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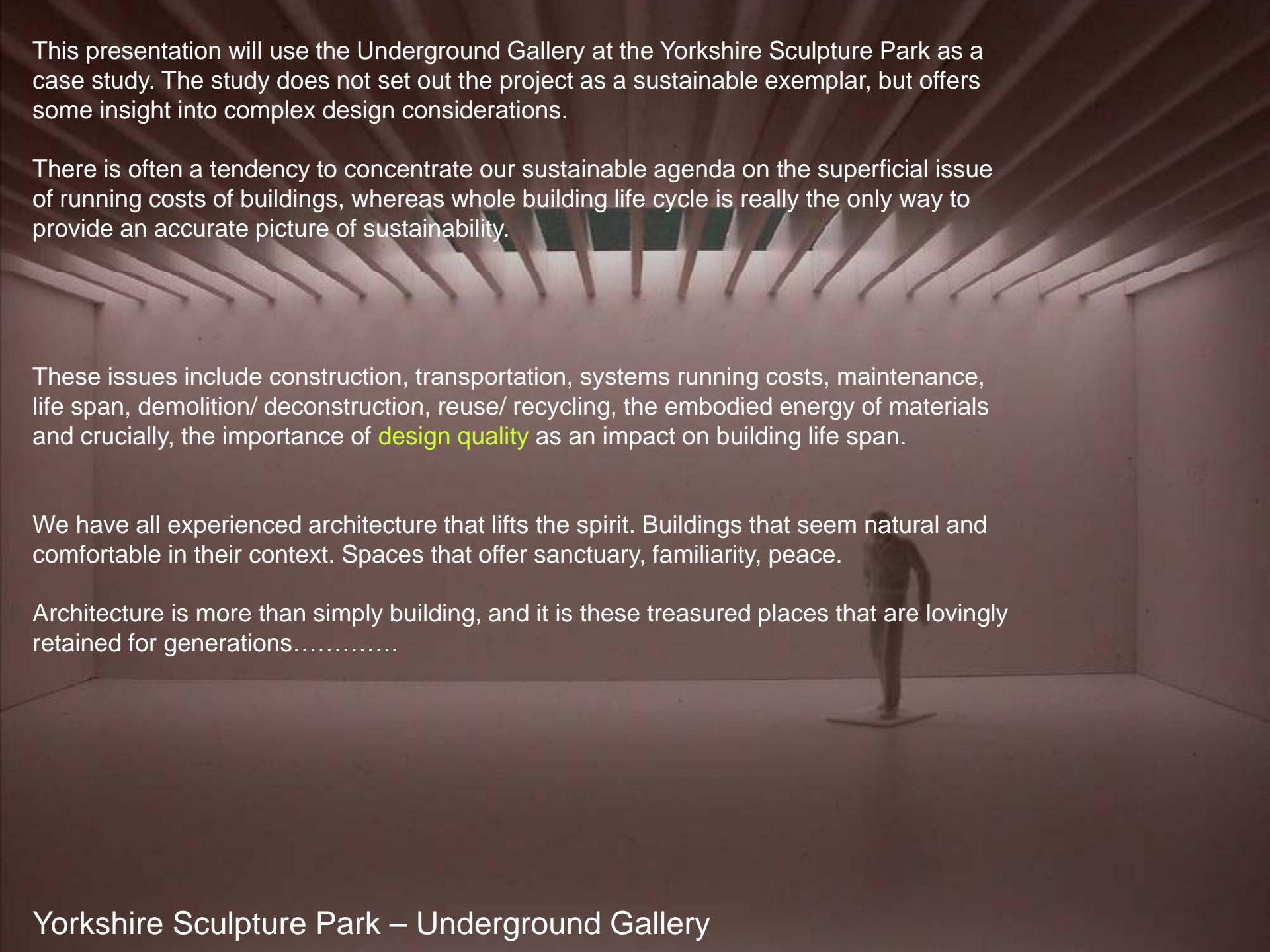
Perspectives of Sustainability

A Cross-Disciplinary Conference

Case study : Yorkshire Sculpture Park : Underground Gallery
Architects : Feilden Clegg Bradley Studios



Ben Elliott : Senior Lecturer in Architecture : Northumbria University



This presentation will use the Underground Gallery at the Yorkshire Sculpture Park as a case study. The study does not set out the project as a sustainable exemplar, but offers some insight into complex design considerations.

There is often a tendency to concentrate our sustainable agenda on the superficial issue of running costs of buildings, whereas whole building life cycle is really the only way to provide an accurate picture of sustainability.

These issues include construction, transportation, systems running costs, maintenance, life span, demolition/ deconstruction, reuse/ recycling, the embodied energy of materials and crucially, the importance of **design quality** as an impact on building life span.

We have all experienced architecture that lifts the spirit. Buildings that seem natural and comfortable in their context. Spaces that offer sanctuary, familiarity, peace.

Architecture is more than simply building, and it is these treasured places that are lovingly retained for generations.....

Sustainable can often be used by weaker practitioners as a justification for design which may be lacking in intellectual rigour and sophistication.

In truth aspects of sustainability are important, inherent design considerations which may serve to strengthen the quality of a scheme.

Technology should always be subservient to understanding of design principles, which should inherently encompass aspects of sustainability. A starting point of natural ventilation and lighting should be used where particular conditions apply, for instance. It is of crucial importance to engage with the local climate rather than try to mitigate against it.

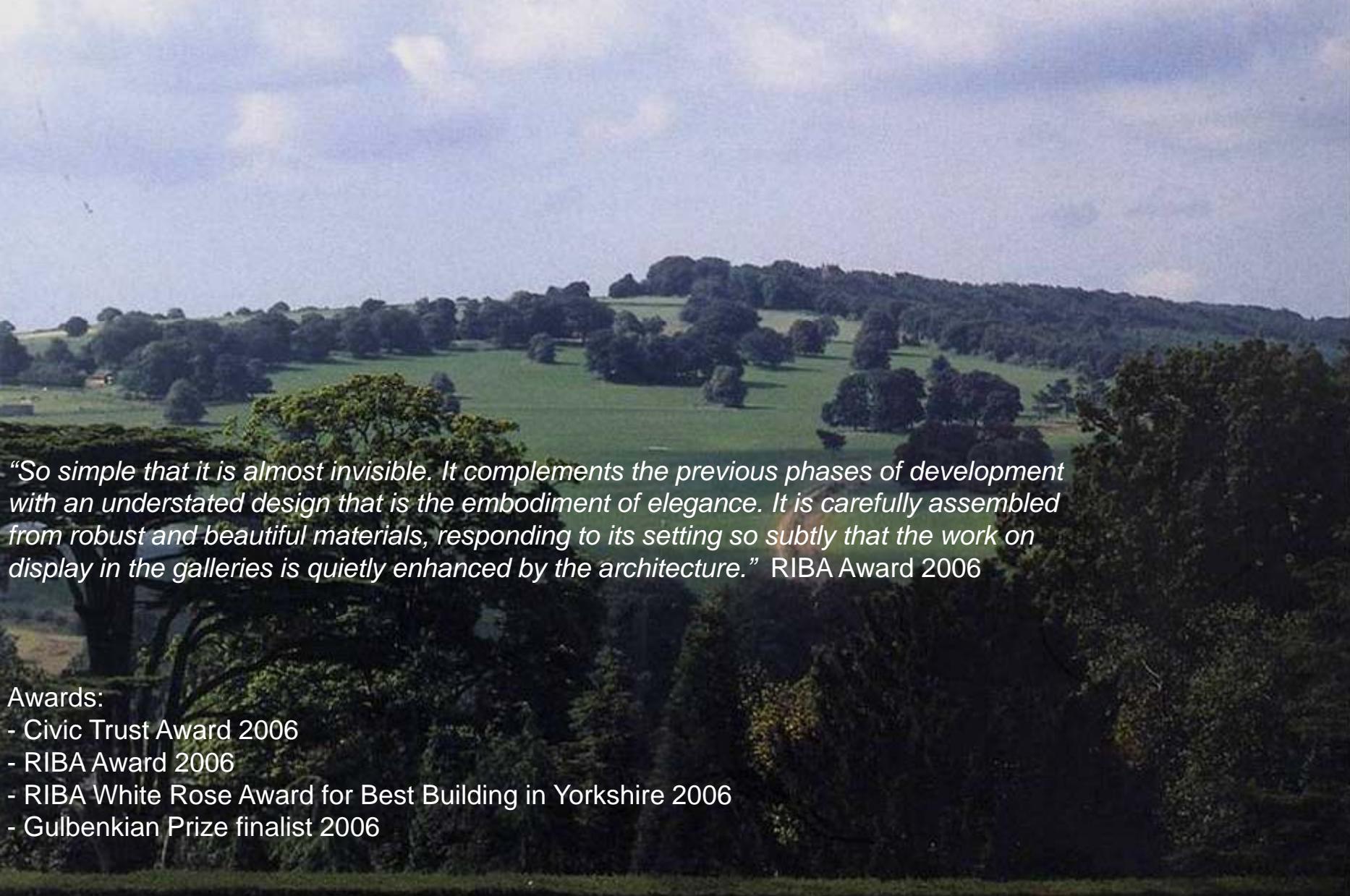
Designing with sensitivity to context is a mark of quality design.
Routed in the cultural context the design forms a stronger and more direct relationship with those who encounter the building, this is part of the *genius loci*.....

sensitivity + appropriateness

Client: The Yorkshire Sculpture Park

Construction value: £2.75 million

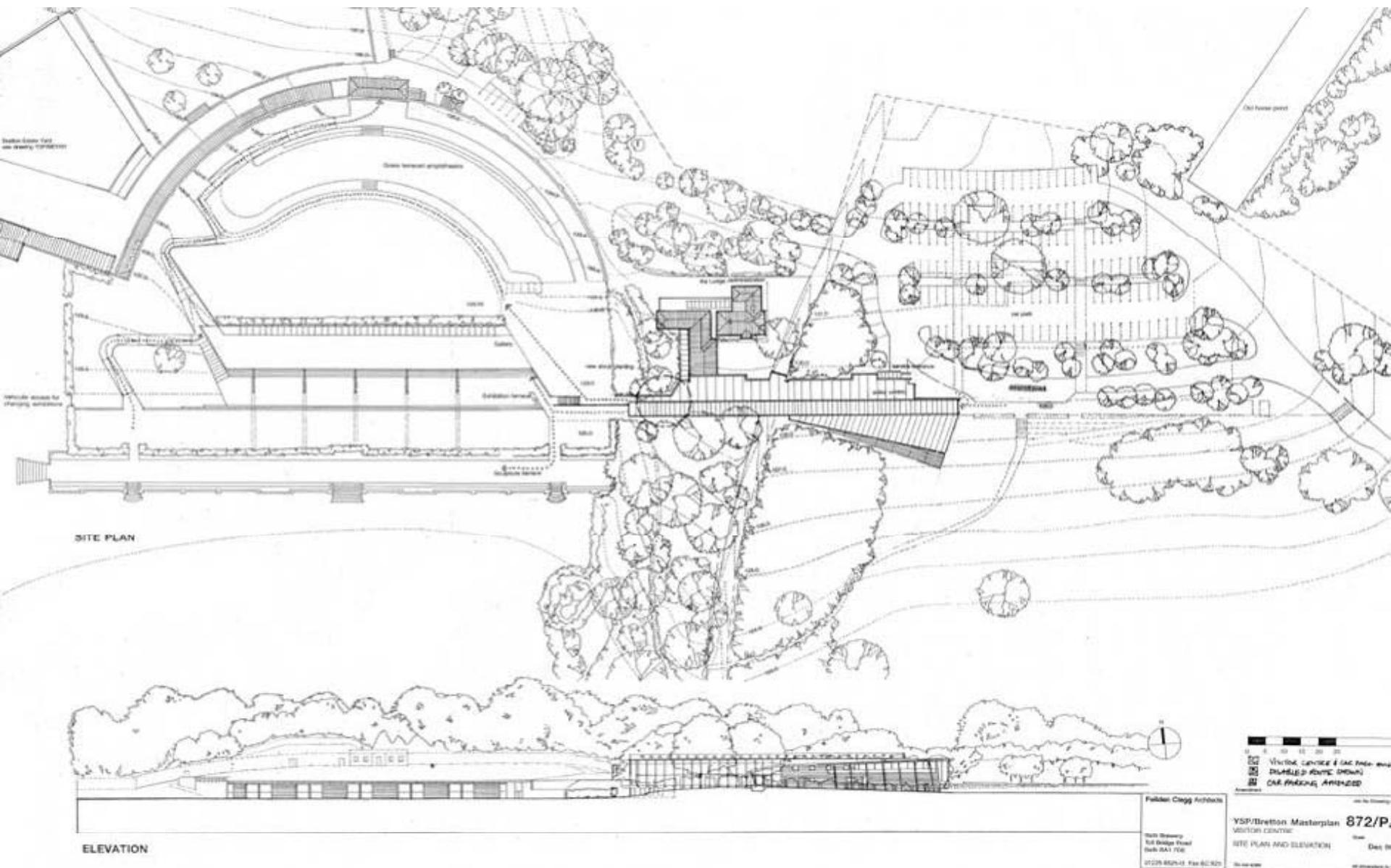
Completion: December 2004



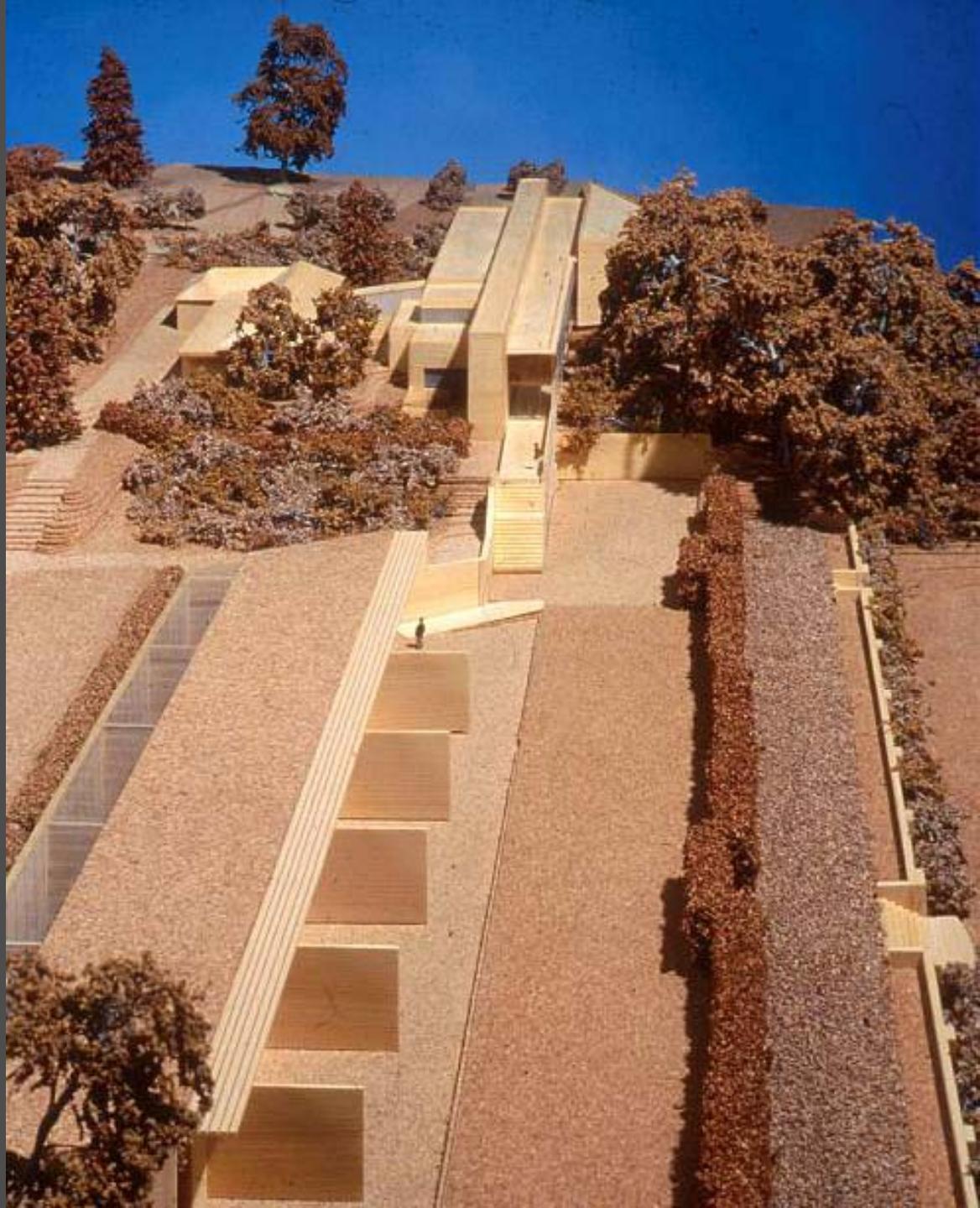
"So simple that it is almost invisible. It complements the previous phases of development with an understated design that is the embodiment of elegance. It is carefully assembled from robust and beautiful materials, responding to its setting so subtly that the work on display in the galleries is quietly enhanced by the architecture." RIBA Award 2006

Awards:

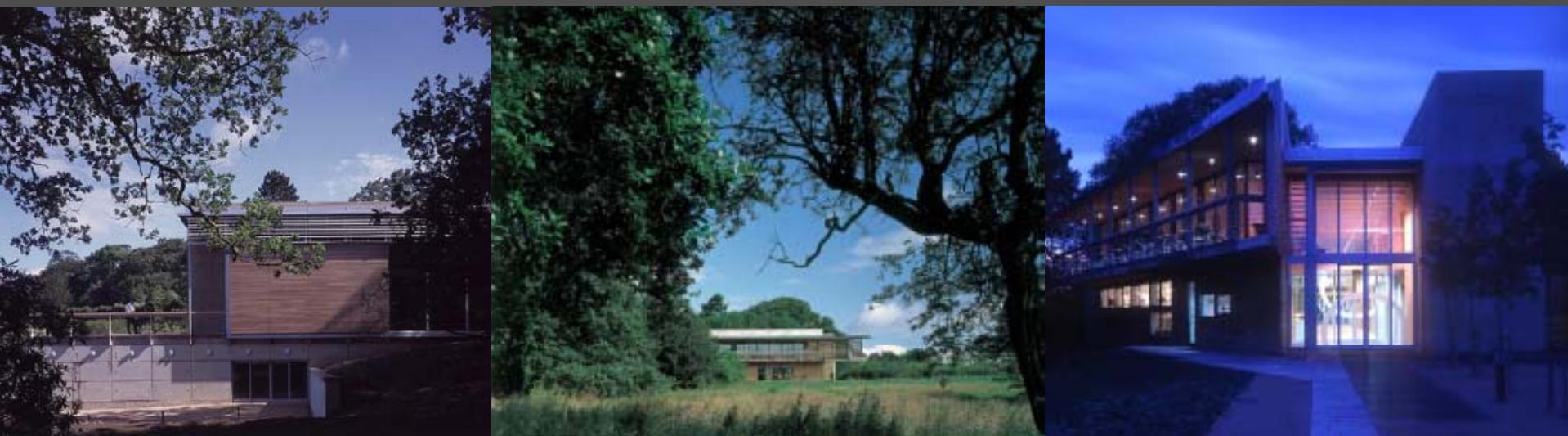
- Civic Trust Award 2006
- RIBA Award 2006
- RIBA White Rose Award for Best Building in Yorkshire 2006
- Gulbenkian Prize finalist 2006



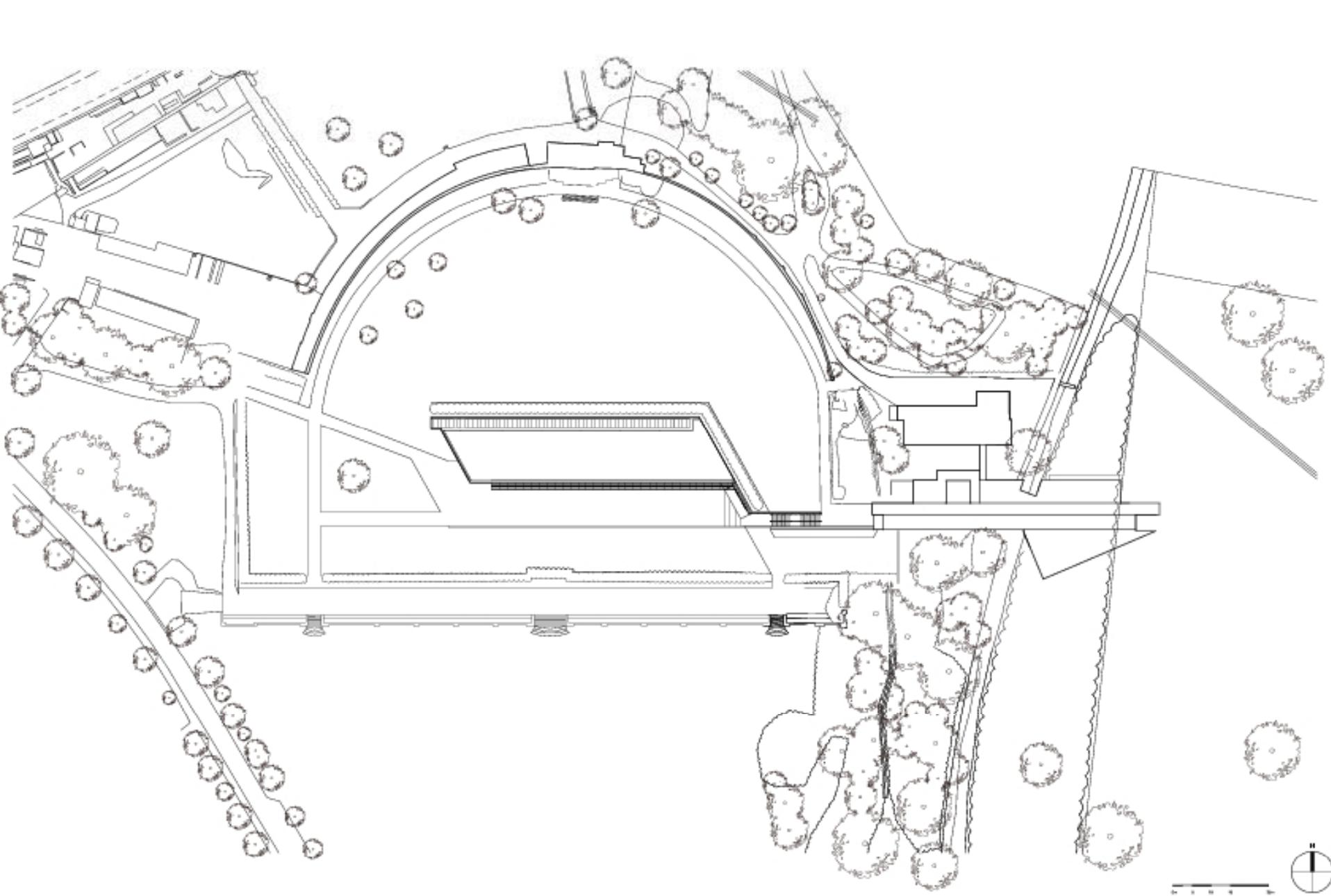
Original planning drawing



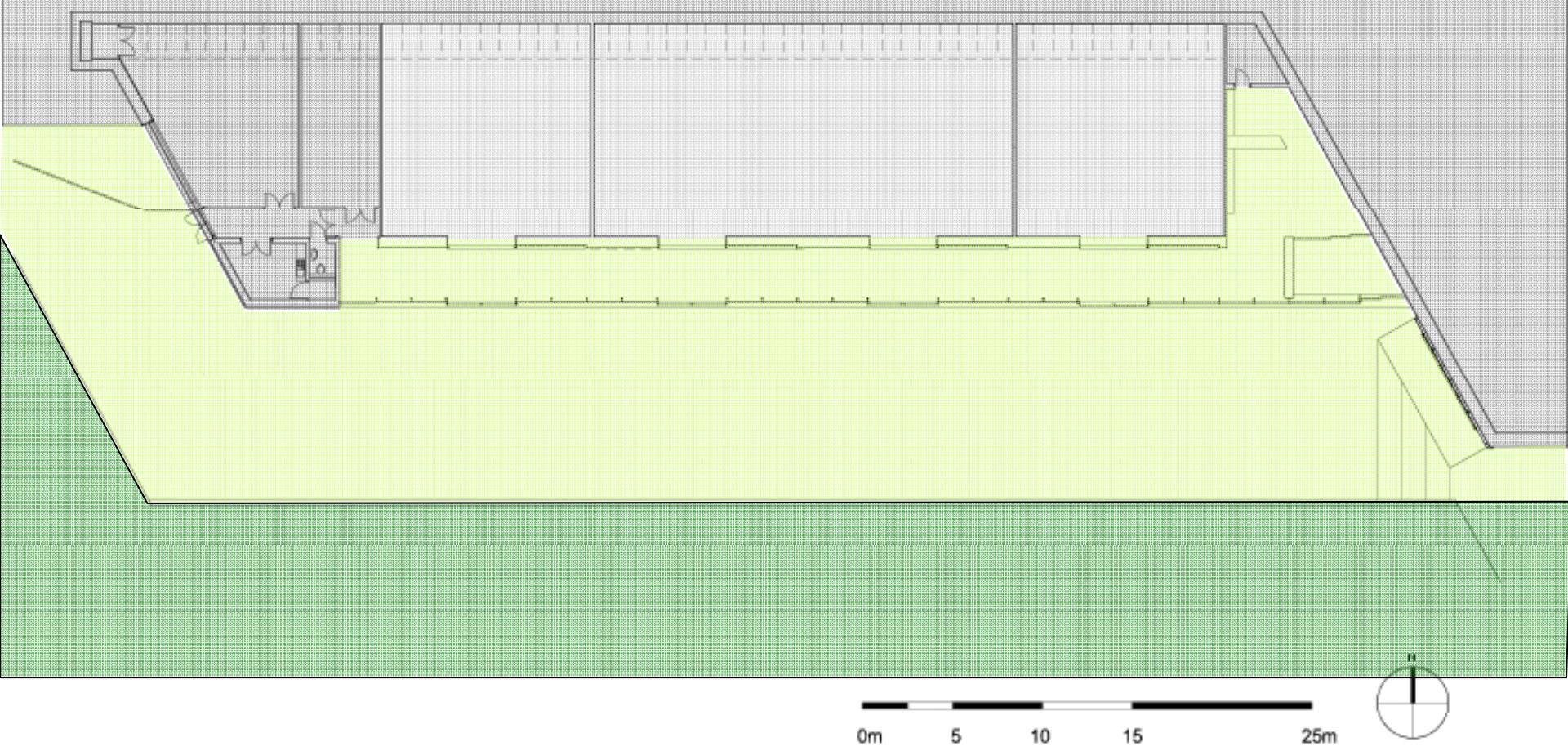
Early site model



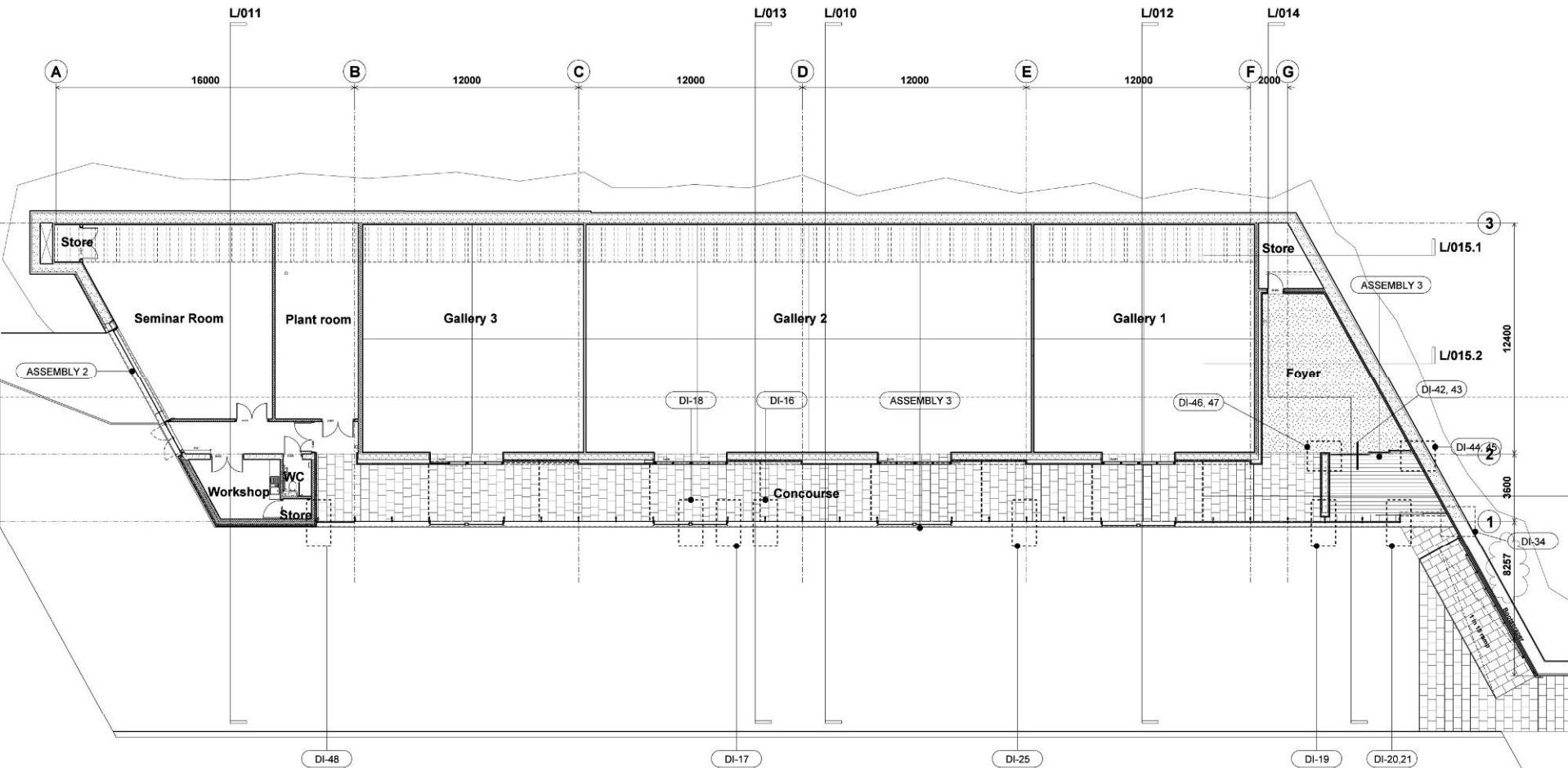
Existing visitor centre



Site plan

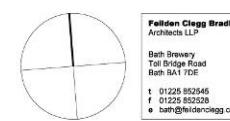
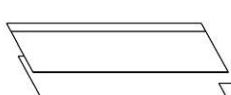


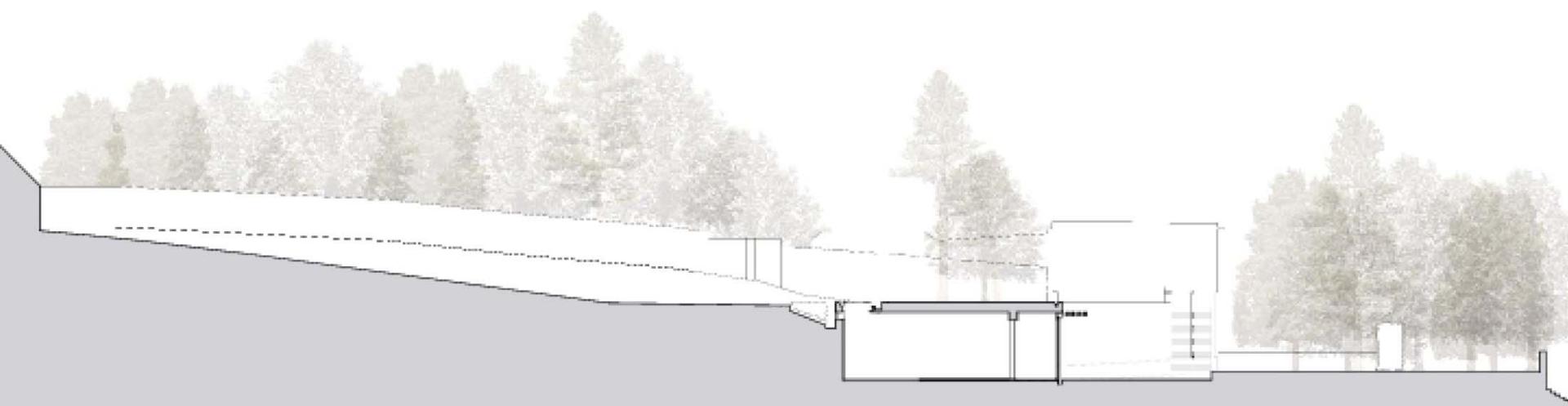
Plan – adjacent garden space



F - AS BUILT ISSUE
E - General revisions. Detail added to curtain walling & west elevation openings. Minor revisions to corridor openings. Detail reference added.
D - South retaining wall, entrance ramp and steps revised.
Setting out dimension revised in line with site measurements.
C - Column detail amended in line with landscape drawings.
B - Amended to Structural Engineer's Tender Drawings.
A - TENDER ISSUE
Amendment:

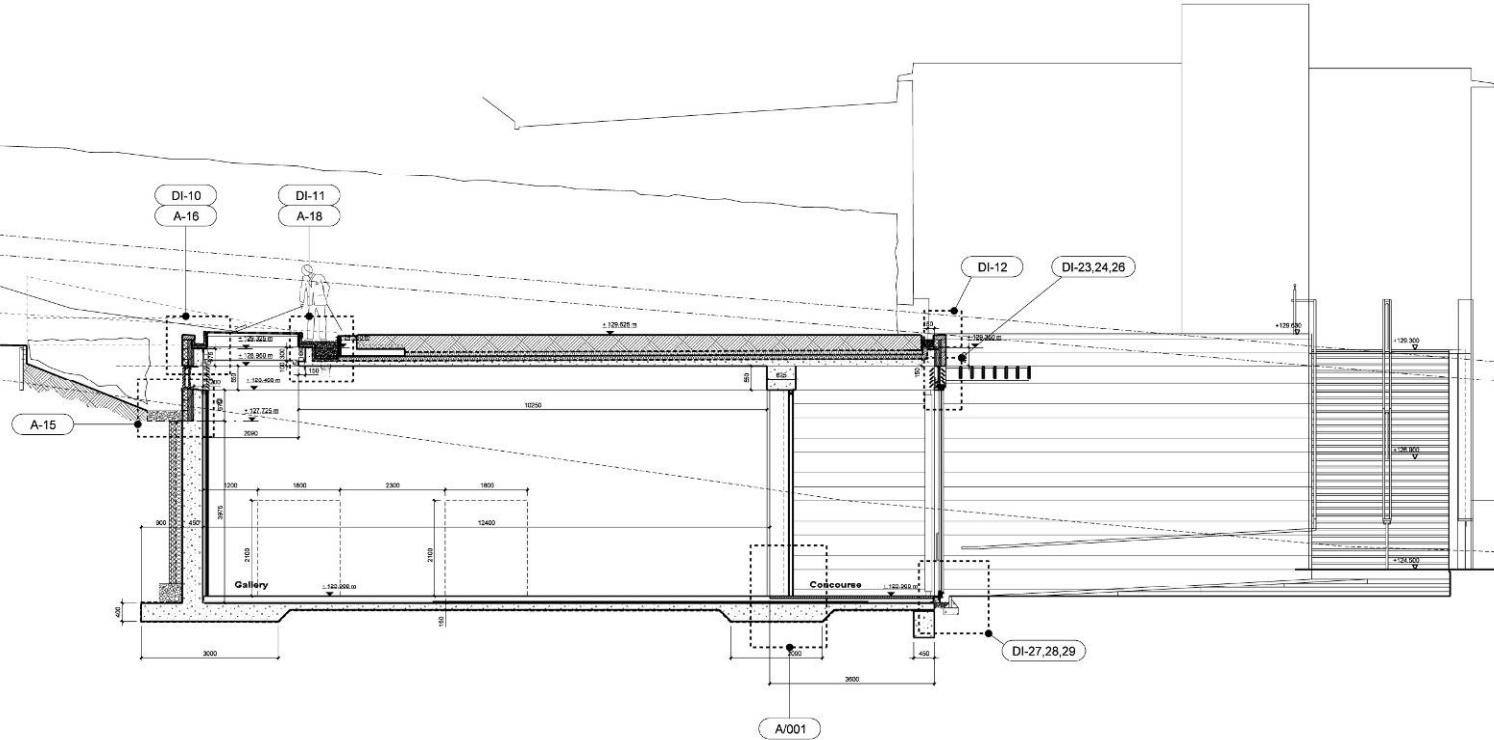
Job Drawing No: 1176/L/005 F
Amendment:
Yorkshire Sculpture Park
Underground Gallery
Scale: 1:100 (1:200 @ A3)
Date: June 2003
Drawn: FCBA
Floor Plan
Do not scale
All dimensions to be checked on site
Original printed at A1





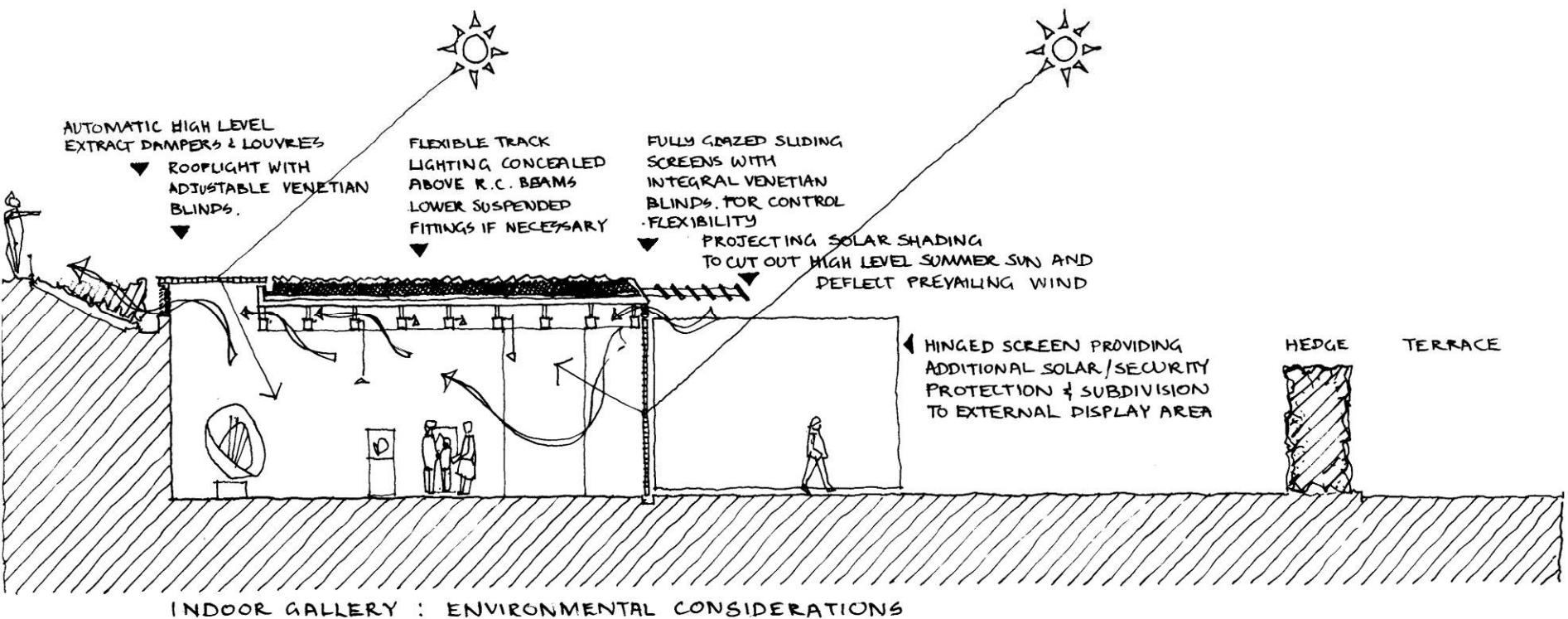
Site section sketch

0m 5 10 15 25m



F - AS BUILT ISSUE	18.1
E - Details developed & detail references added.	08.0
D - Gutter adjacent to rooflight widened after discussions with waterproofing manufacturer. Approach star updated.	11.1
C - Level of concrete roof upstands amended	16.0
B - Amended to Structural Engineer's Tender drawings and dimensions added	18.0
A - TENDER ISSUE	10.0
Amendment	

Job Drawing No **1176/L012** Amendment **F**
Yorkshire Sculpture Park
Underground Gallery
Section through Door
Do not scale
Original printed at A1
 Scale 1:50 (1:100 @ A3)
 Date June 2003
 Drawn GEAS
 All dimensions to be checked on site



Earth sheltered/ green roof

Solar & thermal protection to roof membrane

Aesthetic enhancement of roof membrane

Improved rainwater attenuation

Increased bio diversity

Improvements in CO₂ & pollutant absorption

Keeps building temperature more stable

Opportunities for useable roof garden area - maximising space

Consider implications of maintenance, service life of membrane, cost of system and implications on structure





Initial excavations on site



Construction phase – topsoil in place – yet to be backfilled



Existing site



View of roof – continuation of landscape

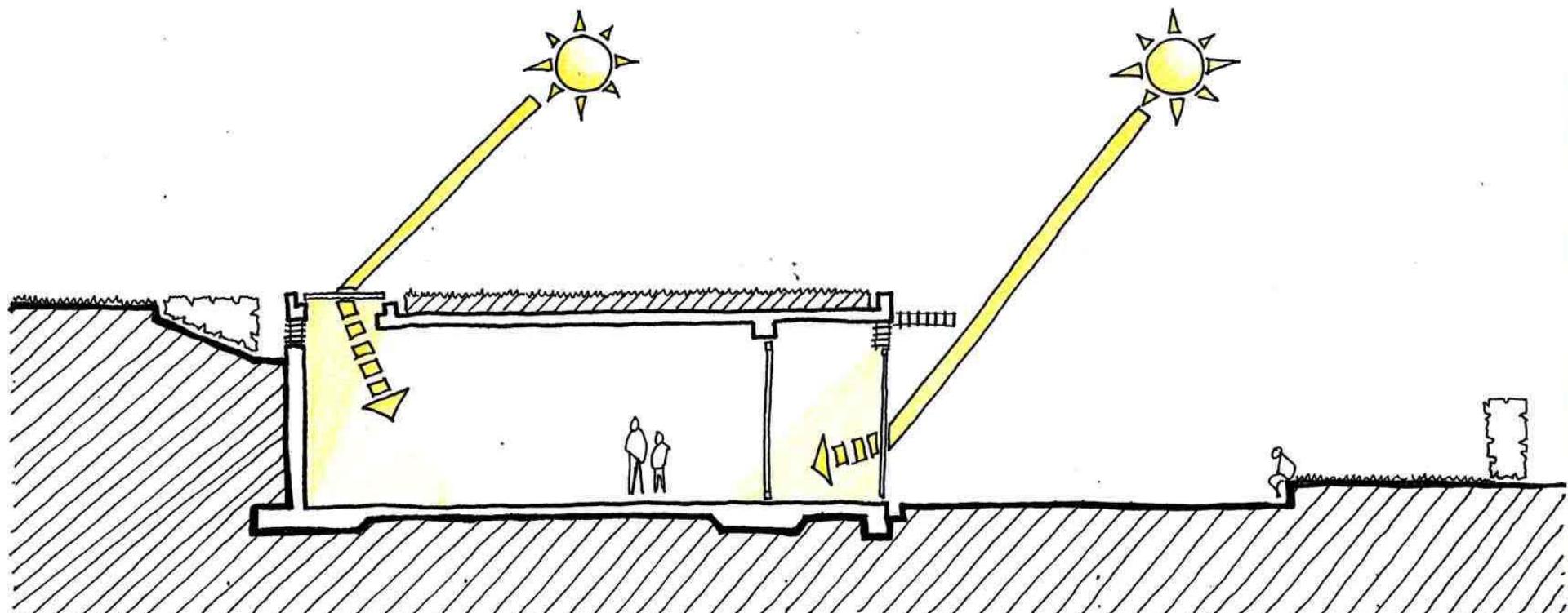
Natural Lighting

Large extent of south facing glazing to maximise solar gain

Controlled through use of louvres & circulation space as a buffer zone

Use of rooflights to gain natural light into galleries at back of building in a continuous strip to distribute daylight evenly

Glare from rooflights limited by use of opaque glazing & adjustable roller blinds





Solar control louvres



Solar control louvres



Solar control louvres

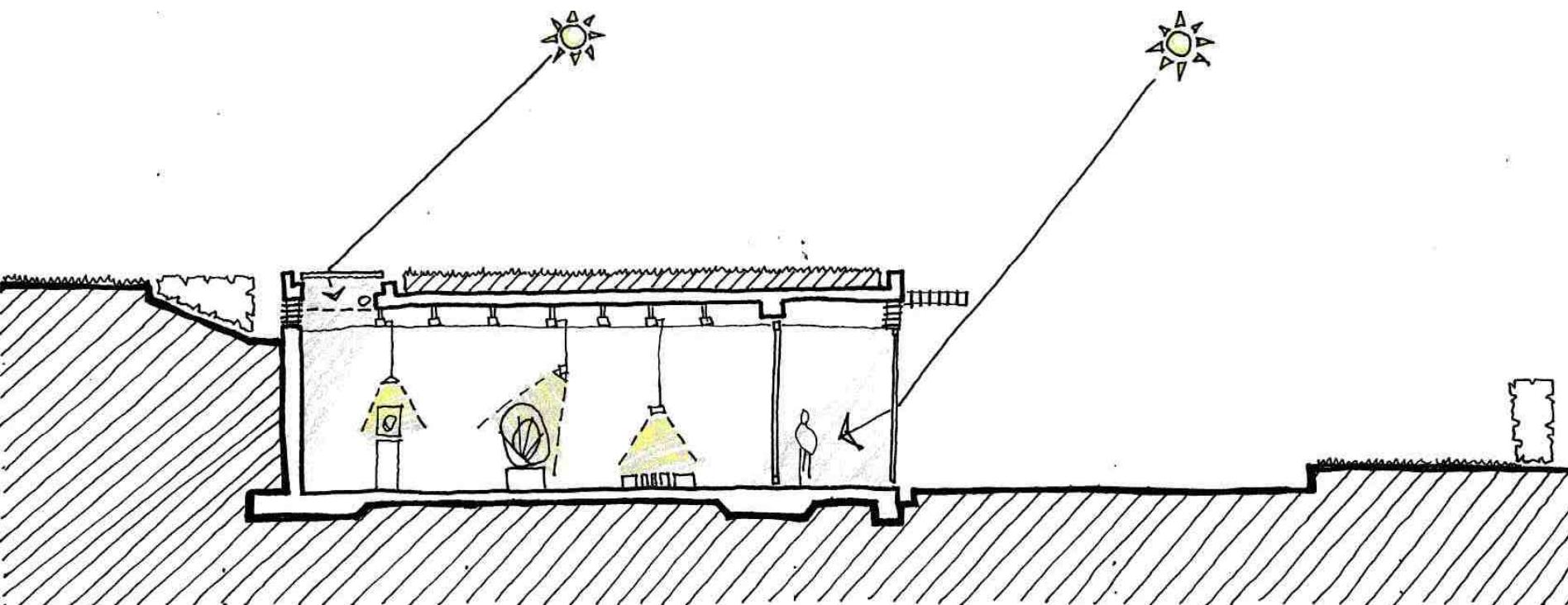


Rooflights – model study



Rooflights –under construction

Artificial lighting





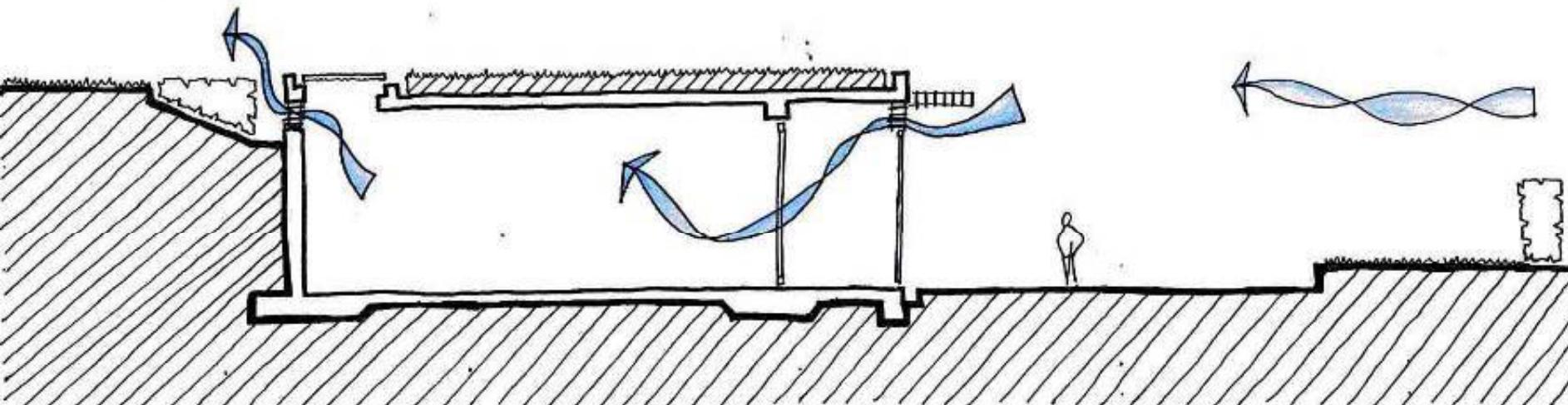
Artificial lighting - flexibility

Natural Ventilation

Internal temperatures cooled by movement of air through building

Cross ventilation enables deeper plan than single sided vents

Controlled through use of continuous automatic vent dampers along circulation space & back of galleries





louvred vents to gallery spaces



louvred vents to south façade

Thermal Mass

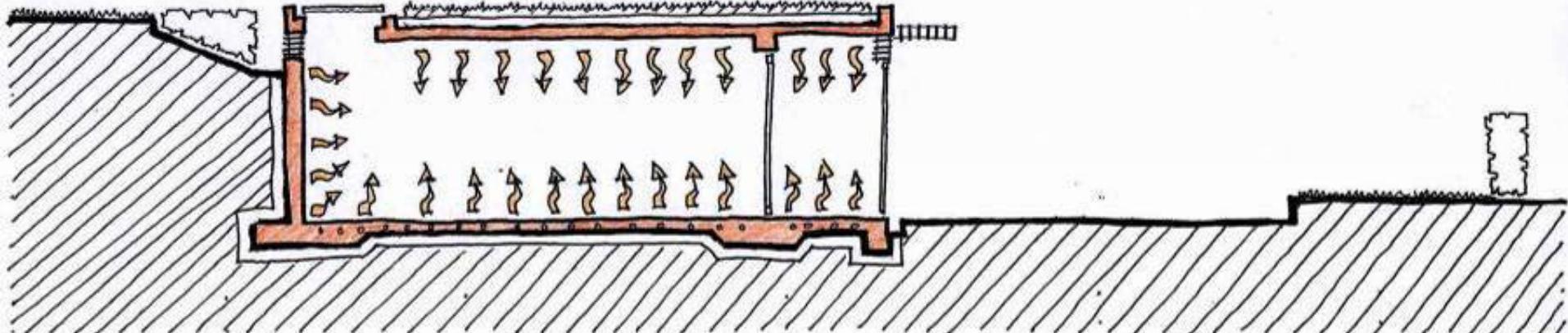
Insulation placed outside of heavy structural elements to maximise thermal mass

Mass helps to regulate temperatures for a more stable environment

Day/ night cycle particularly beneficial for summertime cooling

Exposed concrete floors & ceilings maximise effect

Works in combination with the natural ventilation









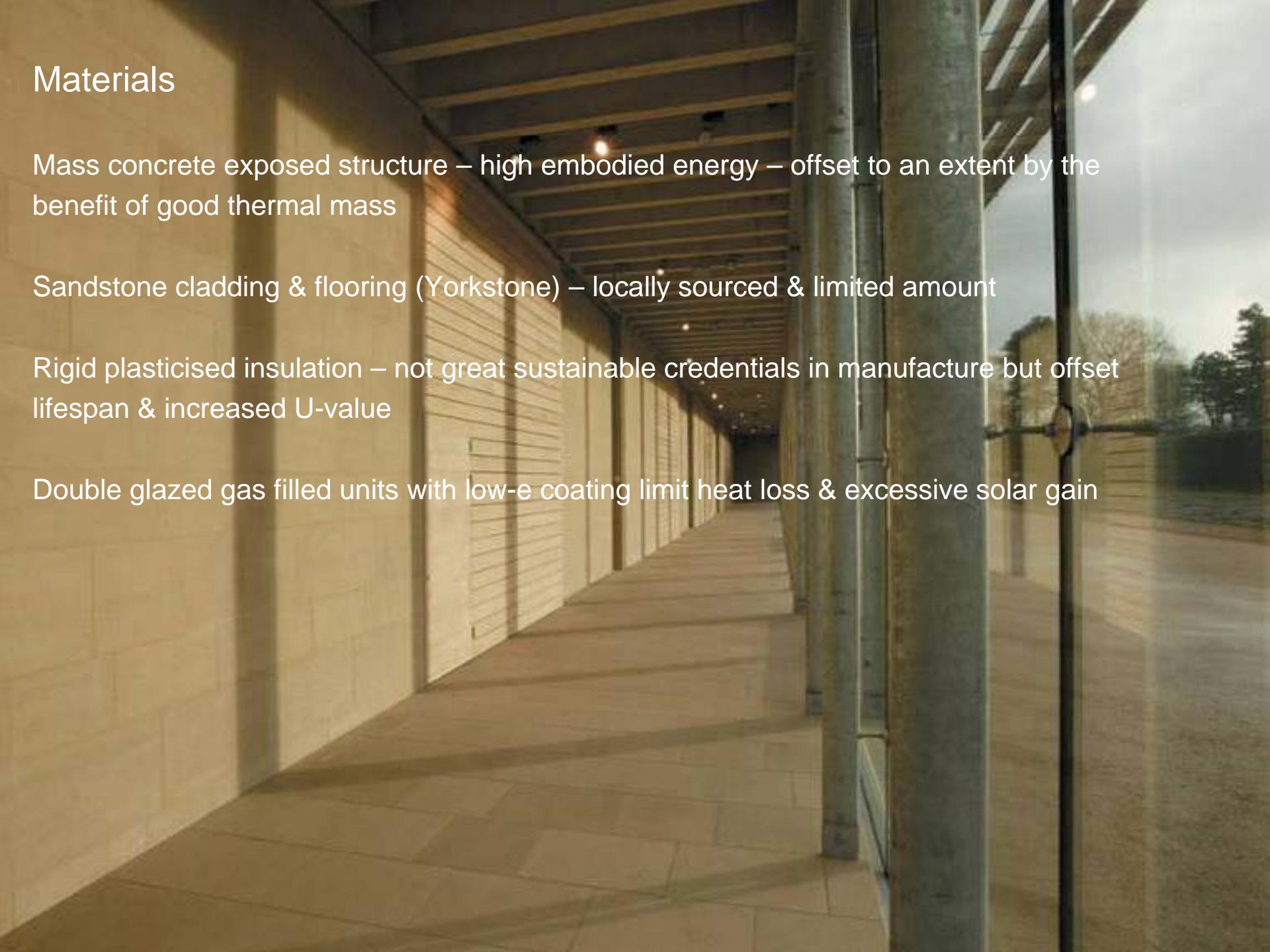
Materials

Mass concrete exposed structure – high embodied energy – offset to an extent by the benefit of good thermal mass

Sandstone cladding & flooring (Yorkstone) – locally sourced & limited amount

Rigid plasticised insulation – not great sustainable credentials in manufacture but offset lifespan & increased U-value

Double glazed gas filled units with low-e coating limit heat loss & excessive solar gain



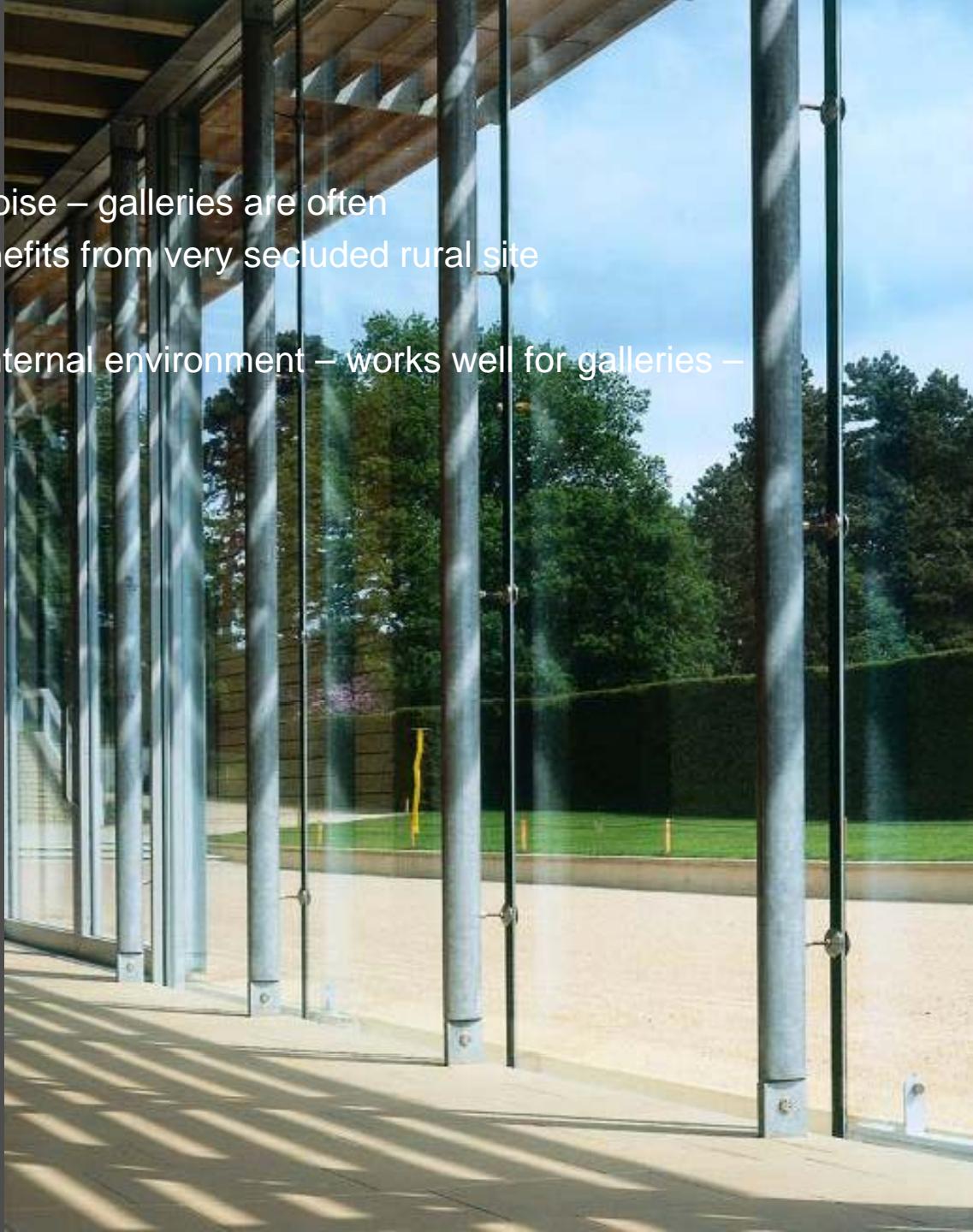


Existing visitor centre – gallery continues material language

Acoustics

Natural ventilation can let in external noise – galleries are often intended to be quiet spaces – YSP benefits from very secluded rural site

Hard internal finishes create echoing internal environment – works well for galleries – generally limited occupancy





Hard materials visually softened by use of timber & natural light



Existing visitor centre interior – gallery continues spatial & material language



Existing visitor centre & bothy garden



Existing visitor centre with completed gallery in context



Gallery in context from east

Yorkshire Sculpture Park Underground Gallery

Architects: Feilden Clegg Bradley Architects LLP

Project Manager & Cost Consultant: Burnley Wilson Fish

Structural Engineer: WSP

M&E Engineer: Ernest Griffiths & Son

Planning Supervisor: Turner & Townsend

Landscape Consultant: Land Use Consultants

Façade Consultant: Montresor Partnership

Contractor: Quarmby Construction Company Ltd

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