

by Kenny McNally

Blending the Edinburgh Skyline

Now an accepted part of the Edinburgh City skyline, it is hard to believe that the Calton Square office and leisure complex had preoccupied developers and their Design Teams for many years before its final concept could be realised.



1. The Calton Square Site.

As the last remaining gap site in Edinburgh's East End and part of the city's World Heritage Site, getting this development right seemed an impossible task. With many previously failed planning applications that had cost developers tens of thousands of pounds, a new approach was needed.

The major problems, and reason so many previous applications had failed, chiefly related to the site's positioning to the nearby Calton Hill – an historical and nationally recognised feature of the Edinburgh skyline. Previous applications had failed to convince the planning authority that the sensitivities of this site and relationship to Calton Hill had truly been considered.

This major stumbling block was ultimately overcome by an innovative design company using Graphisoft's award winning software, ArchiCAD®. By using ArchiCAD, the architects were able to create a fully rendered 3D model of both the new buildings and also the surrounding topography. This made it possible to accurately convey how the proposal had considered the site's key location within the city and the aesthetic impact the development would have on the surrounding area.

The ArchiCAD generated designs launched the creation of a vibrant commercial development, while successfully retaining the aesthetic and environmental qualities of the World Heritage Site location, and enabling potential difficulties to be assessed and addressed at the design stage (see figure 1).

As a result, an exciting 235,000 sq.ft leisure and hotel complex, a 185,000 sq.ft office headquarters building, roof gardens and a new civic square providing a potential link to Calton Hill itself, were carefully co-ordinated into a £75m development that proved sensitive to the existing restrictions of the site.

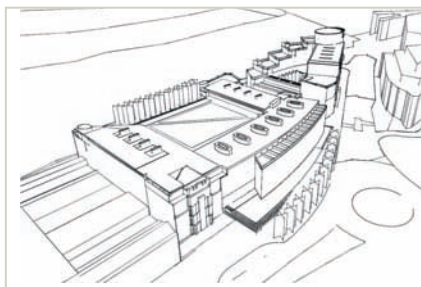
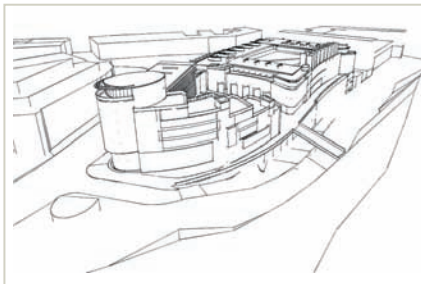
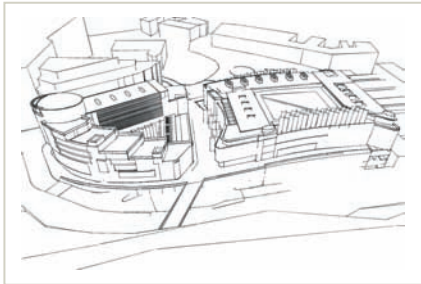
The Foundations

Situated in Edinburgh's UNESCO World Heritage Site in the east end of the city's New Town, near the historic Calton Hill, the site had been empty for over 30 years. Numerous prior planning applications had failed to convince the authorities that proper consideration had been given to the views of the Hill and the sensitivities of the local environment.

An international competition to develop designs for the site was launched in 1998. On the basis of their awareness of the critical issues and what was required to address them, it was won by local practice Allan Murray Architects (AMA). A vital partner in realising AMA's proposals, and an integral tool in overcoming the issues arising from previous applications, was Graphisoft's ArchiCAD software.

An old challenge put into perspective

The key challenge facing AMA was how to maintain the historic views to and from Calton Hill and, equally important, how to demonstrate this to the planning authority. A distinctive component of Edinburgh's skyline, Calton Hill houses the city's two observatories dating from 1792 and 1818 along with a host of other memorials from the early 19th Century. The panorama from the top of the hill provides one of the best views of Edinburgh and it was vital, not only that the new buildings did not obstruct the sightlines from the city, but also that the vista from the hill top was maintained and enhanced.



2. 'Hand Drawn' Effects in ArchiCAD.

Allan Murray Architects is a design-led architectural practice based in Edinburgh, Scotland. We are known not only as innovative architects, but also as urbanists. We apply our understanding of the city to our buildings – capturing new public spaces, making better use of our cities' limited resources, making a difference to our cities for everyone. Our aim is to make the experience of using buildings rich, rewarding and enjoyable.

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3. Key Focal Elements of the Development.



Photograph by Keith Hunter

"From the outset, it was clear that the variety and detail of visualisations would be critical to success. In demonstrating that we had truly addressed the concerns relating to the site's position, it became obvious that our ideas had to be presented in three dimensions. This was due to the complexities of the site requirements and the need to enable non-architect parties to visualise the project for its ultimate approval," explains AMA's Kenny McNally.

Working with ArchiCAD

Having used ArchiCAD for around twelve months prior to this project, AMA had quickly and easily begun to use the software for basic modelling requirements and was learning all the time how to exploit its capabilities.

"We'd been using ArchiCAD for around a year at this stage and had been quickly impressed with its 3D capabilities which stood out amongst the competition. It was quick, easy to grasp and had an inherently logical structure that reflects the fact it's been designed by architects, meaning 3D images just seemed to 'take shape', with an almost effortless quality," McNally continues.

"Being able to extract information such as material requirements or precise measurements at the click of a mouse was also a useful time-saving device, but more importantly an adjustment made in one elevation or aspect will be made throughout the design (in both 2D and 3D) – work that could take hours to amend on traditional plans."

An immediate benefit of the ArchiCAD modelling approach is being able to get an early idea of the massing of a building. Using this software gives the benefit of quick visualisations, enabling strategic decisions about massing and form to be made from which the design of the building will evolve. The software automatically calculates floor areas, and therefore occupancy capacity and escape requirements, ensuring that the most efficient use of the space can be made – a critical factor to ensure the viability of any project. In this instance it proved invaluable, as did the capability of modelling the surrounding area and checking views of the development from the critical Calton Hill aspect.

Taking a Fresh Perspective

The ArchiCAD software was used to create a 3D model of the entire development and its context. It also provided floor plans and elevations, which were then rendered as part of the supporting information documentation (current issues of the software are able to produce a range of 'hand drawn' effects on the 2D plans and 3D perspectives – see figure 2).

McNally continues: “Using ArchiCAD, it was possible to combine site photographs and details from the land survey to model the whole site (including Calton Hill) and then to view it from a range of perspectives, adjusting the new buildings accordingly to achieve the most appropriate massing for the site.”

As a result, AMA designed attractive roof gardens on the hotel and building and a series of cascading terraces for the office development, which would ensure the bird’s eye view from Calton Hill was enhanced, as well as breaking down the mass of the building and working with the key focal element of the entrance tower to the offices (see figure 3). These elements proved key when it came to winning planning permission. Indeed, at one stage the office buildings were subtly re-shaped as a result of an ArchiCAD view provided from the ground level up to the hill, to ensure that the monuments could be seen.

By modelling in 3D, it also meant that views and design details could actually be seen in-situ, avoiding the need for changes to be made at later (more costly) stages. The efficiencies and improved coordination experienced through the use of software that can create a ‘virtual building’ are becoming a fundamental part of the success of large construction projects. Up-to-date design methodology is critical.

Something Old, Something New

Other complications came in the form of a listed church building already in existence on the site but in a poor state of repair. Whilst application could have been made to remove the stonework, AMA actually elected to incorporate the structure into its hotel design – using it to form part of the façade for the leisure complex. Known as the Omni Centre, this now includes a Warner Village 12-screen cinema, a hotel, health & fitness club and bars.

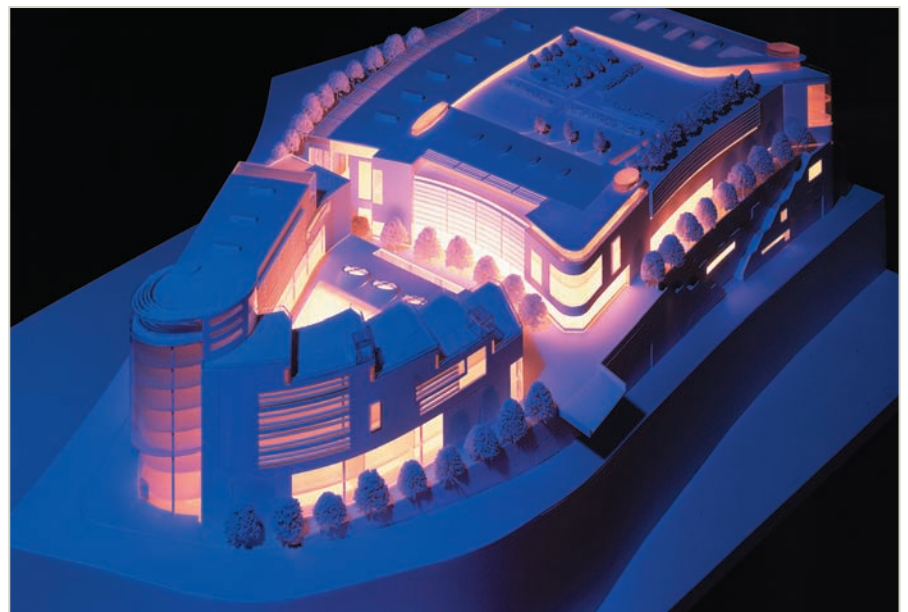
For some modelling software creating old buildings or bespoke items can prove difficult. However ArchiCAD achieved excellent results with AMA delighted that they were able to capture the essence of the robust structure and contrast it with delicate structural glazing. “The software was able to accurately represent the listed structure, helping us to creatively incorporate it into the design of the new building. The church façade has



4a: Preserving the views of Calton Hill Monument
Photograph by Keith Hunter



4b: Creating a new view from Calton Hill



5.

become an important part of the hotel's identity, forming a memorable entrance to the main reception area", adds McNally.

Virtual weather

The ArchiCAD model was further utilised to allay the client's concerns that the new public square between the two buildings would be a wind tunnel.

A version of the model was exported to a specialist consultant who was able to carry out an environmental analysis to show how external weather conditions would impact on the building.

This work required inputting the topography and building outlines from ArchiCAD into a CFD (Computational Fluid Dynamics) programme and then incorporating average (2.3m/s or approx 5mph) and extreme (23.5 m/s or approx 50 mph) wind speeds measured from the area.

"Essentially, we model the air between the solid items that an architect might normally be concerned with," explains Tom Scanlon of the Mechanical Engineering department at the University of Strathclyde, who worked on the analysis. "This just serves to illustrate the unique capabilities of 3D modelling and data - what we are able to offer as a result of this technology really can avoid significant problems later on. It's great to see architects making intelligent use of the capabilities."

Space Management

Inside the buildings, AMA used the ArchiCAD model to carry out a floor area analysis to make sure space was used

to maximum capacity. The proposed development would include a mix of uses and so the commercial viability of the spaces was another important factor in the design. An early indication of the massing of the building and a reliable schedule of areas was required in order to maximise the amount of income-generating space.

In the case of the cinema, for example (which was to include 12 screens), the occupancies of each room were accurately calculated in order to minimise the number of emergency exits while still ensuring the safety of the public, thus maximising the available space.

Multiple options were developed to analyse and appraise the layout of the ground floor mall, allowing the viability of combinations of bars, retail outlets and restaurants to be quickly assessed.

A bonus for the client was the opportunity to 'walk' around the public foyer, courtesy of the QuickTime VR model generated by ArchiCAD, enabling him to anticipate the scale and atmosphere of the end product.

A closing view

AMA's fresh approach paid off and a site that had been empty for 30 years has become home to successful retail, leisure and commercial facilities wrapped up in a development of under £75 million. What had been needed all along was, quite literally, a fresh perspective (see figure 4a & 4b).

Ultimately, ArchiCAD provided AMA with a powerful tool to demonstrate visually

how their proposals addressed concerns and how external views would be preserved. Since many of those involved in the design process were not expert in reading drawings, the visualisation aspect was critical.

McNally concludes: "We knew exactly what we wanted to do and how to overcome the problems that had faced previous architects and developers. The key was having the right tools to do this with. ArchiCAD helped us to communicate with a range of disciplines and enabled the realisation of our designs in such a way that they were both understood and appreciated by persons with little or no architectural and design experience and allowed us to foresee potential problems (see figure 5). We now use the ArchiCAD software for all our projects and on many more levels throughout the process, as we have become increasingly aware of the product's intelligent capabilities."

Allan Murray Architects was awarded the Commercial Development of the Year Scottish Property Award in 2003 for its design and implementation of the 'Omni' and 'Calton Square' buildings, and the client received the Property Executive Award for Excellence 2004 in the Office category.

About Graphisoft

Graphisoft is the pioneer and leader in developing Virtual Building™ solutions. It is widely acknowledged as the world's #1 supplier of model-based software and services for the building industry. Our clients are at the forefront of the industry – delivering projects that are better designed, more predictable to construct and less expensive to operate.

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