

Constructing Excellence in Wales

Merthyr Tydfil Town Hall

Reducing the Carbon Footprint of a Listed Building

17th June 2013

Ed Evans

Director, Exemplar and Demonstration Programme

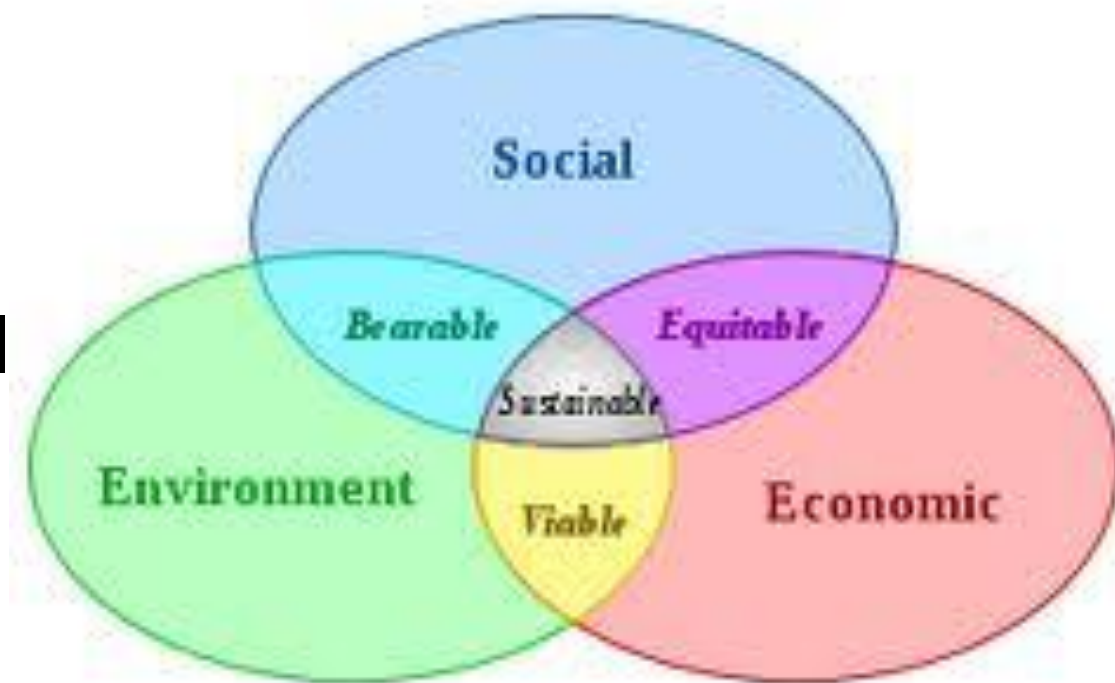
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ARBENIGRWYDD
YNG NGHYMURU



CONSTRUCTING
EXCELLENCE
IN WALES

Exemplar Programme

- Launched in March 2011
- “Worthy of being copied”
- Innovative but “well rounded” (and evidenced)
- Key actions at key stages = successful outcomes
- “Telling the story”
- Based on the sustainability model



Exemplar Programme

Case studies at 3 key stages :

- Post-design – intent
- Post-construction – delivery
- Post-occupation – outcomes

United Welsh Passivhaus

Two detached dwellings were developed by United Welsh Housing Association on a site in Oldor Vale as part of a Passivhaus Design Competition to Wales. The project aimed to demonstrate how designing and building to the Passivhaus standard can help meet tough modern energy requirements and keep carbon emissions to a minimum. It also hoped that the benefits learned will help ensure the success of larger scale social housing developments in the future.

The three bedroom Larch house was designed to achieve Passivhaus certification and the code for Sustainable Homes level 3 energy requirements, while the two bedroom Lime house took a lower cost approach to achieving Passivhaus Certification and Code level 3. The houses were not occupied (despite being empty) but designed to be occupied by Larch being heavily and monitored to verify that energy consumption.

The project has already informed the development of a skilled and experienced local supply chain able to work on other Passivhaus projects.

project details

client	United Welsh Housing Association
architect	Base Architects
contractor	Penrhyn Design & Build
value	Larch house 3-bed £179,959 Lime house 2-bed £115,499
project size	Larch house 3-bed 76m ² Lime house 2-bed 76m ²
contract method	JCT Design & Build 2016

what is an exemplar project?

An Exemplar is defined as 'something worthy of being copied'. The purpose of the Exemplar programme is to identify what actions have taken place at key stages of a project that have led to a successful outcome, so that the learning can be applied in other projects. The Exemplar programme has been developed to help identify the reasons why certain projects are successful in a standardised, identifiable way, which aligns with the industry what enabled these successes. An Exemplar considers all aspects of sustainability, including economic, social and environmental factors. Projects must demonstrate that they have been innovative in one or more of these aspects or a way that exceeds normal industry practices, while achieving at least minimum standards in all other areas of the project. This is to demonstrate that the scheme is well rounded and has not sacrificed one aspect to be successful in another, while also incorporating best practice measures that can advance the state of the industry. An Exemplar report trends to reflect the local industry goal of achieving a scheme's primary aims in a sustainable way, of acceptable costs.

notable achievements

- Several opportunities to reduce build costs have been identified, making the Passivhaus concept more accessible to wider social housing developments in the future.
- Passivhaus Certification was achieved, with energy use, energy demand and air-tightness of 0.34ach/1.0 and 0.30ach/1.0 respectively, which would significantly reduce modern energy bills.
- The dwellings meet the Code for Sustainable Homes level 3, 3-bed house and 2.5-bed house respectively, with the use of additional solar PV panels, listed as the 'lowest tariff'.
- Local supply chains have been developed to deliver systems and components locally that were capable of meeting the Passivhaus requirements.
- The project provides a visual demonstration to the public and the construction industry of what will be needed to meet tough new building standards in future.

what made the project successful

- Taking a 'fabric first' approach to the design of the dwellings helped achieve the energy efficiency requirements of the Code for Sustainable Homes and Passivhaus Certification.
- Learning from the development of the first plot (the Larch house) led to a different design approach on the Lime house, improving delivery and maintenance issues and identifying cost savings.
- The lessons learned, along with the upskilling of the local supply chain, will enable similar projects using local products and trades to be delivered in the future.

Panel review

Evidence based ie. KPI's

Project Locator

<http://goo.gl/maps/3snqG>

Google



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Get directions

My places



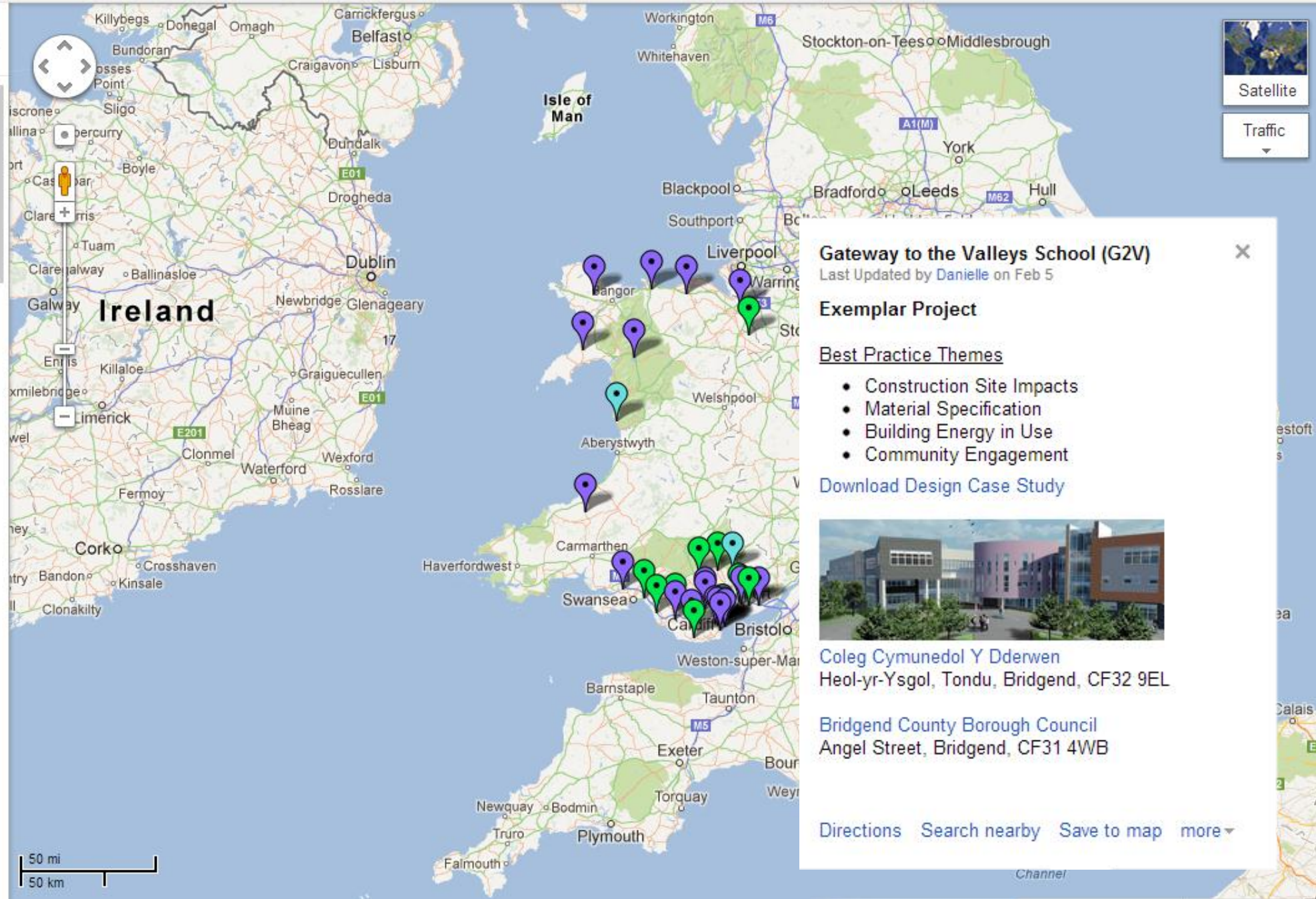
Save to My Places

CEW Best Practice Programmes - Project Locator

Exemplar Projects - Green
Demonstration Projects - Purple
Case Studies - Blue

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- Gateway to the Valleys School (G2V)**
Exemplar Project Best Practice Themes Construction Site Impacts



Case Studies



Contact us

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**Merthyr
Housing**

*Where People
Come First*

**Tai
Merthyr**

*Lle Daw Pobl
yn Gyntaf*

Merthyr Tydfil Old Town Hall - Community Value



The Old Town Hall – Why a Housing Association?

- Our Roots
 - History
 - Past Experience
 - Charitable Status
- Our place within the community



Mission

- To provide the people of Merthyr Tydfil with an excellent housing service at an affordable price.
- To work in partnership and to reinvest surpluses back into our community to:
 - Give people opportunities to grow;
 - To provide housing;
 - To improve the built environment



Our Vision for the Old Town Hall

Our vision for Merthyr Tydfil Old Town Hall is for it to reignite the ingenuity, entrepreneurship, creativity and pride of the community which is endemic in the heritage of the town.

Our mission is to successfully renovate the Old Town Hall, bringing it back into purposeful use and to ensure that this heritage asset is maintained for future generations.

The values that will underpin the way we work to deliver this project are:-

- **Participation**
- **Creativity**
- **Inclusion**
- **Educational**
- **Efficiency**
- **Accountability**



The Strategic Context

- **Heads of the valleys Regeneration Programme**
- **European Physical Regeneration Project: £20 million.**
- **Merthyr Learning Quarter and Castle Cinema Redevelopment: £40 million**
- **Heritage Lottery Townscape Heritage Initiative: £4 million**
- **Arts & Creative industries**





**Merthyr
Housing**

*Where People
Come First*

**Tai
Merthyr**

*Lle Daw Pobl
yn Gyntaf*

For more information

Please feel free to get in touch if you have an idea you would like to develop or would like more information

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The Procurement of:

Red House/Old Town Hall Project

Merthyr Tydfil

CEW – 17/06/13

The Buy Decision

- Produced draft procurement strategy in June 09
- Initial proposals considered scheme with façade retention, greater levels of funding and more commercial space
- Consideration of D&B with ECI and Framework option (Devco/Genus Development Framework)
- MTHA subject to Public Contract Regulations i.e. OJEU process

- Project objectives refined in early 2010 with structural investigations showing internals solid
- Enhanced focus on historical elements, sustainability, and needs of end user/operator
- In January 10 we had elemental cost plan and sketch scheme from Chapter Arts, Cardiff
- Produced draft spend profile & programme March 10 and refined procurement strategy adopting traditional approach with JCT SBC

- Traditional procurement offered greater control of design in Grade 2* listed building
- MTHA pump primed discrete packages of design and costing works allowing more robust projections of time/cost feeding into business plans (risk assessment used throughout)
- Our overall project programme reflected the staggered & overlapping procurements of design team i.e. CDM & architect ahead of QS, M&E and structural engineers

- Selection processes based on Cost/Quality mix
- October 10 procured architects through OJEU on restricted procedure, lump sum fee
- March 11 procured rest of design team (sell2wales/buy4wales i.e. non OJEU)
- Designs and Bills prepared to F2 stage i.e. beyond that required for normal tender production (2nd release of info, November 11.)
- October 11 Contractors advert through OJEU restricted procedure, lump sum

Features

- Site familiarisation tours during tender period
- Interviews with presentations (scored)
- Contractor's briefing session to explain ITT
- Consultants part of Contractor selection process
- Architects provided sketch designs for roof over courtyard
- Resource allocations of staff required
- Programmes and cashflows from Contractors
- Used RIBA, RICS, ACE and JCT forms
- GMP approach to Final Account and time

END

Gracia Consult Ltd

Procurement Strategy & Project Monitoring

www.graciaconsult.com

Old Town Hall Merthyr

Approach to Energy Efficiency

Colin King

Part of the BRE Trust



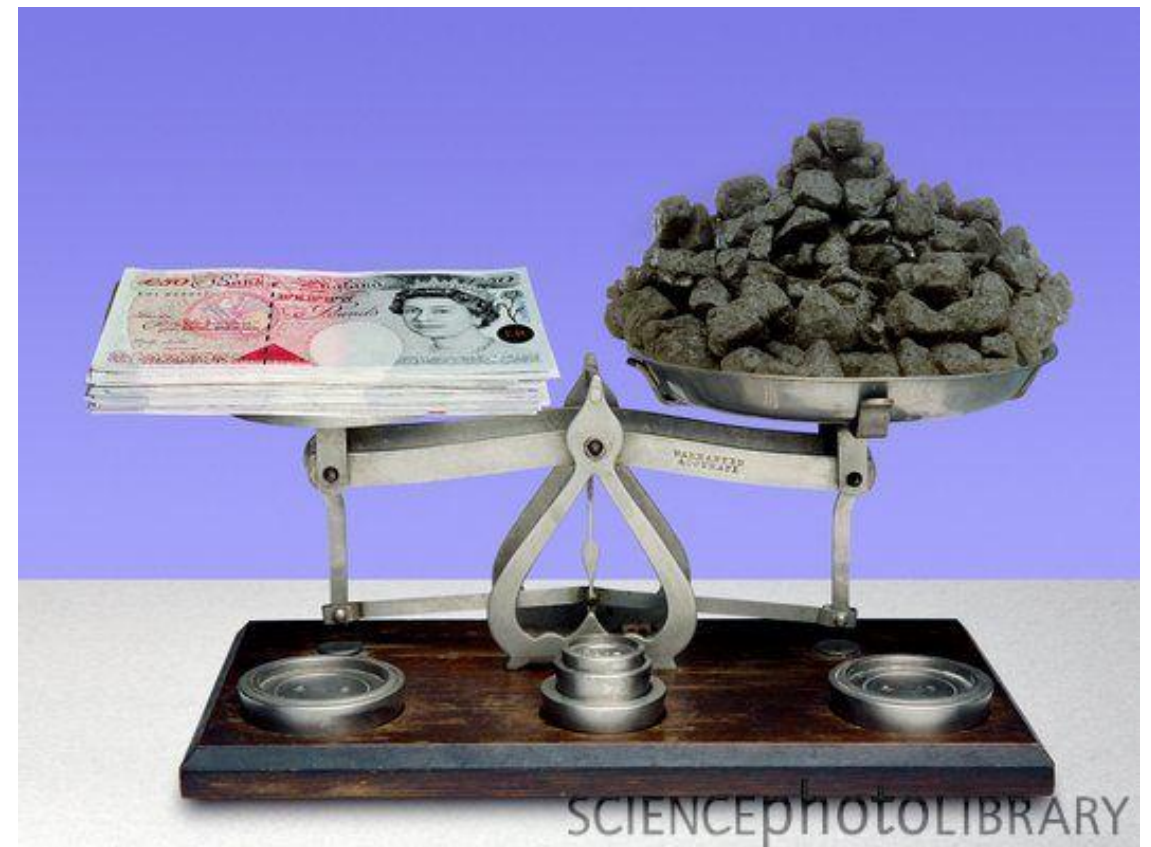
Grade 11 Listed Building

- Subject to normal listed building consents
- Desire to deliver a sustainable building
- Not just materials and technologies
- Running Costs
- Passive approach
- Whole Life Costing – maintenance v capital cost



Issues

- Old brick wall
- Exposed location
- Empty for many years
- Very damp building
- Strange growths in the fabric
- No requirement for unjustifiable technologies or solutions.

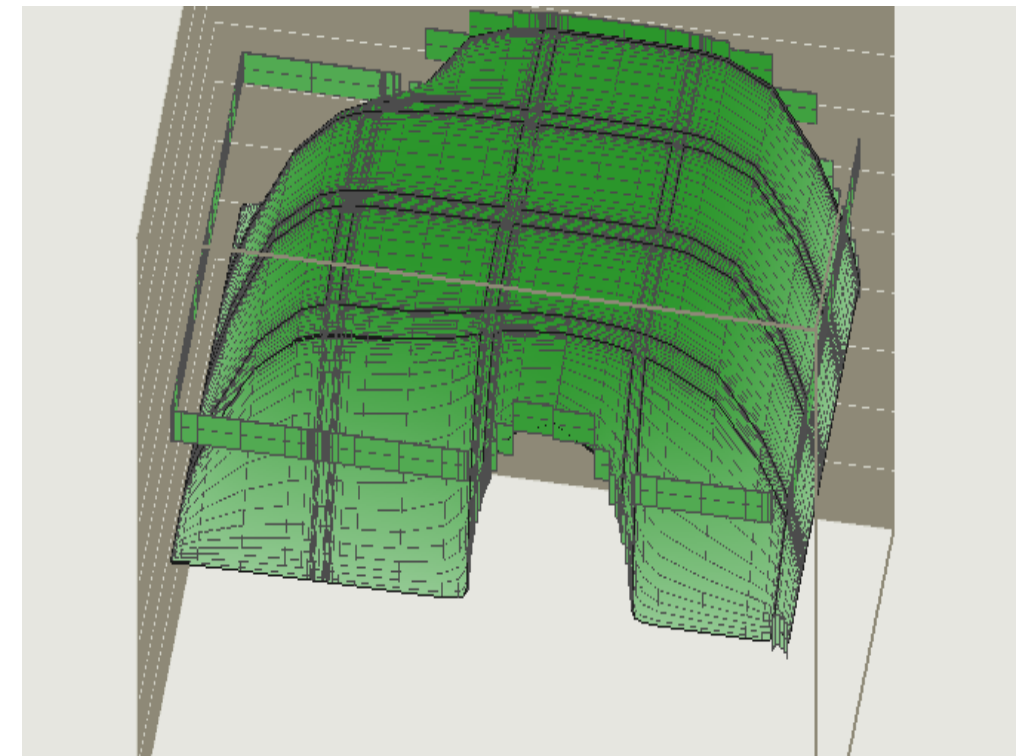
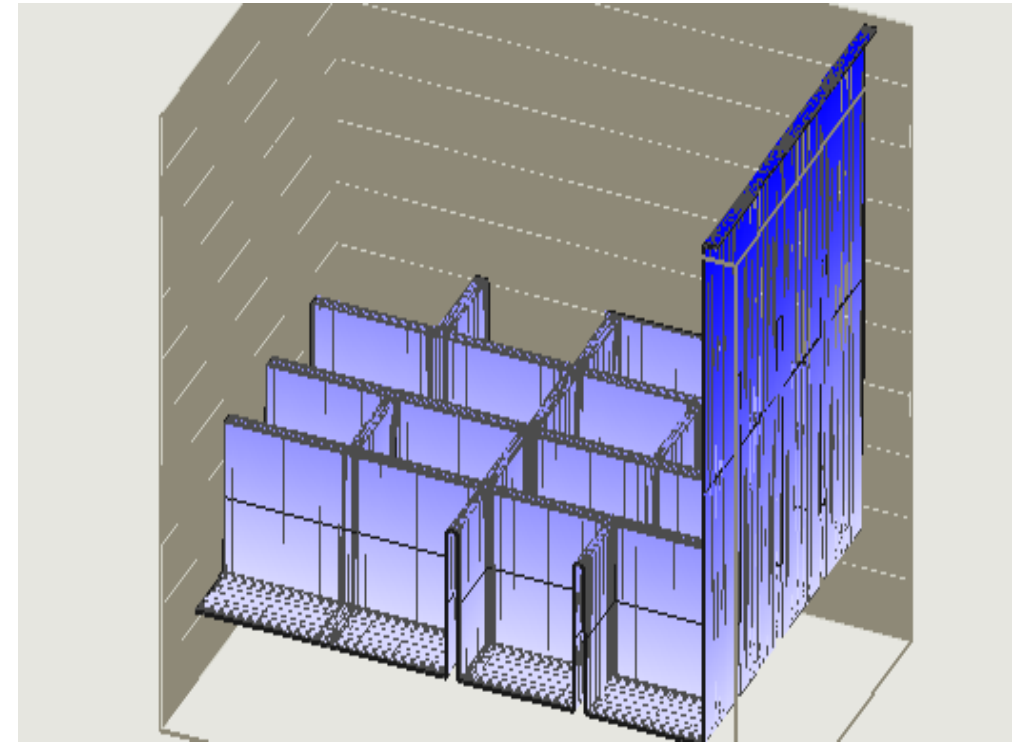


Issues



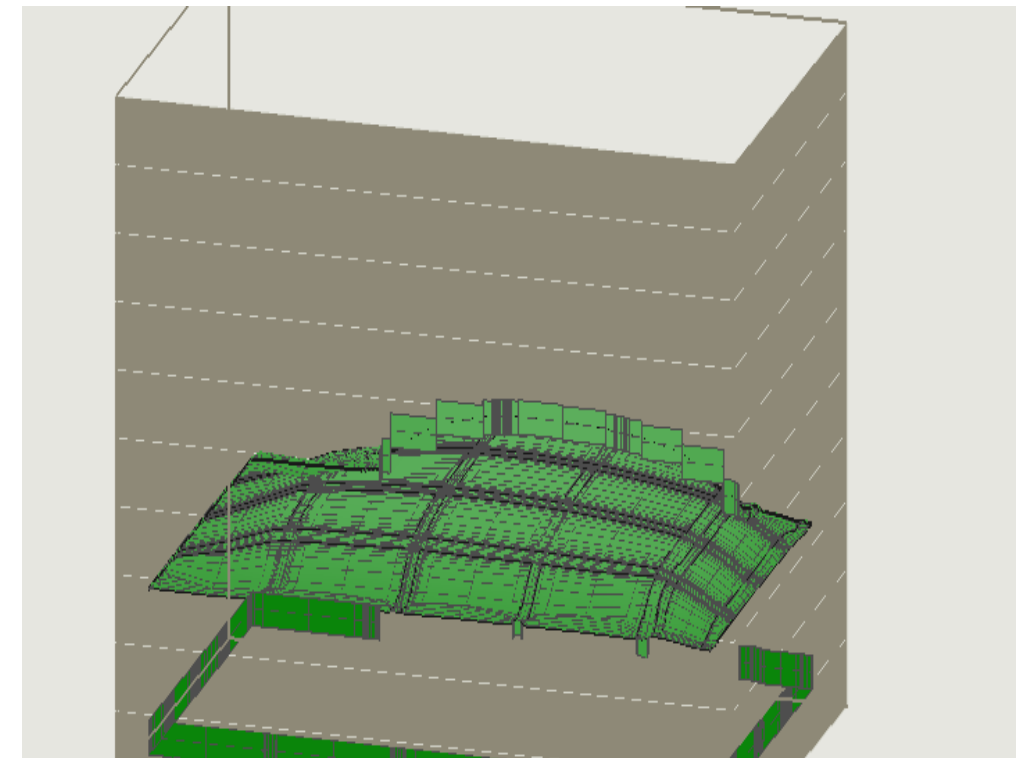
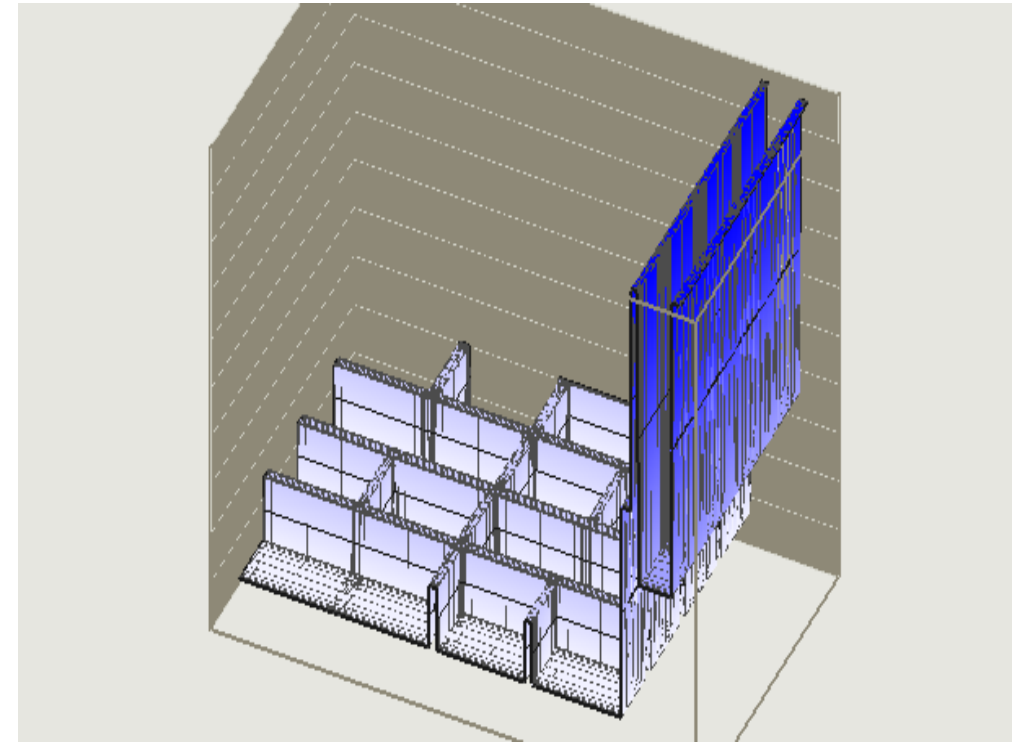
The Solution ?

- Wufi 2D modelling of heat and moisture transfer through walls
- Actual weather data
- Long term climate change analysis
- Insulation applied by zone and risk
- Sampling of materials and moisture content

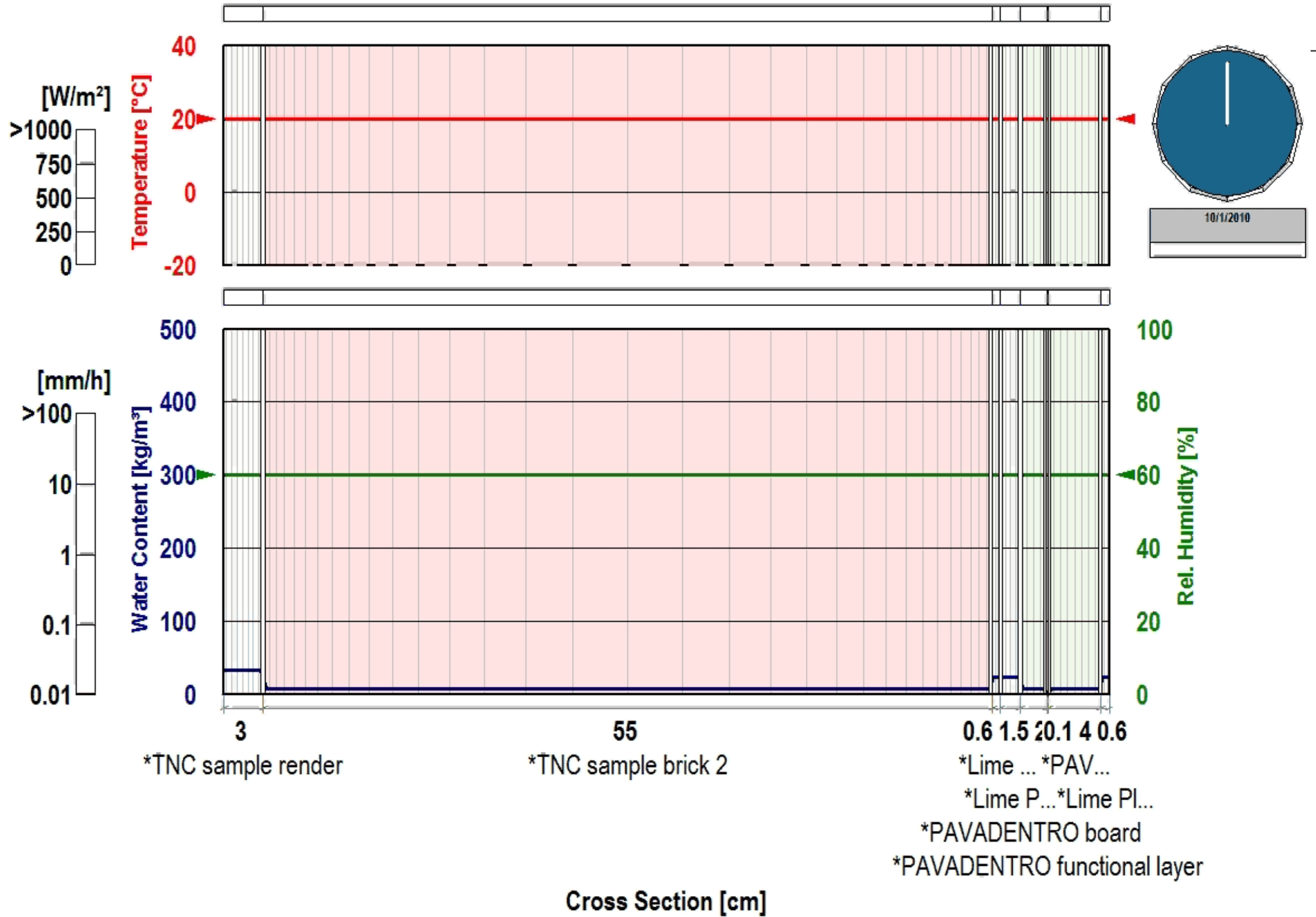


Modelling Results – Dynamic Modelling

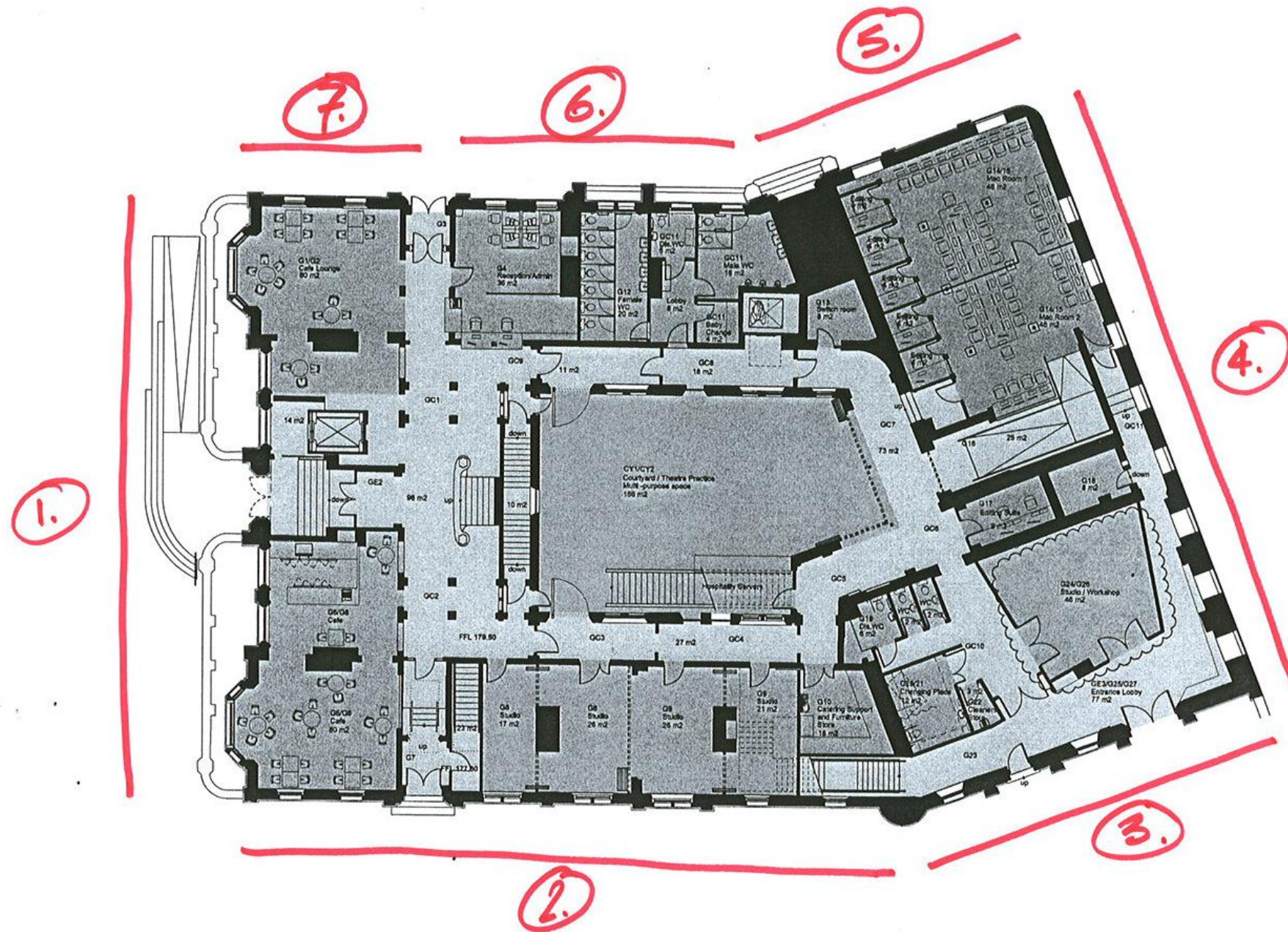
- Water content shifted to where it can be dealt with. Using open strand insulation and lime based mortar.
- RH levels lowered in the wall
- 2 climate change predictions modelled – no significant risk even in worse case scenario.



Pavadentro

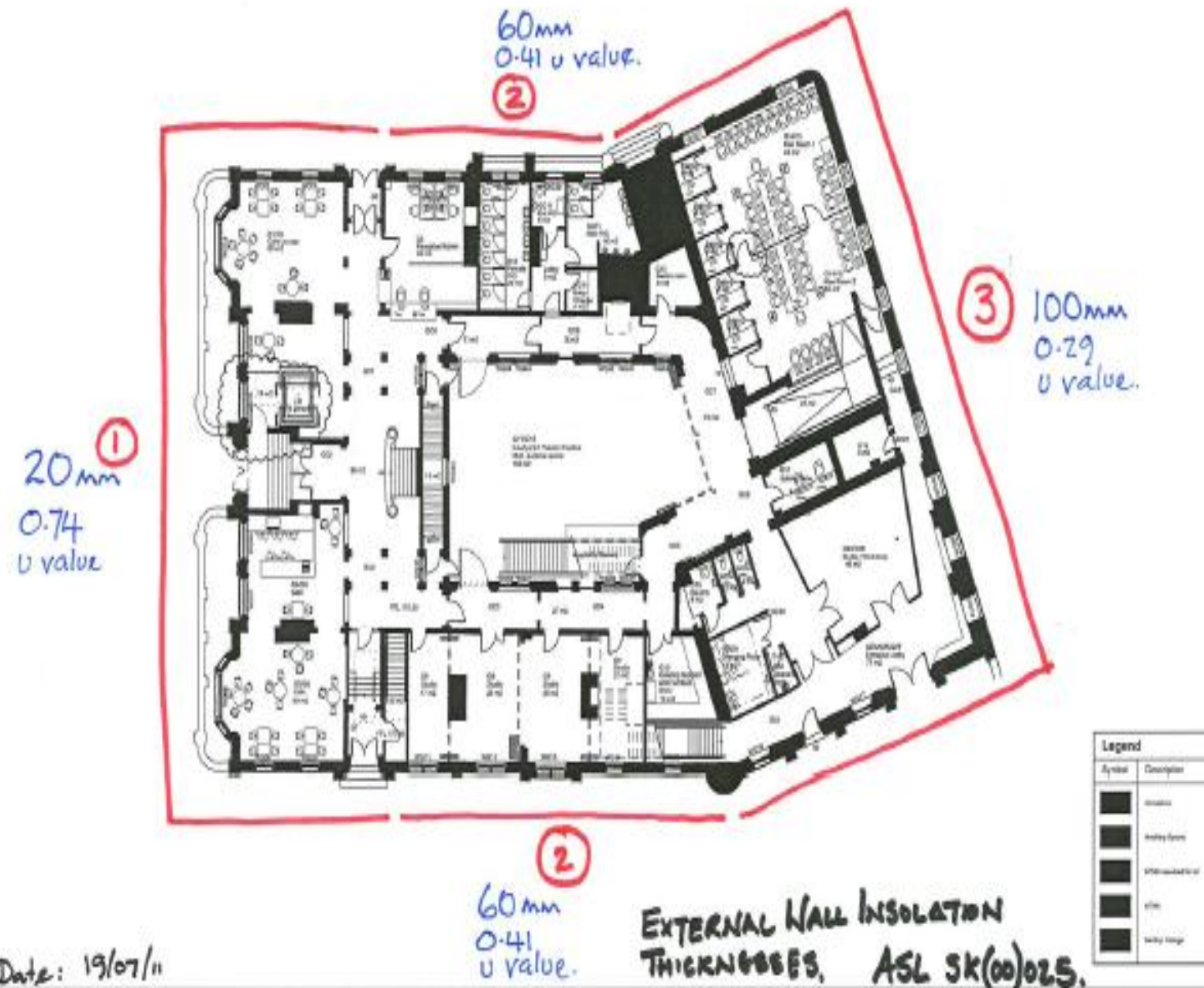


Original Approach



⑧ - AS ① EXCEPT WITH OAK PANELING

Zoned Approach Solution



Internal Building Conditions

- Although a technical solution was possible – issues around suitable resilience, robustness, and acceptable maintenance costs.
- High moisture content in the walls
- Compatibility of insulation and lime plaster



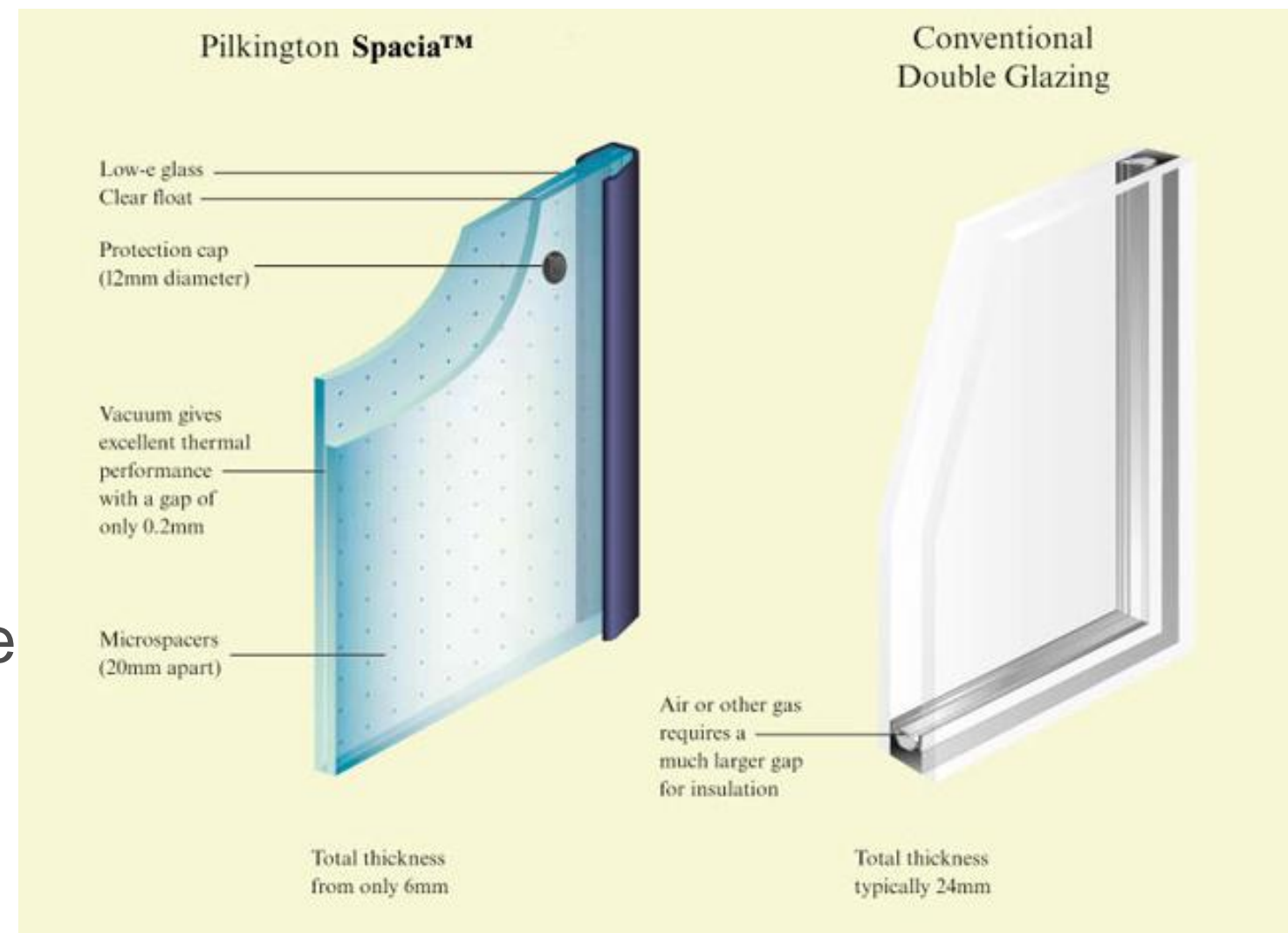
Other Approaches

- External space now internal space.
- Balance of the sustainable principles
 - Lower running costs
 - Reduced CO² emissions
 - Heritage preserved and enhanced
 - No risk to external fabric
 - Practical solutions for long term viability.
 - Flexible space for end user changes.



High performing glazing

- Pilkington Spacia
- External space now internal space
- Insulation where appropriate



Exemplar

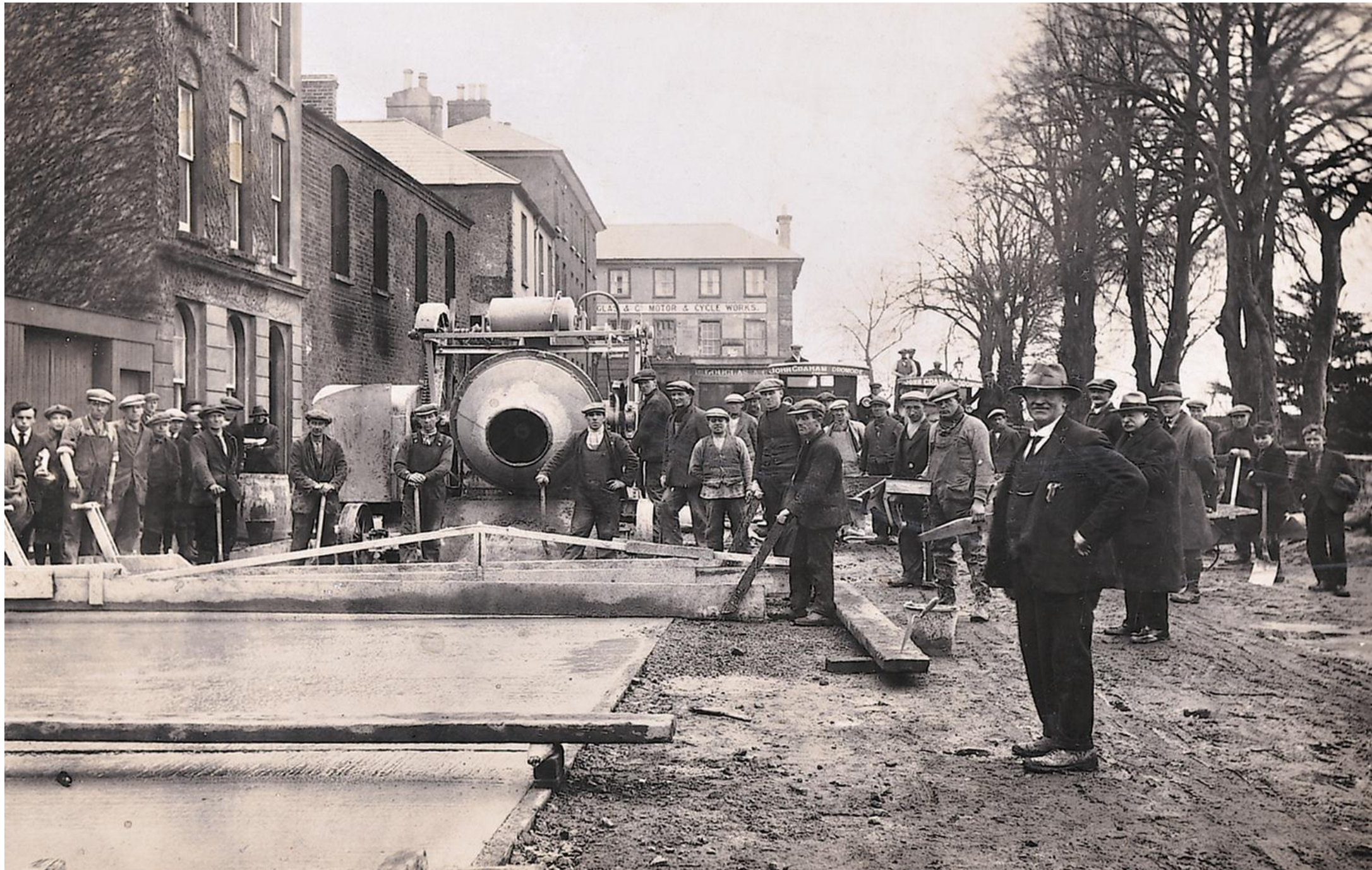
- The process
- The people/ their bravery
- The balance of heritage and sustainability in all its aspects
- Life Cycle Analysis



Gerry Rowe
Contracts Director
GRAHAM



Practicalities & Buildability





Practicalities & Buildability

❑ **Discovery**

- Working with / providing solutions to the unknown

❑ **New into Old**

- Integrating modern materials and equipment without compromising original aesthetics

❑ **Access and Storage**

- Constructing building with limited site access and storage facilities leading to Alternative access routes
- Careful scheduling and managing site deliveries

❑ **H&S and Productivity**

- Renovating and constructing within building, whilst being able to maintain high standard of Health & Safety
- Ensuring adequate workspaces were provided to facilitate productivity on site

Labour & Materials Issues





Labour & Materials Issues

- ❑ **Locally Sourced Suitable Materials**
 - Sourcing sufficient & suitable materials utilising locally sourced materials & suppliers
 - Local supply chain that met our program of works or having to reach agreeable compromise
- ❑ **Low Interest from Local Supply Chain**
 - Lower than expected interest from Local Supply Chain to become involved in 'Local Community Project' (Low attendance at an organised 'Meet the Buyer' event)
- ❑ **Local Contractor Issues**
 - Being able to source Local Contractors who had; sufficient resources, specialist experience & able to facilitate 'Out of Hours' working when necessary
- ❑ **Manufacture of Bespoke Materials**
 - Having to manufacture bespoke materials & machine tools to ensure replication of original features were integrated into the fabric of the building
- ❑ **Liquidation of Supply Chain**
 - Dealing with a Contractor who had gone into liquidation: Dealt with HR issues around employment of operatives on site, and honoured supply Chain Commitments to source materials allocated to project. Resequencing of the works.



Thank You

Delivering quality construction projects in a safe, professional and sustainable manner for over 200 years