

Welsh Government

M4 Junction 28 Improvements

Road Safety Audit Stage 1 - Designer's Response

M4J28-ARP-HAC-SWG-RP-CH-000001

P01 | 5 October 2015

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Road Safety Audit Plans

1 Introduction

This Road Safety Audit Response Report relates to the Stage 1 Road Safety Audit Report for the M4 Junction 28 Improvements Scheme. The Stage 1 Road Safety Audit Brief comprised a set of drawings assembled by the Design Team for the scheme, and sent by [REDACTED] to the Road Safety Audit Team for examination. The Road Safety Audit Report was prepared and issued by the Road Safety Audit Team Leader, [REDACTED] of TMS Consultancy.

The proposed scheme comprises the improvement of three existing junctions to the West of Newport, specifically Junction 28 of the M4, Bassaleg Roundabout and the Pont Ebbw Roundabout.

At Junction 28, the proposed scheme would replace the existing roundabout and A48 approach from Castleton, with an enlarged gyratory, and incorporate a link to allow eastbound traffic from the M4 and A48 to link directly to the A48 Cardiff Road eastbound. The finished junction would benefit from full-time signalisation.

At Bassaleg, the existing roundabout would be enlarged to the south and west, and full time signals introduced. The Court Crescent and Park View arms would operate as priority, without signals. A signalised crossing of the A467 Forge Road arms to the south of the roundabout would provide a crossing facility for NMUs.

At Pont Ebbw, the existing roundabout gyratory would be modified, and two through links added, one for the eastbound A48 and one for the westbound A48. The roundabout would benefit from full-time signalisation.

The Design Team have carefully considered the problems and recommendations in the Stage 1 Road Safety Audit Report. This Road Safety Audit Response Report includes all of the problems and recommendations raised by the Road Safety Audit Team, as well as the Design Team's response to these issues.

2 Key Personnel

2.1 Welsh Government (Project Sponsor)

[REDACTED]

2.2 WSP: Parsons Brinckerhoff (Employer's Agent) and TACP (Environmental Advisor)

[REDACTED]
[REDACTED]
[REDACTED]

2.3 TMS Consultancy (Road Safety Audit Team)

[REDACTED]
[REDACTED]

2.4 Costain (ECI Contractor) and Arup (Design Organisation)

B [REDACTED]
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[REDACTED]
[REDACTED]

3 Items Raised at the Stage 1 Road Safety Audit

3.1 M4 Junction 28 Improvements

Problem 2.1

Locations	General – 3 Lane Approaches to Traffic Signals
Summary	<p>Potential failure to stop and shunt-type vehicle collisions.</p> <p>Where approaches to the traffic signal stop lines is to be increased to three lanes around the M4 Junction 28, large vehicles in the outer lanes may mask the traffic signal heads to drivers of smaller vehicles in the middle lane(s). Failure to see the traffic signal heads may result in failure to stop, late braking or shunt-type vehicle collisions.</p>
Recommendation	Duplicate high mounted primary traffic signal heads should be provided where there are three approach lanes.
Design Team Response	<p>Problem and recommended measures accepted.</p> <p>Duplicate high-mounted signals would be provided on 3 lane approaches where no secondary splitter islands are provided.</p>

Problem 2.2

Locations	General – traffic signal junctions
Summary	Potential late braking, shunt and overshoot-type vehicle collisions.

Due to the close proximity of numerous sets of traffic signals, particularly on the north side of the junction, there is a potential for 'see-through' whereby a driver on the approach to a set of traffic signals may see and react to another set of signals ahead. This may result in late braking, shunt and overshoot-type vehicle collisions (and also potential vehicle to pedestrian collisions where a crossing is present).

Recommendation At detailed design stage it should be ensured that any likely see-through is mitigated against by the provision of cowls or louvres.

Design Team Response Problem and recommended measures accepted.

Signal placement to be designed to minimise risk of "see through". Any unacceptable residual risk would be eliminated with the use of cowls or louvres.

Problem 2.3

Locations General – pedestrian crossings at traffic signals

Summary Potential vehicle to pedestrian collisions

At some of the controlled pedestrian crossings around the junction, the distance between the stop lines and pedestrian crossing studs is only 2m. Given the high speed approaches around the junction vehicles braking late may overshoot the stop line with the potential for collisions with pedestrians on the crossings.

Recommendation A gap of 3m should be provided between the stop lines and pedestrian studs at controlled pedestrian crossings.

Design Team Response Problem and recommended measures accepted.

A gap of 3m would be provided between the traffic signal stop lines and the studs associated with the pedestrian crossings.

Problem 2.4

Locations General – approach to splitter islands

Summary Potential hazard to vehicles

Although indicative at this stage, there are a number of splitter islands around the junction where the hatching markings are shown to be directed straight into the nosing of the islands. During darkness or adverse weather, drivers may be guided in the islands resulting in loss of control type vehicle collisions.

Recommendation At detailed design stage, it should be ensured that white lining on the approach to splitter islands pass to the side of the nosings rather than directly into them.

Design Team Response Problem and recommended measures accepted.

White lining would be designed to direct vehicles alongside splitter islands.

Problem 2.5

Locations General – pedestrian routes

Summary Potential vehicle to pedestrian collisions

Some of the pedestrian routes, particularly on the southern section of the junction, are adjacent to high speed roads. Pedestrians may be vulnerable to high speed passing traffic.

Recommendation A risk assessment should be carried out to determine the requirements for vehicle restraint systems.

Design Team Response Problem and recommended measures accepted.

A suitable risk assessment would be undertaken to determine the requirements for vehicle restraint systems.

Problem 2.6

Locations General – traffic signals and signs

Summary Potential late braking, shunt, sideswipe and overshoot-type vehicle collisions.

There is a significant amount of vegetation around the existing junction. Poor forward visibility to traffic signal heads and signs due to being obscured by foliage may result in late braking, shunt, side-swipe and overshoot-

type vehicle collisions (and also potential vehicle to pedestrian collisions where a crossing is present).

Recommendation It should be ensured that adequate forward visibility is provided to traffic signal heads and signs throughout the junction which may require the cutting back or removal of vegetation.

Design Team Response Problem and recommended measures accepted.

Existing vegetation would be cut back as required to provide suitable visibility. New landscaping would be provided behind any visibility envelopes with an allowance made for maintenance frequencies.

Problem 2.7

Locations M4 westbound diverge slip road and circulatory carriageway.

Summary Potential vehicle collisions.

The M4 eastbound exit slip on the north east approach to the circulatory carriageway is shown to have traffic signals but it is not clear if these are purely for the controlled pedestrian crossings or the signals are integrated into the circulatory carriageway phasing and staging.

Recommendation It should be clarified at detailed design stage if the approach is to be integrated into the junction signalisation.

Give way markings to cater for the eventuality of the signals failing.

In addition, although the drawing shows an adjacent stop line on the circulatory carriageway, no traffic signals are shown. This should be added at detailed design stage.

Design Team Response Problem accepted and recommendation partially accepted.

The design intent is for the approach, including pedestrian phases, to be integrated into the junction signalisation.

The designer considers that the provision of give way markings on this arm may cause confusion to drivers, leading to unexpected braking and shunt type collisions. This part of the Road Safety Auditor's recommendation would not be implemented.

Problem 2.8

Locations

Circulatory carriageway; northern quadrant

Summary

Potential side-swipe vehicle collisions.

Within the northern quadrant of the circulatory carriageway, there is a potential for drivers to get into the incorrect lane in advance of the splitter islands on approach to the traffic signals. In the event that drivers do get into the wrong lane, they may attempt to correct themselves after passing the stop line, which may result in side-swipe vehicle collisions following crossing or converging manoeuvres.

Recommendation

Appropriate traffic routes should be clarified by road markings and the alignment of splitter islands.

Design Team Response Problem and recommended measures accepted.

The alignment of road markings and splitter islands would be considered in detailed design to minimise the risk of mistaken manoeuvres by drivers. Confirmatory messages via signing, signals and markings would be included.

Problem 2.9

Locations

Circulatory carriageway; southern quadrant (attenuation basin)

Summary

Potential hazard to occupants of errant vehicles.

There is an attenuation basin shown within the centre of the circulatory carriageway at the southern end. In the event that an errant vehicle leaves the carriageway on the inside of the circulatory carriageway and descends to the attenuation pond, the occupants of the vehicle may risk serious injury or even drowning.

Recommendation At detailed design stage the attenuation basin should be risk assessed and a suitable vehicle restraint system provided as necessary.

Design Team Response Problem and recommended measures accepted.

A suitable risk assessment would be undertaken to determine the need for vehicle restraint systems.

Problem 2.10

Locations Northwest arm

Summary Potential vehicle to pedestrian collisions.

No pedestrian crossing facilities are shown to be provided across the northern arm of the junction, despite there being footways on both sides of the road. If there is likely to be a pedestrian demand to cross here, vehicle to pedestrian collisions may result, given the likely high speed of vehicles.

Recommendation The need for a pedestrian crossing facility (preferably controlled) should be assessed and provided if necessary.

Design Team Response Problem and recommended measures accepted.

The need for a pedestrian crossing facility has been assessed. It has been identified that this site is not appropriate for the provision of a pedestrian crossing, as the site layout and constraints would not permit the provision of a safe crossing layout.

Problem 2.11

Locations General – Markings and signage

Summary Potential lane changing and side-swipe type vehicle collisions.

At a junction where there are multiple circulatory carriageway lanes and approach lanes to traffic signals, signage and road markings are critical to inform drivers which lane is correct for their intended exits and destinations. A lack of good and concise information may result in potential lane changing and side-swipe type vehicle collisions.

Recommendation At detailed design stage, a signage schedule should be provided for the M4 Junction 28. Signs should be clear and concise and consistent with the carriageway lanes provided. Gantry signage may be required for the wide multi-lane sections of the circulatory carriageway. It may also be prudent to provide carriageway lane destination markings. New signage should be provided on passively safe posts unless otherwise protected.

Design Team Response Problem and recommended measures accepted.

Signing and markings would be provided at detailed design.

3.2 Bassaleg Roundabout Improvements

Problem 2.12

Locations General – 3 Lane Approaches to Traffic Signals

Summary Potential failure to stop and shunt-type vehicle collisions.

Where approaches to the traffic signal stop lines is to be increased to three lanes around the Bassaleg roundabout, large vehicles in the outer lanes may mask the traffic signal heads to drivers of smaller vehicles in the middle lane(s). Failure to see the traffic signal heads may result in failure to stop, late braking or shunt-type vehicle collisions.

Recommendation Duplicate high mounted primary traffic signal heads should be provided where there are three approach lanes.

Design Team Response Problem and recommended measures accepted.

Duplicate high-mounted signals would be provided on 3 lane approaches where no secondary splitter islands are provided.

Problem 2.13

Locations Court Crescent entry onto circulatory carriageway

Summary Potential side-swipe and circulatory carriageway vehicle collisions.

There is a single lane entry onto the circulatory carriageway from Court Crescent which will operate under give way control. Drivers wishing to enter the inside lane of the roundabout to make a right turn manoeuvre to A467 Forge Road (S) will have to cross four lanes of traffic. Given that the flows around the circulatory and will be heavy, this may be a difficult and hazardous manoeuvre for drivers. Potential sideswipe and circulatory carriageway vehicle collisions may result.

Recommendation It should be ensured that adequate inter-green time is provided to give sufficient gaps for drivers to enter the circulatory carriageway from Court Crescent.

Design Team Response Problem and recommended measures accepted.

A suitable intergreen time would be included within the signal phasing, which would be prepared during detailed design.

Problem 2.14

Locations Circulatory carriageway; (attenuation basin)

Summary Potential hazard to occupants of errant vehicles.

There is an attenuation basin shown within the centre of the circulatory carriageway. In the event that an errant vehicle leaves the carriageway on the inside of the circulatory carriageway and descends to the attenuation pond, the occupants of the vehicle may risk serious injury or even drowning.

Recommendation At detailed design stage the attenuation basin should be risk assessed and a suitable vehicle restraint system provided as necessary.

Design Team Response Problem and recommended measures accepted.

A suitable risk assessment would be undertaken to determine the need to vehicle restraint systems.

Problem 2.15

Locations General – controlled pedestrian crossings on A467 Forge Road (S)

Summary	<p>Potential vehicle to pedestrian collisions.</p> <p>At the controlled pedestrian crossings on the A467 Forge Road southern arm, the distance travelled between the stop lines and pedestrian crossing studs is only 2m. Given the high speed approaches around the junction vehicles braking late may overshoot the stop line with the potential for collisions with pedestrians on the crossings.</p>
Recommendation	<p>A gap of 3m should be provided between the stop lines and pedestrian studs at controlled pedestrian crossings.</p>
Design Team Response	<p>Problem and recommended measures accepted.</p> <p>A gap of 3m would be provided between the traffic signal stop lines and the studs associated with the pedestrian crossings.</p>

3.3 Pont Ebbw Roundabout Improvements

Problem 2.16

Locations	<p>General – traffic signal heads on circulatory carriageway</p>
Summary	<p>Potential late braking, shunt and overshoot-type vehicle collisions.</p> <p>Forward visibility to traffic signal heads around the circulatory carriageway may be restricted by vegetation within the central island. Poor forward visibility to traffic signal heads and signs due to being obscured by foliage may result in late braking, shunt, side-swipe and overshoot type vehicle collisions (and also potential vehicle to pedestrian collisions where a crossing is present).</p>
Recommendation	<p>It should be ensured that adequate forward visibility is provided to traffic signal heads and signs throughout the junction which may require the cutting back or removal of vegetation.</p>
Design Team Response	<p>Problem and recommended measures accepted.</p> <p>Existing vegetation would be cut back as required to provide a suitable visibility envelope. New landscaping would be provided outside of visibility envelopes, with an allowance made for maintenance frequencies.</p>

Problem 2.17

Locations A48 Southern Distributor Road (western arm)

Summary Potential hazard to pedestrians.

There is a significant distance on the stagger between the pedestrian crossing across the east and westbound running lanes on the A48 Southern Distributor Road (W). Visually impaired pedestrians may have difficulty in locating the displaced crossing.

Recommendation Either the length of the stagger should be reduced or additional wayfinding measures provided for visually impaired pedestrians to help locate the displaced crossings.

Design Team Response Problem and recommended measures accepted.

Wayfinding measures, including guard railings to be considered during detailed design.

Problem 2.18

Locations Access onto Pont Ebbw roundabout from south western arm.

Summary Potential vehicle

There is an existing separate bus layby and gate within the south western arm of the roundabout that is separated from the general traffic lanes on approach to the roundabout. The new road layout will mean that the bus stop will now be within the left turn lane for traffic to A48 Southern Distributor Road (W). Buses stationary at the bus stop will block driver visibility of the traffic signal heads during periods when the signals are operational. This may result in late braking, shunt and overshoot type vehicle collisions.

It will also result in drivers wishing to make the left turn manoeuvres having to do so via the straight-ahead lane which enters the main circulatory carriageway. Unexpected deviations may result in vehicle collisions within the south western arm or within the circulatory carriageway.

Recommendation The bus stop should be appropriately relocated.

Design Team Response Problem and recommended measures accepted.

The bus stop would be relocated to sit within the exit arm for the Government Offices to minimise disruption to traffic and the loss of visibility to signals due to buses.

Appendix A

Road Safety Audit Plans





