

**WEST YORKSHIRE + TRANSPORT FUND PROJECT BOARD**

**PROJECT: HARD INGS ROAD IMPROVEMENTS**

**SUBJECT: JUNCTION OPTIONS REPORT**

**1. PURPOSE OF THIS REPORT**

- 1.1 To provide the Project Board with the results of the current review of various junction options at the Beechcliffe Roundabout, Hard Ings Road, Keighley.
- 1.2 To offer a recommended option for progression to Gateway 1 submission to the Combined Authority in April 2015.

**2. DEVELOPMENT OF OPTIONS LEADING TO THE IDENTIFICATION OF A PREFERRED JUNCTION OPTION FOR A GATEWAY 1 SUBMISSION**

- 2.1 This report concentrates on junction options at the Beechcliffe Roundabout. See the Options Appraisal report for background to the Hard Ings Road Improvements scheme.
- 2.2 Definitions:-  
Phase 1A – the section of Hard Ings Road between and including Bradford Road and Beechcliffe roundabouts  
Phase 1B – a potential extension of the works between Beechcliffe and Skipton Road roundabouts.
- 2.3 One of the project's key challenges is the constraint placed on the site by level differences immediately beyond the back of footway line and the width of the existing bridge over the railway line. An existing road layout plan (Do Nothing - Base Plan) is included in Appendix 1, and a plan indicating various constraints that have been taken into consideration as part of the design process (including the link options), is included in Appendix 2.
- 2.4 Early Aimsum modelling suggested the need to provide additional capacity on the link between Beechcliffe and Skipton Road roundabouts at some point in the future – works to this section have been termed as Phase 1B. However, further modelling and the ongoing development of options for the Beechcliffe junction indicate the junction operates satisfactorily for the preferred option at the design year (2026) and therefore Phase 1B works are not required.

2.5 A number of options have been considered:-

- Junction Option J1 – existing roundabout with signal control and minor alterations to kerb lines to the central island (to increase lane widths on the circulatory carriageway and aid the passage of Heavy Goods Vehicles),
- Junction Option J2 – signal controlled roundabout – Hamburger type (allows U-turn manoeuvre), and
- Junction Option J3 – signal controlled T-Junction with No U-Turns (U-turns must be undertaken at the Skipton Road / Hard Ings Road roundabout)

All Beechcliffe junction options can be accommodated within the existing junction footprint and with no additional land acquisition. Junction option plans are included in Appendices 3 – 5.

2.6 The three options have been tested using Aimsun modelling techniques to compare the impact each proposed option will have on the operation of the junction for the opening year 2017 compared with Do Nothing, in conjunction with the preferred Link Option 5 (see Appendix 6). All junction options operate at the opening year 2017. However, Options J2 and J3 give little benefit in terms of travel time / delays compared with the Do Nothing option, and are therefore discounted. Particularly Option J3, where U-turns are not accommodated within the junction and must be undertaken at the Skipton Road / Hard Ings Road roundabout, with significant implications on queue lengths on this approach to Beechcliffe junction.

2.7 Junction Option J1 only is further modelled for the predicted demand in the design year 2026 (to align with the Combined Authority's Urban Dynamic Model), and continues to give benefits compared with the Do Nothing option. An additional lane is required for all options on the approach to Beechcliffe Roundabout from the A629 dual section, with associated embankment works.

2.8 There is a retail park located in the vicinity of the Beechcliffe Roundabout, and therefore, there is a potential for additional vehicle U-turn manoeuvres being undertaken, particularly on Saturdays. Option J1 has also been tested using Saturday peak hour vehicle flow data in the opening year 2017 and design year 2026, and indicates benefits compared with Do Nothing at both years.

2.9 In accordance with the DMRB (TA 91/05, Provision for Non Motorised User's), roundabouts with an inscribed circle diameter of over 50m and/or dual carriageway entries, generally have significantly higher speeds on entry, exit and on the circulatory carriageway, and are of greatest risk to cyclists. In these cases it is recommended that cyclists are provided with an alternative route such as an off-carriageway cycle track around the perimeter of the roundabout, with signal controlled crossing of entry and exit arms, or the provision of a grade separated facility.

- 2.10 The inscribed circle diameter of Beechcliffe Roundabout is 68m. However, due to site constraints (as mentioned in paragraph 2.3), it is not feasible to provide an off carriageway cycle track at this location. In addition to this, the provision of signal controlled crossings on the exit arms cannot be accommodated within the proposed junction options without significant delay implications to the operation of the junction.
- 2.11 It is proposed to provide a two way shared facility for cyclists and pedestrians on the outbound side of Hard Ings Road, between the access to the Keighley Retail Park and the Bradford Road roundabout. A Toucan crossing is proposed on Hard Ings Road between Lawkholme Lane and Byrl Street, which would allow both pedestrians and cyclists to cross. A two way shared facility will also be provided on the inbound side of Hard Ings Road between the proposed Toucan crossing and Royd Way. This would provide a cycle route to join Hard Ings Road and the existing cycle route along Royd Ings Avenue through the tunnel under the A629 dual carriageway, leading to the Skipton Road area. Enhancements to the existing local cycle network could also be considered as measures through this project. The extent of the proposed shared facility for cyclists is indicated on Link Option 5 plan (preferred link option), included in Appendix 6.
- 2.12 Consideration is being given to the provision of a pedestrian crossing facility on the section of Hard Ings Road between Beechcliffe Roundabout and Skipton Road to provide a route avoiding crossing the A629 at the Beechcliffe Roundabout (this is the current arrangement). However, further Aimsun modelling is required to determine the type and location of a proposed pedestrian facility. This will be confirmed at Gateway 2.
- 2.13 The 727 bus route uses Beechcliffe Roundabout on route from Lawkholme Lane to Royd Way. This is a 2 - hourly service and therefore no consideration has been given for signal priority to assist bus journey times.
- 2.14 As discussed in the link option report, capacity of the existing signal controlled roundabout at the Bradford Road junction has been modelled for the design year, 2026. In discussion with the UTC Unit it is expected that any potential demand for increased storage can be controlled by adjusting signal timings. However, this is assuming that vehicles can undertake a right turn from Hard Ings Road into Lawkholme Lane rather than continuing to the Bradford Road roundabout and undertaking a U-turn.
- 2.15 The scheme has been developed with a signalised junction at Lawkholme Lane incorporating a Toucan crossing (to replace an existing pedestrian refuge). This allows the 727 bus route to undertaken a right turn from Hard Ings Road into Lawkholme Lane (this is the existing bus route). There are also a significant number of right turning movements

into the McDonalds and the adjacent petrol filling station from Hard Ings Road. Therefore, a right turn priority facility incorporating a turning lane (to allow through traffic to proceed unobstructed) has been included within the scheme at this location.

### **3.0 ASSESSMENT OF OPTIONS**

- 3.1 An options comparison table is included in Appendix 7 to assess all options and identify the recommended option (Junction Option 1) against the alternative options.

### **4.0 RECOMMENDATION**

- 4.1 The Board is requested to ratify Junction Option 1 as the preferred option for progression to the Gateway 1 submission.

### **5.0 APPENDICES**

- 5.1 Appendix 1 – Do Nothing – Base Plan  
(Drawing No. TDG/HDB/102582/OPT-L1B)
- 5.2 Appendix 2 – Constraints Drawing  
(Drawing No. TDG/HDB/102582/MS-1B)
- 5.3 Appendix 3 – Junction Option J1 - Signal controlled roundabout  
(Drawing No. TDG/HDB/102582/ OPT-J1)
- 5.4 Appendix 4 – Junction Option J2 - Hamburger type roundabout  
(Drawing No. TDG/HDB/102582/ OPT-J2)
- 5.5 Appendix 5 – Junction Option J3 - Signal controlled T-Junction (No U-turns)  
(Drawing No. TDG/HDB/102582/ OPT-J3)
- 5.6 Appendix 6 – Link Option 5 – Composite Design (Part Dual)  
(Drawing No. TDG/HDB/102582/OPT-L5B)
- 5.7 Appendix 7 – Comparison Table for all Junction Options