

# CAPITA





## Mount Leven Roundabout, Stockton-on-Tees

Stage 3 Road Safety Audit

25<sup>th</sup> October 2017

**Mount Leven Roundabout****Stage 3 Road Safety Audit****October 2017**

# CAPITA

Status (Shaded)		Names	Signatures	Date(s)
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		Ian Guard		
		<b>Checked</b>		06/11/2017
		Paul McKenna		

Distribution List

- Project Sponsor – Gary Laybourne, Stockton-on-Tees Borough Council
- Design Team – Rosstam Asadi, Stockton-on-Tees Borough Council

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## Quality Management

<b>Job No</b>	CS/093826		
<b>Project</b>	Mount Leven Roundabout		
<b>Title</b>	Stage 3 Road Safety Audit		
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<b>Prepared by</b>	Ian Guard	Signature (for file)	
<b>Checked by</b>	Paul McKenna	Signature (for file)	

## Revision Status / History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked
0	25/10/17	Draft Issue	IG	PM
A	06/11/17	Final Issue	IG	PM

# 1. Introduction

## 1.1 Introduction

Capita Real Estate and Infrastructure is instructed by Antony Wilton of Stockton-on-Tees Borough Council to carry out a Stage 3 Road Safety Audit on the completed construction of a new roundabout on the A1044 Leven Bank Road in Stockton-on-Tees, Yarm.

## 1.2 Terms of Reference

The terms of reference of the Road Safety Audit are set out in Departmental Standard HD 19/15. The comments and suggestions for road safety improvements made in this report seek to address matters that might have an adverse effect on road safety in the context of the chosen design. No attempt has been made to comment on the justification of the scheme or the appropriateness of the design or to carry out a technical/design standards check. Consequently, the Auditors accept no responsibility for the design or construction of the scheme.

It is confirmed that this is a “Stage 3 Road Safety Audit”, i.e. one carried out after construction.

The Audit Team consisted of:

**I Guard**, MCIHT, MSoRSA, HE Cert of Competency (Audit Team Leader)  
Projects Manager/Road Safety Engineer

**P McKenna**, MSc, BA (Hons), MCIHT, MSoRSA, HE Cert of Competency (Audit Team Member)  
Senior Engineer

The Audit comprised an examination of the construction issue Road Markings and signing drawing and two site visits, one during daylight hours and one at night time. The documents were made available to the Audit Team by the Design Team on behalf of the Project Sponsor.

A full list of drawings and documents used is provided in Appendix A.

## 1.3 Description

This Audit will examine the completed works to construct a new 3-arm compact roundabout on the A1044 Leven Bank Road to provide access to the future development site to the north. The works briefly comprised the following:

- New roundabout at the junction of the A1044 and the proposed development access road
- Modifications to road markings
- Introduction of approach traffic signs
- Installation of new street lighting columns
- High friction surfacing on the main road roundabout approaches

## 1.4 Traffic Data

The Audit Team has not been provided with Traffic Data.

## 1.5 Collision Data

The Audit Team has not been provided with Collision Data.

## 1.6 Road Safety Audit

The Road Safety Audit Team visited the site together during daylight and during the hours of darkness on Monday 9<sup>th</sup> October 2017. The weather was fine and dry during the site visit.

A Combined Stage 1/2 Road Safety Audit was carried out by Capita in August 2014. The findings of this Audit will be examined, however no Designer's Responses have been provided to clarify how the problems raised may have been removed or mitigated.

## 1.7 Purpose of the Scheme

The purpose of the scheme is to provide a safe access for the proposed Retirement Village to the north from the A1044 Leven Bank Road.

## 1.8 Departures from Standard

A Departure from Standard was submitted and approved in relation to the sub-standard horizontal alignment on the approach to the roundabout, where the curvature radius is two steps below the desirable minimum. Details of the approved departure have been provided to the Audit Team and will be taken into consideration during this Audit.

## 1.9 Audit Management

This Audit Report will be submitted to the Client, who is responsible for agreeing with the Audit Team Leader the content of the final version of the report.

Matters which the Terms of Reference exclude from this report, but which the Audit Team wishes to draw to the attention of the Project Sponsor, will be in the covering email.

It is the Project Sponsor's responsibility to advise the Audit Team Leader if any Problem/Recommendation is not accepted. The Project Sponsor should then supply a copy of each signed Exception Report to the Audit Team Leader, for information.

## 2. Items Raised at the previous Stage 2 Road Safety Audit

### 3.1 PROBLEM

LOCATION: The development access road.

SUMMARY: Pedestrians could trip and fall or be struck by vehicles

The plans do not show dropped kerbs and tactile paving are to be installed across the development access to link the two sections of shared footway/cycleway. If these are not provided, partially sighted or blind pedestrians could be confused as to where to cross the road increasing the risk of trips or of conflicts with vehicles. Wheelchair users could attempt to cross the road and find themselves stranded in the carriageway, again increasing the risk of conflict.

#### RECOMMENDATION

Install dropped kerbs and tactile paving at the junction. Either fully inset the crossing point or convert the splitter island to a refuge with appropriate tactile paving.

**STAGE 3 AUDIT TEAM COMMENTS - No provision for pedestrians through roundabout, therefore no longer applicable.**

### 3.2 PROBLEM

LOCATION: The roundabout and its approaches.

SUMMARY: A number of collision types could occur.

There are no direction signs shown on the roundabout approaches or on its splitter islands. This is a busy road that is also used regularly as a Tactical Diversion Route (TDR). If motorists are unsure which exit to follow they could make last minute manoeuvres or brake suddenly, increasing the risk of collisions.

#### RECOMMENDATION

Install advance direction signs on the approaches and direction signs on the splitter islands. Include any symbols required for the TDR.

**STAGE 3 AUDIT TEAM COMMENTS – This provision should be reviewed when the 3<sup>rd</sup> arm of the roundabout is to become operational. Not relevant at present as there is only one route option in each direction.**

### 3.3 PROBLEM

LOCATION: The roundabout splitter islands.

SUMMARY: Head on collisions could occur and pedestrians could be struck by vehicles. No bollards are shown on the roundabout splitter islands. If these are not provided, motorists might conclude that they can pass either side of the islands.

**RECOMMENDATION**

Provide bollards on the island noses incorporating 'keep left' aspects to Diagram 610.

**STAGE 3 AUDIT TEAM COMMENTS – Bollards have been installed.**

**3.4 PROBLEM**

LOCATION: The roundabout splitter islands.

SUMMARY: A number of collision types could occur.

The centreline markings are splayed on the approaches to the islands but they are not hatched. Hatched markings improve conspicuity of the islands and help to provide deflection.

**RECOMMENDATION**

Provide hatched markings in advance of the splitter islands.

**STAGE 3 AUDIT TEAM COMMENTS – Hatched markings have been installed.**

**3.5 PROBLEM**

LOCATION: The roundabout central island.

SUMMARY: Loss of control collisions could occur.

The drawing specifies chevron block paving for the roundabout but there are no formal signs on the central island – the sharp deviation of route sign (Diagram 515) and an instruction for motorists to proceed to the left (Diagram 606). Motorists might not appreciate that they must change direction increasing the risk of losing control as they either manoeuvre suddenly or continue unchecked through the central island.

**RECOMMENDATION**

Provide signs to Diagrams 515 and 606 on the central island to face motorists on the 3 approaches.

**STAGE 3 AUDIT TEAM COMMENTS – Signs included as recommended.**

**3.6 PROBLEM**

LOCATION: The eastbound approach to the roundabout.

SUMMARY: A number of collision types could occur.

The 300-200-100 yard countdown markers do not appear to be evenly spaced on the drawing. The 200 yard sign in particular looks to be in the wrong location. Similarly, the roundabout warning sign and 250 yard supplementary plate might not be correctly positioned. If they are not erected at their correct locations, motorists could be confused as to the distance to the junction.

**RECOMMENDATION**

Ensure that the countdown markers and 250 yard warning sign and plate are correctly positioned on the detailed design drawings.



**STAGE 3 AUDIT TEAM COMMENTS – Issue remains, Designers Response required.**

### 3.7 PROBLEM

LOCATION: The shared footway/cycleway.

SUMMARY: Cyclists could be fall or struck by vehicles.

The two sections of shared footway/cycleway curtail immediately to the east and west of the roundabout, but the arrangements for cyclists to leave and re-join the main carriageway are not clear. If cyclists are forced to negotiate full height kerbs, they could lose control and fall or be struck by vehicles.

#### RECOMMENDATION

Provide dropped kerbs and appropriate road markings where the cycleway joins the main carriageway.

**STAGE 3 AUDIT TEAM COMMENTS – The constructed scheme does not include shared use areas, therefore no longer relevant.**

### 3.8 PROBLEM

LOCATION: The development access road.

SUMMARY: A number of collision types could occur.

It is assumed that the speed limit for the development and its access road will be less than the limit on Leven Bank Road (40mph) and that it is likely to be 20mph given the current national trend in speed limits for such developments. However, the limit for the development has not been specified and there are a number of possible traffic signing arrangements depending upon the limit and it's method of imposition. Traffic signs will reduce the likelihood of a number of collision types by removing confusion and the risk of sudden braking and manoeuvres. The following recommendations are made on the assumption that 20mph will be imposed either as a standard speed limit or a zone and that some form of vertical traffic calming features will be present within the development.

#### RECOMMENDATIONS

Two alternative recommendations are made as follows: -

1. If the development is subject to a 20mph speed limit, erect signs to Diagram 670 (20/30) back to back at the junction. In addition, if speeds are controlled by the use of vertical traffic calming features, erect a sign to Diagram 557.1 to warn of the presence of the features;
2. If the development is subject to 20mph zone control, erect signs to Diagrams 674 and 675 back-to-back at the junctions. Zone control will obviate the need for a sign warning of the vertical features.

**STAGE 3 AUDIT TEAM COMMENTS – Speed limit signs are installed at the change in speed limit.**

### 3.9 PROBLEM

LOCATION: The interface between the existing and new sections of carriageway.

SUMMARY: Loss of control collisions could occur.

There are areas of new carriageway adjacent to the existing surface. If the interfaces are not smooth and clean, or the new surface has a significantly different PSV from the existing, drivers could lose control of their vehicles in wet conditions due to differential grip.

#### RECOMMENDATION

Ensure that the interfaces between the existing and new surfaces are structurally secure, clean and sound. In addition, provide a wearing course on the new sections of carriageway with a similar PSV value to the existing.

**STAGE 3 AUDIT TEAM COMMENTS – No further comments.**

### 3. Items Raised at this Stage 3 Road Safety Audit

#### 3.1 Road Signs, Carriageway Markings and Lighting

##### **PROBLEM 1**

**LOCATION:** Roundabout circulatory southern quadrant

**SUMMARY:** *Poor lighting provision*

The new street lighting columns are positioned along the northern verge of the A1044 and to the north of the new roundabout. This provides reduced illumination to the southern quadrant of the circulatory carriageway. During the hours of darkness, a road user may fail to appreciate the alignment of the roundabout in sufficient time, leading to late decision making and possibly late braking. This may result in a shunt type collision.

**RECOMMENDATION:** Provide adequate illumination throughout the full extent of the roundabout.

##### **PROBLEM 2**

**LOCATION:** Throughout the extent of the scheme

**SUMMARY:** *Lighting columns and traffic sign lighting units not operational*

At the time of the site visit, the Audit Team observed some lighting columns and traffic sign light units not illuminating. The reduced illumination of the highway during the hours of darkness will provide insufficient appreciation of the road layout for road users. The traffic signs which are meant to be lit will not provide a clear message to the road user during the hours of darkness, resulting in a failure to provide the warning or important information to the road user. Both of these deficiencies could result in drivers not taking appropriate action, leading to loss of control type collisions.

**RECOMMENDATION:** Ensure all lighting columns and traffic sign lighting units are operational.

##### **PROBLEM 3**

**LOCATION:** A1044 Leven Bank Road Eastbound

**SUMMARY:** *Partially obscured speed limit sign*

A street lighting column has been installed directly in front of the nearside 30mph speed limit sign on the eastbound approach to the roundabout. Due to its close proximity, the column partially obscures the sign face.



**Photograph 1: Lamp column obscuring speed limit sign**

Whilst the Audit Team recognise that an equivalent speed limit sign is positioned in the southern verge area, the majority of road users are more likely to observe signs placed in the nearside verge, therefore some drivers may fail to appreciate the change in speed limit. Road users approaching the roundabout at inappropriate speeds may find themselves braking late, potentially leading to a loss of control collision.

**RECOMMENDATION:** Re-position the lighting column to the rear of the speed limit sign.

#### **PROBLEM 4**

**LOCATION:** A1044 Leven Bank Road Westbound

**SUMMARY:** *Lighting column positioned too close to running lane*

A street lighting column has been installed approximately 300mm from the kerb face. At this distance the column will be susceptible to strikes from passing large vehicles, particularly those with wide wing mirrors. Such collisions could lead to the driver swerving suddenly, potentially into the path of an oncoming vehicle, causing a head-on collision.

**RECOMMENDATION:** Re-position the lighting column with sufficient set back from the carriageway.

#### **PROBLEM 5**

**LOCATION:** A1044 Leven Bank Road Eastbound

**SUMMARY:** *Non-passive lighting column*

A street lighting column has been installed close to the roundabout eastbound entry in the northern verge. It would appear that this column is not a 'passive' column whereas all other new lighting columns appear to be. Should an errant vehicle collide with the column, the severity of injury to occupants will be increased. Whilst the Audit Team acknowledges that speeds should

be low at this point, this is countered by the fact that the column is located on the outer edge of the horizontal curvature, increasing the risk of an errant vehicle leaving the carriageway.

**RECOMMENDATION:** Replace the column with a passively safe column.

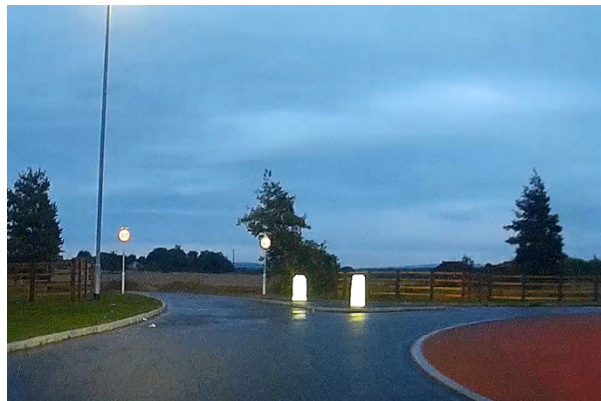
## 3.2 Local Alignment

### PROBLEM 6

**LOCATION:** New roundabout northern arm

**SUMMARY:** *Limited warning of stopped-up exit arm*

The new roundabout includes a northern exit arm which is currently stopped up. Soil mounds have been placed across the arm to prevent vehicles from using the arm. However, during the hours of darkness, the soil mounds are not clearly visible.



**Photograph 2: Driver perspective of stopped up arm and soil mounds**

Drivers not familiar with the road layout could misinterpret the exit arm as a viable route and potentially collide with the soil mounds. Alternatively, drivers observing the stopped up route whilst negotiating the roundabout may make a late manoeuvre, potentially into the path of another vehicle.

**RECOMMENDATION:** Increase the conspicuousness of the stopped up nature of the roundabout arm by placing retroreflective barriers immediately in front of the soil mounds.

## 4. Audit Team Statement

We certify that this Audit has been carried out in accordance with HD 19/15.

**AUDIT TEAM Leader****Ian Guard**

Project Manager/Road Safety Engineer

Capita Real Estate and Infrastructure

Signed: 

Date: 06/11/17

**AUDIT TEAM Member****Paul McKenna**

Senior Engineer

Capita Real Estate and Infrastructure

Signed: 

Date: 06/11/17

**ENQUIRIES REGARDING THIS AUDIT SHOULD BE MADE TO****Ian Guard**

Road Safety Engineer

Capita Real Estate and Infrastructure

Email: 

## Appendix A Documents Forming the Brief

Drawing No	Revision	Title
TS10028-1200-001	C1	Proposed Road Markings and Signing
<b>Documents (provided for this Stage 3 Road Safety Audit)</b>		
-	-	Combined Stage 1/2 Road Safety Audit
-	-	Completed Road Safety Audit Brief

## Appendix B Problem Location Plans

