M5 Junction 10 Improvements Scheme

Road Safety Audit 1 Response Report

TR010063 - APP 9.54

Rule 8 (1) (b)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

M5 Junction 10 Improvement Scheme

Development Consent Order 202[x]

Road Safety Audit 1 Response Report

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M5 Junction 10 Improvements Scheme

Road Safety Audit 1 Response Report

Date: 13/09/23

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Gloucestershire COUNTY COUNCIL

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This document has 34 pages including the cover.

Document history

Revision	Status	Purpose description	Originated	Checked	Reviewed	Authorised	Date
C04	A1	Final issue	CG	CCR	CJ	LJ	13/09/23
P04	S3	Responses added to interim RSA 1 report	CG	CJ	CCR	---	27/07/23
C03	A1	Design Fix 3 - Final	CCR	CG	CJ	BM	25/05/23
C02	A1	Tables completed with OO comments and actions	CCR	CJ	AM	TT	29/06/22
C01	A1	First Issue	CJ	CCR	AM	TT	06/04/22

Client signoff

Client	**Gloucestershire County Council**
Project	**M5 Junction 10 Improvements Scheme**
Job number	**5197035**
Client signature / date	[redacted] 22/9/23

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1. Project Detail

Table 1-1 - Project Details

Report Title:	M5 Junction 10 Stage 1 RSA Response Report
Date:	13/09/23
Document reference and revision:	GCCM5J10-ATK-GEN-ZZ-PC-CH-000014 C04
Prepared by:	Atkins
On behalf of:	Gloucestershire County Council

Table 1-2 - Authorisation Sheet

Project:	M5 Junction 10 Improvements Scheme
Report title:	**M5 Junction 10 Stage 1 RSA Response Report**
Prepared by	
Name:	Chris Roberts
Position:	Design Manager
Signed:	[redacted]
Organisation:	Atkins
Date:	13/09/23
Approved by	
Name:	Scott Macaulay-Lowe
Position:	Team Leader; Major Projects
Signed:	Scott Macaulay-Lowe
Organisation:	Gloucestershire County Council
Date:	22/09/23

2. Introduction

2.1. Scheme Background

2.1.1. Gloucestershire faces significant challenges to achieve its vision for economic growth. A Joint Core Strategy (JCS) – a partnership between Gloucester City Council, Cheltenham Borough Council and Tewkesbury Borough Council was formed to produce a co-ordinated strategic development plan to show how the region will develop during the period up to 2041. This includes a shared spatial vision targeting 35,175 new homes and 39,500 new jobs by 2041.

2.1.2. New housing and employment sites are proposed for development to the west of Cheltenham. To unlock these housing and job opportunities, Gloucestershire County Council (GCC) needs to ensure that there is sufficient highway capacity to accommodate the increased motorised traffic and non-motorised users it will generate.

2.1.3. An all movements junction has been identified as a key infrastructure requirement to enable the housing and economic development proposed by the Gloucestershire Local Enterprise Partnership's (GFirst LEP) Strategic Economic Plan and is central to the transport network sought by the council in the adopted Gloucestershire Local Transport Plan. The planned housing and economic growth have been included by Cheltenham Borough, Tewkesbury Borough and Gloucester City Councils in the adopted Joint Core Strategy (JCS).

2.1.4. A Bid was submitted in March 2019 to Homes England to the Housing Infrastructure Fund (HIF), wherein an investment case was made for the following infrastructure improvements, which together make up the M5 Junction 10 Improvements Scheme:

- Scheme element 1: Improvements to Junction 10 on the M5 and a new road linking Junction 10 to west Cheltenham;
- Scheme element 2*: A38/A4019 Junction Improvements at Coombe Hill; and
- Scheme element 3: A4019 widening, east of Junction 10.

2.1.5. *It should be noted, however, that element 2 is now being considered as a separate scheme and will therefore not be included in the scope of this road safety audit.

2.2. Purpose of the report

2.2.1. This RSA response report addresses problems identified in the Stage 1 Road Safety Audit, dated 16/02/22 (doc ref: SA212220-1) and the Interim Stage 1 Road Safety Audit dated 19/07/2023 (doc ref: SA212220-2).

2.2.2. The representatives from the design organisation who prepared the RSA response report are:

- Chris Roberts
- Craig Jones
- Paolo Malara
- Steve Dimmock

2.3. Location of the scheme

2.3.1. M5 Junction 10 is located 48 miles to the south of Birmingham, five miles to the south of Tewkesbury, four miles to the north-west of Cheltenham, and eight miles to the north-east of Gloucester. It is the northernmost of four junctions serving the Gloucester and Cheltenham urban areas.

2.3.2. This places the junction in a strategically important location for the region, particularly as northern and western Cheltenham are the sites of a number of large retail parks and employment areas, and the location of planned future housing and nationally-significant business development.

3. Key Personnel

Table 3-1 - Project Details

Overseeing Organisation:	Project Manager:
RSA Team:	**Audit team leader: Chris Thompson (GCC)** **Audit team member: David Holland Gloucestershire Police Traffic Management and Road Safety**
Design Organisation:	**Atkins, 500 Park Avenue Aztec** **West Bristol BS32 4RZ**

4. Road Safety Audit Decision Log

Table 4-1 - Road Safety Audit Decision Log

Note: the original RSA Audit Report appears to make erroneous references to the A419 and A4109. In table 4-1; columns 1 and 2 (RSA Problem and Recommendation) have been updated to refer to A4019 (and such corrections are highlighted with red text).

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 1 ***Location:*** B4634 South bound exit from junction with A4019 Tewkesbury Road ***Summary:*** The audit team noted that this is a Stage 1 Audit and that all road makings may not have been included but noted that there are no tuck in arrows on the South bound B4634 exit from the Tewkesbury Road as the road reduces from two lanes to one. With no tuck in arrows to warn road users that the two lanes will merge and reduce to a single lane the likelihood of side swipe type of collisions will increase possibly resulting in a damage or slight injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend tuck in arrows are added on the B4634 prior to the road reduces from two lanes to a single carriageway when leaving the Tewkesbury Road junction for the Stage 2 detailed design audit.	The design organisation accepts the problem raised but suggests an alternative solution. The design organisation has reviewed the need for a two lane exit from the junction as part of the final stage of the preliminary design. The traffic modelling assessment concluded that only a single lane exit is required at this location and it is therefore suggested that the design is amended as such.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to a single lane exit as outlined in Design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 2 ***Location:*** Central pedestrian refuges located at several junctions in various locations ***Summary:*** The audit team raised a concern regarding the width of the pedestrian/cycle refuges located at the junctions listed above. The width of the refuges was not shown on the plans and a concern was raised regarding the width available to house a cyclist waiting to complete their crossing. If the pedestrian refuges located at the junctions above are not wide enough to safely house a cyclist, they could be clipped by vehicles travelling through the junction possible resulting in a slight injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that the width of all pedestrian refuges located at junctions that have cycle facilities either side should be wide enough to safely house a cyclist waiting to complete the crossing.	The design organisation accepts the problem and recommendation made by the RSA team. It is noted that the RSA team did not have the width of the refuges available to them so the design team want to clarify that all refuges within the current design, which require pedestrians or cyclists to stop at them, are a minimum of 3m wide. There are some other islands which are narrower than this but these do not require pedestrians or cyclists to stop as the traffic signal phasing will allow them to cross both carriageways without stopping. This would be made clear to pedestrians and cyclists as no tactile paving would be provided where pedestrians are not expected to wait. These islands are included within the design for siting traffic signal equipment.	Happy with the response provided by the designer and have no further issues to raise at this time.	Detailed Design to ensure no reductions in width are made to all central islands intended for pedestrians/cyclists to stop at in order to maintain a minimum of 3m width. Detailed design could seek opportunities to enhance the width of islands where space allows and could also consider split islands where appropriate so that the cycle route and pedestrian route markings continue through the island without the need for drop kerbs.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 3 ***Location:*** Bus stop located on the A4019 next to the service road and junction with Sandpipers Drive ***Summary:*** The audit team noted that no provision had been made for pedestrians to access the bus stop, there is currently no dropped kerb crossing point across the service road to access the bus stop which could prove to be a barrier for mobility cart users. The 2m wide parking strip also show no gaps which would mean pedestrians would have to cross between parked vehicles when crossing the service road which will make them much less obvious to road users travelling along the service road which lead to a pedestrian stepping out into the path of a vehicle travelling along the service road which could result in a slight / Serious injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that a couple of parking spaces are removed and replaced with build out to enable pedestrians to stand proud of the parking when waiting to cross the road as this will give them much better visibility to road users travelling along the service road. The build out should have a dropped kerb crossing point with tactile paving to ensue visually impaired pedestrians are able to identify the crossing point to the bus stop.	The design organisation accepts the problem raised but suggests an alternative solution: The design will be changed to remove all the parking bays along the service road and provide a 7.3m carriageway with appropriate crossing facilities.	Happy with the response provided by the designer and have no further issues to raise at this time.	The design of the service road will be changed to remove the parking bays and provide a 7.3m carriageway. Detailed design will consider crossing facilities, such as build-outs, tactile paving, dropped kerbs etc in this location.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 4 ***Location:*** Homecroft Drive junction with the service roads that run adjacent with the A4019 ***Summary:*** The audit team noted that the junction on Homecroft Drive with the service road is located very close to the junction with the A4019 and large vehicles may overrun the corner of the island splitting the service road from the A4019 which could result in damage if this occurs regularly, the service road does not have any turning heads at the end of them to allow a large vehicle to turn around which could result in large vehicles reversing back out onto Homecroft Drive which could result in a slight injury accident. (Note : This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that swept path drawings are provided, to ensure large vehicles will not overrun the island that splits the service road from the A4019, when turning into or out of the service road. Turning heads at the end of the service roads should also be considered to ensure large vehicle do not have to reverse out of the service road onto Homecroft Drive.	The design organisation accepts the problem raised but suggests an alternative solution: The design is proposed to be amended in order to remove the problem identified, where direct access from the A4019 to Homecroft Drive is stopped up. Homecroft Drive would be connected to a 7.3m wide service road which would run parallel to the A4019 from the fire station to the Civils Service Sport Ground where it would then connect to the A4019 via a signalised crossroads junction, with Site Access B positioned opposite.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments to Homecroft Drive access from the A4019 as detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 5 ***Location:*** Gap in central reservation on the A4019 to enable vehicles from the Fire Station to turn right out of the fire station ***Summary:*** The audit team noted that this is a stage 1 Audit and details of signage have not been provided, but would like to ensure vehicles travelling East along the A4019 towards Cheltenham do not attempt to turn right though the gap to access the Fire Station. The gap in the central reservation is intended to allow Fire service vehicles to turn right out of the station and not for vehicles to access the station by turning right from the A4019. If vehicles stop on the A4019 and attempt to turn right into the station there is a high potential of rear end shunt type of collisions as vehicles in lane two travelling towards Cheltenham would not expect to find a stationary vehicle in their path, which could result in a slight / Serious injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that no right turn or No Entry signage is installed on the A4019 at the gap in the central reservation opposite the Fire Station.	The design organisation accepts the problem raised but suggests an alternative solution: The kerb line on the island will be amended to remove the radius and create a more 'pointed' alignment to make turning right more difficult. Give way markings will be introduced for vehicles exiting the fire station when wig wags are not operating. A No Entry sign will also be added on the central reserve island. Additionally a u-turn prohibition is proposed along the full length of the improved A4019 as part of this scheme. No u-turn signs are proposed near the A4019 eastern and western extents with repeater signs in between these points.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 6 ***Location:*** Close proximity of signal stop lines to the Homecroft Drive A4019 junction with the service roads located either side of Homecroft Drive ***Summary:*** The audit team thought that the stop line for Homecroft Drive and the A4019 signals is located very close to service roads that run adjacent with the A4019. A concern was raised regarding visibility of the signal heads, and if the traffic sensors would pick up vehicles waiting to pull out of the side roads. A vehicle turning right out of the Eastern service road may not be able to clear the entry lane if other vehicles are waiting to exit Homecroft Drive, which could block entry into Homecroft Drive for vehicles leaving the A4019. The audit team also questioned if the signal heads were easily seen form both service roads as a slight injury accident could occur if a vehicle exits the side road into the path of a vehicle entering Homecroft Drive. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that that signal heads locate at the stop line on Homecroft Drive, should be clearly visible from both service roads located either side of the stop line on Homecroft Drive	The design organisation accepts the problem raised but suggests an alternative solution: The design is proposed to be changed in order to remove the problem identified, where direct access from the A4019 to Homecroft Drive is stopped up. Homecroft Drive would be connected to a 7.3m wide service road which would run parallel to the A4019 from the fire station to the Civils Service Sport Ground where it would then connect to the A4019 via a signalised crossroads junction, with Site Access B positioned opposite.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to incorporate the design change mentioned in the design organisation response in DF3 to include amendments to Homecroft Drive access from the A4019 and remove the problem identified.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 7 ***Location:*** Close proximity of signal stop lines on The Green to the service road located either side of the junction ***Summary:*** The audit team noted that The Green has service road located very close to the stop line with the A4019. The close proximity of the stop line and access to the service roads may make it difficult for users of the side roads to see the signal heads and if it is safe to proceed. Vehicle exiting the Western service road may not be picked up by the sensors of the signals and this could lead to the pulling out across the junction into the path of a vehicle entering The Green which could result in a slight injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that the signal heads at the stop line on the Green should be easily visible from either of the side roads. Sensors may also be required on the Western service road to help ensure it does not pull out when the traffic light are on red as they may not be able to complete the manoeuvre and could block vehicles entering The Green.	The design organisation accepts the problem but suggests an alternative solution: An additional primary signal will be provided. These signals will be positioned for visibility to traffic on the main side road carriageway (The Green) but should be visible to access road traffic without causing confusion as to where the right of way applies. 'Keep Clear' markings will also be added to prevent vehicles blocking the entry width into the access to the eastern service road. The available space between the stop line and the start of the 'Keep Clear' marking would be approximately 5m and sufficient for a standard car to enter. Access to the service road could be temporarily obstructed if a large vehicle pulled up to the stop line either from The Green or from the western service road and if this corresponded with a time when other vehicles were trying to gain access to The Green/eastern service road from the A4019. However, this has been considered to be low	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
		frequency given the relatively low flows on The Green and even lower flows on the service roads. The installation of a traffic signals ahead warning sign to TSRGD Diagram 543 with an arrow subplate on the service roads could also be considered at detailed design. The design at this location comprises a non-typical layout based on the need to minimise impacts on existing properties on the north side of the A4019 and Manor Farm land and outbuildings to the south of the scheme. Further geometrical improvements are constrained without acquiring additional land. Swept path analysis has been undertaken and examples of these are included in Figure 4-1 to Figure 4-4. Large vehicles including a 7.5t box van and refuge vehicle have been assessed and these can perform the likely turning movements with some limited over-run into opposing lanes in places.		

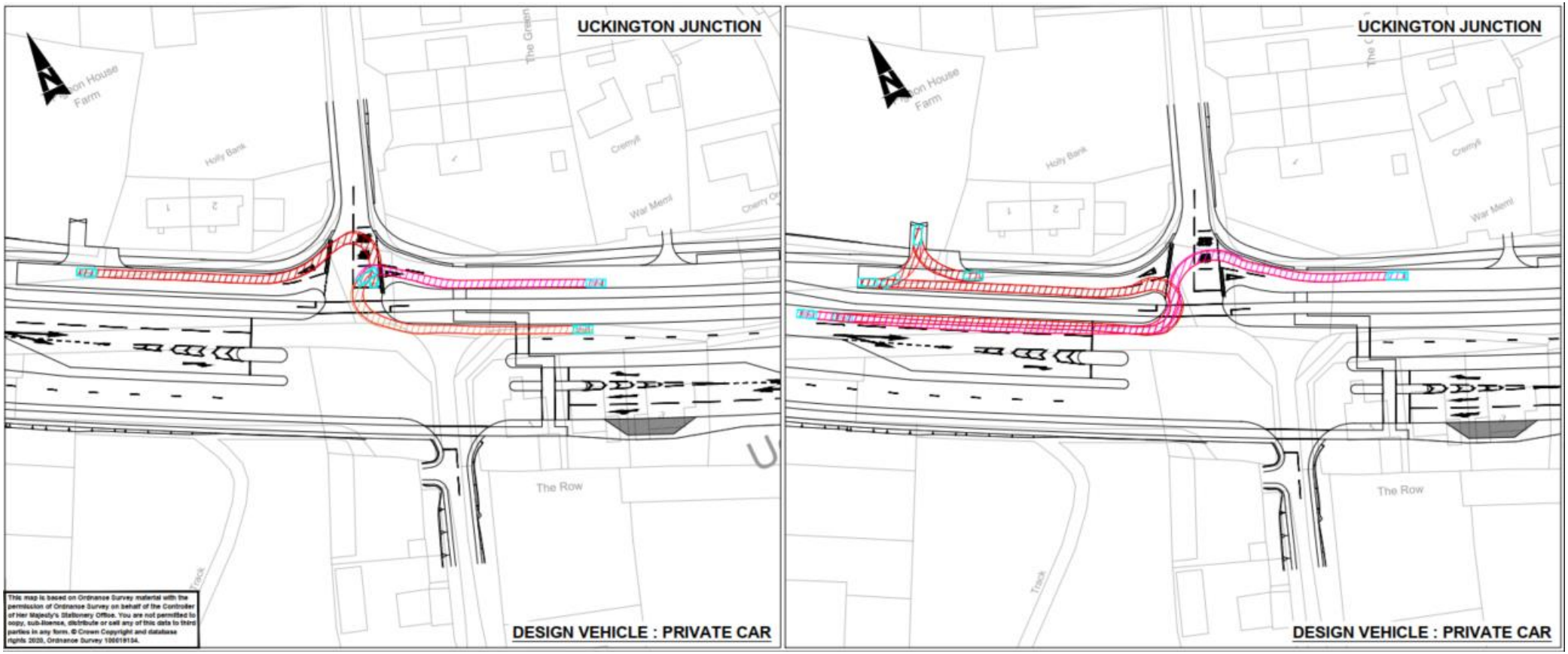

Figure 4-1 - Swept Paths of Private Car

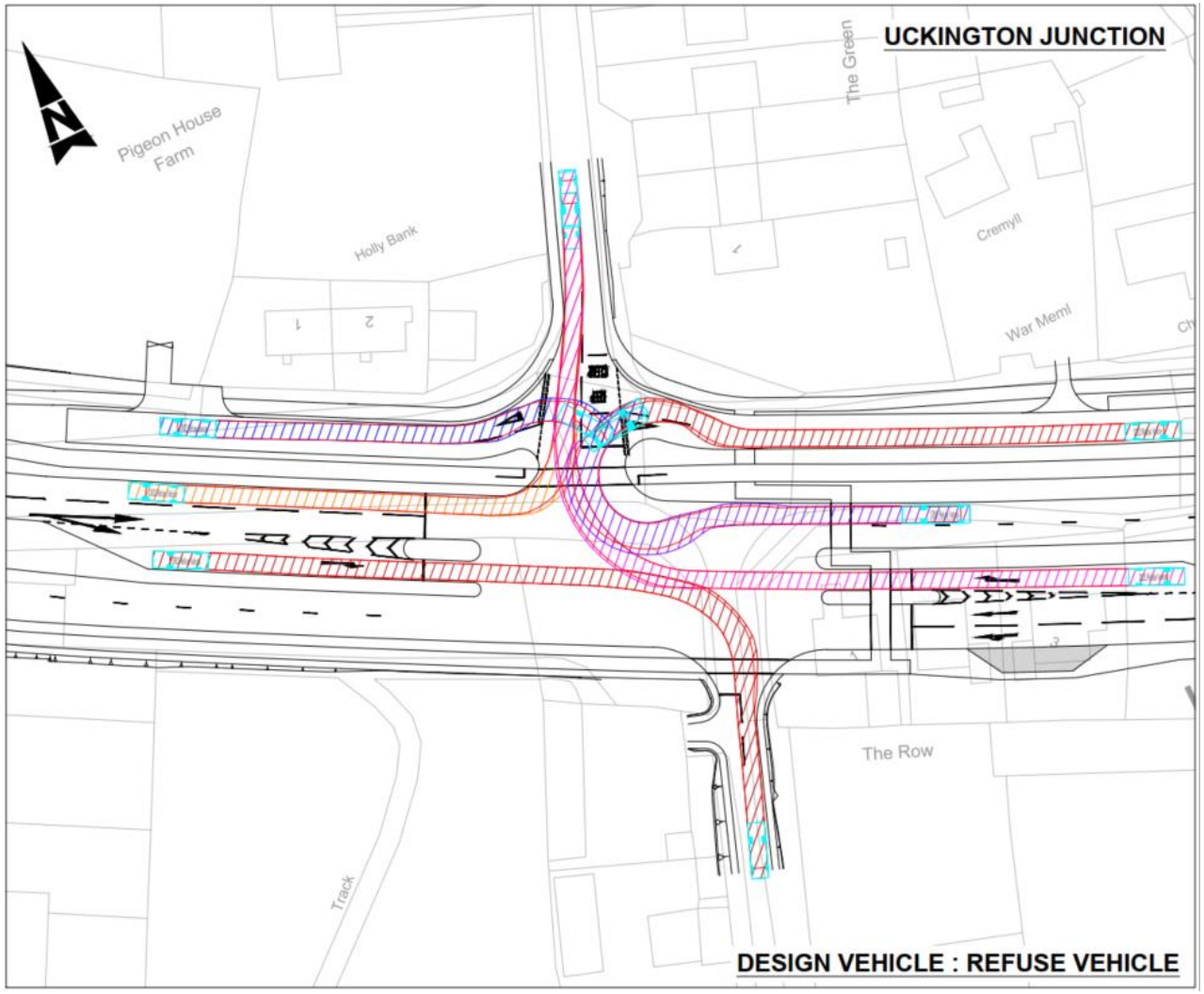

Figure 4-2 - Swept Paths of Refuse Vehicle

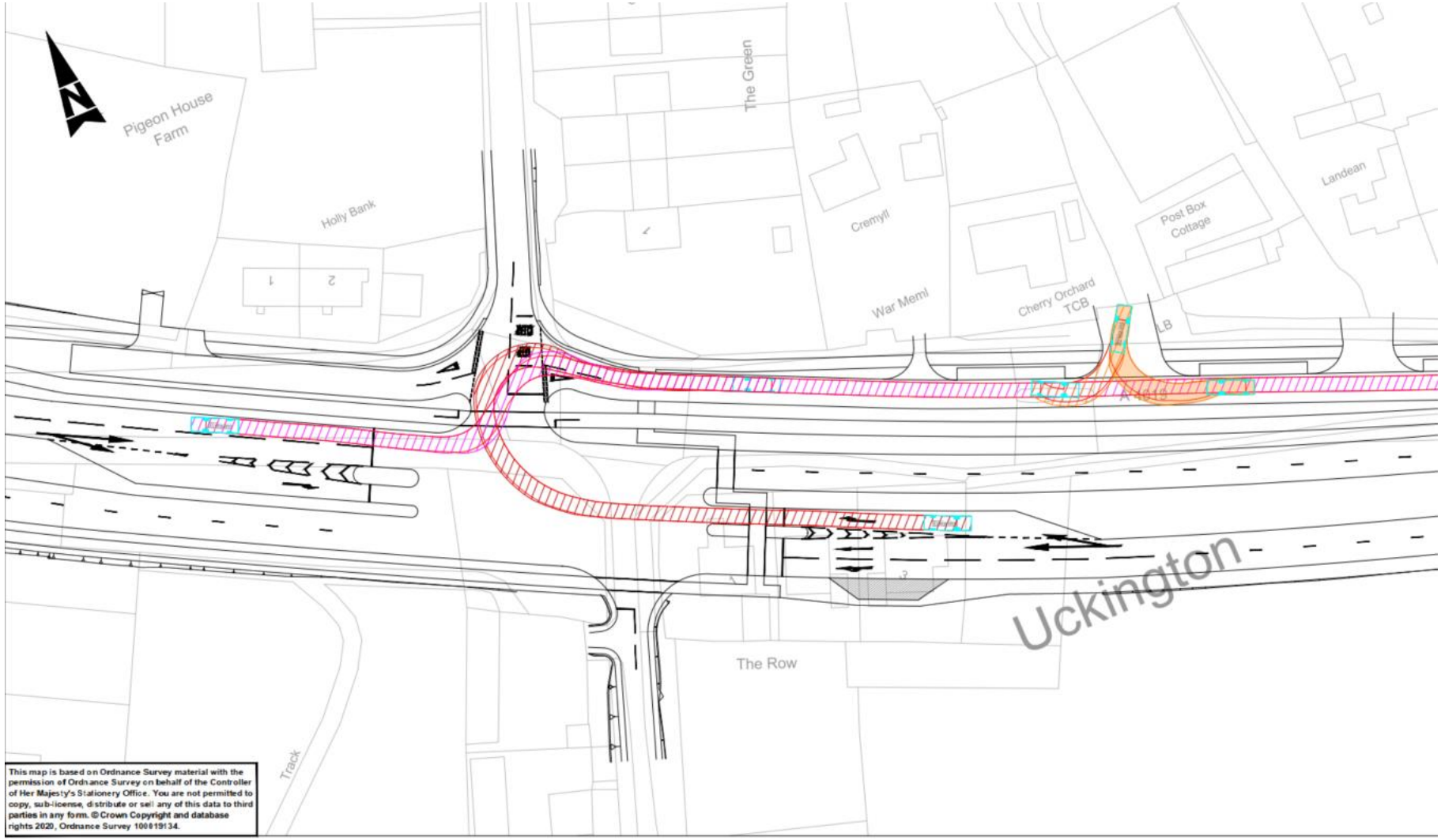

Figure 4-3 - Swept Paths of Refuse Vehicle

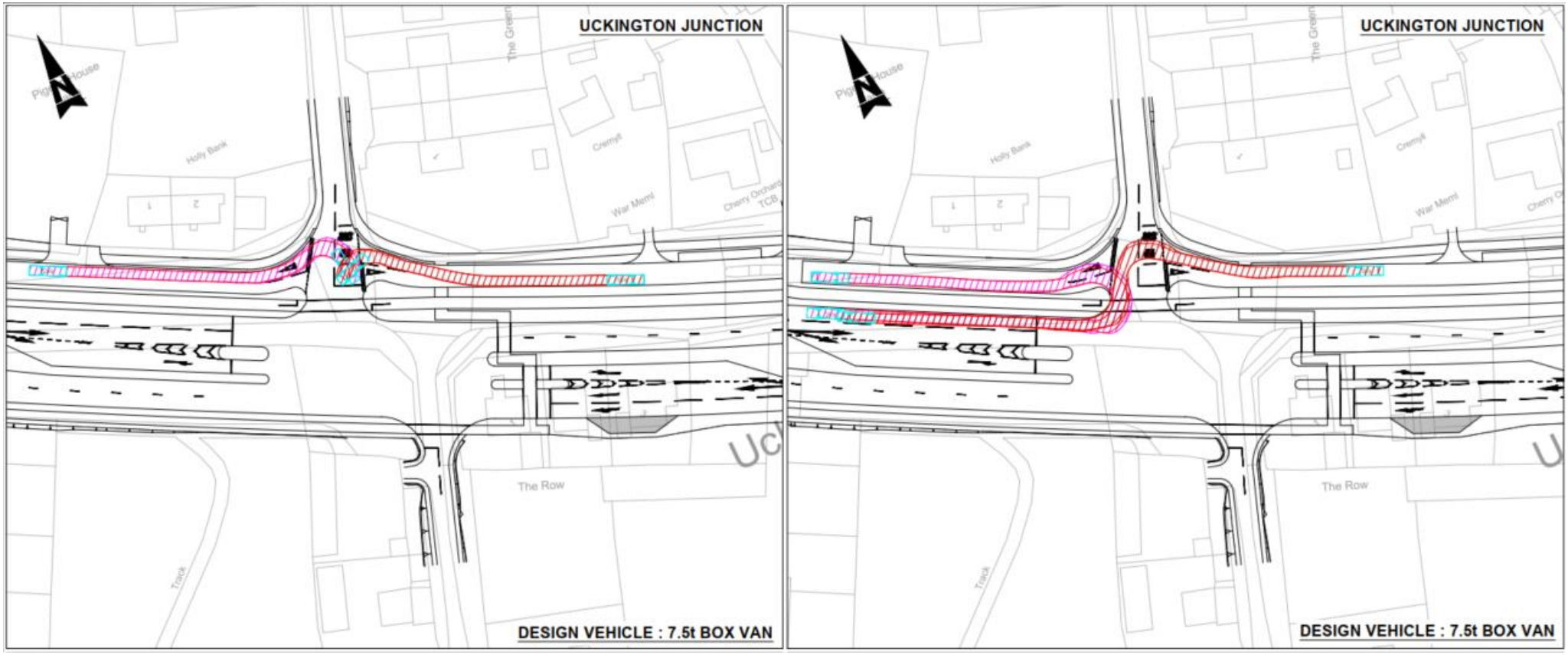

Figure 4-4 - Swept Paths of 7.5t Box Van

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 8 ***Location:*** The Green Junction with the A4019 ***Summary:*** The audit team noted that the segregated cycle and footway facility runs adjacent to the A4019 and it passes the signalised junction for The Green, but it was not clear from the drawings if a push button crossing facility would be installed, to aid cyclists and pedestrians crossing the side road. If pedestrians or cyclists cross at the wrong time they could be hit by a vehicle entering The Green form the A4019 which could result in a slight / Serious injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that a push button controlled crossing should be installed to aid pedestrians and cyclists to cross The Green.	The design organisation accepts the problem raised but suggests an alternative solution. Design developments have been made at this location since the drawings were issued to the RSA team. The design proposals now include segregated cycle and footway facilities along this section, in place of the previously proposed shared use path. The proposed cycle path would generally follow the route of the previously proposed SUP and cross The Green with a signal-controlled cycle crossing, located between the proposed service roads and the A4019. The segregated footway is proposed between the service road and the property frontages. This footway would cross The Green just north of the service road junctions and, due to its position away from the main junction and low forecast traffic flows, an uncontrolled pedestrian crossing is proposed.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 9 ***Location:*** Shared use path of only 3m wide located West of junction with The Green ***Summary:*** The audit team noted segregated cycle / footpath finishes and changes to a 3m wide shared surface, close to where an old section of road has been restricted. The reduction in width and change of segregated facility to shared use may not be obvious to visually impaired pedestrians and may increase the potential of them being clipped or hit by a passing cyclist which could result in a slight injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team recommend that a continuous segregated cycle / footpath may be able to be constructed, if the route was slightly diverted so it joins part of what used to be the old road, there appears to be plenty of room available just North of the proposed 3m shared use facility.	The design organisation accepts the problem raised but suggests an alternative solution: Design developments have been made at this location since the drawings were issued to the RSA team. The design proposals now include segregated cycle and footway facilities along this section, in place of the previously proposed shared use path. The proposed cycle path would generally follow the route of the previously proposed SUP and the segregated footway is proposed to the north, continuing between the service road and the property frontages.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 10 ***Location:*** Road marking on the A4019 South bound approach to the M5 roundabout ***Summary:*** The audit team noted that the road markings in lane one approaching the roundabout indicate that road users can turn left to access the Motorway or go straight on the A4019 towards Cheltenham. The audit team raised a concern that these road markings could be misleading as lane two can also turn left to access the M5. There is potential of side swipe type of collisions may occur if a road user in lane one attempts to travel straight on and a road user in lane two attempts to turn left to access the Northbound M5 which could result in a slight / Serious injury accident. (Note: This problem relates to the approach to the proposed J10 roundabout, so has the potential to impact upon the National Highways' network)	The audit team recommend that the road marking on the A4019 south bound approach to the M5 Roundabout should be changed to a left turn only, and road users wanting to travel over the roundabout towards Cheltenham should use lane two.	The design organisation accepts the problem raised but suggests an alternative solution: The proposals are for lane one to be ahead and left, lane two ahead only and lane three ahead only. Lane guidance markings would direct lane two traffic ahead. Lane usage has been designed to suit optimum operation of the signals. We will include proposed lane discipline signs located on approach to the junction and around the gyratory in order to minimise the likelihood of the problem occurring. If lane one was left turn only and has a relatively low flow, straight on traffic could use the lane to avoid queueing and this could lead to side swipe collisions on the circulatory carriageway. This has been the case at Spittals junction on the A14 when it was incorrectly marked.	Happy with the response provided by the designer and have no further issues to raise at this time. Mark Arberry (NH) - All recommendations appear to be accepted by the designer so no further comments. Iain Reidy (NH) - I note that the majority of problems / recommendations are fully accepted, with two responses providing clarification. Therefore no current rejections that require safety risk assessment to support a designer challenge. I am content at this stage and need not comment further.	Include proposed lane discipline signs located on approach to the junction and on around the gyratory.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
		We have also received some comments from cycling organisations who have asked for the scheme to avoid left turn only lanes on the entry to roundabouts as cyclists wishing to proceed ahead are vulnerable to being struck by left turning vehicles.		

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 11 ***Location:*** Stop line for the crossing facility across the M5 entry slip lane ***Summary:*** The audit team discussed the location of the stop line for the signalised crossing across the North bound slip road onto the M5, and agreed that the location of the crossing is on a desire line. But commented that road users stopping for the signals are likely to back up and queue onto the Roundabout, and this could result in rear end shunt type of collisions which could result in a slight or damage type of collision. (Note: This problem relates to the crossing of the J10 NB slip road entry, so has the potential to impact upon the National Highways' network)	The audit team struggled to suggest a recommendation that would completely remove the possibility of rear end shunt type of collisions due to traffic backing up onto the roundabout, but thought that sensors on the crossing could be used to keep the red time of the signals down to a minimum.	The design organisation accepts the problem but suggests an alternative solution. The current design includes the M5 Junction 10 crossings being controlled via leaving amber links from the downstream roundabout signal node to ensure they change at the desired movement. This is expected to address the RSA problem. It is proposed to run this crossing in a stage when the western gyratory is green and the M5 northbound off-slip is on green. No (or very few) vehicles would be expected to be coming from the northbound off-slip and going towards the on-slip and therefore should not cause issues with blocking back.	Happy with the response provided by the designer and have no further issues to raise at this time. Mark Arberry (NH) - All recommendations appear to be accepted by the designer so no further comments. Iain Reidy (NH) - I note that the majority of problems / recommendations are fully accepted, with two responses providing clarification. Therefore no current rejections that require safety risk assessment to support a designer challenge. I am content at this stage and need not comment further.	Preliminary Design updated to include amendments detailed in design organisation response.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
PROBLEM 12 ***Location:*** West Cheltenham Link Road ***Summary:*** The audit team discussed the new link road and commented on how rural and straight the road was and that this could create problems with vehicles driving at inappropriate speeds. If speeding does occur on the straight rural link road, the severity of the collision is likely to increase from slight to serious. (Note: This problem relates only to GCC's local roads, not to National Highways' network)	The audit team were unaware of what the speed limit is proposed to be on the new link road that links the B4634 and the A4019, but there does not appear to be any measures to ensure that vehicle speeds are kept to an acceptable level. The audit team would be interested to know what the proposed speed limit for the new road is and what measures are being undertaken to try and ensure the majority of road users comply with the speed limit.	The design organisation accepts the problem and recommendation made by the RSA team. The proposed speed limit along the West Cheltenham Link Road is 50mph and the road has been designed to an 85kph (50mph) design speed. Measures to assist speed control will include the vertical alignment crest curve at River Chelt Bridge. This has been reduced to one step below desirable minimum for the 85kph design speed, in accordance with CD 109 for single carriageway design to restrict forward visibility and introduce a clear non-overtaking section. The long section is included in Figure *4-5*. We will also include proposed woodland planting on earthwork slopes to back of verge position. These will reduce the apparent openness of the road. Consideration will be given to additional repeater signs and road marking roundels at detailed design stage.	Happy with the response provided by the designer and have no further issues to raise at this time.	Preliminary Design updated to include amendments detailed in design organisation response.

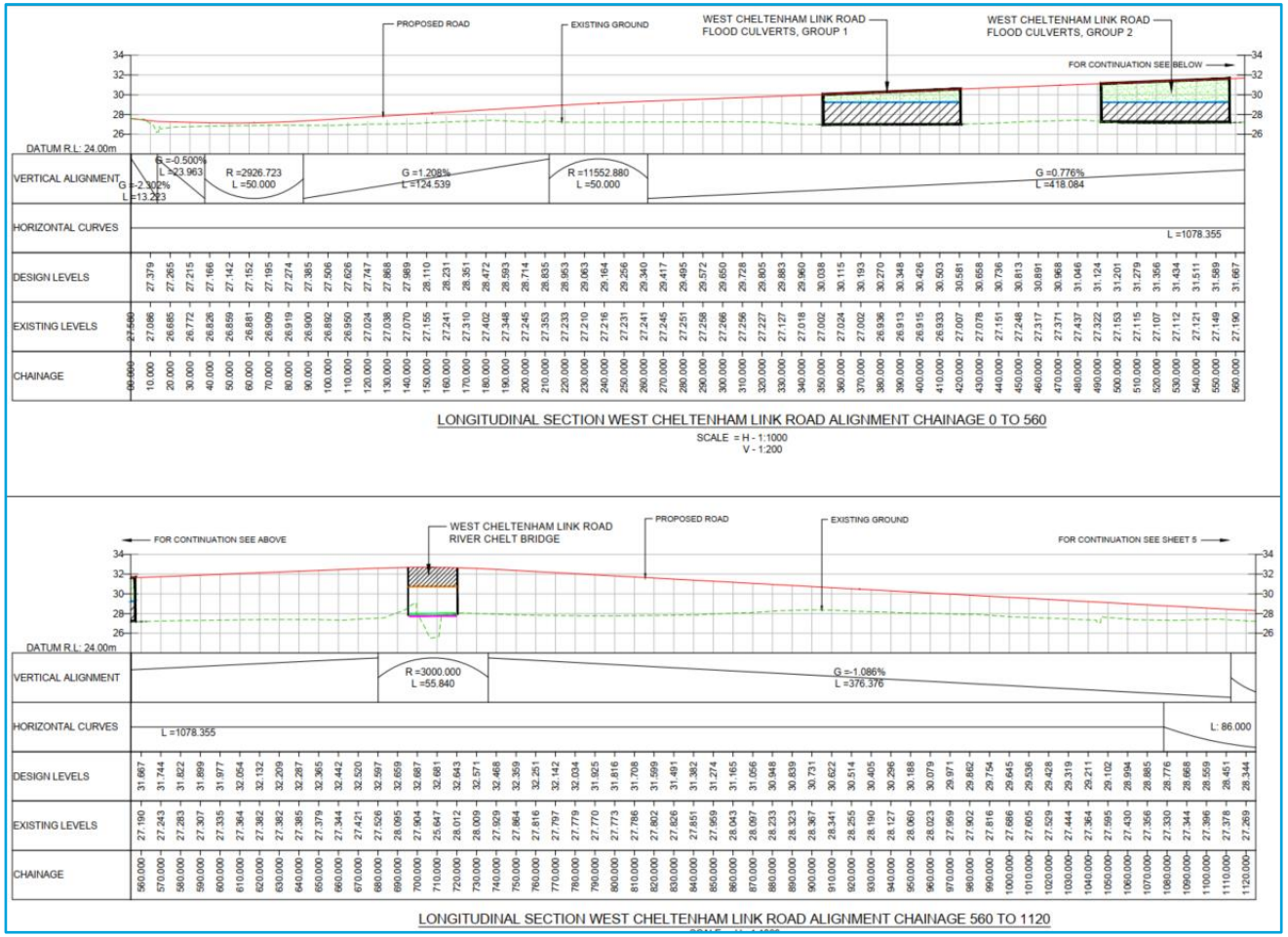

Figure 4-5 - West Cheltenham Link Road Long Section

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
INTERIM STAGE 1 RSA PROBLEM 1 ***Location:*** End of two left turn slip roads from Tewkesbury Road into 1) Site Access A Junction, 2) Site Access B Junction 3) the left turn slip road into Gallagher Retail park, Shown on drawing GCCM5J10-ATK-HGN-J4_JN-DR-CH-001201 ***Summary:*** The audit team noted that this is a stage 1 Audit and that all road makings may not have been included, but noted that there are no give way road markings at the end of the left turn slip lanes from the Tewkesbury Road into the new Junction marked as 1) Site Access A Junction 2) Site Access B Junction and 3) the left turn from Tewkesbury Road into the Gallagher retail park. If vehicles do not give way at the end of the left turn slip roads from Tewkesbury Road there could be collisions with vehicles entering the junctions from other directions. A collision between two vehicles	The audit team recommend that give way road markings are added at the end of the left turn slip roads from Tewkesbury Road into 1) Site Access A Junction 2) Site Access B Junction and 3) the Gallagher retail park.	The design organisation accepts the problem and the recommendation made by the RSA team. It is noted that the audit team may not have had information regarding the signal staging available to them so the design team want to clarify that the left turn lanes will be signal controlled and the phasing of the signals has been designed such that left turning traffic will run concurrently with the bus lane and straight ahead lanes at the junctions. Therefore, right turning traffic will be on a stop signal and there should be no conflict with traffic using the left turn lanes. However, it is accepted that give way markings at the end of the left turn lanes could provide added clarity to left turners to check for opposing traffic and will be considered during detailed design when final signal phasing is also confirmed.	Happy with the response provided by the designer and have no further issues to raise at this time.	Give Way markings at the end of the left turn lanes to be considered at the detailed design stage in conjunction with the final signal timings.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
is likely to result in a slight or serious injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)				

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
INTERIM STAGE 1 RSA PROBLEM 2 ***Location:*** Western arm of The Tewkesbury Road Cross road junction with Site Access B junction, Lane 3 merges into the Westbound dual carriageway in a very short distance. Details of the junction are shown on plan GCCM5J10-ATK-HGN-J4_JN-DR-CH-001201. ***Summary:*** The audit team raised a concern regarding the short distance that road users in lane 3 have, to merge back into lane 2 of the west bound dual carriageway. The audit team also noted that only 1 left turn arrow road marking is shown on the plans prior to the end of the merge. As only one tuck in left road marking, little warning may be given to road users who are following others in heavy traffic and side swipe type of collisions could occur which could during the short distance to merge from lane 3 into lane 2 which could result in a slight injury accident.	The audit team recommend the length of the lane 3 merge into lane two is increased to give more room to merge from lane 3 into lane 2, but appreciate that this may not be very easy to achieve due to the width of the central carriageway to the East bound traffic. The Audit team would also recommend that two tuck in left arrows are added, one at the start of the 3rd lane road markings and the second prior to the end of the 3 lane merge. The audit team did comment that it would be safer if the 3rd lane merge was removed and lane 3 could be used as a right turn only from the Tewkesbury Road. Is the third lane merge being provided due to capacity reasons at peak traffic times?	The design organisation accepts the problem but suggests an alternative solution. The length of the lane three merge has been designed in accordance with DMRB CD 123 Figure 7.12.1 which recommends that where it is necessary to reduce the number of lanes on the exit arm at an at grade signalised junction, a single lane should be reduced over a distance of 100 metres starting at or beyond the limit of the junction intervisibility zone. Three straight ahead westbound lanes were included at Gallagher Junction and Site Access B junction based on the traffic modelling analysis undertaken. To ensure traffic enters the correct lanes at Site Access A (i.e. 2 straight ahead lanes and 1 right turn lane), a merge from lane three after Site Access B was included. This would avoid late lane changes and traffic weaving between straight ahead and right turning traffic	Happy with the response provided by the designer and have no further issues to raise at this time.	Additional left turn tuck in arrow and vertical merge signs to be considered during detailed design.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
(Note: This problem relates only to GCC's local roads, not to National Highways' network)		that may result from continuing lane three into the right turn lane. However, it is noted that the proposed central reserve width would allow for lane 3 to continue and become the right turn lane at Site Access A junction, hence removing the merge, so this could be considered at detailed design. Consideration would however need to be made on how this is signed in advance of the junction to encourage traffic to enter the correct lanes early and avoid late lane change movements and increased traffic weaving between straight ahead and right turning traffic, which otherwise may increase the likelihood of side swipe collisions. If this layout remains unchanged through detail design, then a second left turn tuck in arrow should be added as recommended. Vertical merge signs could also be added.		

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
INTERIM STAGE 1 RSA PROBLEM 3 ***Location:*** Junction of Tewkesbury Road with the Gallagher Retail park and the B4634 where the East bound bus lane stops and merges into lane one of the East bound dual carriageway, shown on plan GCCM5J10-ATK-HGN-J4_JN-DR-CH-001201. ***Summary:*** The audit team noted that the East bound bus lane on the Tewkesbury Road stops at the cross road junction with the Gallagher Retail park and the B4634, and busses will have to merge from the bus lane into lane one of the dual carriageway after leaving the stop line at the signalised junction. The audit team are not aware if any bus priority is provided to enable the bus lane to go green prior to the green light for lanes one and two of the dual carriageway. If no bus priority is provided to enable the bus to go before the traffic on the dual carriageway side swipe	The audit team recommend that bus priority is provided for the west bound bus lane at the Tewkesbury Road Junction with the B4634, as this will enable a bus to set off from the traffic lights before both lanes of the dual carriageway and merge into lane one without any conflict from vehicles travelling East on the Tewkesbury Road.	The design organisation accepts the problem and the recommendation made by the RSA team. It is noted that the RSA team did not have information regarding the bus priority available to them. The design team wish to clarify that the traffic signal phasing design will include provision to allow buses to proceed on a green signal in advance of the mainline traffic to allow time for buses to merge into the mainline without conflict. Bus priority should therefore be retained as part of detailed design.	Happy with the response provided by the designer and have no further issues to raise at this time.	Detailed design of Traffic Signal phasing to include Bus Priority to allow time for buses to merge into the mainline without conflict.

RSA Problem	RSA Recommendation	Design organisation response	Overseeing Organisation response	Agreed RSA action
type of collision are likely to occur when a bus is attempting to merge from the bus lane, which could result in a slight injury accident. (Note: This problem relates only to GCC's local roads, not to National Highways' network)				

5. Design Organisation and Overseeing Organisation statements

Table 5-1 - Design Organisation statement

On behalf of the Design Organisation I certify that: 1) the RSA actions identified in response to the road safety audit problems in this road safety audit have been discussed and agreed with the Overseeing Organisation	
Name:	Chris Roberts
Signed:	[redacted]
Position:	Design Manager
Organisation:	Atkins
Date:	13/09/23

Table 5-2 - Overseeing Organisation statement

On behalf of the Overseeing Organisation I certify that: 1) the RSA actions identified in response to the road safety audit problems in this road safety audit have been discussed and agreed with the design organisation; and 2) the agreed RSA actions will be progressed	
Name:	Scott Macaulay-Lowe
Signed:	[redacted]
Position:	Team Leader – Major Projects
Organisation:	Gloucestershire County Council
Date:	22/09/23

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