

## Camden Road Footbridge, Bristol

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Following graduation he has worked on a wide variety of bridge and structural engineering projects, both in the UK and abroad. He has been with CH2M since August 2013.

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### 1. Introduction

Following the award in 2013 of £6.3m to the Cycle City Ambition Fund by central government a series of improved river and harbour crossings were proposed by Bristol City Council to increase cycling permeability into the city centre. Under this Ambition Fund, CH2M were commissioned to complete the outline and detailed designs for Camden Road Footbridge, a segregated pedestrian and cyclist crossing over Bristol's historic New Cut.



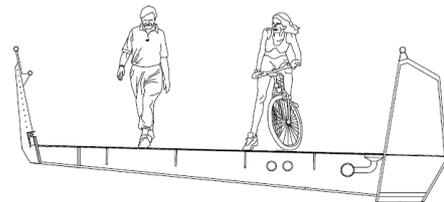
*Fig. 1: 3D Render of Camden Road Footbridge*

### 2. Content

After being presented with a number of aesthetic and structural options developed by CH2M and the Architect Architecton, Bristol City Council ultimately settled on the arrangement depicted in Figures 1 and 2, an unusual asymmetric through-bridge with a large torsion box running along the eastern edge and transverse cantilever members which support a stiffened steel deck.

Such a structural form naturally introduced interesting challenges into the design, particularly for the steelwork, and therefore in-depth analyses, including the use of the Finite Element software MIDAS, were employed for both ultimate and serviceability limit states. MIDAS was a particularly useful aid when completing dynamic analyses, allowing a number of models to be quickly built in order to determine the structure's sensitivity to changes in geometry.

In addition to the unconventional geometry, perhaps the greatest challenge encountered was the requirement agreed with Bristol City Council not to impart any additional loading onto the banks of the New Cut, given the high level of erosion present and the likely low factor of safety on the existing walls and slopes. This required the piles, on which the abutments and approach ramps are proposed to be supported, to be sleeved down to river bed level, allowing free horizontal movement above that point. Such piles are naturally sensitive to horizontal loading, and as a result investigations were undertaken to find the optimum articulation. Eventually, the fixed point was centred at the centre of the south 'V' pier, this arrangement minimising the horizontal reactions whilst still providing enough stiffness for positive results from the dynamic analyses.



*Fig. 2: Section through asymmetric deck*

### 3. Conclusions

Camden Road Footbridge is not only a strategic new gateway for sustainable travel into Bristol City Centre, it is also an innovative and elegant structure, with a great number of engineering challenges ultimately overcome during the design. Construction is planned for 2016.