SURREY
COUNTY COUNCIL

B369 Walton Road j/w B3379 (Bridge Road / Esher Road) East Molesey, Elmbridge

Safety Improvements Feasibility Study Report

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1. INTRODUCTION:

Between January 2012 and December 2017 there have been eight collisions at the roundabout junction of Walton Road, Bridge Road and Esher Road, all of which have involved cyclists. This rate of injury collisions has attracted the attention of Surrey County Council's Road Safety Team whose task is to identify locations where high levels of injury incidents occur; highlight the safety concerns; and investigate potential improvements to eliminate hazards and reduce risk of occurrence.

This report documents the investigation into the causes of the injury incidents; considers feasible improvements that have the potential of making roundabout navigation safer for cyclists; and provides recommendations.

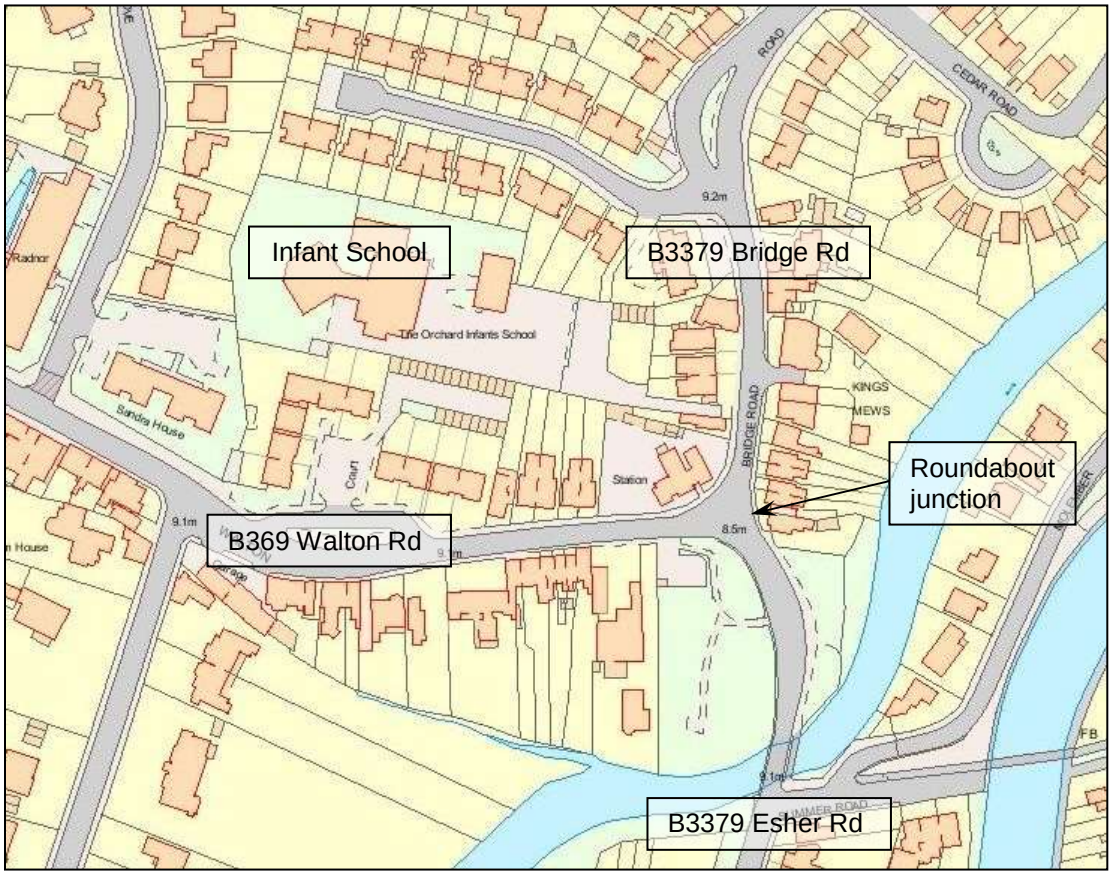

Figure 1: Location of roundabout junction

2. SITE ANALYSIS:

The B369 Walton Road provides a link to Molesey and Walton on Thames beyond, with the B3379, Bridge Road and Esher Road, providing a link to Hampton Court to the north and Esher to the south. A speed limit of 30mph is in place on all three roads approaching the junction and on the roundabout itself.

In 1976 the road junction of the Walton Road, Bridge Road and Esher Road took the form of a T-junction, with Walton Road and Bridge Road being the major road and Esher Road the minor side road. Since then the layout of the junction has

changed, incorporating a roundabout.

Figure 2: Road junction 1976 (Source: www.moleseyhistory.co.uk)

View of junction from B3379 Esher Road 2016

View of junction from B369 Walton Road 2016

View of junction from B3379 Bridge Road 2017

Figure 3: Current layout of road junction (Source: Google Streetview)

Surrey Priority Network (SPN) reflects the needs, priorities and actual use of each element of the road network in Surrey. It is used to identify needs based provision of services and identify appropriate levels of service.

Prior to 2012 Walton Road was in band 1 of the SPN traffic classification. In 2012 the recorded 11,193 vehicle movements placed it just below its original classification in to traffic band SPN 2. Both Bridge Road and Esher Road dropped from SPN 1 in 2012 to SPN 3. This would tend to suggest most traffic using these roads splits between the Walton on Thames / Hampton Court link and the Walton on Thames / Esher link. The B3379 link between Hampton Court and Esher,

running parallel to the A309, does not appear to be used as much as the other two. None of the three roads considered here form part of the primary road network.

It is unlikely many heavy goods vehicles navigate through the junction on a frequent basis. However, as neither width nor weight restrictions are in place there will no doubt be some HGVs that do pass through the junction, particularly when conducting business in the local area.

Both the No 411 and No 514 bus routes pass through the roundabout: the No 411 using Walton Road and Bridge Road; and the No 514 using Walton Road and Esher Road.

Waiting restrictions between 8.30am and 6.30pm Monday-Saturday are in place at the junction. When restrictions do not apply, with the lack of off- street parking, vehicles may be parked in close proximity to, if not within the bounds of, the roundabout. Parked vehicles are likely to have an effect on visibility, representing a potential safety issue for other road users.

A few residential properties along the eastern side of Bridge Road have direct access from the roundabout area; where off-street parking is utilized at these properties, this practice is likely to improve traffic flow.

It should be noted, the recent parking review does not indicate the need of changes to the existing restrictions, suggesting the existing parking arrangements are viable at this location.

The Orchard Infant School is in the vicinity, behind the old police station, with an access point in Bridge Road.

3. DATA COLLECTION:

As the feasibility study has been initiated by concerns over the number of injury incidents affecting cyclists on the roundabout—junction of the A368 (Walton Road) and the B3378 (Bridge Road / Esher Road)—the most relevant data for personal injury incidents has been collected and analysed.

3.1 Personal Injury Incidents

Personal injury incident data is based on all road traffic incidents where injury and/or fatality has occurred; and as a consequence the police have recorded the details. The personal injury incident data used in this study is from records held for the period 1st January 2012 to 31st December 2017.

Analysis of data

Between 1st January 2012 and 31st December 2017 there were eight recorded personal injury incidents, all of which record injuries to cyclists. In the last three year period, 1st January 2015 to 31st December 2017, there have been three incidents. On average there is one personal injury incident each year involving cyclists.

Six involved motorized vehicle collisions, five involving cars and the sixth a van. Of the other two incidents: one involved a collision between two cyclists, the other involved a lone cyclist. As the incident involving the lone cyclist was not the result of a collision it will not be included in further data analysis in this report.

All seven of the collisions were the result of one party failing to give way to a cyclist on the roundabout. That failure being a driver of a car or van, and a cyclist in the incident where two cyclists collided. None of these collisions resulted with a fatality. From the data collected to date, the incidents are distributed between the three arms of the roundabout. Although more incidents occurring in the Walton Road arm than the Bridge Road arm, no one arm can be considered particularly more hazardous than another.

Four collisions occurred during morning and evening peak time traffic. One occurred midmorning and the other two during the hours of darkness.

Latest five years and year to date collisions (01/01/12 to 31/12/17)				
Year	**Arm**	**Slight**	**Serious**	**Failure to giveway**
2012	Bridge Rd			
	Walton Rd			
	Esher Rd			
2013	Bridge Rd	1		1
	Walton Rd			
	Esher Rd	1		1
2014	Bridge Rd			
	Walton Rd	1		1
	Esher Rd		1	1
2015*	Bridge Rd	1*	1*	
	Walton Rd			
	Esher Rd			
2016	Bridge Rd			
	Walton Rd			
	Esher Rd			
2017	Bridge Rd			
	Walton Rd	2		2
	Esher Rd			
Totals	**Bridge Rd**	**1**		**1**
	Walton Rd	**3**		**3**
	Esher Rd	**1**	**1**	**2**
* 2015 One incident occurred involving just pedal cyclists, both were injured.				

Figure 4: Personal injury incident data

The TRL study Accidents at Urban Mini-roundabouts, Report 281, detected the many factors that lead to incidents at mini-roundabouts. The key findings of the report point out: pedestrians are relatively safe at mini-roundabouts; whereas pedal cyclists are, by comparison, vulnerable.

There is a disproportionate number of cyclists involved in the recorded collisions at this roundabout. Indeed, all injury collisions between January 2012 and December 2017 have impacted on cyclists' safety.

Cycling is being encouraged more and more rather than being discouraged. It is therefore likely that more cyclists will encounter this roundabout junction in the future.

Important barriers to safe cycling relate to other road users' behaviour, volume and speed; junctions are particularly associated with cyclist collisions, interventions at junctions should be a high priority; there is strong evidence that reducing the general speed of motorized traffic provides a safety benefit for cyclists—Pedal Cyclists Key Facts Road Speed Observatory website (http://www.roadsafetyobservatory.com/KeyFacts/riders/pedal-cyclists).

4. DISCUSSION AND OPTIONS:

Question: Why are drivers failing to give way to cyclists?

This may be an issue about visibility. If a driver sees a cyclist that has the right of way they would (should) stop to give way to them.

This begs the further question: Why are cyclists seemingly invisible to some drivers, especially car drivers?

The problem of failing to give way does not appear to be one for drivers of large vehicles but is for those of smaller vehicles—this may be due to infrequent use of the junction by large vehicles. Nevertheless, from the data available, it is a problem for car drivers.

The majority of recorded incidents have occurred in daylight, only two during the hours of darkness—existing street lighting meets the required standard for the junction. If cyclists are inconspicuous because of the clothing they wear, or the lack of pedal cycle lights, this will not be resolved through improvements to the highway infrastructure. It is probable an element of causation of the collisions will be due to the driver's lack of attention, lack of awareness of what could be encountered, exacerbated by the speed of travel.

Drivers of large vehicles (light goods, heavy goods and passenger service vehicles) are likely to be more attentive and take more care when approaching and negotiating the roundabout: because of vehicle size and the area in which to manoeuvre; making themselves more aware of other road users, which would include any cyclists, circulating the roundabout. This is perhaps in contrast to drivers of smaller vehicles that need less space and therefore travel at greater speed: approaching the roundabout at greater speed, creating less time to observe their surroundings, for example cyclists; potentially taking less care and attention.

Mini-roundabouts can act as a traffic calming feature, where drivers expect to give way at the site and this results in speed reduction. Problems arise when it is assumed mini-roundabouts control traffic speeds when there is little turning traffic. In these circumstances drivers tend to "run through" the mini-roundabout without expecting to yield, and in some cases do very little to yield: drivers merely treat them as an obstruction to be negotiated. This may be a reason for them colliding

with cyclists.

4.1 Option 1 – Raised table roundabout junction (Appendix A: Drawing PC0813/11)

The main use of raised tables is that of calming traffic. The resultant effect is drivers travel at lower speeds, are able to be more observant of their surroundings, and of other road users. Slower speed means more time to react to changing conditions avoiding conflicts, particularly pertinent when giving way to cyclists whom have the right of way.

Physical traffic calming measures are those which introduce vertical and/or horizontal deflection to vehicles. However, there are problems associated with such measures: lack of popularity; potential adoptive high acceleration and deceleration driving style causing high exhaust emissions (although maybe compensated by reduced traffic flows); noise and vibration traversing vertical alignments affecting nearby residents and properties; potential vehicle damage and occupant discomfort caused when negotiated using inappropriate speed; costly construction; visual intrusion from the necessary signs and road markings.

As a whole, a raised table will fit in with the existing characteristics of the junction. Some adjustment to the eastern (Bridge Road) kerb height and footway may be required to accommodate a raised table. This could have the added benefit for pedestrians in providing a wider footway. Minor adjustments to the drainage system will be required. Topographical survey would be required to determine how much space is available and the existing road levels which affect surface water run-off. To meet the required lighting standard, lighting levels within the existing street lighting equipment will also need minor adjustment.

Budget cost estimate: £25,000

4.2 Option 2 – Roundabout entry measures (Appendix A: Drawing PC0813/12, 13 & 14)

Non-physical measures, village gateway treatments and road narrowing for example, are designed to influence driver behaviour by presenting a change in environment. Unfortunately, some of these measures only have a small impact, while others can be visually intrusive. These psychological traffic calming measures work within such design elements as: context; scale; proportion; roadside activity; and road surfacing.

In this context, the following roundabout treatments have been considered:

- “Dragon teeth” road markings
- Mock raised table with high friction surfacing
- Mock speed humps with textured surfacing

Some carriageway repairs are likely to be required to enable successful application of the markings and surface treatments.

The treatments intend to affect drivers, leading to reduced vehicle speeds and greater awareness of the surroundings. However, any long term traffic calming

effect is likely to be lost to frequent users of the roundabout.

Budget cost estimate: £10,000 - £20,000

4.3 Option 3 – Coloured advisory cycle lanes (Appendix A: Drawing PC0813/15)

Advisory cycle lanes are not commonly used on roundabouts, mainly because of their size, multiple lanes and number of arms. However, where roundabouts are small in size and with just three single lane arms, as in this case, the placement of advisory cycle lanes is unlikely to conflict with how roundabouts work. The coloured lanes reflect the cyclists' path of travel and the priority they have at give way points: reinforcing the information provided in the Highway Code to drivers; and providing an indication to drivers that cyclists use the roundabout. This should result with drivers being more aware of cyclists and so reduce the risk of collisions at the roundabout. This type of arrangement is in place a roundabout junction in Shepperton, where the High Street and Church Road join the B375 (Russell Road/ Renfree Way).

There have been a number of injury incidents at the Shepperton roundabout involving pedal cyclists: a suggestion is that these would be replicated if the same arrangement was implemented at the Bridge Road junction. However, other than both junctions being roundabouts the similarity ends there (see Figure 5: Comparison of roundabout junctions): Bridge Road is a far smaller junction than the one at Shepperton. Therefore, implementing coloured advisory cycle lanes could well be more effective at Bridge Road than the evident poor safety record at Shepperton. However it should be noted that such an arrangement is only likely to be successful if cyclists negotiate the roundabout using the designated lanes, rather than taking a more direct route through the junction.

Roundabout junctions		
Roundabout feature:	Location	
	Shepperton	East Molesey
Inscribed circle diameter	40m	16m
Central island diameter	25m	N/A
Number of arms	Four	Three
Arm separation islands	Four	None
Entry / exit lane average width	6.35m	9.50m (combined)
Designation	Roundabout	Mini-roundabout

Figure 5: Comparison of roundabout junctions

Carriageway repairs will be required prior to placement of the coloured advisory cycle lanes (coloured high friction surfacing). Placement and refreshment of road marking would also be required.

Budget estimate: £25,000

4.4 Option 4 – Central domed island and surrounding over run area (Appendix A: Drawing PC0813/16)

Repositioning the circulation road marking to the centre of the roundabout would help drivers who experience difficulty with the current off-set. Replacement of the existing road marking with a larger domed feature should reinforce the message to circulate the central marking.

Unfortunately, drivers tend to drive over and, in the some cases, bypass the central marking regardless of the requirement to attempt to circulate (see Figure 6). Drivers may merely treat them as an obstruction to be negotiated and often not circulated; being treated in a similar way to speed cushions that are driven over. It is likely this same driver behaviour will be unaffected if an overrun area, surrounding the central marking, were to be introduced.

Figure 6: Example of vehicle travelling over circulation road marking. (Source: Google Streetview)

Budget cost estimate: £12,000

4.5 Option 5 – Traffic separation islands (Appendix B: Drawing PC0813/17)

The primary function of islands is to obtain orderly, and hence better and safer traffic flow. Their effectiveness lies in the shape and size, location and type and are used to channel and divide traffic, and may create refuges for pedestrians.

Vehicle path plots for a bus and pantechnicon have been undertaken for the existing roundabout using AutoTURN. The purpose of this is to ascertain available room for the placement of traffic islands. The results of the plots made can be found in Appendix B.

The outcome of running the AutoTURN routine identified only very small areas between the entry and exit lanes are available. Installing kerbed traffic islands where there is insufficient room will inhibit the progress of large vehicles through the junction. Indeed, any island structure of this nature is unlikely to remain

unscathed as large vehicles pass by them.

Painted islands can be considered as an alternative to kerbed islands and can work if drivers adhere to them. As evidence suggests drivers do not adhere to the existing roundabout markings it is unlikely that this type of feature will have any significanteffect; either on making pedal cyclists more conspicuous or reducing traffic speeds approaching the roundabout.

NB. The AutoTURN plots are based on Ordnance Survey mapping; a topographical survey would be required to accurately determine the available space. However, it is unlikely that more detailed information would show that the installation of robust traffic islands in any of the roundabout arms could be accommodated.

Budget cost estimate: N/A

4.6 Option 6 – Improve traffic deflection

This option intends to reduce the approach speeds of vehicles. Deflection is created by tightening up the kerb-lines between the entry and exit points and by widening the footway.

Pedestrians would benefit from the footway being widened. This is less likely to cause problems for small vehicles, than for larger vehicles. Buses and HGVs could mount the footway as they negotiate the roundabout and any increase in width may lead to the partial parking of vehicles on the footway during the hours of permitted waiting. Therefore some form of control measure, installation of bollards for example, may be required, which would protect the footway and its users.

This option is unlikely to provide safety improvements for cyclists negotiating the roundabout, although a reduction in vehicle speeds and localised narrowing of the roads may encourage cyclists to take up a position more conspicuous to drivers.

Budget cost estimate: £25,000

4.7 Option 7 – Revert to conventional ‘T’ junction

The introduction of a mini-roundabout at the junction was likely to have been to alleviate congestion caused by increases in vehicular traffic at the junction. However in doing so the priority status of each arm of the junction has changed, potentially to the detriment of pedal cyclists’ safety based on the personal injury data.

Reversion of a mini-roundabout to a ‘T’ junction has occurred elsewhere in Surrey, the junction of Cheam Rd with High Street, Ewell is an example of where this has occurred and proven to be a success.

Modelling the effects on traffic flows, direction and volume this potential change would need to be undertaken. This would ensure the practicality of this option is fully assessed. Topographical survey data determine how much space is available, which would enable consideration of wider footways and/or cycle features such as dedicated turn lanes.

Budget cost estimate: £50,000

4.8 Option 8 – Traffic signs, including vehicle activated signs

Road traffic sign to diagram 950 is for warning traffic where a cycle route crosses or joins a road, not under traffic signal control. Although cyclists circulating the roundabout effectively cross a road, they are not using a separate entity, they are in effect just cycling across a road junction. Because of this it would not be appropriate to place diagram 950 signs at any of the approaches to the roundabout.

Temporary traffic signs, yellow background with black lettering, may be suitable when installed in conjunction with coloured advisory cycle lanes, Option 3. Signs conveying a messages, such as “Caution! Cyclists circulating roundabout” need Department of Transport approval.

Budget cost estimate: N/A

5. RECOMMENDATION:

With the knowledge that pedal cyclists are vulnerable when using mini-roundabouts, there is merit in further investigation into measures to address safety issues. It is recommended that measures which reduce vehicle speeds, encourage negotiation of the roundabout and remove conflict between vehicles and cyclists would provide the most benefits. Such measures may also provide benefits for pedestrians by way of increased footway widths. The selection of any particular measure is likely to be influenced by detailed information on the use of the roundabout and local interest as well as available funding.

Recommended options:

- Option 1 – raised table roundabout junction (potential local concerns over noise and vibration)
- Option 2 – roundabout entry measures (would need to consider likely long-term benefits)
- Option 6 – improve traffic defection (widening of the footway would benefit pedestrians)
- Option 7 – revert to conventional T-junction (modelling required)

APPENDIX A: Option drawings

Drawing PC0813/11 – Option 1 - Raised Table

Drawing PC0813/12 – Option 2a - Roundabout entry measures: “Dragon teeth”

Drawing PC0813/13 – Option 2b - Roundabout entry measures: Mock Raised Table

Drawing PC0813/14 – Option 2c - Roundabout entry measures: Mock Speed Humps

Drawing PC0813/15 – Option 3 - Coloured Advisory Cycle Lanes

Drawing PC0813/16 – Option 4 - Central Domed Island & Over Run Area

APPENDIX B: AutoTURN Vehicle Plots

Drawing PC0813/17 – Traffic separation islands AutoTURN vehicle plots

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