

6MRR IN PRACTICE:

AUTOMATIC STAGE SELECTION FOR FULLY-SIGNALISED RIGHT TURNS

Thanks to Rotherham Metropolitan Borough Council (RMBC), Motus and Joel Dodsworth (now the Leeds UTMC manager) in making this project successful.

Thanks to Leeds City Council (LCC) for allowing us to show their current concept for Lawnswood Roundabout in Weetwood.

Whiston Crossroads – Single 6MRR

Located in Whiston within the Rotherham Borough District, the crossroads is a key junction on the A631 strategic orbital route and was one of council's first "big" MOVA implementations. Once MOVA was implemented, a review was undertaken following the validation process in which it was recommended separating the A631 Westbound right turn would provide significant benefit. Based on further modelling, the additional right turn and exit pedestrian crossing on the east exit was added with the intention to use 6MRR MOVA facility.

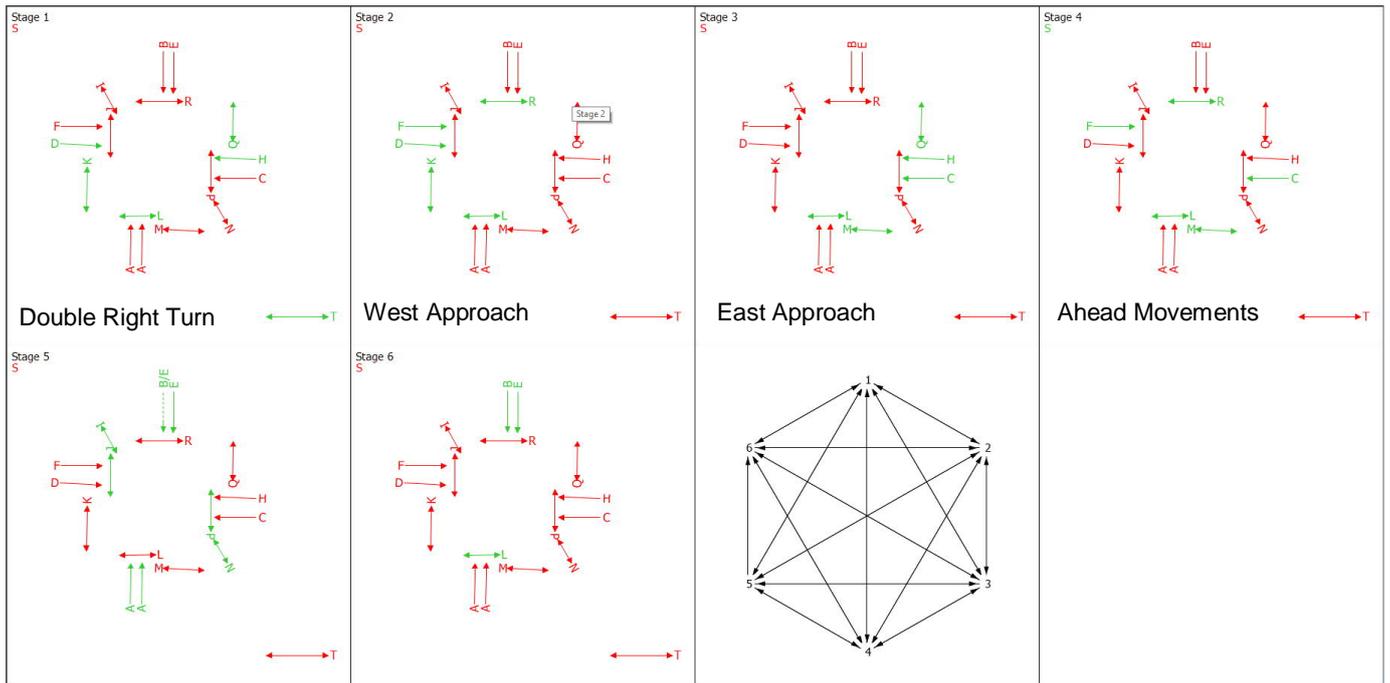
Before – Westbound Signalised Right Turn



After – Eastbound and Westbound Signalised Right Turns



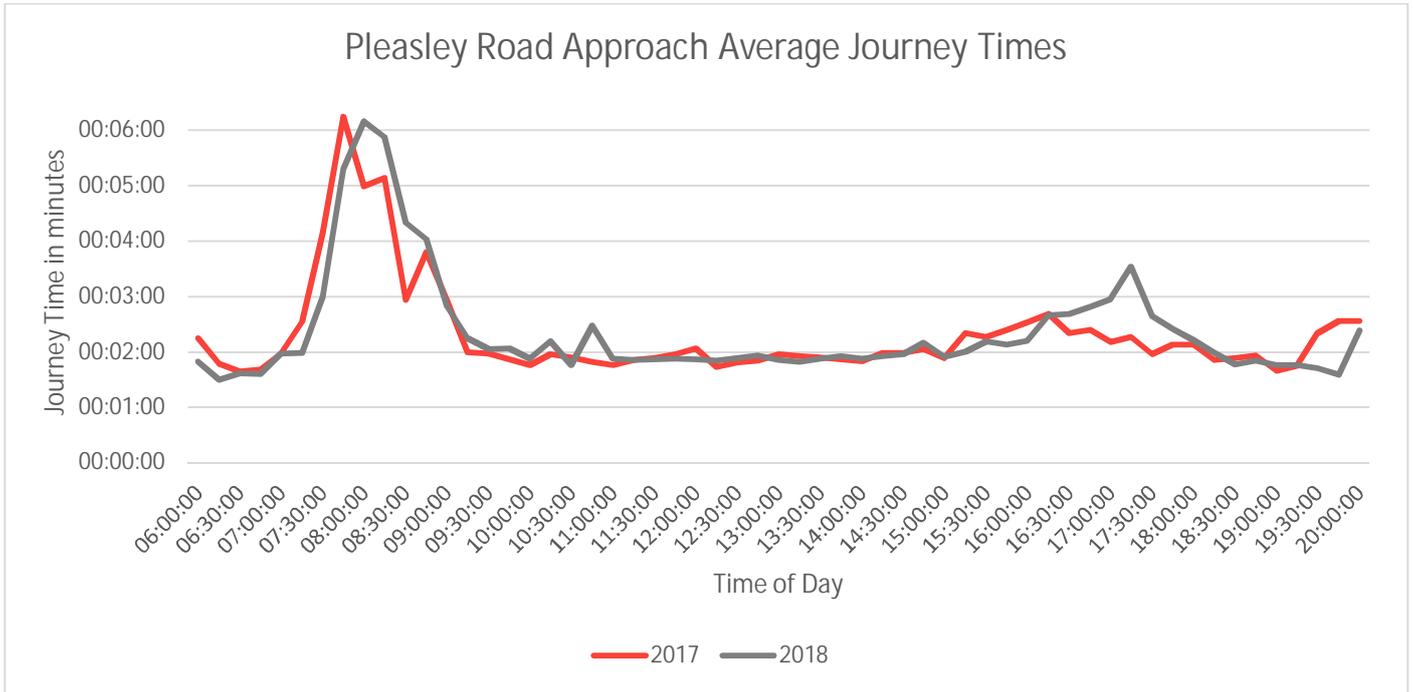
MOVA 8 can switch datasets by an input which was a key factor in allowing this junction to perform. MOVA 8 has the flexibility to change conditioning through the dataset which means there is greater control during the day to day optimisation process. The 6MRR code can manage the right turn movements effectively given the large variability both time of day and day to day.



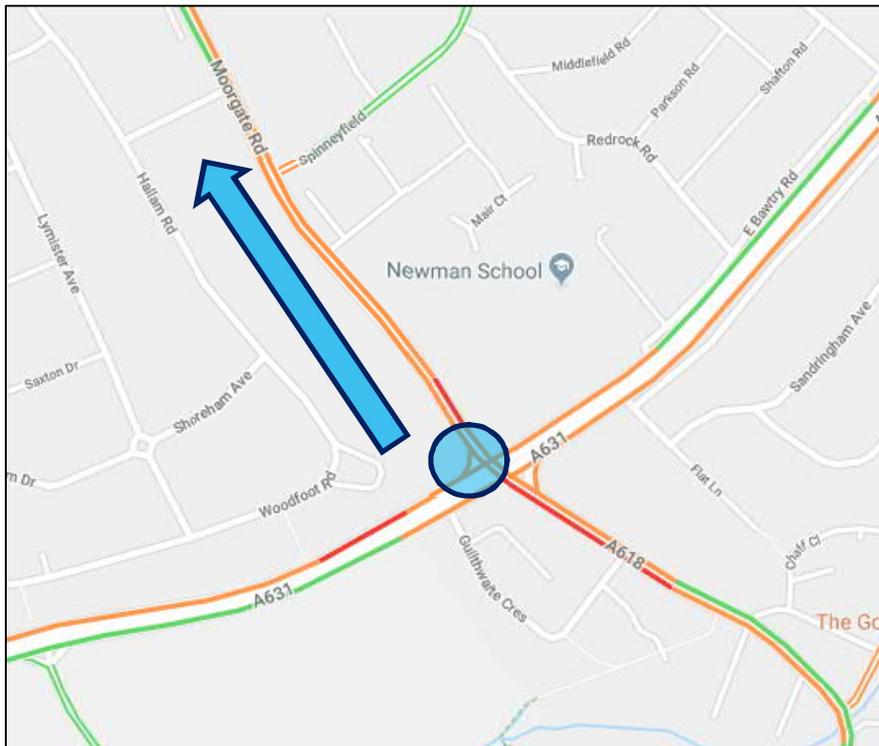
The table below shows the results between March 2017 and March 2018, before and after the scheme was to understand the performance benefits.

Bluetooth JT March 2017 v 2018	Journey Time Saving 6MRR against Normal MOVA			
	AM Peak	Flow Vehicles	PM Peak	Flow Vehicles
Moorgate Rd Approach	13%	501	23%	816
A631 East Approach	8%	1425	17%	825
Pleasley Road Approach	-17%	618	-18%	474
A631 West Approach	16%	1169	10%	1745

The journey time information was extracted from RMBC Bluetooth monitoring units. The result shows a big journey time saving across each approach for both morning and evening peak apart from the Pleasley Road approach. The reason the south approach is worse is due to the network strategy and exit blocking shown below, where traffic is held on the Pleasley Road approach to redistribute the queue which normally occurs in the centre of the junction. If the upstream constraints were removed the junction would perform even better.



Google map traffic image of junction – showing Northbound Exit blocking

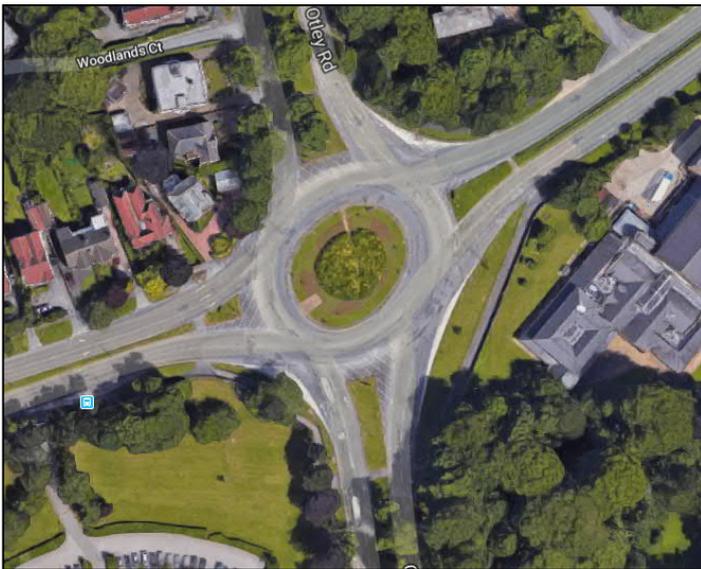


The junction operates using automatic stage selection in MOVA. A single dataset is used. However, exit blocking from Moorgate Road will trigger an alternative dataset to be loaded that operates with a shorter cycle time. In addition to this dataset, the presence of exit blocking will truncate the Pleasley Road approach after 15 seconds (adjustable) and the right turn into Moorgate Rd from the A631 after 10 seconds (adjustable). This is to reduce the possibility of traffic from the respective approaches being stranded in the junction. A further timer (120 seconds – adjustable) is set when exit blocking is detected that keeps the alternative dataset loaded for a specified time after exit blocking occurs. This is reset if exit blocking reoccurs.

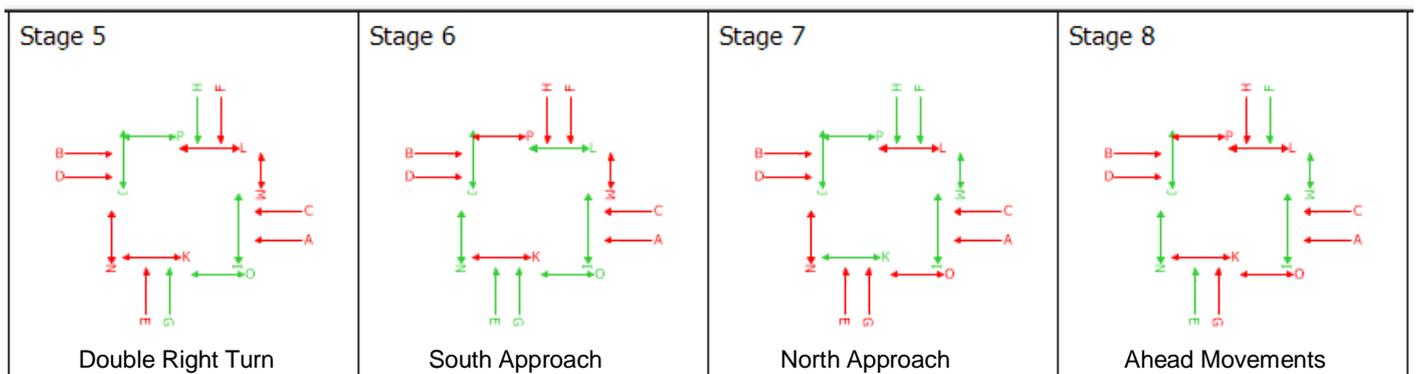
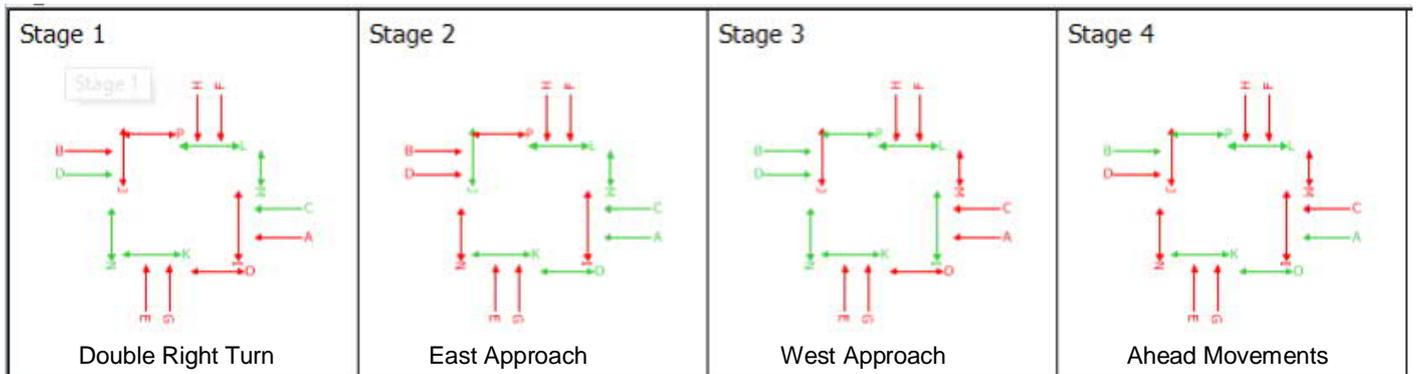
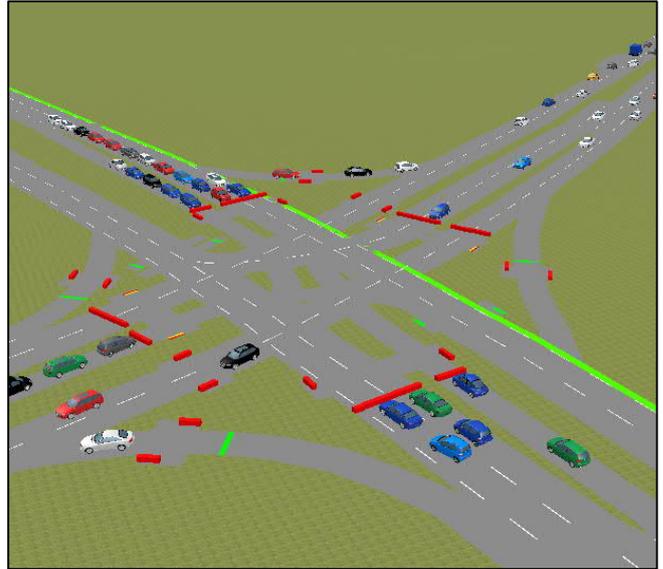
Lawnswood Crossroads – Double 6MRR

Lawnswood crossroad is a proposal for Leeds City Council where separate right turn lanes are located on all approaches. This allows the 6MRR code to be used twice in a cycle, MOVA will choose the best sequence for the first four stages (1-4) and similar for the second four stages (5-8).

Current - Priority Roundabout



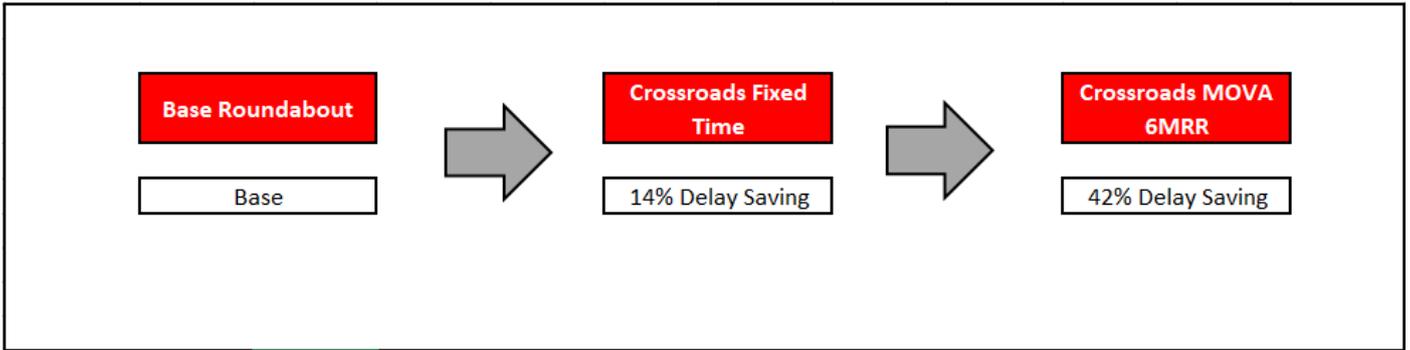
Proposed Scheme – Signalised Crossroads with Separate RTs



This has been tested in Vissim 8.0 alongside PCMOVA 2 and will be shortly upgraded to MOVA 8 with PCMOVA 3. This junction is part of a wider bus priority network including bus gates and pedestrian crossing all linked within MOVA to provide flexibility while maintaining priority and control.

Image of the whole network in Vissim 8.0





Current modelling outputs from the Vissim work completed on this project suggest the performance benefits shown above. 6MRR when engineered to suit the right situation can provide significant performance results for a junction while maintaining control over all the movements. In the Lawnswood Crossroads proposal there is a network constraint south of the junction as traffic funnels through a single street suburb into the city, under this junction arrangement actions can be taken like at Whiston Crossroads to manage the downstream constraints.

Like Whiston Crossroads, the ability to optimise effectively whilst responding to exit blocking at times is important for the Lawnswood Crossroads proposal.

Where 6MRR could be suitable:

- A junction which has variable demand for the right turn movements;
- A junction which is currently a priority roundabout;
- A small signalised roundabout;
- A junction on a key corridor;
- A junction with downstream network constraints.

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