

Building Information Modelling

Scottish Futures Trust

BIM Case studies



Client Transport Scotland

Value £600 Million

Type Infrastructure

Sector Highways

RAITH INTERCHANGE

Photo credit: Lagon Ferroviai JV

Relevant project stages

01	02	03	04	05	06	07
Brief	Concept	Definition	Design	Build and Commission	Handover & Close out	Operation in Use

COLLABORATION THROUGH DESIGN

→ The Project

The £600M M8/M73/M74 Motorway Improvements Project is a major transport infrastructure scheme. It completes the M8 motorway link between the cities of Glasgow and Edinburgh and provides key upgrades to sections of the M73 and M74. Ferroviai, Lagan, Amey and RPS are collectively responsible for the design, construction, commissioning and operation and maintenance of the project on behalf of the Scottish Roads Partnership.

The scheme comprises a new 12km dual three-lane M8 motorway section between Baillieston and Newhouse and upgrades to 16km of the existing motorway network. The upgrades include widening for additional lanes and significant new works and alterations to existing motorway interchanges at Raith (M74/A725) and Baillieston (M8/M73).

The Raith Interchange is one of the largest interchanges on the project. Works include the construction of a new 600m long and 12m deep underpass, construction of a realigned Raith Roundabout, three new bridges, two new pedestrian footbridges, pier protection at two existing bridge structures, five signalised junctions and numerous other off-line works such as flood alleviation storage ponds. The junction remains open to traffic during the construction works.

In this project, Amey and Ferroviai Lagan Joint Venture (FLJV) have a mutual objective to develop capability in

Key Benefits



Minimise the co-ordination risk between teams, establishing a collaborative framework, guided by the principles in BS11000.



Maximise the experience, knowledge and resource pool that can be applied to the BIM activity, including sharing the lessons learnt on other similar projects delivered by RPS and Amey.



Drive greater efficiencies in joint working for both the

Client and consultants

BIM in the infrastructure sector. This objective is shared by RPS, the design sub-consultants on the M8/M73/M74 Motorway Improvements Project. The design and construction of the M8 Upgrade has already commenced using conventional 2D design techniques and content management platforms. Due to construction programme pressures, a change in strategy to adopt BIM as the core approach for the design and construction of the entire project was deemed unrealistic. Therefore, it was decided that there was potential to develop a 3D model of the Raith Interchange section of the M8 Upgrade using BIM techniques and processes. It was intended that the Raith Interchange model would be developed in parallel with the 2D design process. The design of the Raith Interchange was assigned to RPS under the existing consultancy contract.

Project Team

Joint Venture delivery partners – Amey / Ferroviai / Lagan

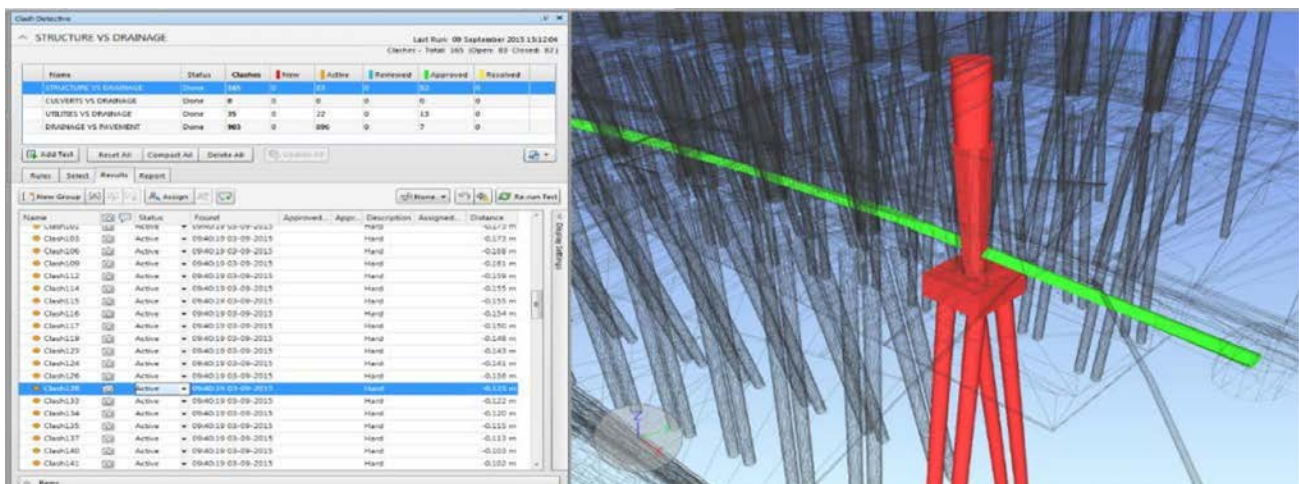
Designer – RPS

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➔ Key Challenges

A unique characteristic of this pathfinder was that the project team decided to use the traditional CAD-based design and a BIM-based one in parallel for the Raith Interchange section of the project. This proved a fascinating test bed for the team as well as other interested parties to make a direct comparison between CAD and BIM-based design.

As is clear from the earlier sections, the adoption of BIM in this project was largely focussed around the design activities. However, some aspects of Level 2 BIM were also implemented like the BIM Execution Plan (BEP) which was used to manage the use of BIM and data sharing and exchange on the project through a CDE. 4Projects was used as the CDE and information was shared with all the different departments of the project, e.g. construction team, H&S, QAQC, environmental, traffic management and utilities. The client team also had access to the CDE.



- Development of Level 2 BIM models up to 'for construction'* status level of detail for. Alignment, Structures, Culverts and Drainage.
- Enabling the integration of BIM models produced by FLJV, namely models for Utilities, Sign, traffic management and Temporary works.
- For various practical reasons, a number of disciplines, mentioned below, were excluded from being modelled using 3D BIM: This included items such as Traffic signs and road markings , Pavements and geotechnical details, earthworks and soft landscaping.

↓ Lessons learnt & feedback



Improved coordination, Faster and easier Clash Detection.

Reduction in design time in adopting 3D design software. Project suggests traditional CAD takes 5 times longer in comparison to 3D design software when resolving a design issue.



Use of 4D and 5D models helped optimise construction programming besides being a powerful visualisation & communication tool which enabled the identification of problems in advance of construction and also helped extract material quantities much more efficiently.



The project team found that the use of BIM and CDE made it easier to control the paperwork. It also helped keeping all stakeholders in the loop regarding what was the current state of the design or works



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