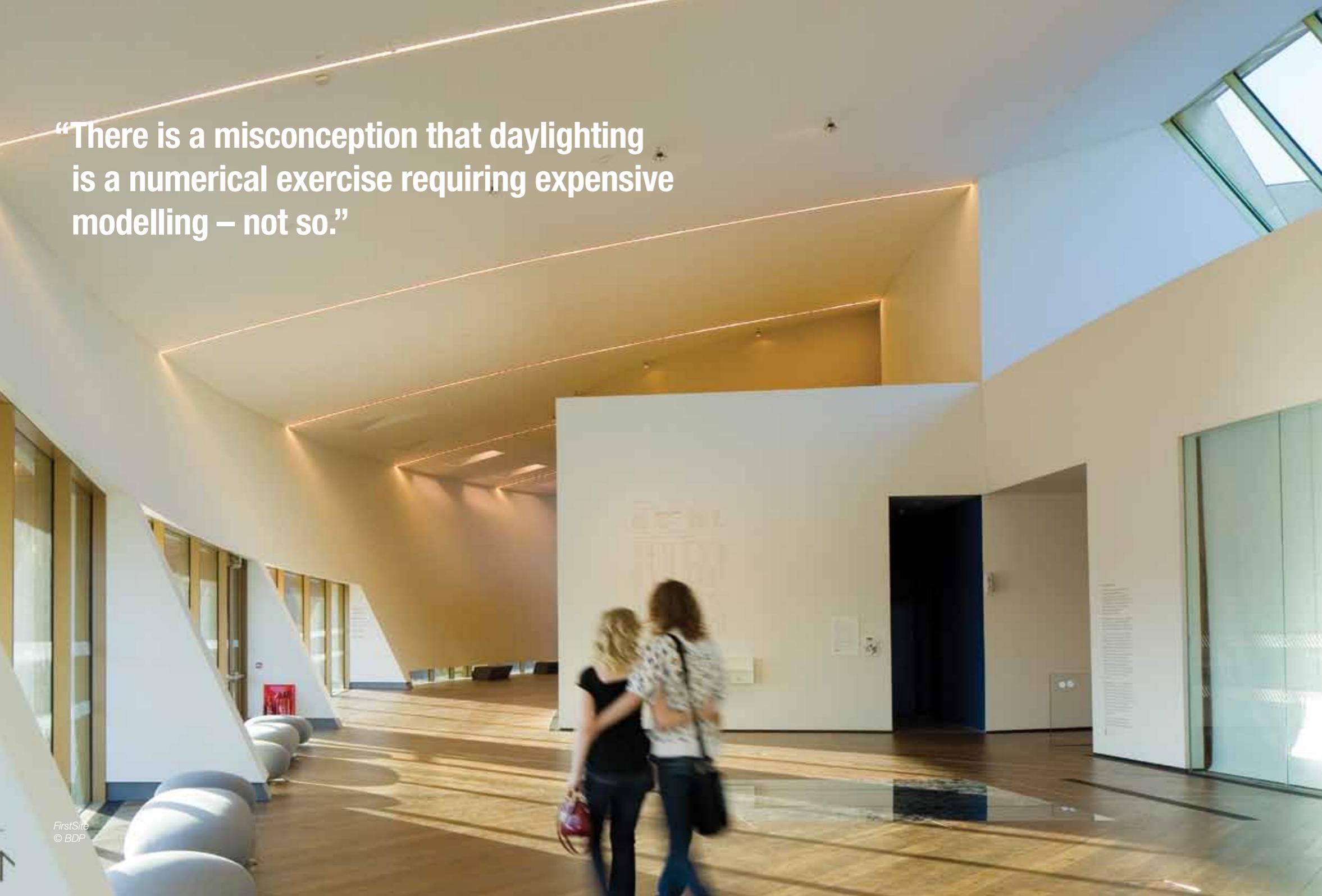


An aerial photograph of a dense forest, showing a large, prominent tree trunk in the center. The forest is a mix of green and brown, suggesting a mix of tree species and possibly some dry areas. The text "BDP. Daylight" is overlaid on the image.

**BDP.** Daylight



“There is a misconception that daylighting is a numerical exercise requiring expensive modelling – not so.”

## Our Aim

Daylight is the source of energy that drives the growth and activity of all living things. It is essential for sustaining life by deterring diseases as well as maintaining our biological rhythms and hormonal cycles. The provision of shelter and natural light has been the fundamental element of architecture throughout history.

When lighting typically accounts for a third of a building's CO<sub>2</sub> emissions, maximising daylight and minimising glare is crucial. We have the resources and experience to fully model projects and this enables us to predict and communicate the behaviour of light in the building – crucial to obtaining the BREEAM and LEED credits, as well as sometimes revealing surprising aesthetic opportunities. The most crucial architectural decisions can be made at the earliest stages when massing and orientation are determined.

The benefits to the client and wider design team are an optimised design that minimises carbon and maximises user comfort, health and wellbeing. Stunning effects can be achieved by composing envelope with views. The ultimate aim is a collaboration to create inspiring and effective buildings.

# Climate Based Daylight Modelling

Daylight factors have historically been the method of predicting the quantity and distribution of daylight within buildings. This method has many problems, not least because the numbers are not intuitively understood but also because it assumes an overcast sky and is therefore compromised outside of temperate climates.

The analysis of daylight is changing for the better. Climate based, hour-by-hour, computer simulations are now central to our advice. Whilst the techniques are in their infancy, BDP is at the forefront of professional thinking. Climate Based Daylight Modelling (CBDM) provides far greater detail about light distribution and intensity and uses real climate data to calculate usable daylight expressed in more familiar and useful ways.

**“The most crucial architectural decisions are made at the earliest stages when massing and orientation are determined and a flexible iterative approach is needed.”**

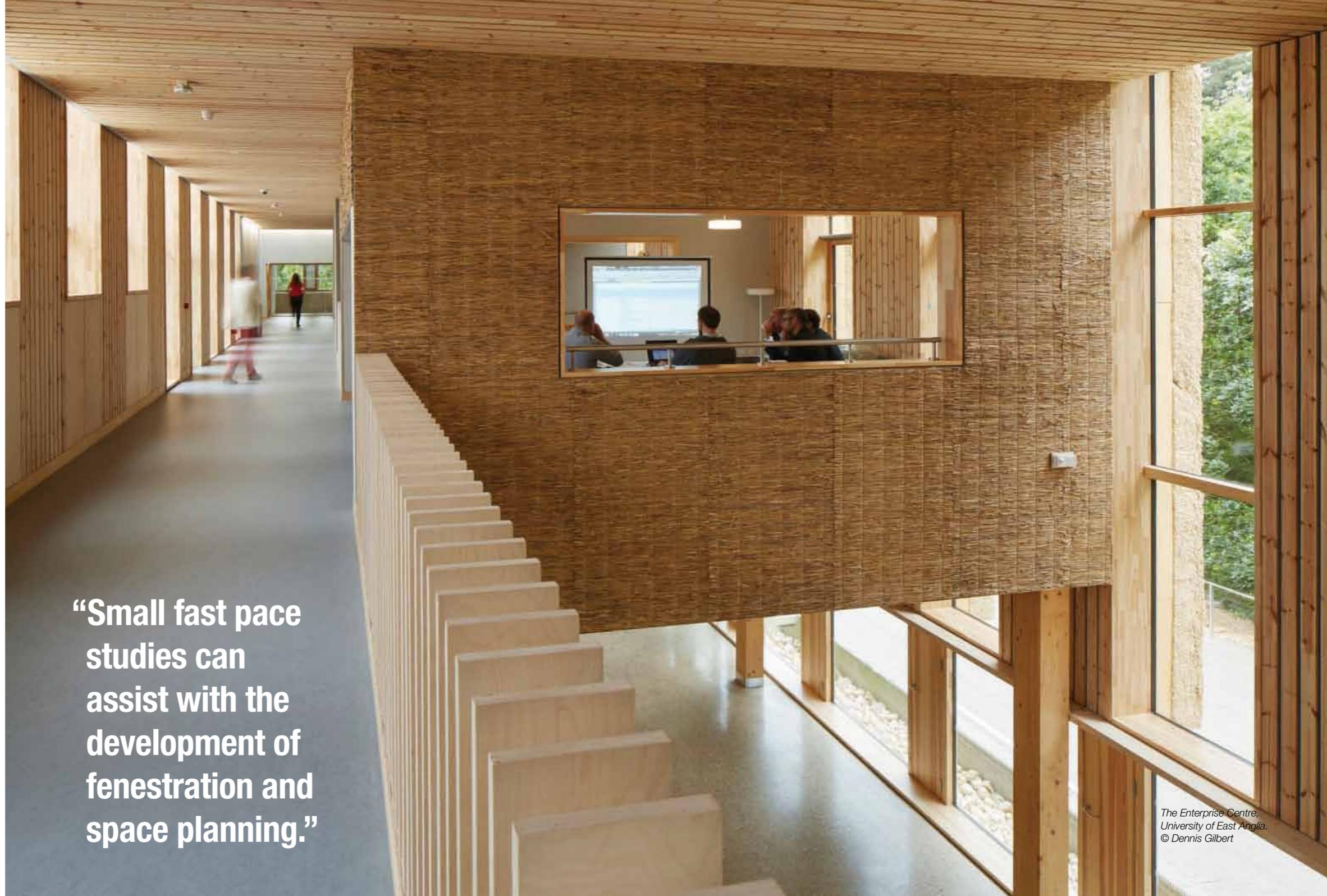
# Our service

We provide architects and developers with intuitive and iterative advice supported by rigorous analysis. BDP has wide experience of guiding the building design process at all stages for the following sectors:

Retail  
Workplace  
Residential  
Education  
Museums  
Healthcare

Daylit environments increase occupant productivity and comfort, and provide the mental and visual stimulation necessary to regulate human circadian rhythms.

*(R.P Leslie, Building and Environment, Volume 38, Issue 2, Feb 2003. pp381-385)*



**“Small fast pace studies can assist with the development of fenestration and space planning.”**

*The Enterprise Centre,  
University of East Anglia.  
© Dennis Gilbert*

# Urban Planning

(RIBA Stages 1)

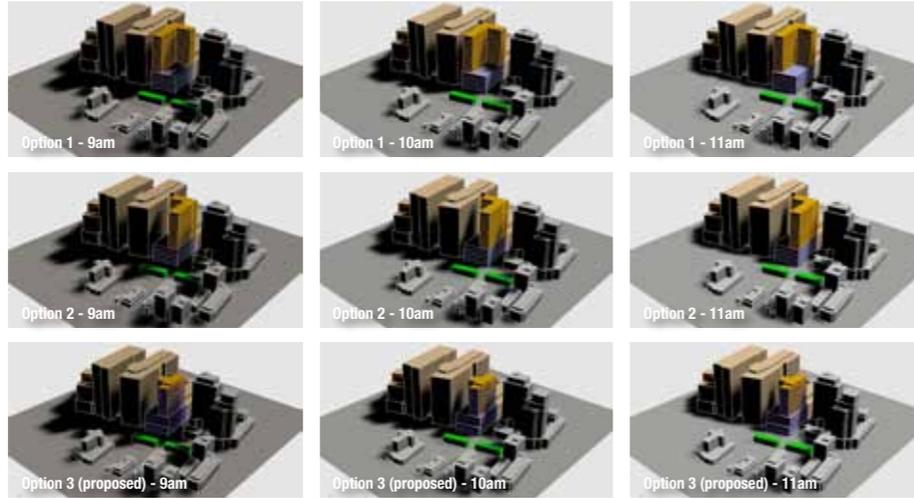
At the earliest stages of plot development, we can assist masterplanners optimise development densities and typologies

## Benefits

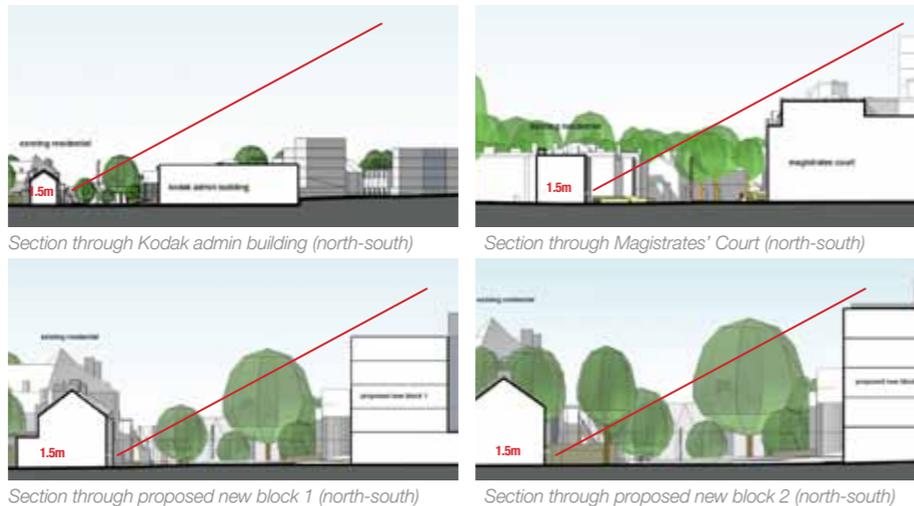
- Maximise development investment returns;
- Minimise neighbourhood impacts to ease planning applications.

## Service

- Iterative studies to quantify development impacts on neighbourhood and within the development;
- Typology performance studies for planning (compact or open, regular or irregular, mixed use or zoned);
- Mitigation strategies;
- Advice on massing and orientation of spaces;
- Early insight on sunlight availability to landscape areas;
- Outline planning reports relating findings to guidance documents.



Summer Solstice - south east facing



This page:  
Top; Queen Mary University London, sun shading study.

Bottom; Harrow View, massing options.

Opposite page:  
Harrow View, artist's aerial perspective.



A study of the Times Building in New York revealed that 30% of energy consumed on lighting was removed through correct daylight control. When lighting typically accounts for a third of buildings' CO<sub>2</sub> emissions, maximising daylight and minimising glare is crucial.

*The New York Times Headquarters Daylighting Mockup: Monitored Performance of the Daylighting Control System - Energy and Buildings 2006.*

# Building Design

(RIBA Stage 2)

For individual buildings we can assist architects optimise building form to maximise the penetration and distribution of natural light within.

## Benefits

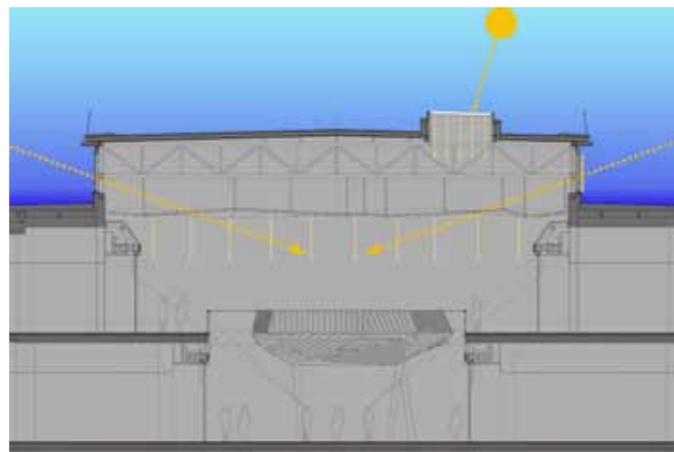
- Minimise neighbourhood impact;
- Optimise building energy performance;
- Minimise heating/cooling loads and artificial lighting energy use;
- Assist the creation of healthy buildings;
- Integrate shading and glare control with the building form.

## Service

- Daylight autonomy modelling;
- Accurately inform energy models by predicting solar gain and artificial lighting needs;
- Overshadowing studies;
- Optimise glazing ratio and distribution, building form, floor plan and orientation;
- Advice on façade strategies (fenestration, solar shading, balcony location, roof overhangs);
- Atrium or courtyard specification;
- Skylight and clerestory composition;
- Visual comfort and access to view studies;
- Solar adapted envelope design;
- Briefing space planning and interior design.

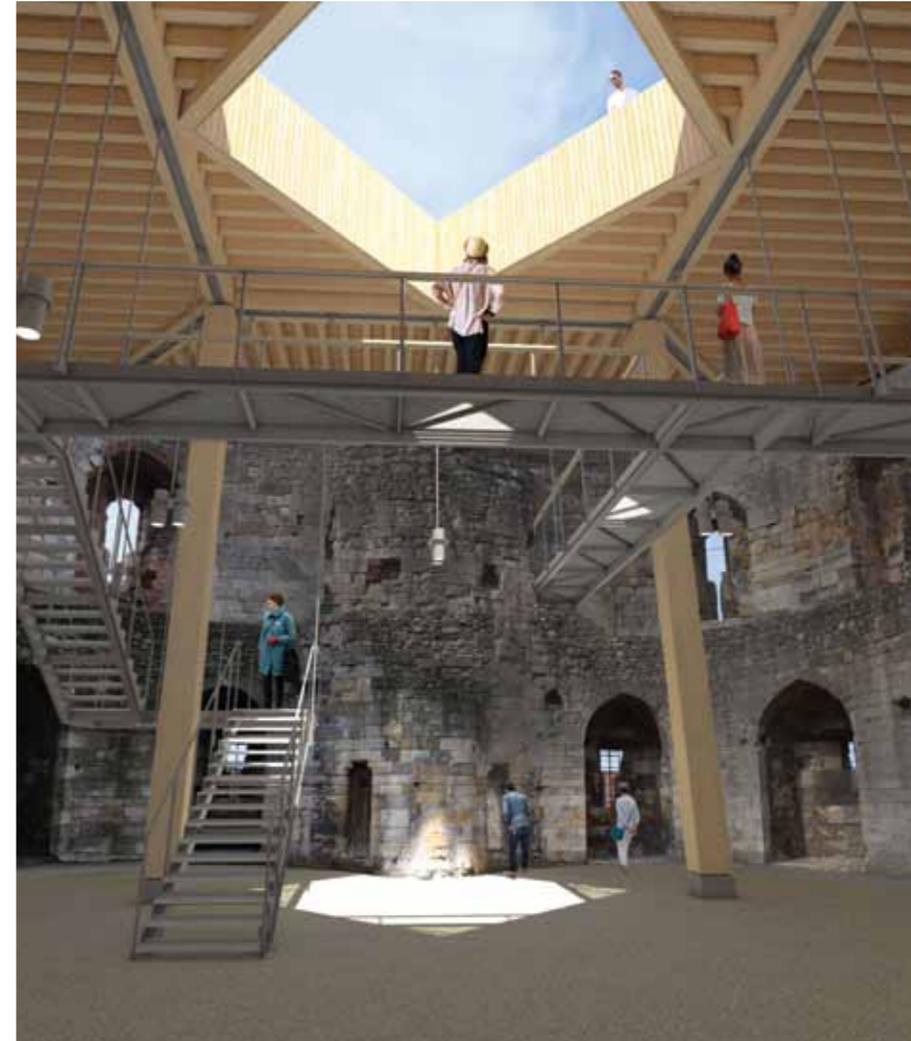
*This page:  
Algarve, skylight  
and clerestory  
composition study.*

*Opposite page:  
Clifford's Tower,  
solar impact study  
informing display  
strategy.*



Students performance increases up to 20-25% in maths and English.  
Sales increase by 25%.  
Office worker productivity up by 25%.

*Skylighting and Retail Sales: An investigation into the relationship between daylighting and human performance. Heschong Mahone Group Inc. August 1999*  
*Windows and Offices: A study of office worker performance and the indoor environment. Heschong Mahone Group Inc. October 2009*  
*Daylighting in Schools: An investigation into the relationship between daylighting and human performance. Heschong Mahone Group, Inc. August 2009*



# Façade Design

(RIBA Stage 3)

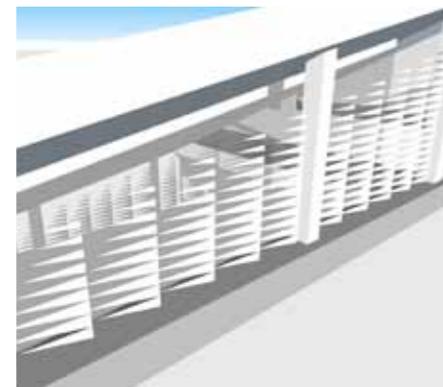
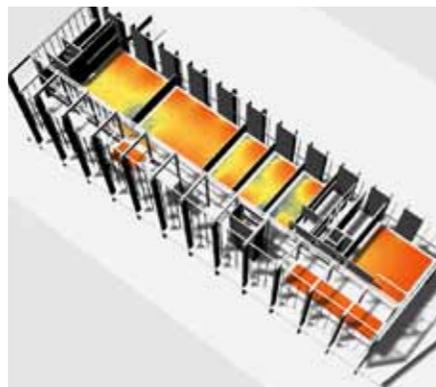
Once the major decisions about building form and elevations are made, we can assist with the detailed design of the building to maximise usable daylight and minimise glare and energy use.

## Benefits

- Healthy low energy buildings through maximising daylight but minimising glare;
- Maximising and composing internal views;
- Aid conservation and curatorial strategies for museums.

## Service

- Assist with the detailed design of facades; fenestration sizing and location, solar shading design;
- Assist with internal shading specification, such as sun shelves and blinds;
- CBDM daylight availability and Daylight autonomy studies;
- Formulate electric lighting control strategies;
- Provide BREEAM and LEED evidence;
- Refine energy modelling inputs;
- Advise on internal and external landscape proposals; sun shielding and species selection.



*This page:  
Top; UCLan CGI.*

*Bottom left;  
Cergy, daylight  
availability study.*

*Bottom right; solar  
shading study.*

*Opposite page:  
Lambeth High  
Street CGI.*



Lighting accounts for about 20% of global building electricity consumption (approximately 7 EJ in 2013). The latest IEA scenarios show the total electricity savings potential in building lighting by 2030 could be equivalent to all the electricity consumed in Africa in 2013.

*(Sources: ETP 2015, WEO 2015 and IEA World Energy Statistics and Balances 2014)*

# Museum Design

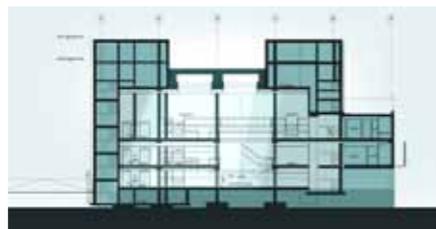
Museums and art galleries experience particular challenges with daylight as certain artefacts are sensitive to fading and damage if exposed to too much light. The challenge is how to balance the beneficial aspects of natural light with conservational imperatives and the rights of generations to come. Rigorous analysis of cumulative light exposure is essential, as is a creative and collaborative approach to the management of natural light.

## Benefits

- Conservation;
- Visitor engagement and avoidance of gallery fatigue.

## Service

- Sunlight and daylight mapping and masterplanning;
- Cumulative illuminance studies;
- Sunlight amelioration strategies;
- Daylight availability;
- Façade and shading design;
- Curatorial strategy support;
- Finishes and case design support;
- Integration with artificial lighting and lighting control.



*This page:  
Top; FirstSite north  
gallery. © BDP*

*Bottom; National Army  
Museum, daylight and  
conservation advice.*

*Opposite page:  
National Maritime  
Museum, Greenwich.  
© Dennis Gilbert*



University of Essex  
Business School.  
© Gareth Gardner

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