

Case Study: Education Funding Agency

BIM Collaboration in Three UK Schools Project

Multi-functional buildings for education delivered through co-ordinated design process with BIM deliverables.

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Some interesting issues have come to light during a recent project for six schools commissioned by The Education Funding Agency (EFA). The tenders for the design of three of the schools, Reading Girls Secondary School, Westfield Academy in Watford and Longdean Secondary School, Hertfordshire, were won by Nottingham based architects, Maber, who were to become the lead designer.

The company has developed considerable experience in the public sector in the 25 years of its existence, and besides fronting other school projects, have previously delivered health care facilities and student accommodation.



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Maber has been using Graphisoft’s ARCHICAD for many years, and consider themselves as experts in the delivery of BIM projects using ARCHICAD before BIM standards were even created. Maber started on this particular EFA schools project in 2013, and construction commenced in the third quarter of 2015.

The brief for each of the schools was to provide a multi-functional environment – spaces capable of accommodating large numbers of students that could be easily broken down into smaller areas, using partitions and other furniture screens, and enabling the creation of enclosed spaces for smaller focus groups. With pupils in the area coming from many different environments, it was felt that opportunities should exist to allow children with different cultural backgrounds to experience some dedicated tuition. ARCHICAD’s zone tool was essential for translating the EFA’s space requirements into an aesthetic and functional building design, as it allowed Maber to experiment with buildings and functions.



Despite the need to create spaces that could be modified to suit different activities, the EFA has its own definitions for classroom sizes, its own catalogue of Furnishings and Fittings with its coding system, supported by a dedicated consultancy within the EFA. Therefore, it was able to provide requirements for Custom FM information which were added into ARCHICAD as IFC parameters from the start of the project. Initially, COBie was also part of EFA’s requirements, but this was subsequently withdrawn in favour of their own system.

The benefit of this for Maber was that the EFA needed to be involved at a very early stage in the design process. The information that would have been accumulated by Maber during the design stage for Operation and Maintenance of the schools following handover – according to the requirements of the Government’s BIM initiative - was already available courtesy of the EFA.

Maber, as lead contractor, was partnered in the projects by Arup, responsible for MEP and the structural requirements of the schools, who used Revit as its principal application. Models were exchanged in IFC format, which suited Maber perfectly, as ARCHICAD is adept at handling IFCs, and Arup were able to use Revit add-ons developed by Graphisoft to improve the movement of IFC data between the different BIM systems. The Tekla Structures model also provided a sticking point until the grid locations of that and the main site models were aligned manually, and checked with the introduction of Solibri’s Model Checker in 2015.

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Solibri was found to be an ideal solution to manage the collaboration between the different applications, not least because it was capable of handling the very large IFC files containing the Furniture and Fittings required by the EFA, but it was felt that it would allow subsequent BIM projects to be co-ordinated at zero, and for the structural grid to be based on the one created in ARCHICAD.

Although ARCHICAD has no problem handling IFCs, Solibri files are capable of being used instead, allowing collaborators to interrogate the model, instead of drawings. The drawback, if it can be called one, is that users had to learn and become familiar with an additional application - Solibri. This enabled ARCHICAD, however, to link directly to MEP and Structural models and directly pinpoint clashes between the different models. With ARCHICAD acting as the principal architectural model - Solibri was the glue that held them together.



Production and Construction Planning

Separate planning meetings were convened, a couple where the BIM Execution plans were drawn up, not attended by the contractors, used to define BIM collaboration, and construction planning meetings, in the Birmingham offices of Interserve, the main contractor where Solibri was used to discuss design and construction issues.

Being able to use federated models was another bonus. Usually they are too large to use in their entirety and are archived – assembled and used only for reference. On the EFA schools projects, Maber was not only able to use the complete federated model, but to include the furniture in the model as well – a significant achievement!

Visualisations

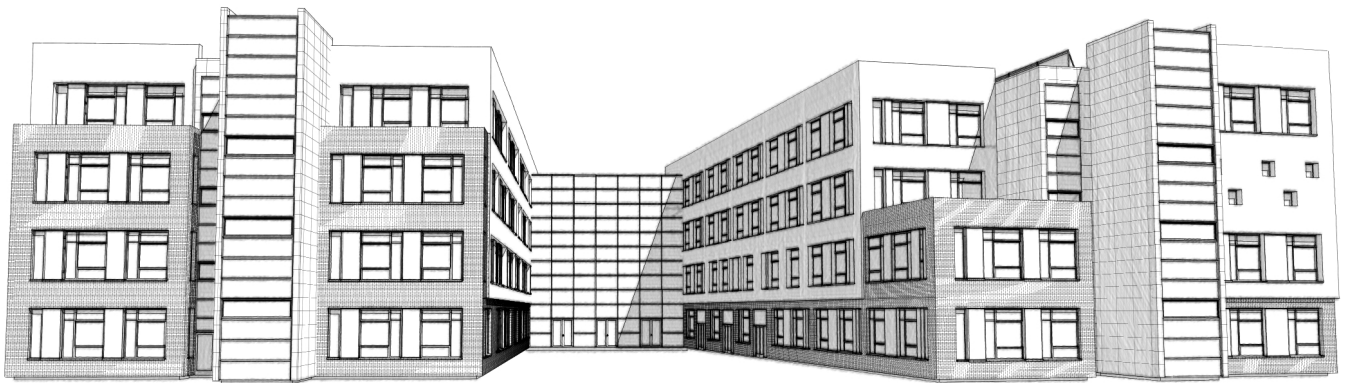
Visualisations were used at an early stage in the project, enabling the client, EFA, to be fully involved in the design process. Models were provided directly in Graphisoft’s BIMx free viewer, which they could walk around, and make selections from various choices. For scene rendering purposes, taking the furniture out, and removing items not in view facilitated quicker rendering of the virtual model. Maber ensures all of its architects are trained in visualisation, but some will obviously find themselves more adept at it than others.

He added "ARCHICAD is a useful tool not just for delivering the BIM requirements on these projects, but for achieving the unique spatial design requirements for these schools..."

Building Efficiency

For the schools project, although BREEAM analysis is currently being assessed, this is being achieved using traditional manual calculations, based on the materials being used, and the expertise of Maber consultants.

Describing the use of ARCHICAD on the schools project, Simon Graham, BIM Manager, stated that ARCHICAD is a useful project tool – the software has been designed by architects to be used by architects. It enables all of the classical reasons for using BIM to be addressed – in particular its productivity gains, and the ability to take advantage of the design for collaboration, visualisation, and of course, subsequent facilities management. Within ARCHICAD, building components, unlike other applications, are independent and can be modified without having to dismantle large parts of the model and turn layers on and off.



About Maber Architects

Founded in 1983, the practice is in the top 100 practices in terms of size in the UK and has built a nationwide client base that is supplemented by a number of international projects. Their client base includes developers, property investors and funds, blue chip corporates, house builders, contractors and the public sector.

About Graphisoft

GRAPHISOFT® ignited the BIM revolution in 1984 with ARCHICAD®, the industry first BIM software for architects. GRAPHISOFT continues to lead the industry with innovative solutions such as its revolutionary BIMcloud®, the world's first real-time BIM collaboration environment, EcoDesigner® STAR, the world's first fully BIM-integrated "GREEN" design solution and BIMx®, the world's leading mobile app for BIM visualization. GRAPHISOFT has been a part of the Nemetschek Group since its acquisition in 2007.

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He added "ARCHICAD is a useful tool not just for delivering the BIM requirements on these projects, but for achieving the unique spatial design requirements for these schools. ARCHICAD allows us to experiment with different iterations of a design, export IFCs for analysis and comparison, and communicate our design through software such as BIMx, which has proved extremely popular with clients."

