



Finished Red Lion link block

## Westwood Link Internal Access Road

<b>Contractor:</b>	Birse Civils
<b>Client:</b>	Wigan Borough Council
<b>Designer:</b>	Faber Maunsell
<b>Supplier:</b>	Tensor International
<b>Case Study Ref:</b>	312
<b>Project Number:</b>	1197
<b>Publication Date:</b>	December 2007
<b>Region:</b>	North West
<b>Sector:</b>	Local Authority, Infrastructure
<b>Contract value:</b>	£7.85m
<b>Project timescales:</b>	May 2005 to January 2007
<b>Themes:</b>	Long-term strategic planning, integrated teams

Wigan's Westwood Link Internal Access Road was a high profile £7.85m dual carriageway scheme to ease traffic congestion entering and leaving Wigan. A specific bottleneck to the works was seen to be the rebuilding of the embankment retaining walls supporting the Henhurst Bridge over the Leeds/Liverpool Canal and the adjacent development area. This was also the first partnered project undertaken by Wigan Borough Council and was a significant move forward for the authority.

### Wigan Town Centre – a more congenial environment

Wigan is historically an industrial town, with long established links with the mining and engineering industries and transport of these via canal. The Town Centre layout reflects the way that Wigan grew to meet the needs of 19th century industry – rather than through being planned from the start.

In the early 21st century Wigan's needs have changed and the Town Centre is now a considerable tourist attraction. To make Wigan Town Centre a more congenial environment for residents, workers and visitors (and open up potential industrial and manufacturing sites) Wigan Borough Council is implementing many measures, one of which is improving the traffic flow.

The contract to improve the inner relief road and facilitate the eventual link via the A5225 to the M6 was awarded to Birse Civils Limited in 2003. Tensor were involved in the design side (December 2004) and in construction phases from May 2005 through to the end of 2006 and its completion early in 2007.

The contractor for the scheme, Birse Civils Limited, and its designer, Faber Maunsell, proposed a *TensorTech* TW1 retaining wall solution as a value engineered alternative to the conventional construction of the retaining walls to the bridge.

The Tensor option provided proven solutions to the concerns that had arisen, as well as being a very flexible system that could accommodate interfaces with underground services. In addition, it was some 50% less expensive than the original design detail and offered aesthetic finishes complementing the surrounding buildings and a more sustainable procurement process.

### Extensive Site Problems

The site and the scheme had extensive problems, which included the following:

- The soft, very low load bearing ground
- The environmental impact on the canal and the adjacent River Douglas
- Close proximity of buildings
- Underground services
- Redirection of traffic
- Completion within a tightly specified time frame
- Potential cost of conventional sheet pile and reinforced concrete solutions
- Sourcing an environmentally sustainable solution
- The impact on the local built environment

## Using Geogrid Technology to provide structural solutions

Tensar International has a 25 year history of using its geogrid technology to provide structural solutions by reinforcing soil: particularly where ground conditions are poor and conventional civil solutions may be costly, time consuming or have a high environmental impact.

The invitation from Birse Civils to develop a specific design for the embankment retaining walls (affecting approximately 500m of the highway) was challenging, but within the capabilities of Tensar technologies. By being asked to contribute at a very early stage, Tensar were able to make a maximum impact to ensure the success of the construction by overcoming the numerous constraints and concerns presented by the project.

The TensarTech TW1 wall system has been developed to combine the cost effectiveness of reinforced soil retaining walls and bridge abutments with the aesthetic appeal of an attractive block finish, which can meet the requirements of the local environment. The system (which has BBA fit for purpose certification over a 120 year life) was put forward for this particular project as it appeared to be the ideal solution for the highway retaining wall.

This solution also eliminated the need for sheet piling and full height reinforced concrete facings which are costly and more difficult to plan around, especially where there is the added complication of underground services. In addition, the TensarTech TW1 wall system solution has low environmental impact through its ability to utilise low grade granular or locally won fill, where appropriate, and so met Wigan Borough Council's sustainability requirements.

### Flexible System

During the construction phases, the embankments were built up from layers of granular fill. The walls were constructed using granular fill reinforced with layers of Tensar uni-axial geogrids which were secured to the TW1 block face with full strength polymer key connectors.

The flexibility of the system was demonstrated when Birse had temporary difficulties with traffic redirection in the very constrained space and needed steel mesh panels (SMPs) for a temporary facing to be delivered and installed within two days to minimise disruption. Tensar designed and supplied the SMPs which were fastened to the geogrids and the construction was strong enough to withstand the redirected traffic.

### Meeting the Concerns and Constraints of the Client

By selecting this particular Tensar developed construction method, Birse Civils were able to comply with all the constraints and meet the concerns of the parties interested in the project, from Wigan Borough Council, through to the Environment Agency and British Waterways.

The Tensar solution primed the project to be completed within the specified time framework, while costing approximately 50% less than the sheet piled and reinforced concrete alternative viable solution.

The flexibility of the TensarTech method accommodated the inevitable variations encountered in a complex project in constrained urban conditions. In addition, use of the aesthetically finished facing blocks ensured that the local built environment was enhanced.

### Satisfying the Client – delivering on time and on cost

Civil construction and infrastructure projects in urban locations have had a reputation for running over time and budget, due to the many complexities and difficulties inherent in such locations. In addition, the results have often placed functionality over environmental and aesthetic considerations. Through careful planning and consultation with experts at early design stages, and the willingness to look at proven techniques outside the purely conventional, Birse Civils were able to deliver the project on time, on cost, within environmentally acceptable guidelines and to the satisfaction of the client in the enhancement of Wigan.

This was the first partnered project for Wigan Council. Whilst the project was awarded on the basis of an 'NEC' form of contract, Wigan and Birse focussed on delivering the project within a partnering ethos. The organisations co-located in shared offices and utilised a joint filing and letter writing system. This approach focussed on delivering the project as opposed to the traditional paper chase. An early benefit from the collaborative approach was when Wigan invited Birse to discuss the various options and technical solutions for a major variation and negotiation of the works up front. Without the partnered approach this could have resulted in significant delays and extra costs.

### Key Lessons Learned

The difficulty of construction work within an historic urban location, and with poor quality ground conditions, is that, at times, unforeseen factors and complexities crop up. The key lessons learned on this scheme were as follows: -

- Plan in depth based on all possible variables and include key parties in planning and design to provide the benefit of their experience and expertise at an early stage.
- Any techniques used should have inherent flexibility to be able to cope with the unexpected, and all involved parties should be aware of the need to be adaptable. In this way projects have the best chance of success.



Constructing Excellence  
Warwick House,  
25 Buckingham Palace Road,  
London SW1W 0PP

T 0845 605 5556 E [helpdesk@constructingexcellence.org.uk](mailto:helpdesk@constructingexcellence.org.uk)  
W [www.constructingexcellence.org.uk](http://www.constructingexcellence.org.uk)



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Brian Farrington, Technical Business Manager, Birse Coastal  
E [Brian.Farrington@birse.co.uk](mailto:Brian.Farrington@birse.co.uk)