

Broadway Highway Improvements

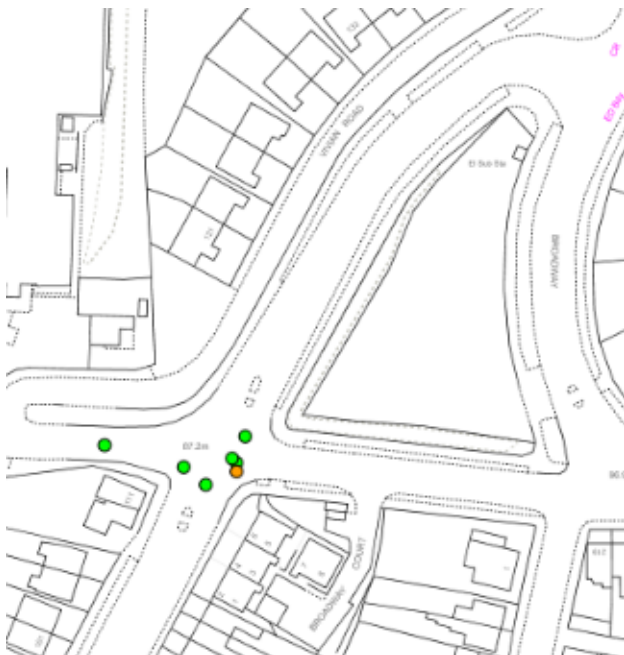
Swansea Council have previously assessed the highway infrastructure at Broadway / Cockett Road, and possible enhancements that may compliment ongoing redevelopment works in and around the City Centre by designing a streamlined efficient traffic system. The junction provides a key link in the City's highway network and in its current format will compromise the development and regeneration aspiration of the City and region as a whole.

The A4216 Cockett Road and Vivian Road are the key routes required for the North – South linkage for vehicular traffic. Proposals have been developed around this baseline requirement to ensure that predicted future traffic flows are catered for. The junction currently distributes large volumes of traffic to Mumbles, Gower and Swansea Airport to the west, Singleton Hospital, Swansea University and Sketty to the south, the city centre and Uplands to the east and Townhill, Cefn Coed Hospital and M4 Junction 47 to the north.

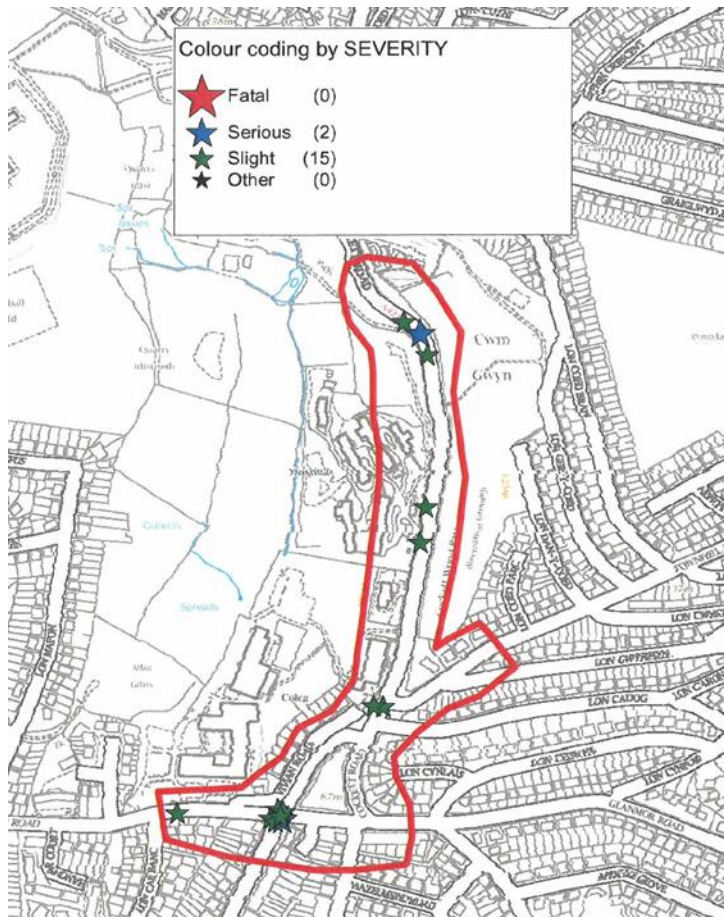
Existing Layout

The Broadway interchange consists of 2 mini roundabouts at the junctions of Cockett Road / Townhill Road and Broadway / Vivian Road. These currently operate at or very close to capacity, in addition the 4 arm mini roundabout at the junction of Vivian Road and Tycoch Road has a significant history of accidents.

Accident History



Latest 3 year accident plot, 3 slight and 1 serious accident, causation factors show drivers frequently misjudge speed when choosing whether to proceed resulting in collision.



A number of accidents have been recorded at the junctions. The proposals acknowledge the volume of traffic wanting to utilise the route and the nearby proximity of a large number of residential dwellings and Gower College. The new controlled crossings and introduction of traffic lights are seen as a mechanism for improving pedestrian priority without compromise to traffic flow, with lane narrowing's and other traffic calming features to be utilised. Safety will also improve as a consequence.

Swansea Strategic Transport Model.

A Macroscopic transport model was commissioned as part of the evidence base for the Local Development Plan. This demonstrated that in the future year no development scenario severe queuing would occur on Vivian Road, Cockett Road, and Glanmor Road. This would be exacerbated by the addition of development traffic over the plan period.

The suggested road measure at this location was to turn the Vivian Road / Broadway / Glanmor Road triangle into a signalised gyratory. Signals were deemed necessary due to the irregular shape and gradients involved.

Existing Layout

This has been modelled using TrLs Arcady software, this is a standard modelling software for undertaking traffic modelling of roundabouts. Results are presented in terms of RFC (ratio of flow to capacity), Queue Length, and Delay per vehicle.

Tycoch Rd / Vivian Rd

Analysis shows for the current year the mini roundabout is at capacity, with queuing traffic on Tycoch Road and Vivian Road (North) in the AM peak and Vivian Road (North and South) in the PM peak.

The queues and consequent delays will increase through the future year scenarios, particularly once the allocated sites in the LDP are built out.

This results in around a 4 fold increase in the level of queuing traffic on Tycoch Road and Vivian Road (North) with the average AM peak queue extending onto Harlech Crescent and approximately to Lon Towy on Cockett Road.

Townhill Road / Cockett Road

This roundabout currently operates above capacity with queuing mainly exhibited on Cockett Road, the inclusion of background growth and potential LDP development traffic is predicted to double the length of the existing queue, and increase the per vehicle delay from around 2 minutes to 8.5 minutes, it can be seen that this will result in travel times along the Cockett Road corridor broadly 4 times those experienced at present.

Broadway / Vivian Road

Analysis shows this roundabout is currently over capacity on all legs of the roundabout. This overcapacity worsens significantly in future years, particularly on Broadway which will experience queues of over a kilometre resulting in increased potential delay to each vehicle of nearly 20 minutes.

Design Options

A variety of concept layouts were developed, whilst considering construction and land acquisition issues, as well as the impact on identified development proposals in and around the vicinity.

Various options have been considered, consisting of alternative mini roundabout designs, full gyratory around the triangular area encompassing Vivian Road, Broadway, Glanmor Road, and traffic signals.

These have been sifted through traffic modelling and safety considerations, resulting in a two signal junction arrangement which provides the optimum solution both in terms of vehicle flows, and providing direct, safe legible routes for pedestrians and cyclists.

The preferred option has been modelled using Linsig software, which results in a significant reduction in queues and delay across all approaches.

In order to provide maximum benefit, some restrictions to turning movements have been made. No Right Turn Vivian Road to Glanmor Road, O/D counts show around only 130 vehicles making this manoeuvre across our 19-hour traffic count, against a total number of vehicles on Vivian Rd (S) of 6800.

No Right Turn Townhill Road to Cockett Road, O/D counts show 340 vehicles making this manoeuvre across the 19-hour traffic count, against a total number of vehicles on Townhill Road of 3800.

Results Vehicle Queues and Delays

		Tycoch Road		Vivian Road (S)		Broadway		Cockett Road		Townhill Road	
SCENARIO		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
2017 BASE	QUEUE (veh)	10.1	0.9	3.1	0.82	18	57.2	40.6	28.4	6.3	2.1
EXISTING	DELAY (secs/veh)	55.12	9.74	21.72	29.76	153.59	385.31	166.79	121.73	50.42	20.5
2030 + DEV	QUEUE (veh)	45.3	1.5	0.6	17.1	41.6	146.7	112.9	97.5	20.4	3.2
EXISTING	DELAY (secs/veh)	190.38	13.19	12.99	101.76	389.93	1147.1	518.7	451.32	132.25	27.17
2030 + DEV	QUEUE (veh)	28	11.2	17	10.5	13.9	15.2	14	16.5	15.3	12.3
SIGNALS	DELAY (secs/veh)	77.9	59	42.3	23	58.2	50	48.4	48.2	51.6	57.7

Conclusions

The proposed junction improvements have been drafted following a detailed assessment of the City Centre's development potential and as such are seen as an essential part of its growth. Whilst an open-minded approach has been taken in terms of design solutions, the preferred solution is pragmatic and deliverable in the context of the significant benefits being offered. Failure to develop the measures would result in some of the ongoing City Centre highway alterations not achieving their full potential and both pollution and safety issues would not be addressed. Development proposals identified at Cefn Coed and Hendrefoilan in the vicinity of Broadway need to be considered with possible further private development contributions being ring fenced and utilised as match funding towards the large scale infrastructure requirements identified.

An initial assessment has been undertaken in terms cost and buildability. It is estimated that the scheme would cost circa £1m and could be developed over a one year period. The design option has been partly promoted due to the ability to undertake some of the works off the main highway network, thereby limiting the amount of disruption to traffic in the area. Clearly with a scheme of such a scale there will be an element of disruption, but the detailed design will provide an opportunity to consider opportunities to reduce programme and impact.

It is acknowledged that the scheme requires a relatively large scale of infrastructure investment, but the scale of benefit due to its direct impact on the City and its importance in maximising recently completed and ongoing infrastructure works supports its significant value. The fact that the junction improvements have a direct correlation to both City Centre and corridor developments in the vicinity should ensure that numerous private investment match funding opportunities are available. It is

therefore proposed that a coherent delivery approach is developed to ensure that funding opportunities are maximised.

In conclusion, the proposed signalisation offers significant improvements in terms of vehicle queues and delays over the existing arrangement.

It allows both background growth and proposed LDP developments to be catered for and in the case of Cockett Road, Broadway and Vivian Road reduced queues and journey times over existing even though vehicle numbers are increased.

Also it provides for pedestrian crossings across all legs of each junctions and a direct off road cycle link along Cockett Road and through the junction.