Petersfield Road Havant. Why and how did the Sparrow cross the road?

Mark Andrews, Intelligent Transport Systems (ITS) Group, Hampshire County County Council

Jonathan Mundy, Intelligent Transport Systems (ITS) Group, Hampshire County County Council

Introduction

This presentation will outline the development of the Sparrow crossing solution at Petersfield Road, Havant. Located on a dual carriageway the Sparrow concept presented a range of design and operational challenges which the presentation will discuss.

Concept

As part of the Transforming Cities Funding (TCF) programme of works being developed in Hampshire an improved cycle/pedestrian link scheme was identified between the Havant railway station along Elmleigh Road to South Downs College. The scheme was to provide a high-quality segregated pedestrian and two way cycle path with a formal crossing over Elmleigh Road, a crossing at Civic Centre Road and an upgrade of the existing dual staggered puffin crossing on Petersfield Road immediately outside the college. B2149 Petersfield Road is a dual carriageway running north-south. It sits to the north of Havant town centre. Although the crossing is within a 30mph speed limit that increases to 40mph immediately to the north.

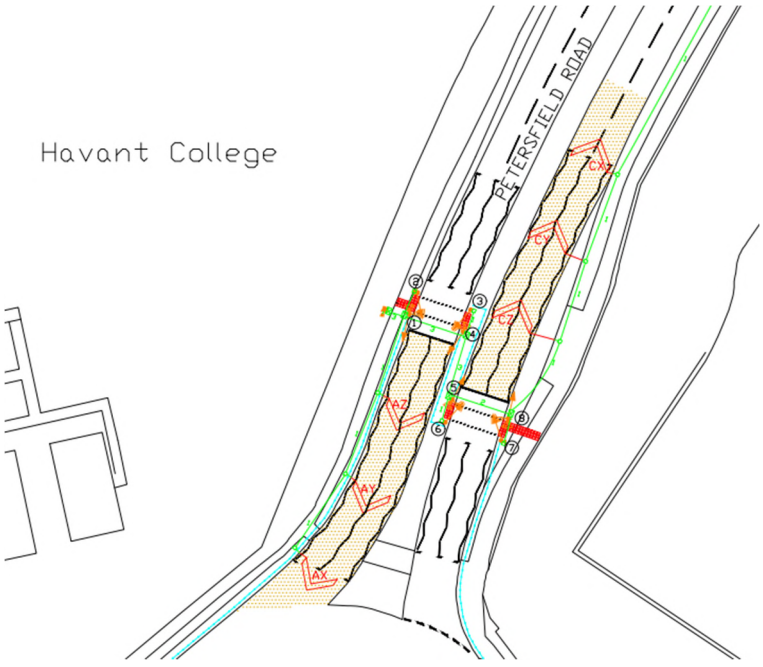

Figure 1 – Original dual staggered puffin crossing layout

In order to capitilise on the priority aspect of the scheme the new crossing on Elmleigh Road was identified to be a Tiger type crossing, similar to the already existing crossing at the Elmleigh Road junction with Leigh Road, and the crossing at Civic Centre Road to be a cycle priority crossing.

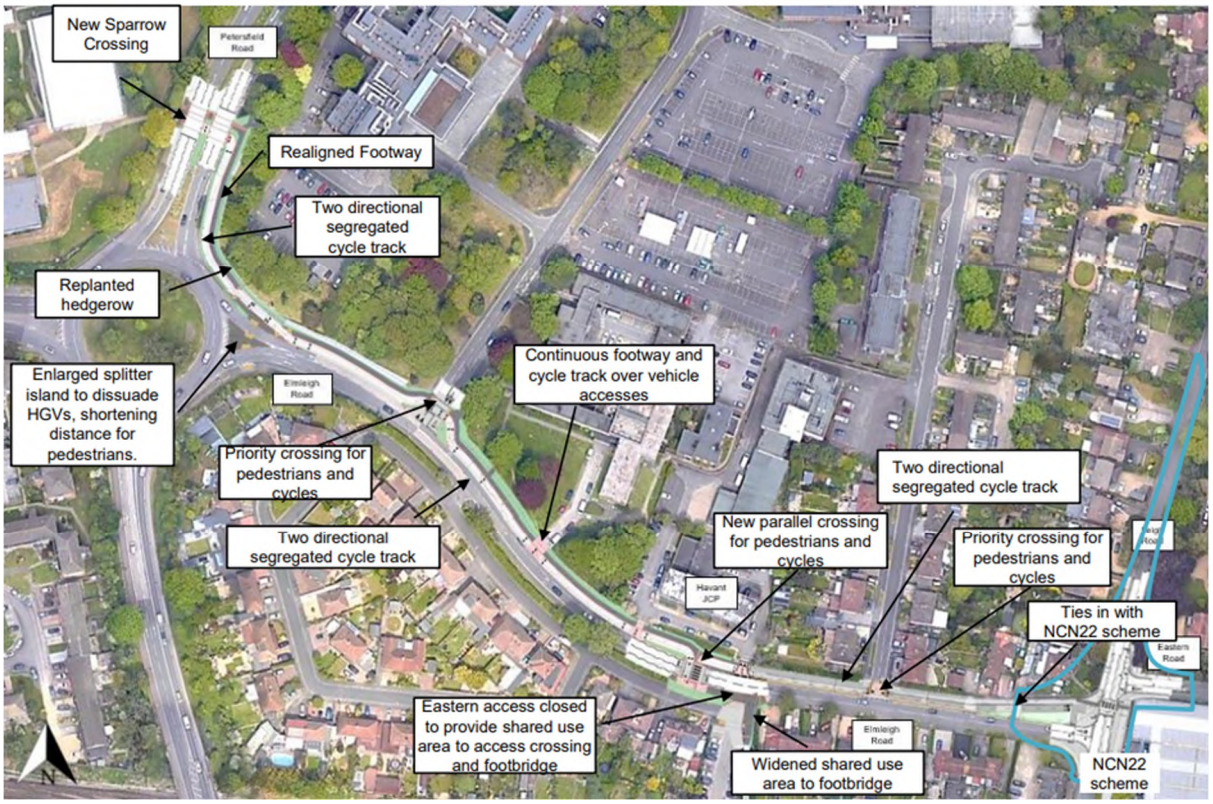

Figure 2 – Elmleigh Road scheme

The crossing at Petersfield Road was initially conceived as being changed to a dual staggered Toucan crossing. However this did not align with Local Transport Note 1/20 (LTN1/20) and the opportunity was identified to maintain the segregation at this location and investigate a Sparrow crossing.

The Sparrow crossing provides fully segregated crossings for both cyclists and pedestrians. The pedestrian crossing phases include nearside indicators and on-crossing detection. The cycle phase has low level cycle signals, above ground detection, push buttons and on-crossing detection. The vehicle detection uses above ground detection on the 30mph northbound approach and system D loops with Speed Discrimination loops on the 40mph southbound approach.

Layout design issues

It became very quickly apparent to the ITS design team that it would not be possible to provide a fully segregated dual crossing at this location, due to the limited existing width of the central reservation which was only 3 metres wide. As such a straight across cycle phase was deemed essential. However, this then meant that to maintain a dual staggered pedestrian crossing the intergreens would be excessive on this busy route given the inevitable separation of the pedestrian and cycle crossing areas on one side of the facility. With the road being a dual

carriageway, it was not considered a practicable or safe option to allow the pedestrians to cross in a single phase. The overall crossing distance would have been 18 metres. Again, the intergreens for this would have been excessive. With the existing central reservation being only 3m in width it was recognised that this would have been inadequate to provide a dual in-line crossing for pedestrians. Localised widening of the central reservation was then developed to attain a 5 metre central separation for the dual in-line pedestrian phases. This layout allowed the pedestrian crossing to run parallel to the cycle crossing for the entire length of the facility whilst maintaining a separate pedestrian crossing over each carriageway

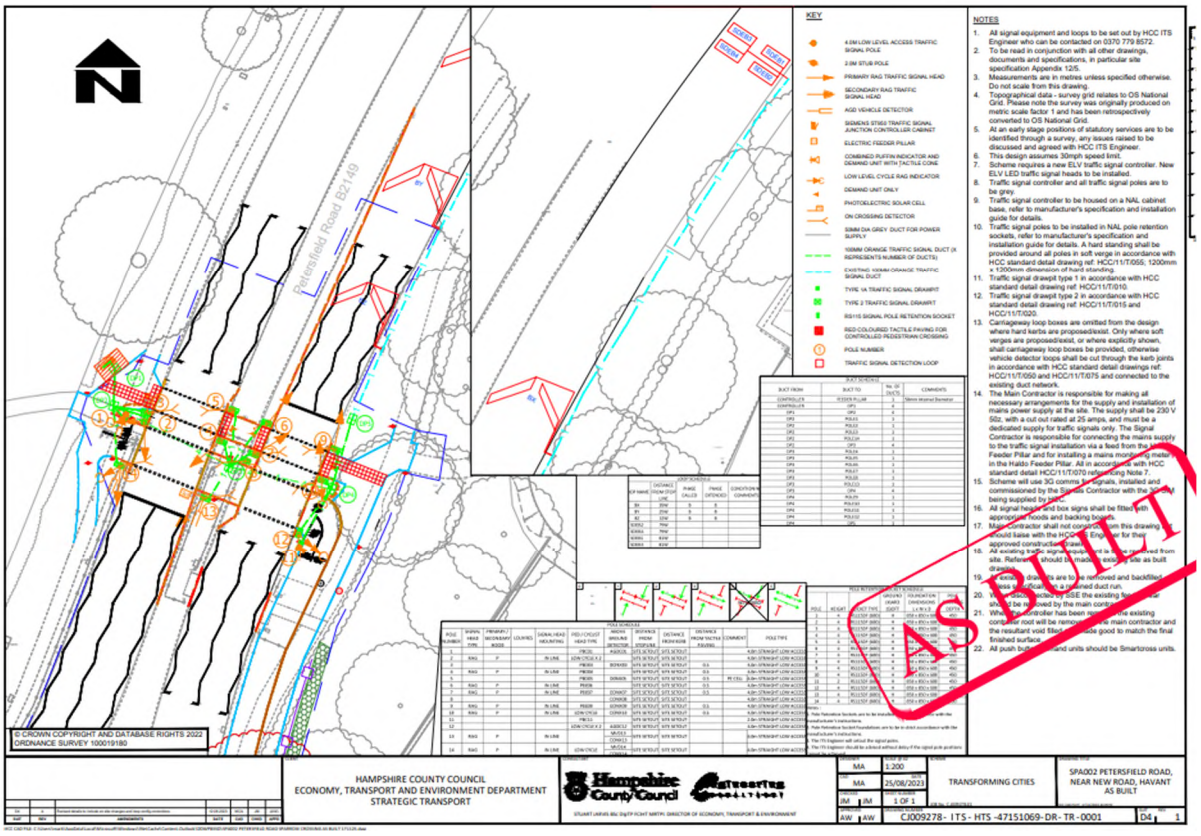

Figure 3 – Sparrow crossing layout

Figure 4 – Widened central island during construction

Control methodology issues

From the outset the control objective was to allow the dual in-line pedestrian crossings to operate separately from each other. However the Stage 1 Road Safety Audit (RSA) highlighted an issue with cyclists potentially noting traffic as being already stopped on one side of the crossing for a pedestrian demand, incorrectly assuming that the facility was at red to all traffic, and thus proceeding into the path of on-coming traffic. This issue formed the basis of a raft of control measures that defined the way the facility operated.

The controller was originally configured to operate in 5 stages (excluding the all red stage). The staging diagram is below in figure 4.

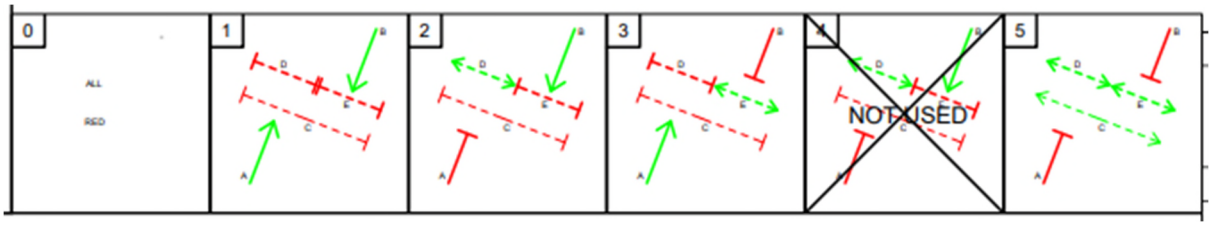

Figure 5 – Sparrow crossing staging

Earlier in the design process that it was identified that early detection of cycles would be required to place a demand into the controller before the cyclist arrived at the pushbutton demand unit. To minimise the need for cyclist to stop at the crossing, or be inclined to cross

without a green signal, it was proposed that the controller should be allowed to ripple change into the cycle crossing stage. This meant that regardless of which pedestrian stage was operating the controller would (subject to safety related signal timings) be allowed to immediately open up into the cycle stage and maintain any pedestrian crossing phases that were currently operating. For example, if the controller was already in stage 2 and a cyclist was detected the staging would immediately ripple into stage 5 to serve the cyclist phase. Similarly stage 3 would seamlessly ripple change into stage 5.

A demand for a cyclist only would see the controller move from stage 1 into stage 5. Both pedestrian phases are demand dependent during stage 5 and may appear immediately during that stage if demanded.

However, an issue was identified that pedestrians may take the opportunity to cross without having pressed the demand units during stage 5. As such the controller would not recognise them for on-crossing extensions. To get around this a background dummy phase was introduced to control on crossing extensions without formally having shown a green pedestrian indication. If no one is crossing, it has no effect.

There was a desire to provide call forwarding between the pedestrian phases in either direction. However, this presented a challenge. Initially the stage 2 was replicated twice in the cycle (stages 2 and 4) to allow the call forwarding to work in either direction. During factory testing it was apparent that the controller could run through stages 2, 3 and 4 resulting in undue delay to traffic. The decision was taken to omit stage 4 but include special conditioning which allows the controller to move directly from stage 3 to 2 if required.

During testing of the configuration, it was noted that during stage 5 the controller correctly operated both pedestrian phases if demanded. However, a situation could occur where a forward call could be placed after the relevant pedestrian phase had been serviced. This would insert an unnecessary pedestrian demand for stages 2 or 3. To prevent this from happening, the call forward timer was set to be 1 second less than the minimum pedestrian green time such that the call forward timer activated whilst the pedestrian phase was being already being serviced during stage 5. Another issue observed during factory testing was that the controller would continue to run stages 2, 3 or 5 until a traffic demand was inserted. The objective was for the crossing to operate similarly to a standard Puffin or Toucan and to revert back to traffic at the end of the non-traffic stages. This was achieved in special conditioning by using revertive traffic demands.

The cycle phase timings were set in accordance with LTN1/20 guidance. While standard intergreens apply when leaving the cycle phase the phase also includes on-crossing detection. These were included to ensure that should pedestrians stray into the cycle crossing area that they would be protected. It also enabled additional clearance time to be given to any slower moving groups of cyclists.

AGD318 detectors were selected as a means to demand cyclists on the approaches. . The use of the AGD318 detection enables the cycle phase green to be extended should other cyclists' approach while on green. Should this occur the pedestrian phase greens are also be extended in stage 5.

Installation issues

A cyclist was used during the commissioning process to ensure the correct alignment of the low level cycle indicators and pushbutton units. The units were aligned to be visible on the approach to the crossing and whilst waiting at the crossing, with a STOP LINE being set 1m back from the kerb edge. The low level cycle indicators were installed in pairs on each side to provide a 'primary' and 'secondary' function. The secondary low level indicators also encouraged any waiting cyclists to look in the direction of on-coming traffic.

The demand units were also aligned to be easily to hand for a cyclist. It should be noted that as the crossing was designed as two way crossing the pushbutton units are only located to the left hand side.

The use of a cyclist during the commissioning process allowed us to accurately set up the AGD318 units to detect the cyclist at a point early enough to allow the controller to respond in time for them to arrive at a green signal. On the eastern side the detection zone started at around 40 metres back which was usually sufficient for the cycle phase green signal to appear just as the cyclist reached the crossing. On the western side a street lighting column restricted the distance that a cyclist could be detected on the approach to around 15 metres.

A slight oversite on our part was that we didn't recognise that the normal cabling procedure for pedestrian/non-traffic phases normally uses what would otherwise be the Amber signal core to illuminate the cycle phase wait lamp. Clearly as the cycle phase uses an amber signal on the low level indicator this was not available to us. A 'switched sign' output needed to be configured to illuminate the wait lamps for cyclists.

Reception

The site has been widely praised within the local community, with the whole project being considered a success to connect the rail station to the college. During the works the scheme was extended further towards the existing Tiger crossing to the east to further connect the local area to the improved facilities.

Figure 6 – Installed Crossing 1

Figure 7 – Installed Crossing 2

Figure 8 – Installed Crossing 3

Figure 9 - Installed Crossing 4

Figure 10 - Installed Crossing 5

Future proposals

There are proposals to fully connect the Sparrow to the shared cycle facilities to the south west and an existing Toucan crossing. Further proposals will link the Sparrow to the northern cycle routes in Havant with a segregated route along Petersfield Road.

Acknowledgements

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