


A1036 Highway Improvements - Askham Bar Park & Ride Site

Road Safety Audit – Stage 2

Designers' Response

City of York Council

October 2012



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Document history

A1036 Highway Improvements

City of York Council

This document has been issued and amended as follows:

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Contents

1	Introduction	1
1.1	General	1
2	Items Raised at the Stage One Audit	3
2.1	General	3
3	Detailed Appraisal - Off-site Road Network	5
3.1	Alignment	5
3.2	Junctions	6
3.3	Road Markings	6
3.4	Signing	9
3.5	Signal Heads	12
3.6	Lighting	13
3.7	Non-Motorised Users	13
4	Detailed Appraisal - On-site Road Network	15
4.1	Alignment and Usage	15
4.2	Road Markings	15
4.3	Non-Motorised Users	17
4.4	Bus Only Link	18
4.5	Landscaping and Vegetation	19
5	Audit Team Statement	20
5.1	General	20

1 Introduction

1.1 General

This report is the Designers’ Response to the Stage 2 Road Safety Audit undertaken for the proposed A1036 highway improvements associated with the planned expansion of the Askham Bar Park & Ride site, to the south of the City of York.

Phase One of the park & ride expansion will create an additional 1,100 spaces, which equates to a doubling of the existing capacity. The development will be located to the south-west of the existing site and Tesco store, with the main access being provided via an enlarged signalised junction with the A1036 between the A64 and Sim Balk Lane. The scheme comprises the following elements:

- Re-modelling of the existing traffic signals south of the Total petrol station;
- Signal co-ordination of the access junction with Sim Balk Lane junction;
- Additional traffic lanes to be provided from the junction into the park & ride site; and,
- New bus only link that will connect the new and existing sites.

The scheme aims to cater for existing and future traffic requirements; by all modes of transport. The scope of the audit comprises the proposals shown on the drawings listed in Appendix A.

The audit team membership was as follows:

DR M POWELL	-	Halcrow Group Ltd, Leeds
Audit Team Leader		Transport Planning Team
E WRAGG	-	City of York Council
Audit Team Member		Sustainable Transport Service
S BURRELL	-	North Yorkshire Police
Audit Team Member		Traffic Management
P BROADHEAD	-	North Yorkshire Police
Audit Team Member		Traffic Management
M SHAW	-	Halcrow Group Ltd, Leeds
Audit Team Observer		Transport Planning Team

The audit was undertaken on Tuesday 18th September 2012. At the time of the audit, the weather was fine and the road surface was dry. The audit was undertaken during the hours of daylight.

The Audit Team has examined and reported only on the road safety implications of the design in accordance with HD 19/03.

The drawings and documents examined during the audit are listed in Appendix A.

The safety aspects of the park & ride junction access and associated works were the subject of comment in a June 2009 Stage 1 Road Safety Audit Report. Following significant modifications to the design, a second Stage 1 Road Safety Audit Report was completed in January 2012. A Designer’s

Response Report to both Stage 1 Road Safety Audits was supplied to the Audit Team in advance of the Stage 2 Audit, and these are included as Appendix B to the Road Safety Audit report.

2 Items Raised at the Stage One Audit

2.1 General

The safety related aspects of the scheme were the subject of comment in the June 2009 and January 2012 Stage 1 Road Safety Audit Reports. The audit team considers that the following items remain a problem, either in full or in part:

Problem A10 (June 2009 Stage 1 Audit)

Problem A4 (January 2012 Stage 1 Audit)

Problem B2 (January 2012 Stage 1 Audit)

Problem D2 (January 2012 Stage 1 Audit)

Problem G3 (January 2012 Stage 1 Audit)

Additional comment relating to each problem is provided in this Chapter, with the Designer’s Response Reports to the Stage 1 Road Safety Audits included as Appendix B.

All other issues raised in the Stage 1 Road Safety Audits have been resolved.

2.1.1 Problem A10 (June 2009 Stage 1 Audit)

Summary: Details of rising bollards for bus access

No details of a rising bollard system have been provided within the designs submitted for the Stage 2 Road Safety Audit. The designer’s response to issue A10 of the 2009 Stage 1 Audit was that the issue would be addressed during the detailed design stage with appropriate measures provided. Since no details of measures are evident within the detailed design drawings provided at Stage 2, it is assumed that no rising bollard system is to be installed at the entrance to the bus only link; a safety concern has been raised based on this assumption and is discussed further in paragraph 4.4.1.

2.1.2 Problem A4 (January 2012 Stage 1 Audit)

Summary: Entry and egress issues with maintenance bay

The designer’s response to the issue raised in the 2012 Stage 1 Audit was that the issue would be discussed with NMD in order to understand their maintenance needs. The audit team remains concerned with the maintenance lay-by arrangement. The issue raised in A4 and other concerns are discussed in paragraph 3.2.1.

Designers Response

As discussed below, through design development and consultation this location was preferred. CYC do not regard this location to present a problem. The location of the maintenance area has been selected in order to supply a direct service point to the relocated CCTV mast and equipment in this island. CYC does not consider that this will give rise to any operational issues.

2.1.3 Problem D2 (January 2012 Stage 1 Audit)

Summary: Acute angle of vehicle approach to left turn out of park & ride site

The designer’s response to the issue raised in the 2012 Stage 1 Audit was that the angle had been relaxed in the modified layout. The design drawings that were submitted for the January 2012 Stage 1 Audit were not provided to the audit team for the Stage 2 Audit so it is not possible to comment on whether the changes to the angle of approach have been made; however, the audit team has assessed the designs as they currently stand and maintain a concern with regards to the angle of approach to the give-way. The issue therefore remains and is commented upon further in paragraph 3.1.1.

Designers Response

This radius has been reduced and the alignment provided cater for sufficiently for the egress of all vehicle types (swept paths demonstrate this). Originally the alignment was driven by the presence of an island which incorporated crossing facilities for non motorised users at this location. Some realignment of kerb lines will be explored. It may be possible to retain the nearside kerb line as shown, but provide some hatching. On the off side kerb line, the layout of the splitter island could be modified to create a more perpendicular approach with the A1036.

2.1.4 Problem G3 (January 2012 Stage 1 Audit)

Summary: Single vehicle lanes susceptible to blocking in the event of a live lane breakdown

The designer’s response to the issue raised in the 2012 Stage 1 Audit was that the designers acknowledged the issue but did not consider the arrangement to be unusual. The designer recognised that in the event of a breakdown some disruption would be inevitable until the vehicle could be removed. The audit team remains concerned over the layout but can only repeat the comment made in the 2012 Stage 1 Audit that no recommendation can be made to overcome this issue within the current design; this issue is therefore not commented upon further within this report.

Designers Response

This has been discussed with CYC NM team and whilst the Auditors’ concern is appreciated, the Designers’ response remains as quoted above. No change is therefore proposed.

3 Detailed Appraisal - Off-site Road Network

3.1 Alignment

3.1.1 Problem (Location 1)

Summary: Alignment of vehicles turning left out of park & ride site

A large turning radius is present on the left turn out of the park & ride site towards York. The large radius will cause vehicles to approach the give-way markings at an acute angle, increasing the likelihood that drivers will be required to look backwards over their shoulder into the ‘blind spot’ area in order to observe vehicles approaching on the A1036 mainline; this would be especially difficult for bus and coach drivers. There is therefore an increased risk of vehicles emerging from the give-way left turn into the path of vehicles already on the A1036 mainline.

This issue was raised as point D2 in the January 2012 audit. The designer has advised that the angle has been relaxed in the modified layout; however the issue is still a concern to the audit team.

Recommendation

Adjust the alignment of the carriageway on the left turn exit from the park & ride site to allow for vehicles (especially buses\coaches) to approach the give-way at an angle that is more perpendicular to the markings. Alternatively the left turn lane should be signalised.

Designers Response

This radius has been reduced and the alignment provided cater for sufficiently for the egress of all vehicle types (swept paths demonstrate this). Originally the alignment was driven by the presence of an island which incorporated crossing facilities for non motorised users at this location. Some realignment of kerb lines will be explored. It may be possible to retain the nearside kerb line as shown, but provide some hatching. On the off side kerb line, the layout of the splitter island could be modified to create a more perpendicular approach with the A1036.

3.1.2 Problem (Location 2)

Summary: Alignment of carriageway to speed table on entering park & ride site

A pedestrian and cycle crossing facility is provided at the entrance to the park & ride site and traverses the carriageway on a raised speed table. The bend in the carriageway on the park & ride entry link means that vehicles will approach the speed table at an angle, potentially causing larger vehicles to ‘roll’; there is therefore an increased risk of loss of control accidents for larger vehicles, including buses and coaches.

Recommendation

Ensure that the carriageway and speed table are aligned so as to allow vehicles to approach the table at an angle that would not cause vehicles to ‘roll’.

Designers Response

There are not intended to be any large vehicles using the access. HGVs and coaches certainly, will not be required to enter via this new access road. However, as there may be occasional Bus access, the northbound approach nearside kerb line could be slightly

adjusted to provide a more perpendicular approach angle to the table. The southbound is already perpendicular.

3.2 Junctions

3.2.1 Problem (Location 3)

Summary: Potential for vehicles parked in maintenance bay to obscure signal heads

A maintenance bay is provided on the eastern side of the traffic island which separates the mid-junction northbound flow to York from the mid-junction flow towards the park & ride site. There is the potential that high sided vehicles parked in the maintenance bay to obscure the view of the traffic signal heads for the right turn movement into the park & ride site. Vehicles may enter the short mid-junction section without being able to see the appropriate signal phase; there is therefore an increased potential for sudden braking and associated rear-end shunts if vehicles are suddenly confronted with a red signal, or vehicles may contravene the red signal and enter the path of northbound vehicles.

In addition to the issue above it is felt that the problem discussed in paragraph 2.1.2 and raised in the January 2012 Stage 1 Audit as point A4 is still relevant; namely that the only way to egress the service bay without moving across a section of hatched markings is to turn right into the park & ride site, which involves a lengthy detour, and the driver may elect to perform a dangerous u-turn manoeuvre into the A1036 northbound carriageway.

Recommendation

The service bay should be re-sited so that access and egress can be carried out by servicing vehicles in a safe manner.

Designers Response

As discussed below, through design development and consultation this location was preferred. CYC do not regard this location to present a problem. The location of the maintenance area has been selected in order to supply a direct service point to the relocated CCTV mast and equipment in this island.

It is not considered that the U-turn manoeuvre, which may be undertaken by service vehicles accessing the maintenance bay to travel on the A1036 NB would be dangerous, as it does not conflict with any traffic phases. CYC does not consider that this will give rise to any operational issues.

The offside primary signal for Phase J (pole 19) may be obscured by high sided maintenance vehicle (this will be a rare occurrence), but duplicate nearside primary signal for phase J (pole 20) would remain visible at all times to approaching vehicles. A secondary signal is also provided for vehicles which are waiting at the stop-line.

3.3 Road Markings

3.3.1 Problem (Location 4)

Summary: Inappropriate carriageway markings on A1036 southbound junction approach

The nearside lane of the two-lane A1036 southbound approach is marked for the A64(E) with accompanying ahead arrow, whilst the offside lane is marked for A64(W), Copmanthorpe and P&R with accompanying ahead and right arrow. The separation of A64 bound traffic into different lanes at this location is unnecessary as both lanes continue as they pass the diverge to the A64(E). If all

A64 westbound vehicles are encouraged to position themselves in the offside lane, then an imbalance in vehicle flows will be created both at the junction approach and downstream of the A64(E) diverge. The imbalance in flows on the junction approach will be most notable on event days such as racing at York Race Course, when the proportion of vehicles heading to the A64(W) is anecdotally increased. The imbalance would create longer queues in the offside lane which would have the potential to extend back to upstream junctions, increasing the risk of shunt type and lane change collisions along the corridor. An imbalance in flows will also be experienced following the A64(E) diverge whereby the majority of A64(W) traffic would find itself in the offside lane, with relatively low flow in the nearside lane, increasing the likelihood of vehicles performing unsafe undertaking manoeuvres of slow moving vehicles in the offside lane.

The majority of vehicles turning right towards the park & ride site from this approach are likely to be bus and coach drivers who are familiar with the junction movements. It is considered that relatively few visitors to York would travel from the north of the city, potentially passing other park & ride facilities on route, and arrive at the site on this approach; the carriageway marking for the park & ride site is therefore unnecessary at this location. The carriageway marking of Copmanthorpe is also unnecessary at this location given its relatively local importance. It is noted that no destination markings are currently provided at the junction. The overuse of carriageway markings is likely to cause driver confusion as well as detract from the markings showing the more important destinations.

Recommendation

Remove carriageway text markings for Copmanthorpe and P&R at this location. Alter the A64(E) destination marking in the nearside lane to advise that both A64 westbound and eastbound vehicles can utilise the lane. Reposition further north-east the Copmanthorpe and P&R carriageway markings of the southbound mid-junction section closer towards the junction carriageway, improving the visibility of these markings for drivers approaching from the A1036 (north) and park & ride.

Designers Response

The Auditors’ recommendations are noted and accepted. The carriageway markings will be amended as per the recommendations.

3.3.2 Problem (Location 5)

Summary: Inappropriate carriageway markings on A64 (east) junction approach

The nearside lane of the two-lane northbound approach from the A64 (east) is marked for York and the park & ride with accompanying double headed, ahead and right arrows; the right-hand lane is marked for York with an accompanying right turn arrow. The alignment of the junction at this approach is such that the major vehicle movement towards York appears as a right turn. Carriageway markings that include the York text and an ahead arrow in the nearside lane are likely to cause confusion amongst drivers; this could result in vehicles travelling towards York mistakenly entering the park & ride site or making late alterations to their path through the junction in order to exit onto the A1036 northbound. There is therefore an increased risk of collisions involving lane change manoeuvres at this location and from drivers carrying out inappropriate turning movements on the park & ride access road.

Recommendation

Remove text from carriageway markings in both lanes of the A64 (east) junction approach. Use appropriate signing to guide York bound and park & ride traffic through the junction. Reposition

the York carriageway markings of the northbound mid-junction section, further south-west, closer towards the central junction carriageway, improving the visibility of these markings for drivers approaching from the A64 (east) and the A1036 (south).

Designers Response

The Auditors’ recommendations are noted and accepted. The P&R carriageway marking will be removed, but the right turn and York markings will be retained .

3.3.3 Problem (Location 6)

Summary: Inappropriate carriageway markings on A1036 northbound junction approach

The nearside lane of the three-lane A1036 northbound approach is marked for York and P&R with accompanying double headed, ahead and left arrows in advance of the stopline; the middle lane is marked for York with an accompanying ahead arrow, whilst the offside, flare lane is marked for A64 with accompanying right turn arrow. The double headed arrow markings accompanied by multiple destinations is likely to cause confusion amongst drivers with the potential for Park & Ride users to carry on straight through the junction and likewise York bound drivers to turn left into the Park & Ride site. Driver confusion over route choice increases the risk of collisions associated with late lane change and braking manoeuvres.

Recommendation

Remove the destination text from the carriageway markings in the nearside and middle lanes.

Designers Response

The Auditors’ recommendations are noted and accepted. The P&R carriageway marking will be removed, but the straight ahead and York markings will be retained.

3.3.4 Problem (Location 7)

Summary: Inappropriate carriageway markings on park & ride exit

The nearside lane of the three-lane park & ride exit is marked for York with accompanying left turn arrow; the middle lane is marked for A64(E) with an accompanying ahead arrow, whilst the offsidelane is marked for A64(W) and Copmanthorpe with accompanying ahead arrow. As was commented upon in paragraph 3.3.1, separating out A64 westbound traffic from A64 eastbound traffic is unnecessary as both lanes continue through the A64(E) diverge. An imbalance of flows is therefore likely to occur at this location on event days, as described in paragraph 3.3.1. Extensive queuing in the offside traffic lane will lead to an increased risk of shunt and lane change type collisions.

It is also considered that, given the local importance of Copmanthorpe as a destination, few vehicles would be exiting the park & ride site in this direction, and those that would are likely to make the journey on a regular basis and be familiar with the junction layout. The carriageway marking for Copmanthorpe is therefore considered to be unnecessary at this location; the overprovision of destination markings may cause driver confusion as well as detract from the more strategically important destination markings.

Recommendation

Remove carriageway text for Copmanthorpe at this location. Alter the A64(E) destination marking in the centre lane to advise that both A64 westbound and A64 eastbound vehicles can utilise the lane.

Designers Response

The Auditors’ recommendations are noted and accepted. Carriageway markings will be amended as per the recommendations.

3.4 Signing

3.4.1 Problem (Location 8)

Summary: Inappropriate position of sign TS23

Sign TS23, to Diagram 2503 of the Traffic Signs Regulations and General Directions 2002 (TSRGD) is to be located on the A1036 northbound approach to the junction, immediately in advance of an existing variable message sign. Sign TS23 is also to be placed in advance of proposed sign TSO3 which is in accordance with Diagram 2114 of TSRGD and provides lane destination guidance on approach to the junction. The audit team has concerns regarding positioning of sign TS23 on two accounts: the sign could potentially obscure the existing VMS, with the potential for drivers to miss important information; secondly the sign advises of the park & ride being the next available left turn, whilst proposed sign TSO3, downstream of sign TS23, depicts the park & ride as being ahead. The inconsistency in the signing of the park & ride may cause driver confusion and lead to vehicles performing late turning manoeuvres.

Recommendation

Reposition sign TS23 to a more suitable location which does not obscure the visibility of existing signs and is downstream of sign TSO3.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS23 will be relocated as per the recommendation.

3.4.2 Problem (Location 9)

Summary: Inappropriate position of sign TS03

Proposed sign TSO3, which is in accordance with Diagram 2114 of TSRGD, provides lane destination guidance in advance of the A1036 northbound single lane bifurcating into two lanes and a right turn flare. The sign indicates that the park & ride site is accessed via the nearside lane and is ‘ahead’. The sign is to be located downstream of sign TS23 which correctly depicts the park & ride as being accessed via the next left turn. Sign TSO3 may give drivers the incorrect impression that the park & ride site is straight ahead through the junction, potentially leading to late lane change manoeuvres when they realise that the park & ride is a left turn at the junction.

Recommendation

Re-position sign TS23 as described in the recommendation to 3.4.1 or remove sign TSO3.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS23 will be relocated as recommended at 3.4.1 above.

3.4.3 Problem (Location 10)

Summary: Large number of destinations on sign TS06 and inappropriate lane destinations shown for A64 traffic

Sign TS06 which is in accordance with Diagram 2114 of TSRGD is to be located at the park & ride exit, immediately upstream of the flaring of the exit link to three lanes. The sign separates A64 westbound and eastbound traffic into separate lanes, which is inappropriate at this location for the same reasons discussed in paragraph 3.3.4 relating to the carriageway markings.

Sign TS06 also includes directions to seven destinations along four routes; this amount of information is likely to confuse drivers and detract from the most commonly used routes and destinations, leading to an increased risk of shunt and lane change type collisions.

Recommendation

Make alterations to the A64 lane guidance to mirror the changes to carriageway markings recommended in 3.3.4. Simplify the destination and route signing on TS06, providing guidance to a readable number of destinations and routes which are likely to be commonly used.

Designers Response

The Auditors’ recommendation is noted. The configuration of this sign is not unusual. One lane has a maximum of 4 destinations, which is in keeping with design criteria within Chapter 7 (Fig 3-15). Evidence shows that drivers do not “read” signs, but quickly scan read them. This also will be Client Driven. The destinations should reflect signing before and after the proposal in order provide route continuity. To decrease the “local destinations” cognisance should be made of these existing signs.

Further to this LTN 1- 94 states that the max number of destinations “NORMALLY” on any one sign shall be 6. Since this is merely one (1) over, this then cannot be considered a MAJOR departure from standards. However, the reference to Acaster could be dropped from the sign as people who need to go to Acaster will have to go through Copmanthorpe.

3.4.4 Problem (Location 11)

Summary: Inappropriate positioning of sign TS07

Sign TS07 which is in accordance with Diagram 2125 of TSRGD is to be located on the central verge between the A1036 north and southbound carriageways, opposite the park & ride exit; the sign directs traffic from the park & ride towards the A64. The sign is to be located at the edge of the verge closest to the A1036 northbound carriageway. At this location the sign has the potential to direct vehicles exiting the park & ride into the A1036 northbound carriageway, leading to an increased risk of head-on collisions.

Recommendation

Reposition sign TS07 at a suitable location further to the south-east, such that the right turn cannot be misinterpreted as being towards the A1036 northbound carriageway.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS07 will be relocated to the same location at TS13/TS14.

3.4.5 Problem (Location 12)

Summary: Sign TS01 does not accurately reflect junction layout

Sign TS01, in accordance with Diagram 2109 of TSRGD is to be located on the A1036 northbound approach to the park & ride junction. The sign shows the junction as having five-arms and does not accurately reflect the shape and layout of the junction. Drivers are likely to be confused when

entering the junction if the layout and turning movements are not as advised on the approach, leading to an increased risk of lane change and head-on collisions resulting from late or illegal turning manoeuvres.

The sign contains destination guidance to six destinations including the separation of the A64 into east and west. The right turn at the junction, for movements towards the A64, is a single lane approach which provides for all A64 traffic, it is therefore unnecessary to separately sign the A64 west and east at this location. The overprovision of destination guidance is likely to confuse drivers and detract from the most commonly used routes, leading to an increased likelihood of shunt and lane change type collisions as drivers make late turning manoeuvres.

Recommendation

Amend proposed sign TS01 to accurately reflect the number and alignment of the exit arms available at the junction. Simplify the destination guidance by signing the A64 as one destination that provides for eastbound and westbound movements.

Designers Response

The Auditors’ recommendations are noted. The junction is a five arm junction which includes the stub from the north bound slip from the A64 within the layout. This stub is provided to indicate the true number of arms within the junction layout in order for the motorist to count down his exit. This “no destination” in a particular direction route arm is in accordance with paragraph 5.13 of Chapter 7. A64W and A64E will be removed and replaced with A64.

3.4.6 Problem (Location 13)

Summary: Sign TS16 - Primary route is not emphasised above other destinations

Sign TS16, in accordance with Diagram 2102 of TSRGD is to be located on the link road from the A64 westbound exit. The sign provides route guidance for seven local destinations. The likely primary route for drivers approaching the junction will be towards York; however, the sign gives equal standing to all destinations and it is possible, given the number of destinations signed and the alignment of the York route as a right turn at the junction, that drivers will miss the guidance for York. This will result in an increased likelihood of late lane change manoeuvres at the junction and associated collisions as vehicles correct their lane choice.

Recommendation

Amend proposed sign TS16 to give greater emphasis to the primary route of York and thereby also highlight the alignment of York as a right turn.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS16 will be amended as per the recommendations.

3.4.7 Problem (Location 14)

Summary: Sign TS17 gives conflicting lane guidance to that on the carriageway

Sign TS17, in accordance with Diagram 2102 of TSRGD is to be located on the link road from the A64 westbound exit. The sign provides lane guidance for the local routes displayed on sign TS16. The sign indicates that all York bound traffic should use the offside lane on approach to the

junction; this conflicts with the carriageway markings closer to the junction which suggest the right turn towards York can be performed from both approach lanes. This inconsistency is likely to lead to an imbalance in lane queuing on approach to the junction, with associated undertaking manoeuvres from drivers who use the route frequently and utilise the left-hand lane; late lane change manoeuvres are also likely as vehicles correct their lane choice closer to the junction.

Recommendation

Ensure that the lane guidance given on sign TS17 is consistent with that provided by carriageway markings and reflects the turning movements available at the junction.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS17 will be amended as per the recommendations.

3.4.8 Problem (Location 15)

Summary: Sign TS20 poorly located

Sign TS20, in accordance with Diagram 2125 of TSRGD is to be located on the mid-junction link road for southwest-bound movements towards Copmanthorpe. The sign is intended to guide traffic ahead for movements towards Copmanthorpe and Acaster Malbis; however the alignment and position of the sign has the potential to direct drivers right towards the park & ride entrance. Vehicles turning right at this location would contravene the signal arrangement and consequently turn across the path of northbound vehicles on the A1036.

Recommendation

Reposition sign TS20 onto the triangular island further south-west and modify its design to incorporate an ahead arrow rather than right turn sign face.

Designers Response

The Auditors’ recommendations are noted and accepted. Sign TS20 will be amended as per the recommendations.

3.5 Signal Heads

3.5.1 Comment (Location 16)

Summary: Signal heads associated with phase G have potential to misdirect vehicles

Primary signal heads 13 and 14, and secondary signal head 18, provide for movements from the A64 westbound exit link and are associated with phase G. Vehicles approaching on this link can travel ahead towards the park & ride from the nearside lane or turn right towards York from both the nearside and offside lane; left turn movements towards Copmanthorpe are under give-way control. Signal heads 13, 14 and 18 show an ahead arrow during the green phase. An ahead arrow has the potential to confuse York bound vehicles and lead to drivers continuing ahead towards the park & ride; the park & ride site entrance is a single lane entry and vehicles mistakenly continuing ahead from the offside lane will increase the likelihood of side swipe collisions at this location.

Recommendation

Provide a standard circular green aspect head to signal poles 13, 14 and 18.

Designers Response

It is considered that sufficient lane destination markings on the approach and guidance markings through the junction are provided to stop instances of vehicles in the offside lane trying to access the park and ride site. The provision of ahead green arrows (green aspect head) would also mitigate against vehicles turning right into conflicting vehicles on the westbound carriageway and as such will be added to the signal head arrangement.

3.6 Lighting

3.6.1 Problem (Location 17)

Summary: Low lighting levels for shared use path on A1036 northbound approach

On the A1036 northbound approach, lighting columns are to be placed at regular intervals on the southern side of the carriageway, but not to the northern side where a shared use pedestrian and cycle facility runs parallel to the carriageway. It is possible that this level of lighting provision will not be sufficient to light the shared use facility adjacent to the northbound carriageway, with the potential for dark patches along the route. Low lighting levels on pedestrian routes will create personal safety concerns for users and bring them closer towards the edge of carriageway, increasing the risk of collisions between motorised and non-motorised users. There is also an increased likelihood of conflict between pedestrians and cyclists.

Recommendation

Ensure that adequate lighting is provided such that the shared use facility along the A1036 is uniformly lit with no dark patches, providing a route which is appealing to all intended users during the hours of darkness.

Designers Response

The Auditors’ recommendation is noted. When considering the complete footpath/cycleway as a whole (including the proposed route to the entrance to the P&R and continuation to the other end of the scheme) a lighting class of S2 (12.6 Lux Av / 3.3 Lux Min / 26% Overall Uniformity) is achieved which should be more than adequate.

In relation to the section of footpath/cycleway on the northbound A1036, although the columns are on the opposite side of the road, this section, in isolation, also achieves lighting class S2, but with improved overall uniformity (12.5 Lux Av / 6.8 Lux Min / 54% Overall Uniformity).

No change is proposed.

3.7 Non-Motorised Users

3.7.1 Problem (Location 18)

Summary: Proposed pedestrian/cyclist shared use facility is not on direct desire line

The existing shared use pedestrian and cycle facility which runs parallel to the A1036 northbound carriageway is to be realigned to join with the proposed raised crossing facility at the mouth of the park & ride entrance. The proposed ‘loop’ route is a significant detour to the existing facility, providing a less direct route through the junction, bringing the user towards the park & ride site before sending them back towards the carriageway. There is potential for pedestrians and cyclists to take the more direct (not provided for) route parallel to the carriageway, especially during the hours of darkness when the detour towards the park & ride site may appear darker and provoke concerns for personal safety. There is therefore an increased likelihood of pedestrians and cyclists being

brought closer to the carriageway and crossing at locations where drivers are not expecting them, increasing the risk of collisions between motorised and non-motorised users.

Recommendation

In addition to providing the shared use ‘loop’, maintain a footway facility for pedestrians and/or cyclists closer and parallel to the junction which directly connects the facilities to the north and south of the park & ride site. The facility would provide a direct route for the more confident and able non-motorised users. Ensure that adequate lighting is provided such that the ‘loop’ is uniformly lit with no dark patches and is appealing to all users during the hours of darkness.

Designers Response

During the consultation exercise, non-motorised user groups had expressed concerns at so many crossing points along a direct desire line and found this to be unacceptable. Changing the off route alignment back to a direct line would therefore not be acceptable to these user groups. The non-motorised facility will therefore been retained as shown.

3.7.2 Problem (Location 19)

Summary: Potential for vegetation to impact upon shared use footway

The landscaping proposals for the land adjacent to the shared use facility along the A1036 northbound show vegetation as being located up to the footway edge. There is potential for vegetation located this close to the footway to shed leaves onto the surface during the autumn/winter months and to obscure user inter-visibility during spring /summer. Leaf fall onto the footway surface creates a maintenance issue, increases the risk of slips and skids and increases the likelihood of non-motorised users moving closer to the carriageway edge. The reduced inter-visibility increases the risk of collisions between cyclists and pedestrians/other cyclists and increase personal security concerns during the hours of darkness, thereby further increasing the likelihood of non-motorised users moving closer to the carriageway edge.

Recommendation

Utilise low lying vegetation and ensure that it is located further back from the edge of the shared-use footway. Ensure that only low level vegetation is provided adjacent to the shared use path.

Designers Response

The Auditors’ may have misinterpreted the landscaping proposals for the off site works, which include only annual and perennial meadow flowers and wildflower seed mix. There are no proposals to include any widespread new tree planting along the sections adjacent to the shared use footway, however existing trees will be retained as far as possible. All new landscaping would be low level vegetation and as shown on drawing THAYPR-AB-3001 is set back from the edge of the shared use footway. A mown strip of 2m is shown between the back of kerb and any meadow or bulb planting.

4 Detailed Appraisal - On-site Road Network

4.1 Alignment and Usage

4.1.1 Problem (Location 20)

Summary: Unsuitable designation of caravan parking area

A parking area for ten caravans has been designated in advance of the main car park and to the immediate left on entry to the park & ride site. The area assigned for caravan parking is relatively small and will require drivers to reverse, with little space available for turning manoeuvres. The entrance and exit to the parking area is via the same two-lane entry/egress meaning that all vehicles using the parking area will be required to perform some level of turning manoeuvre. The constrained parking area and low manoeuvrability of caravans increases the likelihood of (low speed) vehicle collisions in this area, especially given the proximity of the car park to the busy park & ride site entrance.

Recommendation

Either: provide a parking area for caravans which does not require reversing manoeuvres; or, ensure that where caravan parking is to be provided adequately sized spaces and carriageway are available for vehicles to perform turning manoeuvres, such as reversing safely.

Designers Response

Rejected – The area identified has been specifically modelled for camper vans, not caravans. Autotrack has been used during the design stage(s) and show adequate space for reversing manoeuvres. Signage will be amended to highlight restriction of caravans into that parking area.

4.2 Road Markings

4.2.1 Problem (Location 21)

Summary: Inappropriate speed limit

A 20mph roundel is to be located on the carriageway in the vicinity of the main site entrance. There is potential that drivers will view this as an appropriate speed at which to drive within the park & ride site. Given the likely high number of vehicle turning manoeuvres and conflicting pedestrian/cycle manoeuvres this is deemed to be an inappropriate speed; increasing the likelihood of collisions between motorised vehicles and non-motorised users.

Recommendation

Remove the 20mph roundel and either replace with a 10mph roundel or leave unmarked. Provide vertical speed calming measures through the site to manage vehicle speeds.

Designers Response

Accepted in part, the 20mph roundel will be removed. Additional signage will be added to dictate a 10mph speed limit. Refer to problem 4.2.3 with regards to traffic/speed calming measures.

4.2.2 Problem (Location 22)

Summary: Inappropriate lane guidance arrows

Lane guidance arrows are used extensively within the park & ride site to guide drivers around the car park. The audit team consider that two sets of arrow markings are potentially confusing to drivers.

The double headed arrow, located to the top end of the northwest-southeast aligned spine road, is located immediately following an ‘exit’ marking for vehicles who have turned right whilst vehicles that have turned left are likely to be heading towards the exit given their position within the car park; the double headed arrow could make drivers mistakenly believe that the exit is available from both directions. Confusion over vehicle routes through the car park will distract drivers’ attention away from manoeuvring vehicles, with an increased risk of vehicle-vehicle and vehicle-pedestrian collisions.

The second ahead arrow, with accompanying ‘exit’ marking on the outer perimeter road, northeast of the disabled bay parking is confusing to drivers as the ahead movement does not lead to the most direct exit route through the car park; vehicles are required to turn right to access the main exit spine road through the car park. Confusion over vehicle routes through the car park will distract drivers’ attention away from manoeuvring vehicles, with an increased risk of vehicle-vehicle and vehicle-pedestrian collisions.

Recommendation

Remove the double headed arrow to the northwest of the site and alter the ahead arrow on the northeast outer perimeter to show a right turn arrow.

Designers Response

Accepted – Double headed arrow will be removed and straight ahead arrow updated to a right turn arrow.

4.2.3 Problem (Location 23)

Summary: Non-intuitive give-way markings at northeast corner of car park

The give-way marking on the outer perimeter link to the northeast of the site is counterintuitive to the expected priorities for vehicles travelling ahead with a minor road to the right. There is an increased likelihood of side impact collisions from vehicles travelling ahead at this location that ignore or misjudge the priority. The problem is exacerbated by the fact that the ahead link is a relatively wide and straight section of the car park, encouraging higher than desirable vehicle speeds.

Recommendation

Provide vertical speed reduction measures on the outer perimeter link in advance of the give-way line, ensuring that empty parking spaces cannot act as a route around the speed reduction measures. Reverse the priority of the give-way to the more commonly recognised situation of right turn vehicles giving way to ahead vehicles.

Designers Response

Accepted in part – Give-way markings to the outer perimeter will be adjusted to switch priority to straight ahead vehicles. Addition of traffic calming measures will require further discussions with CYC as these promote further maintenance liabilities.

4.2.4 Problem (Location 24)

Summary: Markings for main car park potentially confusing

On entry to the park & ride site, carriageway markings directing to the ‘Main Car Park’ guide vehicles into both lanes on approach to the entry barriers. After passing through the entry barriers the nearside lane is still marked with ‘Main Car Park’ whilst the offside lane is now marked with ‘Car Park’. The separate marking of ‘Main Car Park’ and ‘Car Park’ is unnecessary at this location and is likely to result in driver confusion. Confusion over vehicle routes through the car park will distract drivers’ attention away from manoeuvring vehicles, with an increased risk of vehicle-vehicle and vehicle-pedestrian collisions.

Recommendation

Remove ‘Main’ text from carriageway markings.

Designers Response

Accepted – Text will be updated to state “Car Park”.

4.3 Non-Motorised Users

4.3.1 Problem (Location 25)

Summary: Inconsistency in facilities provided across the carriageway along pedestrian routes.

Uncontrolled pedestrian footways with buff tactile paving are located along the radial routes which connect the terminal building with the curved links of the car park. Where the footways cross the carriageway a mixture of zebra style crossings and road stud delineation markings are proposed. There is an increased risk of collisions between pedestrians and vehicles resulting from the inconsistency in crossing provision, whereby pedestrians might become accustomed to the zebra style crossings and not realise that the provision changes to give less priority to the pedestrian. There is also an increased likelihood of shunts at these crossing locations as a result of driver confusion.

Recommendation

Provide zebra style crossings at all locations where the uncontrolled pedestrian footways intersect with the vehicular carriageway; to avoid confusion, buff tactile paving should be replaced with red tactile paving at the edge of the footway adjacent to zebra style crossings.

Designers Response

Following further discussions with CYC, the provision of zebra crossing facilities is believe to be unwarranted on the basis that low vehicle speeds, low vehicle numbers and good visibility for all do not create the conditions for a problem. Experience of Park and Ride facilities running for 20 years have shown this unnecessary.

4.3.2 Problem (Location 26)

Summary: Lack of clarity over permitted usage of internal footway.

The footway external to the site and in the vicinity of the park & ride entrance has been designated as shared use for pedestrians and cyclists. This external route connects directly into the footway of the internal site, however the proposed markings, crossing provision and signing of the internal site is inconsistent with the external facilities.

Cycle markings are proposed on the internal footways, with no signing to advise that the route is a shared use facility. This could potentially lead to cyclists believing the facility is for cyclists only and consequently being unprepared to encounter pedestrians along the route. In the vicinity of the caravan car park entrance, where the footway crosses the carriageway, tactile paving is only shown as being installed on the south side of the junction, providing further uncertainty as to the permitted use of the facility by pedestrians.

There is an increased risk of collisions between non-motorised users resulting from the uncertainty over which groups are permitted to use the facility. This is particularly likely if cyclists believe the facilities are solely for their use.

Recommendation

Remove the cycle markings on the internal footway and use appropriate signing to advise of the proposed footway usage. Provide additional back-to-back signs to Diagram 956 adjacent to the external footway in the area where the facility diverges for movements northbound or southbound along the A1036. If the internal facility is to be used by pedestrians, then buff tactile paving should be provided at both sides of the caravan park entrance where the footway crosses the carriageway.

Designers Response

Accepted – Cycle markings to be removed and additional back to back signage to be added. Tactile paving layout will be updated.

4.4 Bus Only Link

4.4.1 Problem (Location 27)

Summary: Potential for private motor vehicles to use bus only link

The entry to the bus only link, located immediately after the entrance to the overnight car park, is not controlled by any physical measure, with the only reference to it being a bus link being a single no-entry sign and carriageway marking. The lack of restrictive measures on entry to the bus only link increases the likelihood of private motor vehicles using the link either by accident or on purpose, the latter being especially likely during peak hours whereby the bus link could provide a quicker exit from the park & ride site. Increased vehicular activity in the predominantly non-motorised user area close to the terminal building increases the risk of collisions between motorised and non-motorised users.

Recommendation

Provide rising bollards at the start of the bus only link which will only allow buses to proceed. Replace the proposed non-enforceable ‘No Entry Except Buses’ sign with a ‘Buses Only’ sign (in white writing on a blue background to diagram 953.3 of TSRGD).

Designers Response

The Auditors comments are noted and accepted in part. The usage of the bus only link will be monitored post construction in order to identify if usage by private motor vehicles does prove to present as a problem. Rising bollards is not an aspect of infrastructure that CYC supports and will not be provided, however, signage will be updated to suit TSRGD 953.3.

4.5 Landscaping and Vegetation

4.5.1 Problem (Location 28)

Summary: Proposed landscaping in car park will potentially obscure pedestrians at crossings

The landscaping proposals indicate that trees will be placed at the end of the parking aisles, adjacent to uncontrolled pedestrian crossing points. The presence of mature trees with fully developed canopies has the potential to reduce inter-visibility between drivers and pedestrians waiting to cross the car park internal access roads, increasing the risk of collisions between pedestrians and vehicles.

Recommendation

Ensure any landscaping works proposed in the areas surrounding pedestrian crossing points utilise low level vegetation, which do not have the potential to grow to a height that may obscure inter-visibility between pedestrians and drivers of vehicles using the internal access roads of the car park.

Designers Response

Comments Noted - The long term management plan (currently being produced) is specifying that all trees in the car park areas be retained with a 2 metre clear stem as they develop to ensure good visibility. No multi stemmed trees are included, also for that reason. Trees have generally been restricted within the car park areas to ensure good visibility.

All groundcover planting has been selected to not grow higher than 1m to ensure visibility. The long term management plan will specify that vegetation in the car park areas should be maintained below this level.

5 Audit Team Statement

5.1 General

I certify that this audit has generally been carried out in accordance with HD 19/03. I certify that all members of the Audit Team have examined the drawings and documents listed in Appendix A of this Road Safety Audit Report. The Road Safety Audit has been carried out with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the scheme. The problems identified have been noted in the report, together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No-one on the Audit Team was involved with the design of the measures.

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Appendix A

Drawings and Documents Examined During the Audit

Drawing Number THAYPR-AB/103 – General Arrangement

Drawing Number THAYPR-AB/109 – Statutory Undertakers Equipment Sheet 1 of 2

Drawing Number THAYPR-AB/110 – Statutory Undertakers Equipment Sheet 2 of 2

Drawing Number THAYPR-AB/111 – Existing Site Survey

Drawing Number THAYPR-AB/112 – Long Sections Section 1

Drawing Number THAYPR-AB/113 – Long Sections Section 2

Drawing Number THAYPR-AB/114 – Long Sections Section 3

Drawing Number THAYPR-AB/115 – Cross Sections Section MC01 Sheet 1 of 2

Drawing Number THAYPR-AB/116 – Cross Sections Section MC01 Sheet 2 of 2

Drawing Number THAYPR-AB/117 – Cross Sections Section MTP7 Sheet 1 of 2

Drawing Number THAYPR-AB/118 – Cross Sections Section MTP7 Sheet 2 of 2

Drawing Number THAYPR-AB/119 – Cross Sections Section MTP8 Sheet 1 of 2

Drawing Number THAYPR-AB/120 – Cross Sections Section MTP8 Sheet 2 of 2

Drawing Number THAYPR-AB/151 – Existing Topographical Survey

Drawing Number THAYPR-AB/152 – General Arrangement

Drawing Number THAYPR-AB/154 – Chainage and Typical Long Section Location Plan

Drawing Number THAYPR-AB/155 – Carriageway Long Sections

Drawing Number THAYPR-AB/156 – Typical Long Sections Sheet 1 of 2

Drawing Number THAYPR-AB/157 – Typical Long Sections Sheet 2 of 2

Drawing Number THAYPR-AB/162 – Carriageway Cross Sections Alignment M001

Drawing Number THAYPR-AB/163 – Carriageway Cross Sections Alignment M002 Sheet 1 of 3

Drawing Number THAYPR-AB/164 – Carriageway Cross Sections Alignment M002 Sheet 2 of 3

Drawing Number THAYPR-AB/165 – Carriageway Cross Sections Alignment M002 Sheet 3 of 3

Drawing Number THAYPR-AB/166 – Carriageway Cross Sections Alignment M003

Drawing Number THAYPR-AB/167 – Carriageway Cross Sections Alignment M004 Sheet 1 of 2

Drawing Number THAYPR-AB/168 – Carriageway Cross Sections Alignment M004 Sheet 2 of 2

Drawing Number THAYPR-AB/201 – Site Clearance Street Furniture

Drawing Number THAYPR-AB/202 – Site Clearance Surfacing

Drawing Number THAYPR-AB/250 – Site Clearance

Drawing Number THAYPR-AB/350 – Fencing Layout Sheet 1 of 2

Drawing Number THAYPR-AB/351 – Fencing Layout Sheet 2 of 2

Drawing Number THAYPR-AB/352 – Proposed Fencing and Gate Details

Drawing Number THAYPR-AB/550 – Surface Water Drainage Design

Drawing Number THAYPR-AB/550 – Surface Water Drainage Design (MD Design Results)

Drawing Number THAYPR-AB/551 – Foul Water Drainage

Drawing Number THAYPR-AB/552 – Attenuation Pond Design Details

Drawing Number THAYPR-AB/555 – Surface Water Drainage Design

Drawing Number THAYPR-AB/555 – MD Design Results

Drawing Number THAYPR-AB/601 – Earthworks

Drawing Number THAYPR-AB/602 – Capping

Drawing Number THAYPR-AB/603 – Standard Geotechnical Details

Drawing Number THAYPR-AB/604 – Constraints to Ground Improvement Plan

Drawing Number THAYPR-AB/605 – Ground Improvement General Arrangement

Drawing Number THAYPR-AB/701 – Pavements

Drawing Number THAYPR-AB/750 – Pavement Treatment Sheet 1 of 2

Drawing Number THAYPR-AB/751 – Pavement Treatment Sheet 2 of 2

Drawing Number THAYPR-AB/752 – Typical Cross Sections

Drawing Number THAYPR-AB/1101 – Kerbs, Footway and Paved Areas

Drawing Number THAYPR-AB/1152 – Kerbing Layout Sheet 1 of 5

Drawing Number THAYPR-AB/1153 – Kerbing Layout Sheet 2 of 5

Drawing Number THAYPR-AB/1154 – Kerbing Layout Sheet 3 of 5

Drawing Number THAYPR-AB/1155 – Kerbing Layout Sheet 4 of 5

Drawing Number THAYPR-AB/1156 – Kerbing Layout Sheet 5 of 5

Drawing Number THAYPR-AB/1157 – Standard Highway Details Sheet 1 of 2

Drawing Number THAYPR-AB/1201 – Traffic Signs

Drawing Number THAYPR-AB/1202 – Traffic Signs

Drawing Number THAYPR-AB/1203 – Road Markings

Drawing Number THAYPR-AB/1204 – Traffic Signals Sheet 1 of 3

Drawing Number THAYPR-AB/1205 – Traffic Signals Sheet 2 of 3

Drawing Number THAYPR-AB/1206 – Traffic Signals Sheet 3 of 3

Drawing Number THAYPR-AB/1250 – White Lining Layout Sheet 1 of 2

Drawing Number THAYPR-AB/1251 – White Lining Layout Sheet 2 of 2
Drawing Number THAYPR-AB/1301 – Street Lighting Layout Sheet 1 of 2
Drawing Number THAYPR-AB/1302 – Street Lighting Layout Sheet 2 of 2
Drawing Number THAYPR-AB/1350 – Street Lighting Layout Sheet 1 of 2
Drawing Number THAYPR-AB/1351 – Street Lighting Layout Sheet 2 of 2
Drawing Number THAYPR-AB/1352 – Street Lighting Schematic
Drawing Number THAYPR-AB/3001 – Proposed Planting Layout
Drawing Number H1 – Temporary Fences Type 1 and 2
Drawing Number H15 – Wooden Post and Rail Fences
Drawing Number H3 – Timber Post and Rail Fences

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