safer roads for everyone

Temple Area, City of London

Road Safety Risk Assessment

on behalf of City of London Corporation

TMS Project No: 1673
Date: 31st May 2016

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Contents

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Road Safety Risk Assessment

1.0 Introduction

1.1 TMS Consultancy has been commissioned by City of London Corporation (CoL) to carry out an independent road safety risk assessment of the Temple Area side streets, following the introduction of the north-south Cycle Superhighway (CS6) on A201 Farringdon Street, New Bridge Street and Blackfriars Bridge. The purpose of the commission is to provide CoL with advice on whether the Cycle Superhighway traffic arrangements have introduced unacceptable risks to users of the Temple Area side streets, and vice versa.

1.2 The road safety risk assessment was carried out at by TMS at the same time as a post construction road safety audit, also carried out by TMS (report ref. 12809) and commissioned by CoL.

1.3 TMS Consultancy has extensive experience in providing specialist consultancy, research and training services in traffic management and road safety engineering to a wide client base in both the public and private sectors in the UK and overseas.

2.0 Background

2.1 Transport for London (TfL) has recently constructed a north-south Cycle Superhighway, CS6, through the City of London, which includes alterations to traffic movements to and from the Temple Area side streets onto the roads upon which CS6 has been constructed. CS6 takes the form of a bi-directional cycle track at carriageway level, and shares Farringdon Street, New Bridge Street and Blackfriars Bridge with general traffic, albeit separated from the general traffic with a solid raised median strip. CS6 travels along the western side of these streets. A site plan is included in **Appendix A** of this report.

2.2 To enable CS6 to be a safe as possible, arrangements for the management of traffic across it, such as traffic signals and priority junctions (at which cyclists have priority), have been proposed:

- At the Tudor Street/New Bridge Street priority junction TfL proposed to allow only cyclists to enter and leave CS6 whereas the previous arrangement allowed general traffic to turn left out of Tudor Street and both left and right into Tudor Street, and
- At the Bridewell Place/New Bridge Street traffic signals the one-way exit from Bridewell Place turning right only onto New Bridge Street has been replaced with an arrangement allowing traffic to turn both right out, and left into Bridewell Place, still under signal control. The left turn out, and the right turn into Bridewell place remain banned.

Whilst the latter of these proposals has been implemented, the former still allows general traffic to turn left from Tudor Street onto New Bridge Street, through CS6 using a temporary arrangement.

2.3 With the proposed closure of the Tudor Street/New Bridge Road priority junction to all but cycle traffic, further arrangements have been introduced in the Temple Area to allow traffic to exit and travel north along New Bridge Road:-

- Carmelite Street, formerly closed to all but cycle traffic at Victoria Embankment, has been opened up to allow traffic to enter Victoria

Embankment. No Entry signs preclude vehicle entering it from Victoria Embankment.

- Temple Avenue (formerly only allowing traffic to exit onto Victoria Embankment but with two-way cycling) now only allows two-way cycling through a new closure to general traffic.

2.4 As before the introduction of the north-south CS6, general traffic from the Temple Area can also access the major highway network along Whitefriars Street (one-way northbound) at Fleet Street (left and right turns onto Fleet Street available). General traffic can also still gain access to the Temple Area from Fleet Street by using the Bouverie Street, Salisbury Court/Dorset Rise and Bride Lane, each of which are one-way southbound but with a northbound, contraflow cycle lane.

2.5 The purpose of the commission is to provide CoL with advice on whether the CS6 traffic arrangements have introduced unacceptable risks to users of the Temple Area side streets, and vice versa. Although all roads in the area were inspected, TMS has been asked to focus, in particular, on roads and junctions in the Temple area with the following priority:-

<u>First Priority Locations:</u>

- Junctions of New Bridge Street with Tudor Street and with Bridewell Place
- Bridewell Place (whole length)
- Tudor Street (New Bridge Street to Dorset Rise)
- Junction of Tudor Street, Bouverie Street and Temple Avenue, and
- Bouverie Street (whole length).

<u>Second Priority Locations:</u>

- Tudor Street (Bouverie Street to Dorset Rise)
- Whitefriars Street (whole length), and
- Carmelite Street (whole length)
- Kingscote Street and Watergate.

3.0 Methodology

3.1 This Site Safety Assessment has been carried out by Paul Martin, the Managing Director of TMS Consultancy, visiting all roads and junctions within the Temple area and its peripheral junctions with New Bridge Street, Victoria Embankment and Fleet Street. The assessment has been carried out using engineering judgement based on the assessor's experience in road safety engineering, risk assessment and accident analysis.

3.2 Background information relating to the access proposals was provided by Albert Cheung in e-mail format during May 2016. Alan Rickwood from the City of London Police also provided background information during the site visit.

3.3 Mr Martin visited the site in daylight on Thursday 26th May 2016, between 07:45 and 09.15 hours (morning peak traffic) to gain an understanding of the area, observe any conflicts involving road users and identify any hazards associated with the highway environment. The weather at the time was fine and dry. Vehicle flows along New Bridge Street were heavy with queuing in both direction, the queues being worse southbound towards the New Bridge Road / Victoria Embankment junction. Pedestrian and cycle flows were also heavy on New Bridge Street. Traffic, cycle and pedestrian flows throughout the Temple area were light throughout the morning peak hours. Mr. Martin also visited the junctions on CS6 during the evening peak hour on 25th May during the road safety audit of CS6 and also draws upon observations during that period for this risk assessment.

3.4 To determine the level of risk associated with the various conflicts, a risk assessment matrix was used, which is provided in the IHT guidelines on road safety audit (2008). The table is shown below:

		Frequency of collision			
		More than one per year	One every 1-4 years	One every 5-10 years	Less than one per 10 years
Severity	Fatal	Very high	High	High	Medium
	Serious	High	High	Medium	Medium
	Slight	High	Medium	Medium	Low
	Damage	Medium	Medium	Low	Low

4.0 Safety Assessment Findings

First Priority Locations

Tudor Street junction with New Bridge Street

4.1 The layout of the junction of New Bridge Street with Tudor Street is in a temporary state due to the lack of consensus of the final layout between CoL and TfL – see photo 1.

Photo 1: Looking east towards New Bridge Street from Tudor Street

4.2 TfL's General Arrangement drawing shows that Tudor Street is to be closed off to vehicular traffic. In its temporary state, however, vehicles can egress from Tudor Street and make a left turn manoeuvre onto New Bridge Street. In doing so, drivers were observed to wait at the give way, check for cyclists before crossing CS6 and wait for a gap to complete their manoeuvre. Gaps in the relatively busy CS6 are frequent as cyclists arrive in platoons, regulated by the traffic signals on either side (Watergate junction to the south and Bridewell Place junction to the north). The assessor noted that these left turns were carried out relatively easily,

without conflict with cyclists, albeit the vehicles involved were all small, being private cars, taxis or light goods vehicles. In the event, however, that a large vehicle carries out this left turn manoeuvre, it could obstruct CS6 for a longer period of time whilst waiting for a gap in the general traffic lanes, increasing the likelihood of collisions with cyclists on CS6. The likelihood of the left turn resulting in a collision with a cyclist is estimated to be more frequently than once a year. As cyclists approaching a vehicle blocking CS6 are likely to arrive in a platoon and can see the offending vehicle with a good degree of visibility and advanced warning, their speed would be slow and the severity of a collision is likely to be low i.e. damage to vehicle/cycle or slight injury, putting it in the **Medium to High** category in the risk matrix.

4.3 Of equal if not greater concern, though, is the risk of an illegal right turner into Tudor Street colliding with a fast moving southbound cyclist on CS6. One such movement was observed during the evening peak hour site visit for the associated road safety audit. The driver of an illegal right turning vehicle would have difficulty in looking over their shoulder, through the door pillar, towards a southbound cyclist, and their rear view mirror would be at the wrong angle to spot a fast moving cyclist approaching them from the north. The offending driver might make the manoeuvre on the spur of the moment and then do so quickly due to its illegal nature. The cyclist would not be expecting this illegal manoeuvre and could be travelling at a relatively high speed. The resulting impact could be at relatively high speed increasing the risk of high severity injuries to the cyclist. The likelihood of it occurring would, again, be more than once each year because, although there would be fewer illegal right turners than legal left turners, the probability of the illegal right turn resulting in a collision is much greater for the above mentioned reasons. This puts this risk into the **High to Very High** category.

Bridewell place junction with New Bridge Street

4.4 This junction appears to function safely, the staging ensuring that CS6 is stopped in both directions so that the turning movements of general traffic can take place safely. During the morning and evening peak hours there is a risk of a large right

turning vehicle blocking, or partially blocking, CS6, but cyclists are aware of this as it is a common occurrence at all traffic signalled junctions in London. The likelihood of a vehicle/cycle collision occurring due to blocking would therefore be less than once a year, and the likely severity damage or slight injury, putting this is the **Low to Medium** risk category. This risk level could be reduced further by replacing the temporary 'Cycle Lanes – Look Both Ways' sign with a permanent version of the same sign mounted at lorry driver eye height on the approach to the signals. The temporary sign is shown in photo 2.

Photo 2: Looking north-east from Bridewell Place

4.5 During the morning peak hour a cyclist on CS6 was observed illegally turning right from the north into Bridewell Place, a manoeuvre that can only be carried out at low speed due to the right angle turn and is therefore likely to result in either damage or slight injury to another cyclist or a pedestrian crossing Bridewell Place during the pedestrian phase (green man). Given that this illegal manoeuvre could be occurring several times a day, the likely frequency of a

collision could be more than once a year, making the risk rating in the **Medium to High** category.

Bridewell Place and Tudor Street (New Bridge Street to Dorset Rise)

4.6 Traffic, cycle and pedestrian flows are light during the peak traffic hours on these roads. Visibility is adequate at the Tudor Street junctions even when lorries and vans are loading/unloading on the single yellow lines. Although Tudor Street is virtually straight in alignment traffic speeds are low, helped by the short length of single lane dualling between Dorset Street and Bridewell Place. The risk of collisions on these streets is therefore **Low.**

Bouverie Street and its junction with Tudor Street/Temple Avenue

4.7 Bouverie Street is one-way southbound with a contra-flow cycle lane on the offside of general traffic – see photo 3. This appears to work well, the clear road markings encouraging good lane discipline. Traffic, cycle and pedestrian flows are light during the peak traffic hours. Visibility from Bouverie Street and Temple Avenue onto Tudor Street is adequate, even with the on-street parking relatively close to the junction to the east.

Photo 3: Looking north along Bouverie Street from Tudor Street

Consequently the risk of collisions on Bouverie Street and its junction with Tudor Street is **Low.**

Second Priority Locations

Tudor Street (Dorset Rise to Bouverie Street)

4.8 Traffic, cycle and pedestrian flows are light during the peak traffic hours on this stretch, but speeds can build up as the alignment is straight. This combination can catch out pedestrians crossing the road and drivers wanting to u-turn, the controlled on-street parking exacerbating the risk of collisions. Collisions could occur more frequently than every five years and could be of a slight or serious severity. This puts this stretch of Tudor Street into the **Medium to High** category of the risk matrix.

Carmelite Street

4.9 Now open at its southern end it will experience higher traffic flows than before CS6 was opened, having to cope with traffic diverted from Temple Avenue (southbound). Should the Tudor Street/New Bridge Street priority junction be closed to general traffic movements it will have to cope with the proportion of this traffic that wants to travel north along New Bridge Street. With good visibility onto, and light traffic on, Victoria Embankment the Carmelite Street/Victoria Embankment junction should be able to cope with what is likely to be a relatively light traffic flow safely. Carmelite Street is straight, coping with two-way traffic travelling at low speed, and at its central junction visibility from Tallis Street is adequate in all directions. Collisions are unlikely to occur more frequently than once every five years and if they do occur are likely to be damage only or of low severity. This would put Carmelite Street and its junction with Victoria Embankment into the **Low to Medium** category of the risk matrix.

Whitefriars Street

4.10 Being one the narrower streets providing access to Fleet Street (one-way northbound with a southbound, contra-flow cycle lane) and with controlled on-street parking narrowing the road further, traffic speeds are low. Consequently, even though the southbound cycle lane disappears for a short section and cyclists travel outside parking on the east side, the risk of collisions is still **Low to Medium.** The Whitefriars junction with Fleet Street enjoys adequate visibility in

both directions, the right turn onto Fleet Street being assisted by gaps in traffic flow created by the nearby Pelican crossing.

Kingscote Street and Watergate

4.11 One-way for general traffic south and eastwards, with a contra-flow cycle lane northwards on Kingscote Street, these roads can cope with moderate traffic given the traffic signals at Watergate/New Bridge Street allowing controlled access back onto the major road network. Both being short roads traffic speeds are low and current peak hours traffic, pedestrian and cycle flows are light. The risk of collisions is in the **Low to Medium** category of the risk matrix.

Lowest Priority Locations

South of Tudor Street

4.12 Temple Avenue and John Carpenter Street are straight roads, not too long, and of good width with some controlled parking. Traffic and pedestrian flows are low, and cycle flows low to medium in volume. The Temple Avenue/Victoria Embankment junction is now closed to general traffic as it coincides with the new Toucan crossing on Victoria Embankment giving access for cyclists to Cycle Superhighway CS3. On John Carpenter Street cyclists have access to Victoria Embankment through the unchanged pedestrian/cycle area at its southern end. With the reduced traffic flows along the southern portion of Temple Avenue, these roads remain in the **Low** category of the risk matrix.

North of Tudor Street

4.13 Salisbury Court/Dorset Rise is lightly trafficked, being one way southbound with a northbound contra-flow cycle lane. Like Whitefriars Street it is a relatively narrow street, giving access to the Temple area from Fleet Street and traffic speeds are consequently low. All of other roads (Temple Lane, Lombard Lane and Bride lane) are very lightly trafficked, very narrow and traffic speeds are consequently low. Bride Lane can be used by rat-running traffic seeking to head south along New Bridge Street from Fleet Street as the right turn from Fleet Street into New Bridge Street is banned. All of these roads sit in the **Low** category of the risk matrix.

5.0 Summary and Conclusion

5.1 This safety risk assessment has considered background information relating to the construction of Cycle Superhighway CS6 and associate traffic management alterations in the Temple side streets area.

5.2 The assessment has concluded that, for the majority of roads and junctions in the Temple side streets area the risk of collisions involving personal injury, or damage to vehicles or property, is **Low to Medium.** This means that collisions are unlikely to occur more frequently than once a year, and when they do occur they are unlikely to result in anything worse that a slight injury, or only damage to a vehicle or property. This level of risk is considered acceptable and tolerable in road safety terms.

5.3 There are three exceptions to the general range of Low to Medium risk:-

1) Tudor Street (Dorset Rise to Bouverie Street) – **Medium to High Risk –** higher speeds and parking/turning activity resulting in likely collisions every one to five years with any class of severity as the likely outcome.
2) New Bridge Street/Bridewell Place – **Medium to High Risk –** illegal right turns by cyclist into Bridewell Place resulting in likely collisions more frequently than once a year with non-fatal severities as the likely outcome.
3) Tudor Street/New Bridge Street – **High to Very High Risk –** illegal right turns at the current temporary arrangement resulting in likely collisions more frequently than once a year with any class of severity as the likely outcome.

5.4 Considering how to reduce these risk levels, the imposition of additional engineering measures for the first two locations mentioned above would be likely to be disproportionate to the amount of risk reduction that could be achieved by doing so. For example, installing speed cushions on Tudor Street may still allow motorcyclists and four wheel drive cards to continue at high speed and may also be inappropriate for this area. Additional risk reduction could be achieved by

increased enforcement/education by the police, targeting speeding vehicles and illegal cycle right turners, stopping and warning them before prosecution.

5.5 At the Tudor Street/New Bridge Street junction, where the temporary arrangement is currently used, the risk levels are a category higher, and should be mitigated as soon as possible. It is recommended, therefore, that either TfL's proposal to close off this junction to all but cycle movements, or full signalisation of the left turn out of Tudor Street for general traffic, are implemented. Given the alternative exits from the Temple area, via Carmelite Street and Whitefriars Street, the former of these alternatives is favoured, especially as additional traffic signals also increase the risk of further rear shunt type collisions on both Tudor Street and New Bridge Street.

6. Assessor:

Paul Martin - BSc (Hons), CEng, AMICE, MCIHT, FSoRSA
HA Approved Certificate of Competency
Managing Director – TMS Consultancy

Signed .....

Date .....31st May 2016…….....

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APPENDIX A – Site Plan