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COUNCIL

Monday 14 October 2019

**4 PETITION - CHISLEHURST WAR MEMORIAL JUNCTION
SUPPLEMENTARY INFORMATION (2) (Pages 3 - 38)**

Chislehurst Ward

***Copies of the documents referred to above can be obtained from
<http://cde.bromley.gov.uk/>***

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To: *Ward Members, ES Portfolio Holder*
Date: August 2015
Subject: **A222 Improvements – Chislehurst Common**
From:

1. Introduction

- 1.1 According to data supplied by TfL, the A222 across Chislehurst Common (the Common) suffers from some of the worst traffic congestion in the Borough. In addition, the Summer Hill/Old Hill/Watts Lane and the War Memorial junctions were identified in the 2010 Pinch Point study commissioned by LBB. It is also the subject of frequent complaints or correspondence from residents and commuters.
- 1.2 A further source of complaints from residents and from the local schools is the lack of crossing facilities over Bromley Road by the War Memorial. Concerns about severe congestion have prevented any acceptable improvements to crossing facilities being implemented.
- 1.3 The significant issue, however, is that the Common is protected from any development by the Conservators, meaning that any standard highway capacity improvements will not be possible. However, LBB officers have successfully negotiated a potential “land swap” whereby the barely used portion of Heathfield Road is swapped for land at the key/congested junctions, and Loop Road is converted from a cross shape to a single road.
- 1.4 Over the past year, Officers have been developing options for the worst congested junctions of the A222:
 - Watts Lane (mini roundabout) and Old Hill
 - War Memorial
 - Ashfield Road
- 1.5 In addition, as part of the land swap, officers have looked at potential configurations of Loop Road, and the removal of the section of Heathfield Road.
- 1.6 The purpose of this report is, therefore, to update members on progress and explain the advantages and disadvantages of the potential options that have been developed.

2. Traffic Survey and Base Scenario Traffic Modelling

Traffic Survey

- 2.1 Following agreement at ES PDS in July 2014, a comprehensive traffic survey was undertaken for all roads and junctions across the Chislehurst Common area. The locations of the surveys were chosen to enable all routes (including rat-running) across the area to be captured, and the survey included origin-destination surveys to track routes taken by vehicles.

2.2 Once the survey results were obtained, Officers converted the data into a LinSig traffic model to assess the existing impact of traffic, and provide a base on which to assess any potential options. This process took a lot longer than originally thought, but it was important to ensure that the traffic model was correct given the sensitivity of the area. A summary of these results is shown below

A222 Base Scenario Results

2.3 The modelling undertaken only compares the existing junction with the options. As with all traffic modelling, the results are an average, so there will be times when the various junctions are better and worse than shown.

2.4 The results show that there are five junctions with the A222 which suffer from congestion in the **AM peak**:

- Old Hill - Traffic travelling towards Bromley on the A222 experiences delays caused by right turning traffic blocking traffic moving forward
- Watts Lane (mini roundabout) - Delays on all arms of the roundabout except Camden Park Road. Most significant delay on the A222 is for Bexley/A20 bound traffic.
- Prince Imperial Road – Significant delays for traffic awaiting to join the A222
- War Memorial – Significant delays on all arms of the junction, with worst delay for Bromley bound traffic on the A222.
- Ashfield Road – Traffic travelling towards Bromley on the A222 experiences delays caused by right turning traffic blocking traffic moving forward

2.5 The **PM peak** results show the same five junctions experience congestion, although there are some changes to the details.

- Old Hill – Traffic on the A222 travelling towards Bexley/A20 is delayed as is traffic exiting Old Hill (mostly turning left). However, this is caused by blocking back from the mini roundabout rather than the junction itself
- Watts Lane (mini roundabout) – Significant delay on both A222 arms. No delay on Watts Lane or Camden Park Road.
- Prince Imperial Road – Some delay for vehicles joining the A222, but much less significant delay than the AM peak
- War Memorial – Significant delays on all arms except Bromley bound traffic on A222. Worst delays are on north and southbound arms of the junction (i.e. Centre Common Road and Royal Parade).
- Ashfield Road – Some delays for traffic turning left out of Ashfield Road towards Bexley/A20.

2.6 A model was also undertaken for **Saturday**. This showed no significant delays.

Heathfield Road

2.9 The traffic survey also looked at the usage of Heathfield Road, to consider the impact of its removal. The highest southbound usage was in the AM peak, and was around 120 vehicles in an hour. The highest northbound use was in the PM peak and was also around 120 vehicles in an hour.

2.10 This level of usage is quite low, and in the opinion of officers could easily be accommodated on other parts of the network (e.g. the replacement Loop Road).

3. General Design Considerations

- 3.1 Given the sensitivity of the Common area, a number of design considerations have been made which cover all the locations
- The options are primarily concerned with improving traffic flow. If pedestrian improvements can be considered, they will be, but only if they do not significantly impact on traffic flow.
 - Try to limit the land take wherever possible. For example, whilst a dual carriageway would cure the vast majority of the issues on the A222, it is recognised that the amount of land taken is unlikely be acceptable to the Common Conservators.
 - Try not to remove any trees and avoid well-established/older trees where trees have to be removed. If any trees need to be removed, they will be replaced by two trees somewhere in the Common Boundary.
 - To consider the impact of any proposed changes on alternative routes and likely displacement through the local highway network.
- 3.2 It should be noted that the designs presented in this report are initial/concept designs. Should they progress to detailed design stages it would be expected that a number of changes will be required due to local conditions and to resolve any issues that may arise as part of the detailed investigation. It would be expected, however, that the fundamental designs should not change significantly.
- 3.3 These initial designs have been subject to initial modelling to compare each junction with the existing layout. These results are shown in the following sections for each junction. Once the options have been considered, the next stage of modelling would be to undertake a “network” assessment of the preferred options to consider the combined impact. The initial modelling is the first stage of this, but network modelling is time consuming and costly, therefore, it is prudent to only do this with a smaller number of preferred options.

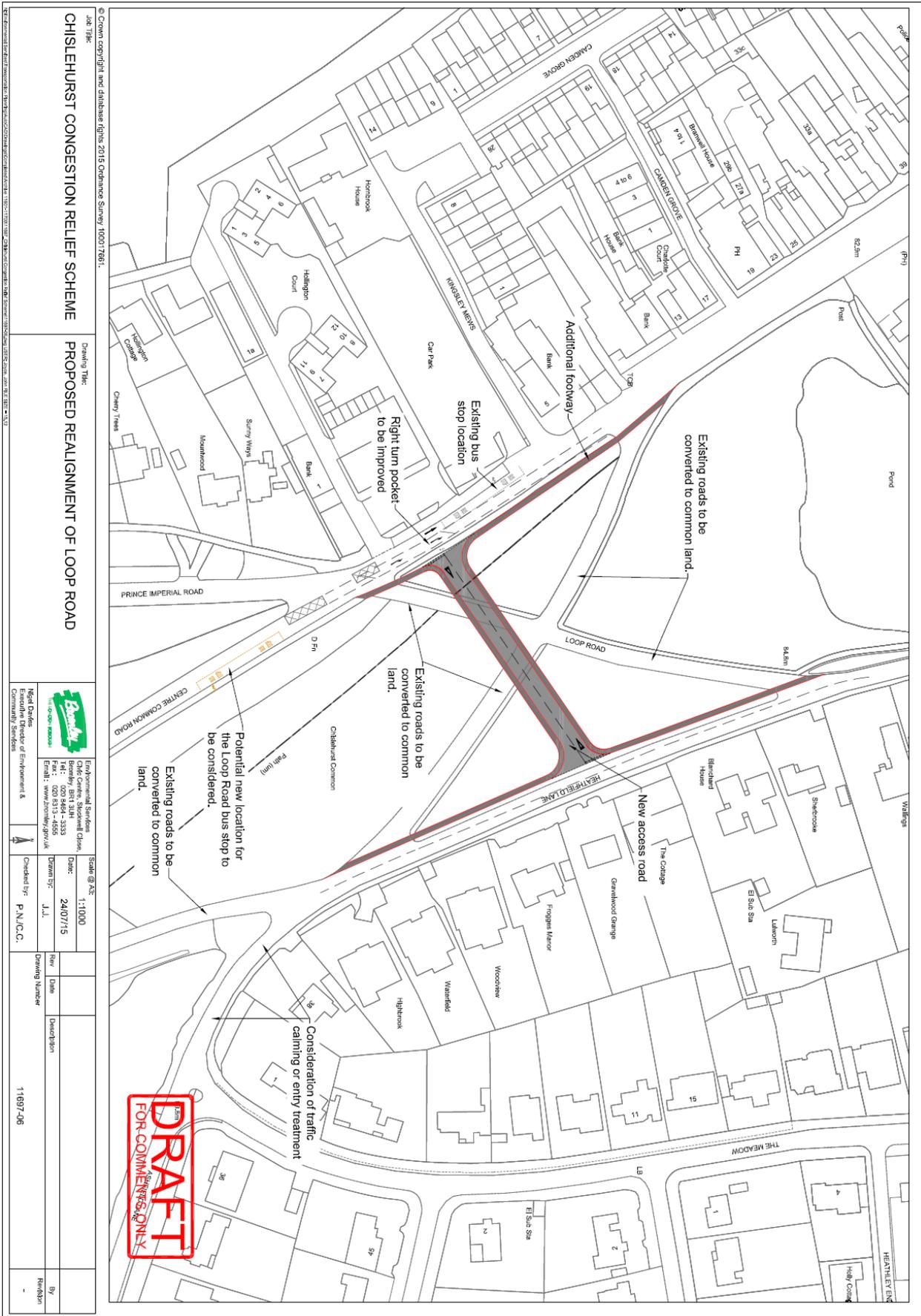
4. Loop Road

- 4.1 There are two reasons to consider reconfiguring Loop Road. The first is that it would enable a sizable area of land to be given back to the Common, which is an important element of the land swap. The second is that the roundabout at the centre of Loop Road is a well know accident blackspot. Several attempts have been made in the past to rectify this, but with no available land this has not been possible.

Existing Situation

- 4.2 Loop Road is the name given to the four cross shaped roads that intersect at a mini-roundabout in the middle of the common. The carriageways are narrow, despite carrying a reasonably high volume of traffic, including buses. Vehicles are often seen over-running corners or driving right on the edge of the carriageway. The mini-roundabout is a particular safety concern; in the past 3 years there have been 10 reported accidents leading to 15 injuries, 2 of which were serious.

Plan 4.1 – Loop Road Option



Job Title:
CHISLEHURST CONGESTION RELIEF SCHEME

Drawing Title:
PROPOSED REALIGNMENT OF LOOP ROAD

Scale @ 1:1000
 Date: 24/07/15
 Drawn by: J.L.
 Checked by: P.N./C.C.

Revision Table:

Rev	Date	Description

By: _____
 1/897/06

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Proposed Option

- 4.3 The proposal is relatively straight forward;
- Replace the cross roads with one carriageway
 - Return the existing carriageway to the Common.
- 4.4 This is shown in Plan 4.1 above.
- 4.5 From the Common's point of view, there could be a significant advantage, not only in terms of the land gained, but also, instead of having 4 small parcels of land intersected by roads, there would be two larger ones.
- 4.6 The proposed carriageway would need some minor land take on the approach to the junction to enable the addition of a right hand turn pocket, but also to allow the geometry of the entrance to accommodate larger vehicles, such as the bus. The route of the replacement road has been chosen to minimise the impact on residents, and includes making the road at an angle to housing to avoid vehicle headlights shining into the windows of houses adjacent to the Common.
- 4.7 There is currently a bus stop on Loop Road, and this would need to be replaced. The exact location would be decided during any detailed design process with TfL buses, although Officers felt it would be appropriate on Prince Imperial Road.

Traffic Impact of Proposals

- 4.8 According to the survey, around 5-600 vehicles travel in both directions on Loop Road during the peak hours (i.e. 500 eastbound and 500 westbound). Combining these together on one road would create a small amount of additional congestion over what is experienced on Loop Road today, as there would be only one exit as opposed to two, however, it would remove the roundabout and cross roads which is a significant safety concern.
- 4.9 It is possible some vehicles would be re-routed back onto the A222 given the improvements generated on this route.

5. Ashfield Road Options

Existing Situation

- 5.1 The issues at the Ashfield Road junction are different in the morning and afternoon peaks. In the morning peak, traffic turning right into Ashfield Road blocks Bromley bound (straight ahead) traffic. In recent years, the right hand turn pocket has been extended, but there is a central reservation which cannot be removed as it would permit right hand turns into and out of the school, which would cause further traffic issues. In the afternoon peak, the A222 runs with some spare capacity, however, Ashfield Lane suffers from delay as traffic (almost entirely left turning towards A20/Bexley) is held up by A222 traffic. There is also quite a large pedestrian footfall at this junction given the proximity to the school. Plan 5.1 below shows the existing layout.

Option 1 - Proposed Roundabout with Formal Crossing to Perry Street

- 5.2 The proposal is to replace the uncontrolled priority junction with a roundabout. There is also an opportunity to improve the pedestrian facilities as part of this design given the proximity of the school.

- 5.3 The main benefit of removing the existing priority junction would be to help to improve facilities for drivers turning right into Ashfield Lane from Perry Street. The current right turn pocket is inadequate for the volume of vehicles turning right, meaning queues can block drivers travelling straight on along the A222, particularly in the AM peak. There would also be benefits for vehicles turning left out of Ashfield Lane into Bromley Road, although volumes of traffic making this turning are very low. The roundabout would help facilitate both turning manoeuvres by giving greater and more frequent priority over other traffic, without significant detriment to the A222.
- 5.4 The scheme also proposes the introduction of a formal crossing (zebra) and this would assist pedestrians crossing to the bus stops and school. The feature would also help to calm traffic on the approach to the roundabout.
- 5.5 The first disadvantage of the roundabout would be the impact on the access to no's 2 and 4 Perry Street as the crossover arrangement for these properties would be altered and visibility of traffic may be reduced and may lead to objections. Having said this there are other examples of crossovers being in the vicinity of roundabouts across the borough and lower vehicle speeds may make it easier for these households to exit their driveway. The proposal could also lead to the increased use of Ashfield Lane, as turning manoeuvres will be improved. Whilst the road is already a popular cut through to Chislehurst High Street and beyond, the existing delays and difficulties turning into and from Ashfield Lane do have an impact in lowering the number of drivers following this route. It is likely that if the tuning is improved by the introduction of the roundabout, this route could be more popular and experience increased traffic flows and demand.

Other Options Considered

- 5.6 Signalising the junction could have been an option, however, this is likely to have a significant negative impact on traffic flows, creating further delay though the area. Given the distance to the memorial junction, the signals are unlikely to be linked to help improve north / south bound traffic.

Traffic Impact of Proposals

- 5.7 The base scenario modelling shows that traffic exiting Ashfield Lane in either direction suffers from significant queueing and this would be reduced to just a few vehicles with the roundabout option.
- 5.8 The right hand turn queues from Perry Street into Ashfield Lane are also significantly reduced. This would have a significant positive knock on effect on the A222, as there would no longer be anywhere near as much blocking back.

6. War Memorial Options

Existing Situation

- 6.1 The War Memorial junction is the worst performing junction on this section of the A222. All four arms of the junction experience congestion in both peaks, and the A222 arms have been observed to suffer from congestion throughout the weekday as well. It is felt that of all the junctions, this is the one with the biggest concerns. In addition, Coopers School have campaigned for improved pedestrian facilities at this junction, however, these have not been

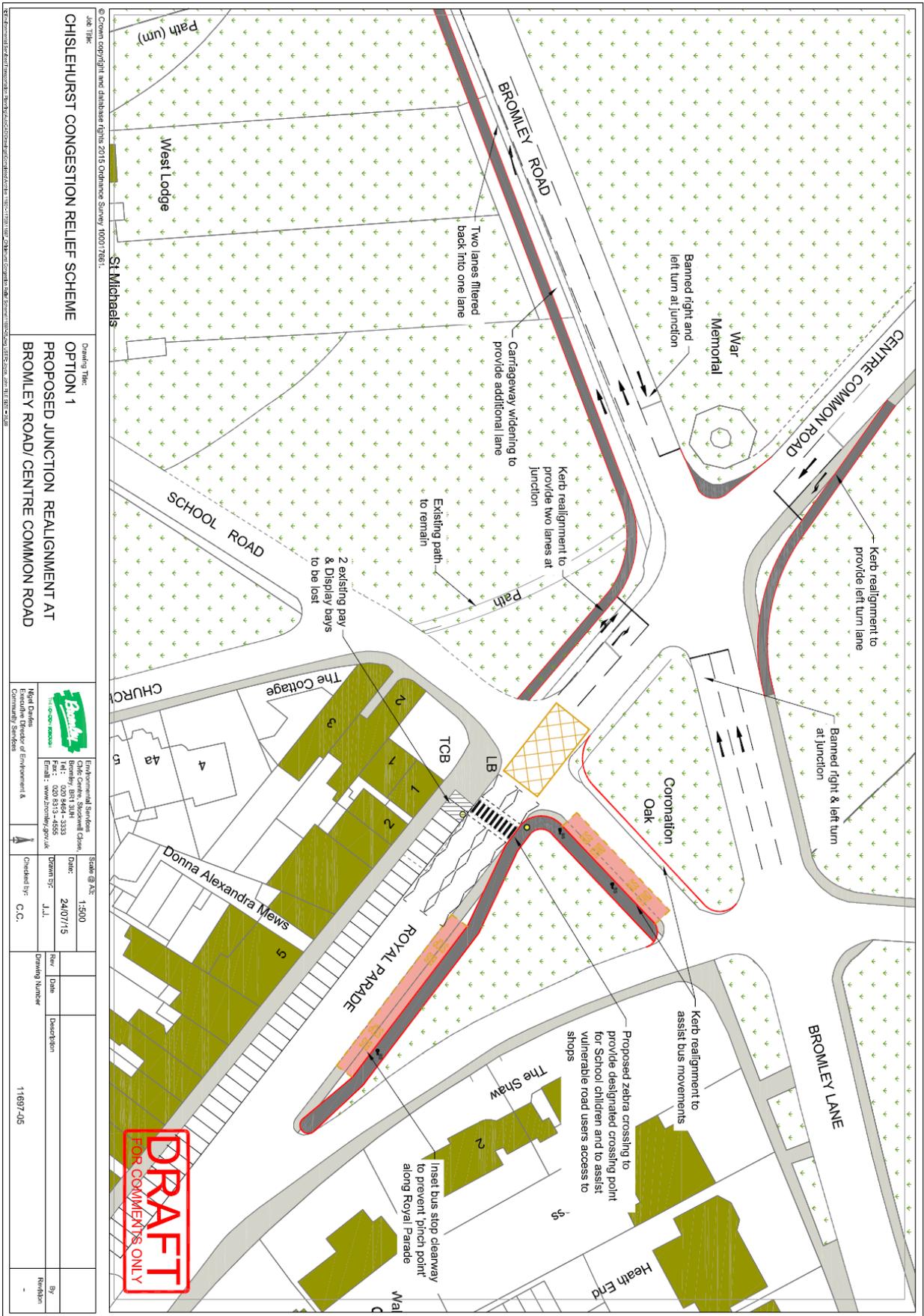
possible to date without making the congestion even worse. There is not currently a pedestrian phase on the traffic lights.

- 6.2 Currently all the arms of the junction have just one lane, except the westbound carriageway of the A222, towards Bromley, which has a turn right lane. The geometry of the junction is complicated with the A208 meeting the A222 at an approximately 60/30 degree angle instead of a 90 degree right angle, making the left hand turn from Bromley Lane into Royal Parade very tight and requiring the stop line to be pushed back significantly to avoid vehicles colliding. In addition, the war memorial on the north-east corner of the junction provides a significant restriction in design terms as moving it was not felt to be an option.

Option 1 - Junction Amendments with additional lanes and banned turning manoeuvres.

- 6.3 The proposal, shown in plan 6.1 makes a number of amendments to the junction:
- Bans left and right turns for both east and westbound traffic on the A222 Bromley Lane i.e. no turns into Royal Parade or Centre Common Road. There are alternative routes available (e.g. Watts Lane, Prince Imperial Road, Ashfield Road)
 - Bans right hand turns from Centre Common Road
 - Widens the carriageway on the A222 exit of the junction for westbound traffic towards Bromley.
 - Adds a left turn lane to Centre Common Road onto the A222.
 - Adds a zebra crossing over Royal parade to assist pedestrians crossing to the bus stand next to the Coronation Oak (at a loss of 2 parking spaces)
 - Insets the bus stop on Royal Parade to remove pinch point when buses are loading which sometimes blocks the junction
 - Some kerb realignments to help enforcement of banned turns and ease pinch points.
- 6.4 The advantages of the option would be to help significant additional volumes of traffic through the junction on each traffic phase, by removing any delay created by left and right turning traffic. The removal of the left and right turns would also allow for the stop lines to be moved forward, which would help reduce dead time within each signal phase waiting for the traffic to clear the junction and should also help reduce red-light running which has been observed at the junction. The additional lane to be provided heading towards Bromley would particularly benefit AM peak flows.
- 6.5 The disadvantages would be the impact on some surrounding/adjoining roads; Watts Lane for example would be likely to experience increased traffic flows, given that some drivers would need to turn off before the memorial junction if they need to travel towards St Paul's Cray and Petts Wood. Similarly there would be increased flows and use of Ashfield lane and also Kemnal Road to reach High Street, Chislehurst and beyond. If the banned turns were introduced, further consideration would also need to be given to Watts Lane and the existing traffic calming (road humps and width restriction) in place and whether this needs to be amended accordingly to cater for the likely additional vehicles using this route.

Plan 6.1 – War Memorial Option 1



6.6 The biggest issue, however, would be the impact on buses. The current route for service 162 is to make the left hand turn (LHT) from Bromley Road into Centre Common Road. If this manoeuvre is banned then buses would need to make three right hand turns (RHTs) using the bus stand, and Royal Parade (which also involves having to go through the lights twice) to get back onto the route. This will add additional time to the bus route, even with the savings on time made by reducing queues at this junction. Considering that TfL Buses were prepared to make a significant contribution to the finances of the project, this is likely to be unacceptable to them.

Option 2 – As Option 1 but with left hand slip lane from Royal Parade

6.7 This proposal has all the same changes as option 1 plus;

- A left hand turn slip road from Royal Parade to the A222 Bromley Road (westbound)
- A “walk with traffic” controlled pedestrian crossing in 3 phases – the new slip road, the A222 and Centre Common Road.

6.8 It is shown in plan 6.2 overleaf.

6.9 The general advantages and disadvantages are the same as option 1.

6.10 In addition, the main advantage of the left hand slip is that it allows a controlled pedestrian crossing which covers all routes from the school to the bus stops on Centre Common Road without the need for an additional phase to the traffic lights which would significantly increase congestion from the existing base.

6.11 The disadvantage of the left hand slip is an increase in land take, however, officers believe that the improvement to road safety that the crossing provides would be worth it. There is a slight increase in traffic congestion compared to option 1, but the levels are still very significantly lower than the existing situation.

Option 3 – As Option 1 but allowing LHT from Bromley Road to Centre Common Road

6.12 This proposal is the same as Option 1 (as shown in plan 6.1) with one exception;

- The banned LHT movement from Bromley Road into Centre Common Road has been lifted

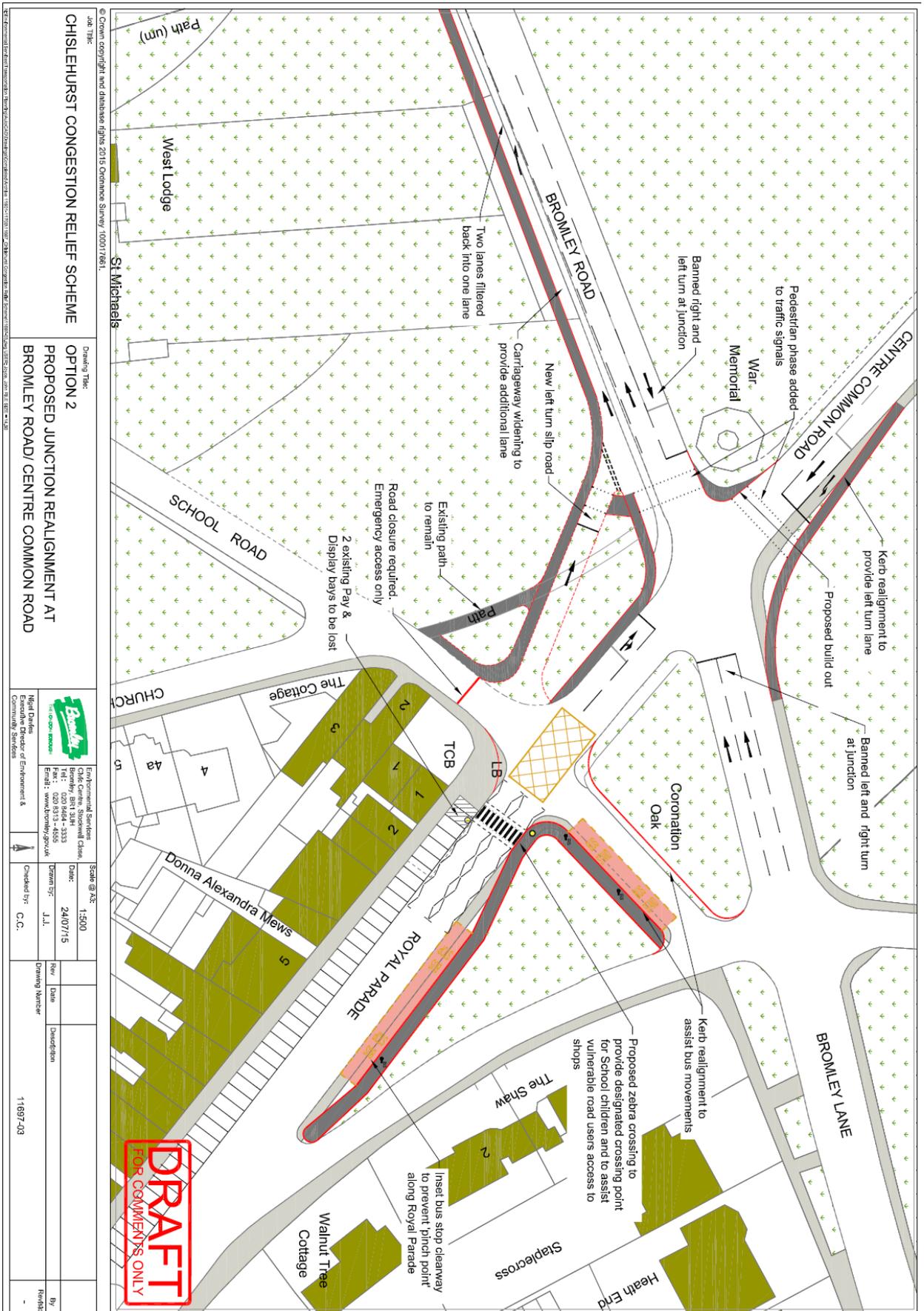
6.13 The purpose of this option is to alleviate the bus issue as described in section 6.6 above. The general advantages and disadvantages are the same as option 1, with one additional disadvantage; it would no longer be possible to have a controlled crossing over Centre Common Road as it would require an additional phase to the traffic lights which would significantly worsen congestion (even over the existing situation).

Option 4 – As Option 2 but allowing LHT from Bromley Road to Centre Common Road

6.14 This proposal combines options 2 and 3, by removing the LHT ban from Bromley Road into Centre Common Road

6.15 The additional disadvantage is having to remove the Centre Common Road controlled crossing.

Plan 6.2 – War Memorial Junction option 2



<p>Job Title: CHISLEHURST CONGESTION RELIEF SCHEME</p> <p>Opening Title: OPTION 2 PROPOSED JUNCTION REALIGNMENT AT BROMLEY ROAD/CENTRE COMMON ROAD</p>		<p>Scale @ A3: 1:500</p> <p>Date: 24/07/15</p> <p>Drawn by: J.J.</p> <p>Checked by: C.C.</p>	
<p>© Crown copyright and database rights 2015 Ordnance Survey 100017661</p>		<p>Environmental Services Chris Carney, Stockwell Clerk 020 8313 4333 Fax: 020 8313 4555 Email: www.bromley.gov.uk</p>	
<p>11697-03</p>		<p>11697-03</p>	

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Other Options Considered

- 6.16 Options 1 and 3 were considered with a controlled pedestrian crossing added. However, the only way to include the pedestrian crossing was to add a new phase to the traffic lights. This would significantly increase congestion as a result as time would need to be taken from the traffic phases to accommodate the pedestrian movement.
- 6.17 Removal of the traffic signals and replacement with a roundabout was considered. However, the option was dismissed on the impact this would have on likely land take and also the difficulty to introduce any formal crossing facilities. Given the number of pedestrians using this area, and the existing carriageway width, such a proposal would be likely to make crossing the road more difficult and would be a road safety concern.

Traffic Impact of Proposals

- 6.18 In terms of impact on traffic, all the above options show significant improvements over the existing base. Those options without the pedestrian crossings are better for traffic. However, there are differences between the options and the impacts are not the same across all arms of the junction.
- 6.19 In terms of impact on the A222, option 2 appears to have the best impact, but the impact on Royal Parade and Centre Common Road is minor. But it has the significant advantage of also introducing a controlled pedestrian crossing to the lights. The difference between options 2 and 4 (adding the LHT from Bromley Road into Centre Common Road) is minor
- 6.20 Option 1 has the best all round impact on traffic, although there would be a slight increase in traffic on the AM peak to A222 eastbound traffic (towards the A20). The difference with adding the left hand turn from Bromley Road into Centre Common Road is not significant.
- 6.21 In all cases the impact on westbound traffic on the A222 is much more significant than the eastbound impact as traffic uses both lanes as opposed to queuing behind a small number of right hand turners.

7. Prince Imperial Road Options

Existing Situation

- 7.1 Prince Imperial Road is currently a give way junction and is primarily used to link the A222 to/from Bromley with the centre of Chislehurst. Very few vehicles turn left out of Prince Imperial Road onto the A222 or right into it from the A222. There is only one lane in both directions. Significant queues form, particularly in the morning peak, as vehicles struggle to enter the A222.

Option Considered

- 7.2 Options at Prince Imperial Road are very limited. The impact of either signalling or adding a roundabout would be a significant negative impact on the A222, which generally runs smoothly through this junction. In addition, giving this junction increased priority may encourage additional rat running via Loop Road. Therefore, no significant junction improvements are recommended for this junction.

Some of the issues at this junction could be helped with some of the options for the Watts Lane roundabout, or with clearer road markings.

8. Watts Lane/Old Hill Road Options

- 8.1 Given the close proximity of these two junctions, they have been combined into one section for the purposes of this report.

Existing Situation

- 8.2 The Watts Lane junction is a mini roundabout with the A222 and Camden Park Road. Camden Park Road has very low volumes of traffic throughout the day. The other three arms of the roundabout all suffer from congestion at peak times. The queue on the Bromley Road section often blocks back to Prince Imperial Road.
- 8.3 Old Hill is a popular short cut, but the junction is quite close to the roundabout. As a result there is only room for 1 vehicle to queue to undertake the RHT. If more than one car is queueing, then this blocks traffic going straight on, and can often block the roundabout as a result.

Option 1 - Amendment of existing mini-roundabout to form 8m diameter roundabout

- 8.4 The proposal is to increase the diameter of the junction from a mini-roundabout to an 8m diameter roundabout. This is shown in plan 8.1 overleaf.
- 8.5 There is a secondary proposal/option to re-route Old Hill across to the south of the current alignment to increase the distance to the roundabout and thus increase the capacity of the RHT pocket, which is also shown on the plan.
- 8.6 The reason for a larger roundabout is two-fold. Firstly traffic usually flows better on larger roundabouts as the gaps in traffic are more obvious; at mini-roundabouts there is often the case of small delays whilst drivers look at each other, which over the course of a rush hour can add up to a significant delay, especially when significant numbers of vehicles are involved.
- 8.7 The second reason is to reduce the propensity for accidents. Whilst the number of injuries at the roundabout are small (3 slight over the last few years) there are a higher number of minor collisions, which cause delay whilst the drivers/vehicles resolve the issues.
- 8.8 It should be noted that the LHT and RHT bans at the War Memorial junction are likely to see increased volumes of traffic in Watts Lane. It is officers' opinion that leaving the mini-roundabout in-situ would be detrimental to the overall impact of the proposals.

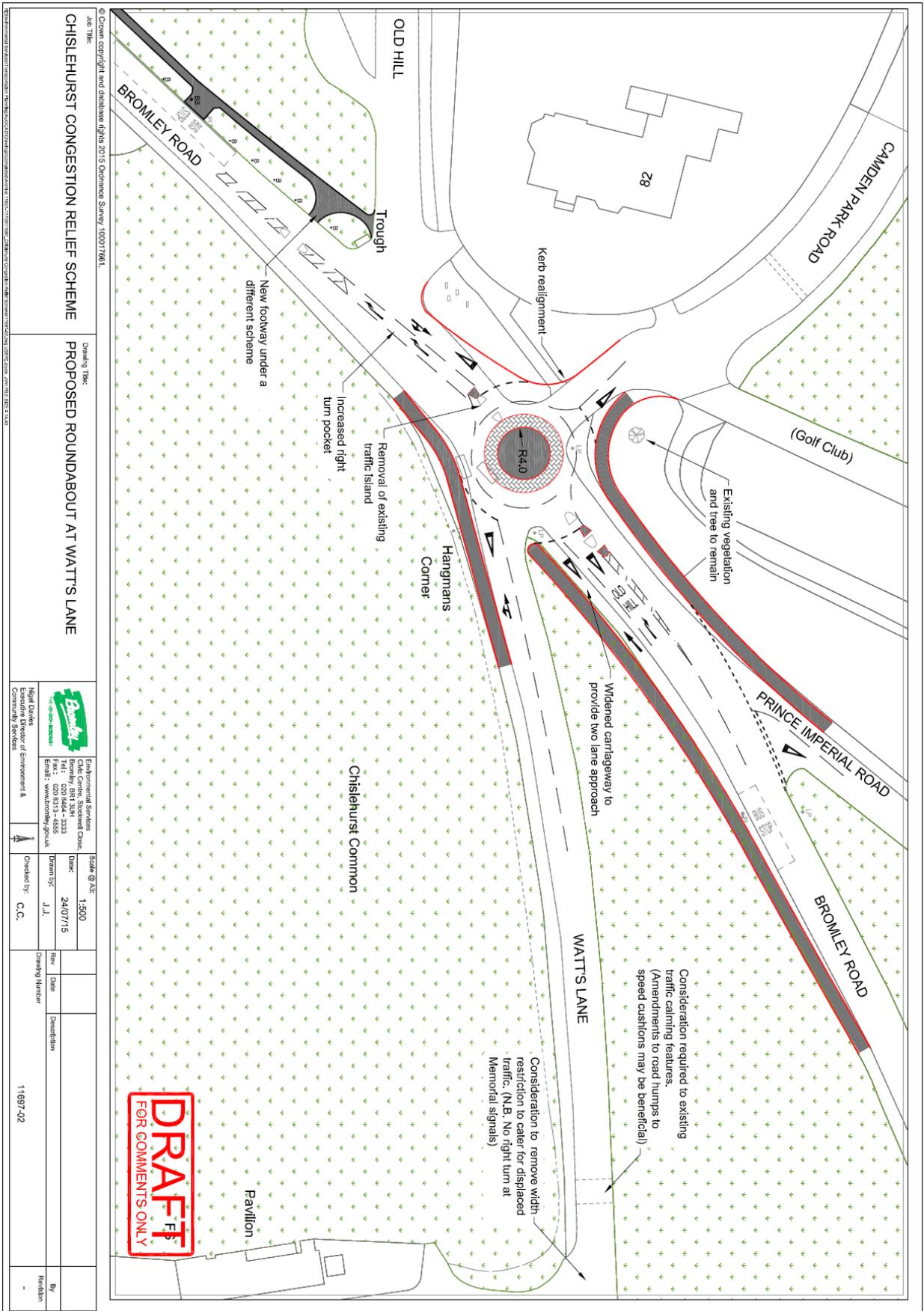
Option 2 – As option 1 with second lane on Watts Lane arm

- 8.9 The proposal is the same as option 1 but with an additional lane on the Watts Lane entry arm of the roundabout. This is shown in plan 8.2 (the second of the plans overleaf).
- 8.10 The modelling results for option 1 showed that there was still some delay on the Watts Lane arm of the junction (particularly with additional volumes arising from the War Memorial junction proposals), therefore, the additional lane was considered to look at the impact. It shows a considerable improvement, but the level of land take is more significant, and involves the land on the Cricket Ground side of the junction.

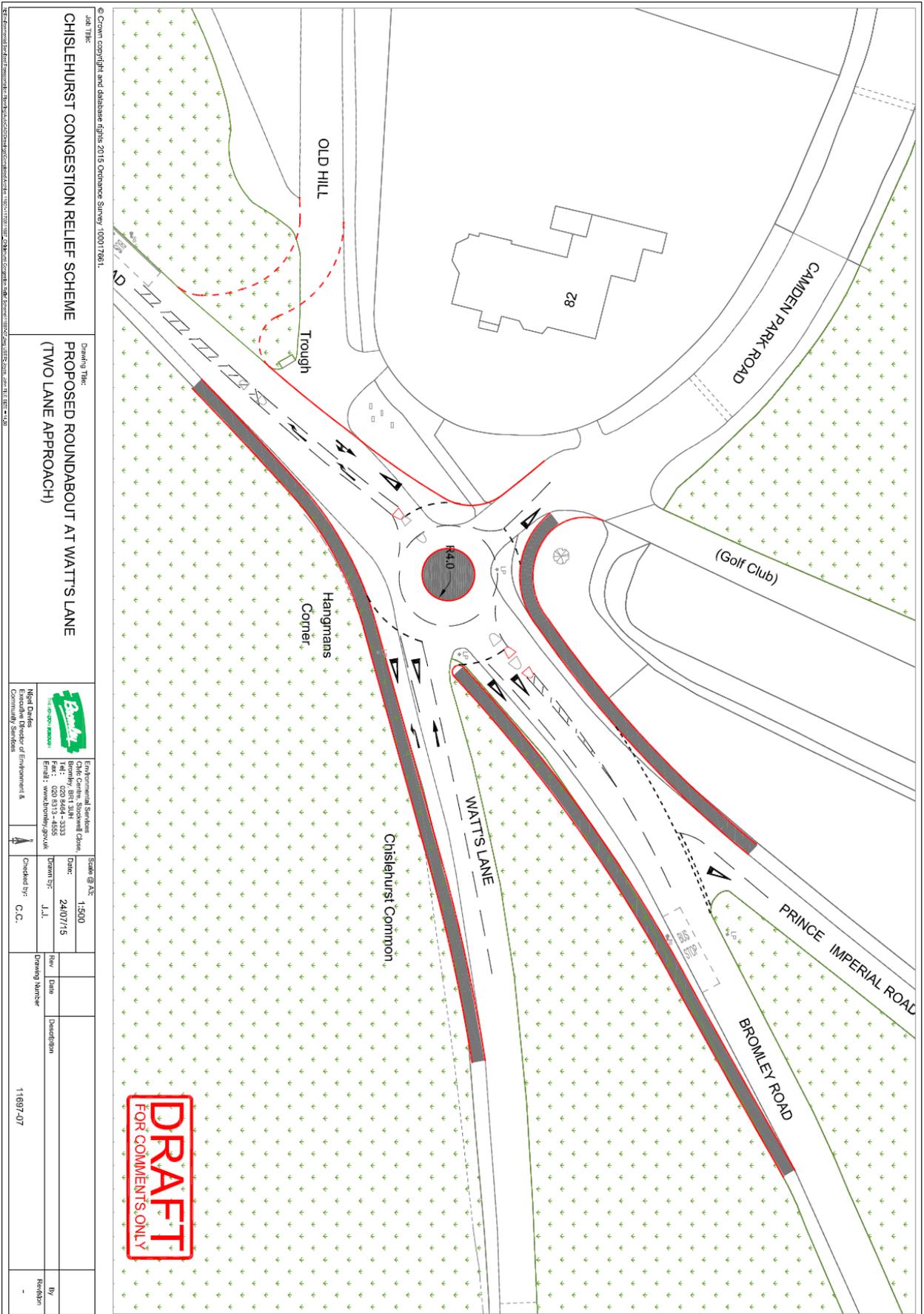
Other Options Considered

- 8.11 Traffic lights were considered at this location, but it would add significant delay to the A222 route compared to a roundabout.

Plan 8.1 – Watts Lane Option 1



Plan 8.2 – Watts Lane Option 2



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Job Title: CHISLEHURST CONGESTION RELIEF SCHEME	Drawing Title: PROPOSED ROUNDABOUT AT WATTS LANE (TWO LANE APPROACH)	Client: Bromley Environmental Services Chislehurst	Scale @ A3: 1:500	Date: 24/07/15	Drawn By: J.L.	Checked By: C.C.	Drawing Number: 11897-07	By: -	
Job Title: CHISLEHURST CONGESTION RELIEF SCHEME		Client: Bromley Environmental Services Chislehurst		Scale @ A3: 1:500		Date: 24/07/15		Drawn By: J.L.	
Drawing Title: PROPOSED ROUNDABOUT AT WATTS LANE (TWO LANE APPROACH)		Client: Bromley Environmental Services Chislehurst		Scale @ A3: 1:500		Date: 24/07/15		Drawn By: J.L.	
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Traffic Impact of Proposals

- 8.12 Option 1 shows significant improvements on the A222, but to the detriment of Watts Lane, which shows a fairly significant rise in queues.
- 8.13 With option 2, the queues on Watts Lane are also significantly reduced.

9. Costs

- 9.1 Officers have undertaken an initial estimate of the cost of these works. Obviously this is still very early in the design process, therefore a significant contingency of 30% has been included for items such as drainage, soil conditions and the final design are still unknown. A search for utilities has been undertaken, and it is likely that some of these would need diverting as they would be affected by the proposals. This can be quite costly, but until the options are decided upon a quote cannot be obtained. A significant sum has been included in the initial cost estimate which, from experience, should be sufficient.
- 9.2 The table below shows the costs for each junction:

Location	Cost
Ashfield Lane roundabout	£120k
War memorial (options 1 and 3 – no slip road)	£350k
War Memorial (options 2 and 4 – with slip road)	£385k
Watts Lane Roundabout	£190k
Loop Road and Heathfield Road	£350k
Guesstimate on utilities diversions (all junctions)	£250k
TOTAL	£1.25M- £1.3M (depending upon options and utilities)

- 9.3 There are a few sources of funding for this project. There is currently £250k from 2015/16 LIP funding allocated to the scheme and a further £250k from 2016/17 LIP funding. In addition TfL buses have promised significant funding of “half a million pounds or more” provided the improvements make improvements to bus journey timings and reliability.
- 9.4 This leaves the project slightly short on funding, however, the conversation with TfL buses needs to be completed, plus it may be possible to derive funding from other LIP or other TfL sources to complete the scheme. Alternatively, it may be possible to phase the scheme over more years. Officers are, therefore, fairly confident that the additional funding could be found without any significant compromises to the design.
- 9.5 Even if the shortfall remains after conversations with TfL, officers recommend that the designs progress together, because the schemes are intrinsically linked. Implementation staging can be considered in due course.

London Borough of Bromley Briefing Paper, Summer 2016:

Chislehurst Common and the A222

Introduction

General Background

The A222 across Chislehurst Common experiences traffic congestion on a daily basis. The congestion is particularly bad during the peak hours with delays of over half an hour a common occurrence. Traffic congestion is not only frustrating for vehicle drivers and bus passengers, it has an impact on the economy of the Borough, it causes air pollution and other health disbenefits and has a visual impact on the Common.

In addition, the Council receives regular complaints about the lack of pedestrian crossing facilities at the War Memorial junction, mainly from officials or parents of pupils attending Coopers School.

The Council, therefore, has a strong desire to make improvements to the A222 route in order to reduce congestion; improve air quality and provide a safer, controlled pedestrian crossing at the War Memorial Junction.

The Common is, however, protected from development by the Metropolitan Commons Act 1888. The Council fully understands the implications of this and the role of the Chislehurst Common Conservators in ensuring that any improvements suggested by the Council should not be to the detriment of the Common.

Summary of Work to Date

The Council and the Conservators have been in conversation for some time. The principle of the proposed solution is that there would be a "land swap", whereby the Council removes some existing highway across the Common in return for land at junction(s) where junction works could decrease congestion and benefit air quality, pedestrians and road safety.

Whilst the absolute specifics of the land swap are yet to be agreed, it would appear there is a general acceptance that the areas of highway the Council would remove from the Common are:

- Heathfield Lane from the junction of Ashfield Lane to Centre Common Road
- Replace the "x formation" of Loop Road/Ashfield Lane with a single connecting highway between Centre Common Road and Heathfield Lane (on an alignment yet to be agreed).

In exchange, the Council has made a proposal to obtain land to make improvements at the War Memorial junction, Watts Lane/Summer Hill/Bromley Road mini-roundabout and the Ashfield Lane/Bromley Road/Perry Street junction. Depending upon the alignment of the Loop Road replacement highway, some minor junction works may be required on Ashfield Lane, Centre Common Road and/or Prince Imperial Road. There is also an option to re-align the Old Hill junction. The Council has shared some designs options for the 3 main junction improvements and the Loop Road replacement with the Commons Conservators.

The Council's proposals have, however, been rejected by the Commons Conservators. Despite an exchange of letters, it would appear that an agreement is not immediately forthcoming and that the Conservators have some significant reservations about the Council's proposals.

Purpose of the Briefing Paper

The intention of this paper is to attempt to lay out the reasoning behind the Council's proposals, to set out some of the alternatives that were looked at and why they were rejected, plus to further examine some of the suggestions raised by the Commons Conservators.

A222 Traffic Congestion Issue

Description of Traffic Congestion

The best way of describing the traffic congestion is to split it on a direction basis, in other words eastbound (traffic heading towards the A20) and westbound (traffic heading towards Bromley Town Centre).

Westbound Traffic

In the morning rush hour (AM peak), traffic usually has to queue to exit the A20. Once traffic has moved onto Perry Street it usually moves (once past the BP petrol garage), although at a slower rate than free flowing traffic until it reaches the first queue/standstill. The queue usually starts around the entrance to the UCL Sportsground. From here, traffic is in stop/start mode until the Ashfield Lane junction.

After the Ashfield Lane junction, traffic will briefly speed up until it reaches the back of another queue that generally extends back to the Shepherds Green junction from the War Memorial junction. It usually takes at least 3 or 4 phases of the traffic lights (i.e. 3 or 4 green lights) for a vehicle to get through the junction. Once through the junction, traffic speeds up again, and can experience some shorter queues at the Watts Lane mini roundabout; vehicles can sometimes be held up at the right hand turn into Old Hill – this a short right turn lane and vehicles often overhang into the straight ahead lane, thus blocking this movement.

In the afternoon rush hour (PM peak), queues are usually shorter for westbound traffic at both Ashfield Lane and War Memorial, but can be longer at Watts Lane, because there are more vehicles turning right into Watts Lane that have the right of way.

The biggest delay in both the AM and PM peaks is, however, the War Memorial junction. Following surveys at the junction, the War Memorial junction was found to be 367% over capacity.

Eastbound Traffic

In the AM peak, eastbound traffic usually experiences two significant delays – at the War Memorial junction (although it normally only takes 2 phases of the lights to cross the junction) and leading up to the roundabout at the A20. Traffic will not be traveling at free flow speeds, but queues in other locations are rarer.

In the PM peak, queues usually extend down Summer Hill. The junctions with Old Hill and the Watts Lane roundabout are involved in these queues. However, it is common for the queue to extend beyond the Watts Lane Junction all the way from the War Memorial junction.

Once through the War Memorial junction, some vehicles can get trapped behind the bus stopped at the bus stop on the east side of the junction, which can block the War Memorial Junction. After the bus stop, there is usually some flowing traffic, but congestion from the A20 roundabout can extend back as far as the Shepherds Green junction.

It is recognised that there is congestion on many of the side roads to the A222. Prince Imperial Road suffers from long queues in the AM peak, Royal Parade and Centre Common Road can be quite congested throughout the day and Ashfield Lane has long queues in the PM peaks. However, without major highways works across the whole Common, which would require significant land take, it is not possible for the Council to cure every congestion issue. Therefore, the Council's aim is to improve traffic congestion on the busiest and most strategic road; the A222.

Causes of the Traffic Congestion

The obvious cause of traffic congestion is the sheer number of vehicles. Obviously this is not something the Council can influence to a large extent. However, there are a number of issues with the A222's road design in the vicinity of the Common that the Council can change, which will ease the causes of congestion:

Signal Timings

Traffic signal timings are calculated using the industry accepted computer programme, Linsig. The method that Linsig uses is a combination of traffic volumes (so that the busier arms of junctions get more green time than quieter ones), plus the size and geometry of the junction.

In order to operate signals safely, the signals cannot turn the lights for a particular arm of the junction green until the preceding traffic (vehicles or pedestrians) has cleared the junction. The greater the distance a vehicle or pedestrian needs to travel to clear or cross the junction, the longer the signals need to wait before turning green. It stands to reason, therefore, that smaller junctions have less dead time (known as intergreen) between turning on the green light.

Similarly, the length of the intergreen can be influenced by vehicle speeds. A pedestrian crossing's intergreen is calculated on a standard walking time of 1.2m/s. However, vehicle speeds are usually related to the angle a vehicle needs to take to exit the junction. Obviously if a vehicle needs to go straight on, then it probably does not need to slow down at all, but if it is turning, the sharper the angle, the slower it needs to go and, therefore, the longer it will take.

The War Memorial junction suffers from its current arrangement. The left hand turn into Royal Parade from Bromley Road (westbound), for example, is very tight at less than 90 degrees. This means that left turning not only has to significantly slow down (with an impact on traffic behind), the stop line for the traffic exiting Royal Parade has to be set back quite a way from the junction to enable enough room for larger vehicles to safely make the turn. The combination of these two issues adds a second or two to the dead/intergreen time; this can be the equivalent to one or two cars per phase, which could mean over 100 cars in an hour. This is repeated for the left hand turn into Centre Common Road. The stop line for eastbound traffic on Bromley Road is also set further back than perhaps it should.

Currently, the traffic signals operate on two phases – east/westbound and north/southbound. It is not possible to add a controlled pedestrian crossing to the traffic lights without adding an additional phase to the lights and this would add even more delay to the traffic.

Right Hand Turns

The problem with turning right is that vehicles have to wait for the opposing flow of traffic to have a gap in it before the vehicle can turn (unless it is a roundabout). Where there is inadequate space in the highway for waiting right hand turning vehicles, the following traffic cannot pass so simply has to wait for those gaps to appear (or more commonly turn in the intergreen periods).

An issue along much of the A222 is that there is not enough room to provide a right hand turn lane or pocket, therefore, right hand turning vehicles often block the following traffic. This is most prevalent at Ashfield Lane, where the size of the right hand turn lane is limited by the central reservation, which was installed to prevent “rat running” along Bull Lane/Shepherds Green. Right hand turns also commonly block traffic at Old Hill (westbound) and the War Memorial junction (eastbound).

The exception is the right hand turn into Centre Common Road from Bromley Lane (westbound). There is a long right hand turn lane, which stretches back to the bus stop, even though the Council’s surveys suggest that only a few vehicles turn right at this junction given that Ashfield Lane provides a shorter and quicker alternative.

Physical Restrictions on the Highway

Physical restrictions can come in many forms, both temporary and permanent. Essentially, the wider the highway, the faster vehicles are likely to travel (unrestricted), whereas parking, bus stops and traffic calming measures can all reduce vehicle speeds and, where roads are busy, this can cause congestion.

On the A222, there are not very many such restrictions. As noted above, the bus stops can be the cause of some delay. The two stops beyond the War Memorial junction (Bromley Road eastbound and Royal Parade southbound) can cause the War Memorial junction to become blocked as vehicles find it difficult to overtake the buses, whilst they are at the stops. This suggests that adding bus lay-bys or another mechanism for allowing vehicles to overtake buses is essential. Bus lay-bys were included in the Council’s proposals.

There is some parking on the A222 to the east of the War Memorial junction where some larger houses have been converted to flats and there is insufficient space for vehicle owners to park off-street. However, removing this parking would have little impact on the flow of the A222. There is adequate room for vehicles to pass these parked vehicles and it would not increase the capacity of the road if they were removed, without additional measures at the War Memorial junction. Even if removing the parked cars did provide an extra lane on the east side of the junction for westbound traffic, there is only one forward lane at the lights and very few right hand turning vehicles. Unless both of these lanes were converted to forward lanes with an adequate merge lane on the far side of the junction capacity would not be increased. Even with such modifications, given the distance of the parked vehicles from the junction, the impact would still be quite small.

Standard Responses to Traffic Congestion

The standard response to congestion issues is usually to simply build a wider road or junction and thus increase capacity. If the A222 were a dual carriageway from the A20 to the A21, then there would be few, if any significant congestion hotspots, other than minor delays caused by any traffic lights. This is simply not possible in this location. Therefore, the response required on the A222 needs to be more carefully considered, taking into account all the constraints and issues within the area.

It is recognised that it is impossible to completely cure the congestion issue on the A222. It is also likely that other junctions in other locations on the A222 would be impacted by any works undertaken at this location. Finally, it is also recognised that any works are likely to cause some disruption and disbenefits to some residents in the area. However, none of these issues are reasons

to dismiss any proposals, as if a majority of people stand to benefit from improvements, then they should be seriously considered.

Options Tables

Below are a number of tables, one for each junction on the A222, which show the various different options that have been considered for each location. The tables show a description of the potential options available to mitigate particular issues. In addition, the advantages/ disadvantages of each option are addressed, plus some commentary on costs and traffic impacts.

War Memorial Junction – Pedestrian Crossing

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Pedestrian phase to existing lights	Provide controlled crossing for school children	<ul style="list-style-type: none"> • Provides crossing facility 	<ul style="list-style-type: none"> • Needs additional phase on existing traffic lights 	Significant - negative	Medium
Add refuges and pedestrian phase to lights	Provide controlled crossing for school children - walk with traffic option?	<ul style="list-style-type: none"> • Provides crossing 	<ul style="list-style-type: none"> • Walk with traffic option does not work – still requires additional phase • No sufficient c/way space for refuges without land take 	Significant - negative	Medium
Left hand turn slip road from Royal Parade	Provide controlled crossing for school children	<ul style="list-style-type: none"> • Allows pedestrian crossing without the need for an additional phase (although crossing in 3 stages is not ideal). • Congestion benefit to Royal Parade 	<ul style="list-style-type: none"> • Additional land take 	Small positive (not to A222)	High
Pedestrian underpass	Provide crossing for school children	<ul style="list-style-type: none"> • Provides crossing 	<ul style="list-style-type: none"> • Significant land take (slopes extensive in length to make DDA compliant) • Visual impact • Cost 	Zero	High

War Memorial – Westbound Improvements

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Ban right hand turns	Allows right hand turn lane to be turned into straight ahead lane	<ul style="list-style-type: none"> • Increase capacity on east side of junction • Ashfield Lane is more popular route 	<ul style="list-style-type: none"> • Needs merge lane on west side of junction • Significant land take on west side of junction • Impact on Ashfield Lane • More vehicles turning right at Ashfield Lane 	Significant - positive	V. small on east side of junction. High + for construction of merge lane.
Ban parking outside flats on A222 (east of junction)	Increase capacity of junction	<ul style="list-style-type: none"> • Very small in practice without above option 	<ul style="list-style-type: none"> • Nowhere else for residents to park. 	Negligible	Low
Ban left hand turns	Vehicles do not have to slow down behind left turning vehicles (acute angle of turn)	<ul style="list-style-type: none"> • Stop line in Royal Parade can be moved closer to junction • Increase in number of vehicles going through the lights on each phase 	<ul style="list-style-type: none"> • Vehicles would need to use Royal Parade (residential section). • Some parking spaces would need to be removed to cope with additional capacity • Enforcement difficult 	Small - positive	Minor (lines and signs only)
Revise signal timings	Give additional time to A222	<ul style="list-style-type: none"> • More time to A222 = more vehicles through lights 	<ul style="list-style-type: none"> • Impact on Royal Parade/Centre Common Road unacceptable 	Positive to A222, negative to other routes	Minor
Underpass	Removes the need to signalise junction	<ul style="list-style-type: none"> • No signals = no delay 	<ul style="list-style-type: none"> • Visual impact • Would still need significant land take to ensure all accesses to properties etc. is maintained • Costly 	Significant positive	Extremely high

War Memorial – Eastbound Improvements

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Ban right hand turns	Reduce blocking of A222 by turning vehicles	<ul style="list-style-type: none"> • Reduce blocking of A222 by turning vehicles • Watts Lane is more popular route 	<ul style="list-style-type: none"> • Would need to remove width restrictions on Watts Lane • Very small increase in larger vehicles using Watts Lane 	Medium - positive	Minor
Create right hand turn lane	Reduce blocking of A222 by turning vehicles	<ul style="list-style-type: none"> • Reduce blocking of A222 by turning vehicles • Avoids Watts Lane issues 	<ul style="list-style-type: none"> • Significant land take • Requires moving War Memorial • Increases distance for pedestrians to cross (more need for controlled crossing) 	Medium - positive	High (excluding ped crossing)
Force right hand turns to use Royal Parade (residential section)	Reduce blocking of A222 by turning vehicles at junction	<ul style="list-style-type: none"> • Should be able to create right hand turn lane by using part of opposing right hand turn lane (westbound) • Could assist buses turning into bus layover with less blocking back 	<ul style="list-style-type: none"> • Impact on local traffic – may not be possible to go safely from Royal Parade to Kemnal Road • Shortened right hand turn lane (westbound) may cause blocking back • Vehicles would need to use Royal Parade (residential section). • Some parking spaces would need to be removed to cope with additional capacity • Enforcement difficult 	Medium - positive	Minor

Create bus lay-by	Reduce buses blocking A222 (inc. junction on occasion)	<ul style="list-style-type: none"> • Reduce buses blocking A222 (inc. junction on occasion) 	<ul style="list-style-type: none"> • Some land take • Buses may not be able to re-join highway immediately, which could add some minor delay to bus journeys 	Small to medium - positive	Medium
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War Memorial – Other Directions

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Add right hand turn lane in Royal Parade	Reduce blocking of junction by turning vehicles at junction	<ul style="list-style-type: none"> • Reduce blocking of junction by turning vehicles at junction • May reduce use of Royal Parade (residential section) 	<ul style="list-style-type: none"> • Significant land take and/or removal of footways • May require closure of School Lane as well 	Medium positive	Medium (excluding signals)
Add right hand turn lane on Centre Common Road	Reduce blocking of junction by turning vehicles at junction	<ul style="list-style-type: none"> • Reduce blocking of junction by turning vehicles at junction 	<ul style="list-style-type: none"> • Significant land take and/or removal of footways • Would exclude option of controlled crossing without an additional phase to lights 	Medium positive	Medium (excluding signals)
Add zebra crossing across Royal Parade to bus layover	Assist school children getting to school buses	<ul style="list-style-type: none"> • Road safety 	<ul style="list-style-type: none"> • Zebras give priority to pedestrians – could block junction at school opening/closing times unless supervised. 	Small - negative	Medium

Ashfield Lane Junction

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Extend right hand turn lane into Ashfield Lane	Reduce blocking on A222	<ul style="list-style-type: none"> • Reduces blocking on A222 	<ul style="list-style-type: none"> • Would need to remove part or all of central reservation which was put in to stop rat running on Bull Lane/Shepherds Green • Removes refuge for pedestrians on A222 	Medium - positive	Medium
Roundabout at Ashfield Lane	Reduce blocking on A222	<ul style="list-style-type: none"> • Reduces blocking on A222 (priority to right hand turn over eastbound traffic) • Could allow introduction of Zebra across A222 for school children. 	<ul style="list-style-type: none"> • Land take • Minor (negative) impact on eastbound traffic • Access to some houses on Bromley Road may be affected. 	Medium positive	High

Watts Lane Junction

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Create additional entry lanes for right hand turns on Summer Hill and Watts Lane	Reduces blocking by right hand turns	<ul style="list-style-type: none"> • Increases roundabout capacity • Could be essential if right hand turns banned at War Memorial junction 	<ul style="list-style-type: none"> • Land take 	Small to medium positive	High
Create additional lane for right hand turning vehicles into Old Hill	Reduces blocking by right hand turns	<ul style="list-style-type: none"> • Reduces blocking on A222 	<ul style="list-style-type: none"> • Slightly confusing lay out – would drivers understand? • Land take 	Small to medium positive	Medium to High

Old Hill Junction

Option	Reason	Advantage	Disadvantage	Traffic Impact	Costs
Realign Old Hill entrance further away from roundabout	Extends right hand turn lane	<ul style="list-style-type: none">• Reduces blocking on A222/roundabout	<ul style="list-style-type: none">• Visual impact on Common• Requires area with rare plants	Small to medium	High

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.4.487 [15039,24/03/2014] © Copyright TRL Limited, 2016
For sales and distribution information, program advice and maintenance, contact TRL: Tel: +44 (0)1344 770758  email: software@trl.co.uk Web: http://www.trlsoftware.co.uk
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Filename: Import of Chislehurst DF AM Peak .arc8
Path: N:\Environmental Services\Transportation Planning\All Office\Traffic\Ismiel\Chislehurst War Memorial\Dim Modelling
Report generation date: 14/11/2016 13:53:03

Summary of junction performance

AM					
	Queue (Veh)	Delay (s)	RFC	LOS	Network Residual Capacity
AM Peak (07:30 - 08:30)					
Arm A	0.63	5.79	0.39	A	8 % [Arm D]
Arm B	1.47	7.80	0.60	A	
Arm C	2.90	17.36	0.75	C	
Arm D	3.62	21.21	0.79	C	

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

"D1 - AM Peak (07:30 - 08:30), AM" model duration: 08:00 - 09:00
"D2 - Interpeak (12:00 - 13:00), AM" model duration: 08:00 - 09:00
"D3 - PM Peak (16:30 - 17:30), AM" model duration: 08:00 - 09:00
"D4 - Weekend, AM" model duration: 08:00 - 09:00

Run using Junctions 8.0.4.487 at 14/11/2016 13:53:01

File summary

Title	Chislehurst Congestion Relief Scheme - Option B
Location	Bromley Road/Centre Common Road
Site Number	
Date	28/10/2016
Version	
Status	
Identifier	
Client	London Borough of Bromley
Jobnumber	
Enumerator	taa77336 [HCL70027]
Description	

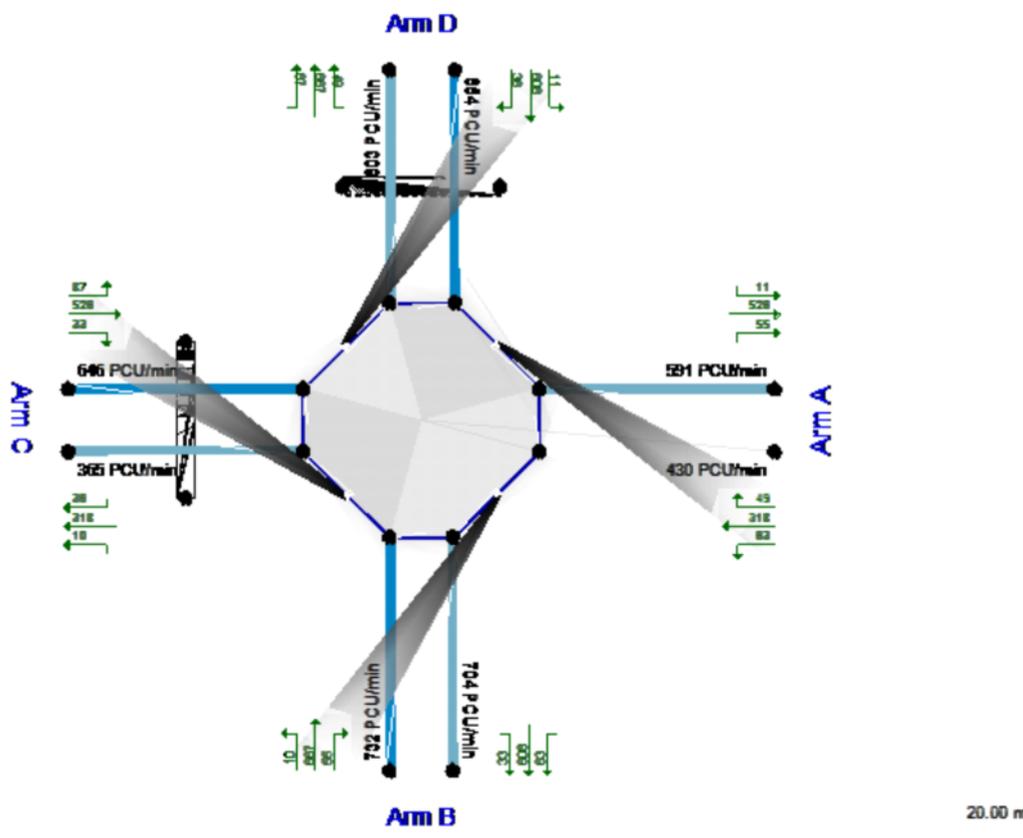
Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75		✓	Delay	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perMin	s	-Min	perMin

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Showing original traffic demand (PCU/min)
 Time Segment (08:00-08:15)
 Showing Analysis Set "A1 - "; Demand Set "D1 - AM Peak (07:30 - 08:30), AM"
 The junction diagram reflects the last run of ARCADY.

AM Peak (07:30 - 08:30), AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Arm D - Pelican/Puffin Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	DemandSets	D1 - AM Peak (07:30 - 08:30), AM	Demand Set 1: Scenario Name includes Time Period Name ('AM'). Are you sure this is correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
ARCADY			✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period	Description	Traffic Profile	Model Start Time	Model Finish Time	Model Time Period	Time Segment Length	Results For Central	Single Time Segment	Locked	Run Automatically	Use Relationship

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		Name	Type	(HH:mm)	(HH:mm)	Length (min)	(min)	Hour Only	Only			
AM Peak (07:30 - 08:30), AM	AM Peak (07:30 - 08:30)	AM	Varies by Arm	08:00	09:00	60	15					✓

Junction Network

Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	untitled	Roundabout	A,B,C,D				13.52	B

Junction Network Options

Driving Side	Lighting	Network Residual Capacity (%)	First Arm Reaching Threshold
Left	Normal/unknown	8	Arm D

Arms

Arms

Arm	Arm	Name	Description
A	A	Centre Common Road	
B	B	Bromley Lane	
C	C	Royal Parade	
D	D	Bromley Road	

Capacity Options

Arm	Minimum Capacity (PCU/min)	Maximum Capacity (PCU/min)	Assume Flat Start Profile	Initial Queue (PCU)
A	0.00	1666.65		0.00
B	0.00	1666.65		0.00
C	0.00	1666.65		0.00
D	0.00	1666.65		0.00

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
A	3.56	6.47	10.10	40.00	28.00	37.00	
B	5.63	7.69	12.10	3.00	28.00	42.00	
C	3.20	6.44	5.60	40.00	28.00	38.00	
D	3.00	6.16	19.50	6.10	28.00	36.00	

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	Zebra
D	Pelican

Zebra Crossings

Arm	Space between crossing and junction entry (PCU)	Vehicles queueing on exit (PCU)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
C	7.00	2.00		Distance	7.60	5.43				

Pelican/ Puffin Crossings

Arm	Amber time preceding red (s)	Amber time regarded as green (s)	Time from traffic red start to green man start (s)	Time period green man shown (s)	Clearance Period (s)	Traffic minimum green (s)	Space between crossing and junction entry (PCU)
D	3.00	0.00	2.00	6.00	8.00	7.00	0.00

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/min)	Final Slope	Final Intercept (PCU/min)
A		(calculated)	(calculated)	0.626	25.628
B		(calculated)	(calculated)	0.507	23.957
C		(calculated)	(calculated)	0.579	21.826
D		(calculated)	(calculated)	0.544	22.265

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	DIRECT		N/A	100.000
B	DIRECT		N/A	100.000
C	DIRECT		N/A	100.000
D	DIRECT		N/A	100.000

Pedestrian Flows

General Flows Data

Arm	Profile Type	Average Pedestrian Flow (Ped/min)
A	-	-
B	-	-
C	DIRECT	N/A
D	DIRECT	N/A

Direct/Resultant Flows

Direct Flows Data

Time Segment	Arm	Direct Demand Entry Flow (Veh/min)	DirectDemandEntryFlowInPCU (PCU/min)	Direct Demand Exit Flow (Veh/min)	Direct Demand Pedestrian Flow (Ped/min)
08:00-08:15	A	6.53	7.18		
08:00-08:15	B	11.39	12.19		
08:00-08:15	C	10.20	10.76		0.11

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Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Junction Arrivals (Veh)	Queueing Delay (Veh-min)	Average Queueing Delay (s)	Queueing Delay (Veh-min/min)	Queueing Delay (Veh-min)	Average Queueing Delay (s)
A	0.39	5.79	0.63	A	6.53	391.80	37.07	5.68	0.62	37.08	5.68
B	0.60	7.80	1.47	A	11.39	683.40	86.42	7.59	1.44	86.47	7.59
C	0.75	17.36	2.90	C	10.20	612.00	164.28	16.11	2.74	164.59	16.14
D	0.79	21.21	3.62	C	10.47	628.20	201.34	19.23	3.36	201.84	19.28

Main Results for each time segment

Main results: (08:00-08:15)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	6.53	97.95	6.49	8.99	10.64	0.00	17.02	15.54	0.384	0.00	0.62	5.675	A
B	11.39	170.85	11.29	11.10	6.02	0.00	19.10	14.17	0.596	0.00	1.45	7.592	A
C	10.20	153.00	10.02	5.50	11.82	0.11	13.71	11.41	0.744	0.00	2.72	15.594	C
D	10.47	157.05	10.25	12.46	9.37	1.13	13.36	12.71	0.784	0.00	3.30	18.208	C

Main results: (08:15-08:30)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	6.53	97.95	6.53	9.14	10.85	0.00	16.90	15.54	0.386	0.62	0.63	5.787	A
B	11.39	170.85	11.39	11.31	6.06	0.00	19.08	14.17	0.597	1.45	1.46	7.799	A
C	10.20	153.00	10.19	5.54	11.91	0.11	13.65	11.41	0.747	2.72	2.84	17.260	C
D	10.47	157.05	10.46	12.58	9.53	1.13	13.29	12.71	0.788	3.30	3.51	20.966	C

Main results: (08:30-08:45)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	6.53	97.95	6.53	9.14	10.86	0.00	16.89	15.54	0.387	0.63	0.63	5.790	A
B	11.39	170.85	11.39	11.32	6.06	0.00	19.08	14.17	0.597	1.46	1.47	7.802	A
C	10.20	153.00	10.20	5.54	11.91	0.11	13.65	11.41	0.747	2.84	2.88	17.329	C
D	10.47	157.05	10.47	12.58	9.53	1.13	13.28	12.71	0.788	3.51	3.58	21.147	C

Main results: (08:45-09:00)

Arm	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Exit Flow (Veh/min)	Circulating Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	Saturation Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
A	6.53	97.95	6.53	9.14	10.86	0.00	16.89	15.54	0.387	0.63	0.63	5.791	A
B	11.39	170.85	11.39	11.32	6.06	0.00	19.08	14.17	0.597	1.47	1.47	7.804	A
C	10.20	153.00	10.20	5.54	11.92	0.11	13.65	11.41	0.747	2.88	2.90	17.359	C
D	10.47	157.05	10.47	12.58	9.54	1.13	13.28	12.71	0.788	3.58	3.62	21.209	C

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	8.91	0.59	5.675	A	A
B	20.45	1.36	7.592	A	A
C	36.02	2.40	15.594	C	B
D	42.67	2.84	18.208	C	B

Queueing Delay results: (08:15-08:30)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.34	0.62	5.787	A	A

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B	21.86	1.46	7.799	A	A
C	41.91	2.79	17.260	C	B
D	51.42	3.43	20.966	C	C

Queueing Delay results: (08:30-08:45)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.40	0.63	5.790	A	A
B	22.02	1.47	7.802	A	A
C	42.96	2.86	17.329	C	B
D	53.25	3.55	21.147	C	C

Queueing Delay results: (08:45-09:00)

Arm	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
A	9.42	0.63	5.791	A	A
B	22.08	1.47	7.804	A	A
C	43.38	2.89	17.359	C	B
D	54.00	3.60	21.209	C	C

Brief results for arms

Arm Results

Time Segment	Arm	Total Demand (Veh/min)	Capacity (Veh/min)	RFC	Pedestrian Demand (Ped/min)	Start Queue (Veh)	End Queue (Veh)	Queueing Total Delay (Veh-min)	Geometric Total Delay (Veh-min)	Average Delay Per Arriving Vehicle (s)
08:00-08:15	A	6.53	17.02	0.384	0.00	0.00	0.62	8.91	-	5.675
08:00-08:15	B	11.39	19.10	0.596	0.00	0.00	1.45	20.45	-	7.592
08:00-08:15	C	10.20	13.71	0.744	0.11	0.00	2.72	36.02	-	15.594
08:00-08:15	D	10.47	13.36	0.784	1.13	0.00	3.30	42.67	-	18.208
08:15-08:30	A	6.53	16.90	0.386	0.00	0.62	0.63	9.34	-	5.787
08:15-08:30	B	11.39	19.08	0.597	0.00	1.45	1.46	21.86	-	7.799
08:15-08:30	C	10.20	13.65	0.747	0.11	2.72	2.84	41.91	-	17.260
08:15-08:30	D	10.47	13.29	0.788	1.13	3.30	3.51	51.42	-	20.966
08:30-08:45	A	6.53	16.89	0.387	0.00	0.63	0.63	9.40	-	5.790
08:30-08:45	B	11.39	19.08	0.597	0.00	1.46	1.47	22.02	-	7.802
08:30-08:45	C	10.20	13.65	0.747	0.11	2.84	2.88	42.96	-	17.329
08:30-08:45	D	10.47	13.28	0.788	1.13	3.51	3.58	53.25	-	21.147
08:45-09:00	A	6.53	16.89	0.387	0.00	0.63	0.63	9.42	-	5.791
08:45-09:00	B	11.39	19.08	0.597	0.00	1.47	1.47	22.08	-	7.804
08:45-09:00	C	10.20	13.65	0.747	0.11	2.88	2.90	43.38	-	17.359
08:45-09:00	D	10.47	13.28	0.788	1.13	3.58	3.62	54.00	-	21.209

Subject: FW: Pedestrian Crossing Facility at the War Memorial Junction, Chislehurst - modelling

From:

Sent: 26 July 2019 17:25

To: Sharma, Suraj, Cllr; Huntington-Thresher, William, Cllr (Ocat); Huntington-Thresher William; Terry, Kieran, Cllr; Boughey, Katy, Cllr.

Subject: Pedestrian Crossing Facility at the War Memorial Junction, Chislehurst - modelling

Dear Ward Members/ Portfolio Holder

You be aware that there is a campaign to add a pedestrian crossing facility at the signalised junction by the war memorial on Chislehurst Common, at the Royal Parade / Centre Common Rd / Bromley Lane / Bromley Rd (A222) junction. You will also be aware that the Council has been requested to undertake a comprehensive modelling exercise at this location. I am not sure what the benefit of that would be, but I did agree at a meeting in Chislehurst (attended by Cllr Sharma) that we would undertake a “baseline” modelling exercise of what would happen to traffic queues if a green-man stage was introduced at the junction with no other changes as previously proposed– e.g. no widening to allow for a central island, no slip road, no banned turns.

My colleague has undertaken the modelling. At present, in the morning peak, the practical reserve capacity (PRC) of the junction is -18.0. The aim when designing a signalised junction is to ensure that the PRC does not fall below zero. Obviously here the PRC is already well below zero. This results in just over 100 vehicles per hour having to queue to get through the junction, which, for example, means an average queue length on Bromley Lane of 47 vehicles (~283m).

There are probably many junctions around the Borough which, during the rush hour, fall below a PRC of zero. For example, the Red Lodge Road / Station Road junction in West Wickham is currently being improved to help bus reliability. The PRC was previously -27.0 here, but the modelling predicts a new PRC, post-completion of the scheme, of -3.7.

For the Chislehurst war memorial junction, modelling suggests that the addition of a green-man phase would lead to the following numbers: PRC changing from -18.0 to -63.1, with the vehicles delayed per hour increasing from 101 to 507, and average queue lengths on Bromley Lane increasing from 47 vehicles (~283m) to 134 vehicles (~804m). The queue lengths on Royal Parade and Centre Common Road would be even longer.

I would suggest that any queues this long would in effect bring traffic through this area to a standstill. This would have the effect of buses having to be terminated and car drivers “rat-running” along any available residential road; thereby creating a danger to vulnerable road users and great annoyance to residents of these minor roads.

The model assumes that the on-demand green-man phase is called regularly, which I believe will be the case in the morning rush hour, due to the presence of the nearby schools. The model includes adding the green-man phase on all four arms, which one might as well do as the only way for the junction to allow pedestrians to cross any arm is to have an all-red phase (i.e. no traffic moves whilst a green-man shows).

This is not to say that I believe a pedestrian facility in this location is not desirable. This modelling reaffirms the need to deliver this as part of a bus reliability scheme, redesigning the whole junction to avoid the negative consequences I outlined above. Any such scheme is dependent upon land take/swap, therefore the delivery of the locally desired pedestrian facility is within the gift of those managing the Common.

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Please ask any questions you may have and also let me know how you wish me to proceed in respect to the petition/campaign.

Regards