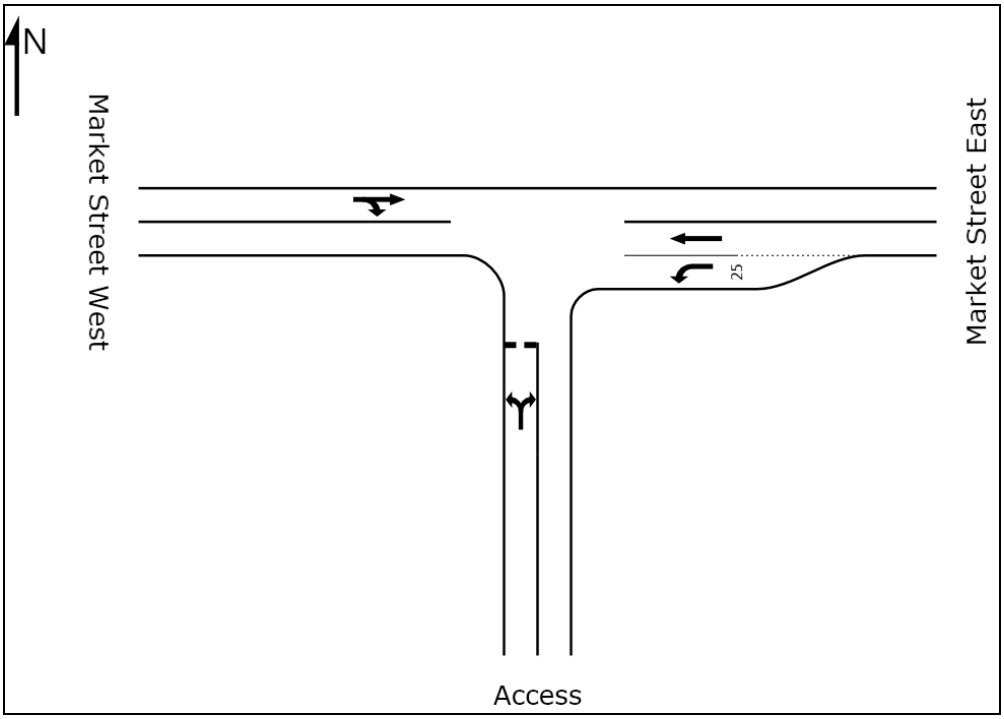
Table 1: Market Street Vehicle Access Sensitivity Test with 25% Increase in Market Street Traffic

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: Access											
1	L	4	0.0	0.458	23.8	LOS B	1.7	12.0	0.86	1.17	17.1
3	R	87	0.0	0.458	23.9	LOS B	1.7	12.0	0.86	1.10	17.1
Approach		91	0.0	0.458	23.9	LOS B	1.7	12.0	0.86	1.10	17.1
East: RoadName											
4	L	90	0.0	0.048	1.7	LOS A	0.0	0.0	0.00	0.29	20.9
5	T	396	0.3	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		486	0.2	0.203	0.3	NA	0.0	0.0	0.00	0.05	39.8
West: RoadName											
11	T	595	0.2	0.380	5.4	LOS A	5.9	41.4	0.80	0.00	41.2
12	R	52	0.0	0.380	13.2	LOS A	5.9	41.4	0.80	1.02	39.5
Approach		647	0.2	0.380	6.1	NA	5.9	41.4	0.80	0.08	41.1
All Vehicles		1224	0.2	0.458	5.1	NA	5.9	41.4	0.49	0.15	36.7

Clarification

Clarification should be sought to confirm that the on-street parking on the northern side of Market Street opposite the driveway, has been considered 'fully parked-out' during traffic analysis. This would not allow through traffic to pass vehicles waiting to turn right into the subject development. Council is concerned that the modelling may not have considered this issue.

The SIDRA assessment was undertaken based on the layout shown below:



As shown by the diagram, the assessment was undertaken based on the assumption that all the parking bays opposite the vehicle access are occupied.

The analysis as submitted with Modification No. 4, indicates the access will operate at LoS B under this arrangement, however, if Council is concerned about the traffic capacity impact on Market Street as a result of the modelled access arrangements, the 3 ticket parking spaces opposite the proposed access may be designated as a 'No Parking' zone during the operation of the car park, pursuant to Council approval. This would enable all through traffic to pass vehicles waiting to turn right into the development.