

BIMXtra – Springfield Primary School, Sale, Greater Manchester

Client:	Trafford Borough Council
Contractor:	Kier Construction
Project Number:	xxxx
Publication Date:	August 2014
Region:	North West
Sector:	Public, New build & refurb
Contract Value:	£4.2m
Project Timescales:	March 2013 – July 2014
Themes:	BIM

Project Summary

BIM 'Level two' is to be mandated on all publicly procured projects from 2016 and requires a paradigm shift for the UK construction industry. Trafford Borough Council were keen to implement the use of BIM on Springfield Primary School. Kier provided strategic advice on this including conducting CPD workshops on how BIM affects both macro and micro level strategies.

Kier assisted design consultants in adopting BIM and funded extra fees, where applicable, to enable the supply chain to up skill to ensure that they could adopt BIM on the project and to improve their competence for future schemes. Gap analyses were conducted to assess current capabilities and training plans were implemented to develop the supply chain.

Kier changed its traditional appointment process and appointed the M&E consultant to do full design to enable early collaboration. A key objective was to reduce the pre-construction period to enable earlier engagement with the supply chain and to enable more efficient communication in respect of procurement and scope of works understanding. A secondary objective was to ensure that the client was

presented with a **completed** COBie data drop with asset information to use in facilities management.

To help achieve this Kier implemented **BIMXtra** free of charge and provided access for the supply chain with complete training and support throughout the project.

Background

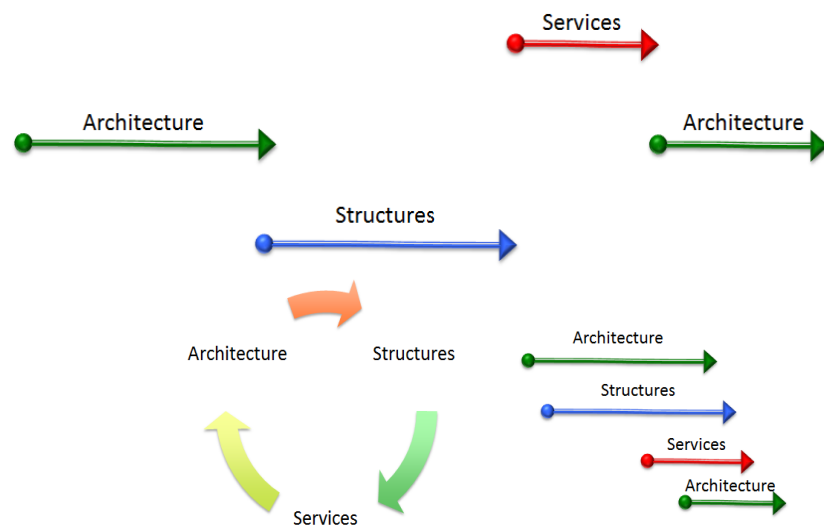
The Government's Construction Strategy which was launched in 2011 mandated the use of 'Level Two BIM' on all publicly procured projects by 2016. BIM aims to increase collaboration within construction, breaking down the antiquated silos which exist and increase efficiency by driving out wasteful processes. Whilst BIM offers significant value, the initial and on-going expense of BIM can be a detriment to its success. Propriety software required creates ad-hoc solutions, increasing costs and adding complexity due to a lack of interoperability. Kier has invested in its own project information management system, **BIMXtra**, to overcome the barriers.

During the early stages the project team identified common project goals and created a BIM execution plan to assist in the realisation of objectives. Kier facilitated extensive collaboration between the design

team which encouraged the regular sharing of project information. The main BIM objective was the early completion of design information to allow early engagement with the supply chain and increase opportunities for further collaboration with specialist subcontractors.

The traditional pre-construction process was mapped to determine any wasteful processes, such as waiting time, design rework and excess inventory.

The process was reworked taking into consideration lean principles and the BIM process. The resultant concurrent workflow that was implemented was a result of intense collaboration: project information was shared daily, via Kier's common data environment.



The lack of adequate software and expertise within the supply chain also presented challenges. During the Springfield Primary School project Kier assisted its design team partners in developing technology strategies which best suited individual needs. This ensured that IT requirements were met in the most cost effective manner. **BIMXtra** was also implemented on the project. **BIMXtra** enabled the entire project team to share information and collaborate through an electronic platform, reducing time and costs.

Engagement

During the earliest stages of the project Kier met with Trafford Borough Council to ascertain their BIM requirements and delivered a workshop to raise awareness and understanding and to help Trafford develop their own BIM implementation requirements.

BIM was adopted early in the project as a means of integrating the team enabling intensive collaboration, reducing wasteful processes and improving the flow of information.

The three main consultants were appointed simultaneously, including the commissioning of the full services design. The preconstruction period was reduced from an anticipated eight month period to just four months and, during March 2013, Kier held workshops with thirty members of its supply chain – both supply and construct.

The project team presented the scheme using BIM and encouraged the supply chain to present solutions based on the integrated design, the specifications and technical information.

This process provided substantial savings to the project.

Health & Safety

Kier Safety Managers have access to model information via **BIMXtra** and Navisworks and interrogate models for residual risks. During the Springfield Primary School project the Kier Safety Manager identified potential safety risks with the cantilevered roof. The risk was subsequently mitigated before the installation of safety netting.

Issues are raised within **BIMXtra** and shared across the team, ensuring that health and safety focus is given by each stakeholder of the project.

During Springfield Primary School the Kier site manager, in collaboration with the design team, used the BIM process to ensure that edge protection was designed to the correct standard. As a consequence it was identified that the beam supporting the edge protection was not adequate and this was amended prior to the steelwork being fabricated. This ensured that the edge protection was pre-installed to the steelwork prior to erection which reduced dangerous at height working on site.

Using BIM models the team designed out risks such as working at height. An example of this being the removal of louvers at roof level – because of early collaboration the louvers were removed and replaced with a mechanical solution, reducing costs and risks during installation.

Logistics were planned using the model to identify the safest and most effective method of construction. This was relayed to the project team via **BIMXtra** where all stakeholders had access to the same information, updated each day. This same information is delivered to site operatives using the production simulations during site inductions and tool box talks, for example.

Innovation

A major barrier for adoption of BIM ‘level two’ is the lack of interoperability and the cost of implementing expensive hardware and software. Kier has invested over £4 million in the development of its BIM server and project information management system – **BIMXtra**.

During the Springfield Primary School project **BIMXtra** was provided free of charge for use by the supply chain. This significantly reduced the requirement for expensive IT solutions and training. The image to the right illustrates that **all** project information is

sourced from **BIMXtra** which acts as the central information artery.

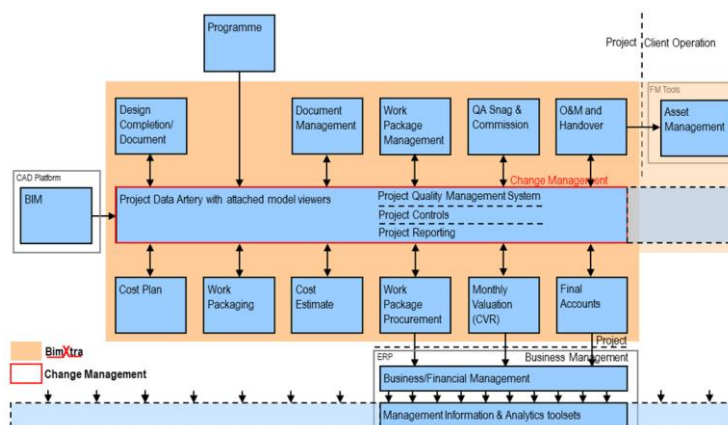
BIMXtra was used to visually compare models, identifying changes which significantly improved change management and control procedures, saving time and removing the potential for errors. All project information was scheduled which enabled efficient coordination, or ‘clash detection’, again saving time and the potential for errors.

All model information and object data was scheduled for procurement, improving transparency with information sourced directly from the BIM and distributed to the supply chain for pricing. This improved detailed cost planning and work packaging as, using **BIMXtra**, objects can only be priced once, removing the potential for double pricing or missing elements. Using **BIMXtra** all stakeholders had access to models which indicate elements which have been procured.

Asset data has been supplemented by the supply chain using **BIMXtra** and MS Excel to ensure complete datasets are handed over to the client, a key deliverable for achieving BIM Level Two. For building use Trafford Borough Council will have **BIMXtra** access to update and validate asset information.

Key successes ... and challenges

During the Springfield Primary School project over £80,000 has been saved due to **BIMXtra**.



Kier is now measuring KPIs during the construction period of projects using tablet devices on site to track issues to determine root cause and effects.

BIM allowed the design team to eliminate any coordination issues, resulting in cost savings and reducing the required contingency fund. Buildability sessions were held, using BIM, to determine the feasibility of the design and instantly correct any issues, proactively, before construction. The result was a reconfigured design, improving logistics and programming.

Critically the visualisations improved client engagement, provoking discussions regarding the design during client meetings and assisted in ensuring the client's needs were met. Typical classroom layouts assisted in understanding the design intent – particularly useful when liaising with non-construction stakeholders.

The project team engaged early with specialist sub-contractors in March 2013 and construction began in July 2013. Procurement benefited from early engagement because a longer period was available for interrogating options and evaluating value for money.

BIMXtra was used to generate work packages directly from BIM, reducing effort and increasing efficiency.

Lessons Learned

The process implemented during the Springfield Primary School project has been documented in order to ensure that best practice is shared amongst Kier's stakeholders and the wider industry. This information

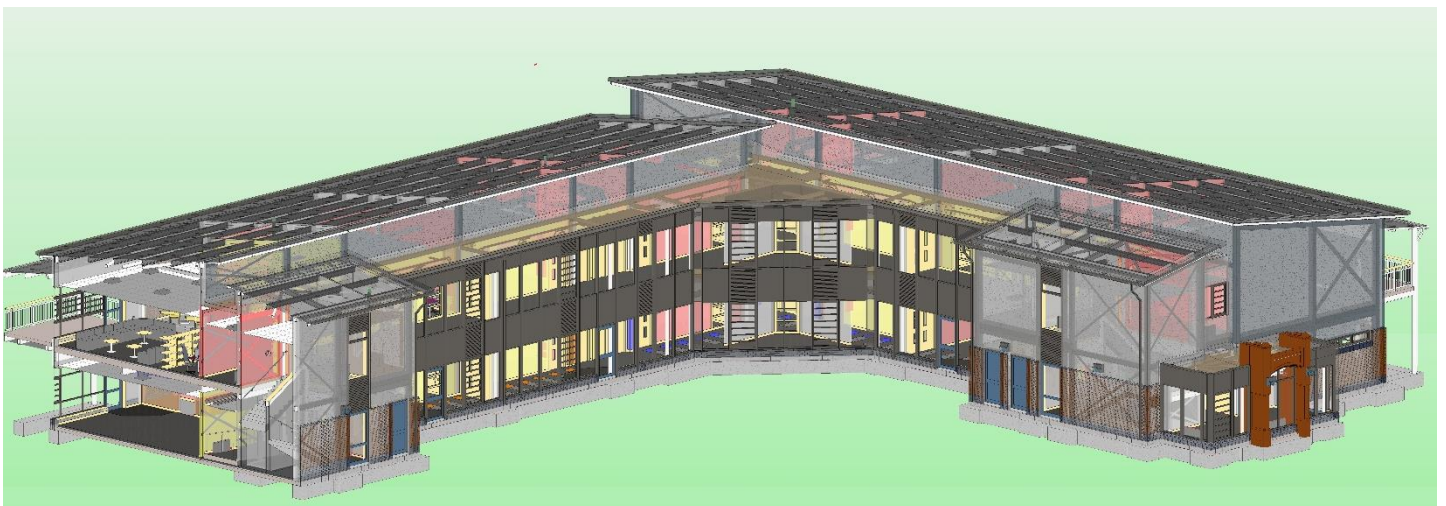
is relayed to a wide variety of audiences, including local and national frameworks which includes the North West Construction Hub via their BIM Special Interest Group.

The use of BIM Level Two and **BIMXtra** during the Springfield Primary School project has improved Kier's standardised protocols which enable us to work more efficiently with our supply chain partners. A 'master information delivery plan' has been created which acts as a single document to articulate Kier's requirements to consultants and contractors to ensure that our client's needs are met.

The use of **BIMXtra** has also enabled Kier and its delivery partners to understand the BIM process which has improved their long term competitive advantage amongst their peer groups.

Best practice is shared via mini case studies – one such example being the use of **BIMXtra** during the procurement of the structural framing solution work package where the local contractor used the models to better understanding their own scope of works, including key interfaces and quantities.

Best practice is also shared via Kier's own website and through social media, such as Twitter. This enables the dissemination of best practice information to thousands of industry professionals.



Kier has commenced the acquisition and improvement of object families stored in a central database and shared openly with the supply chain – this ensures accuracy and precision and removes the necessity for duplicated effort.

Impact

BIMXtra implementation on the Springfield Primary School project has contributed significantly to Kier's business improvement strategy. The collaboration that occurred, the processes adopted and the benefits derived have been documented and implemented across numerous North West projects and the wider UK.

The project affected how Kier interact with the supply chain, both design and construct: learning with the supply chain and understanding how to measure their performance more holistically will enable Kier to 'pull' the supply chain to adopt better and more modern working processes. Using **BIMXtra** projects now have more explicit performance measurement using structured data including data captured during design and construction and, in the near future, assets in use.

Additionally, the project has enabled better engagement with Clients by helping them to understand BIM and 'pushing' the demand side to be more explicit with their requirements and understanding how to articulate objectives more coherently.

A more collaborative culture, which was initially demonstrated on the project, has fed into the organisation culture with an increased number of collaborative planning sessions, both internally and externally. The organisation leadership has invested in 'BIM Caves' in offices to further encourage collaboration amongst stakeholders. Collaboration reduces the required number of stakeholders, increasing responsibility, motivation and productivity.

Finally, the project has demonstrated that BIM can be implemented at little cost on any sized project and can bring added value, including cost savings. It has also demonstrated that BIM is not merely the adoption of digital technology but is a cultural shift for the organisation and its stakeholders.



Constructing Excellence
33 Queen Street
London
EC4R 1AP



T: 0845 605 5556
E: helpdesk@constructingexcellence.org.uk
W: www.constructingexcellence.org.uk

Richard Buck - Kier Construction
E: richard.buck@kier.co.uk

