Constructing Excellence in Wales Demonstration Event

YSGOL FFWRNES

Gwasanaethau Eiddo
Cyngor Sir Gâr Carmarthenshire County Council
Property Services

wrw

ATKINS

Austin·Smith:Lord

C3 CONSULT

saba SABA CONSULT

Melin

Ysgol y Ffwrnes

Demonstration

Event

5th March 2015

ADEILADU ARBENIGRWYDD YNG NGHYMRU

CONSTRUCTING EXCELLENCE IN WALES

Welcome

Ed Evans

Director Exemplar & Demonstration Programme

Constructing Excellence in Wales

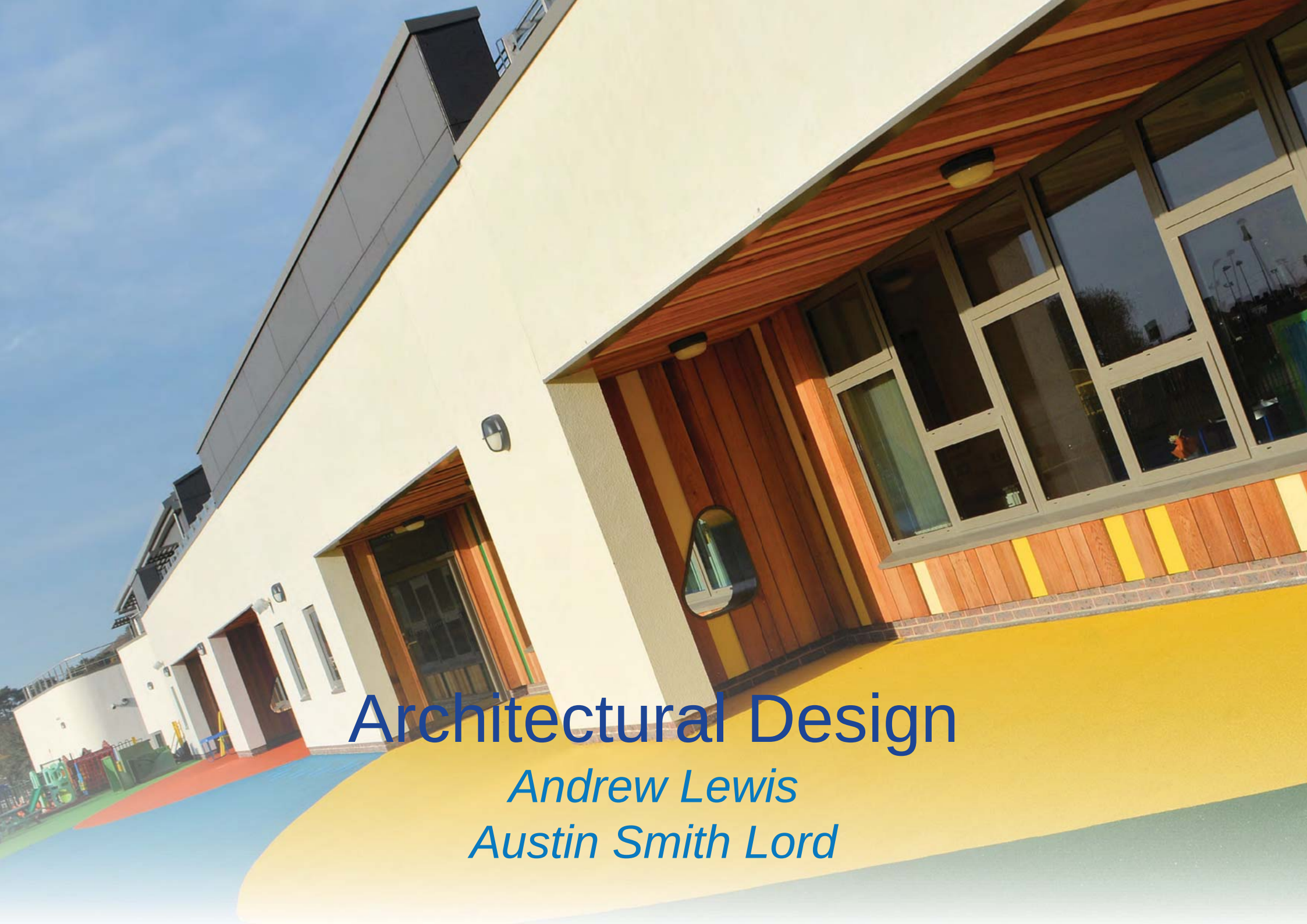
ADEILADU ARBENIGRWYDD YNG NGHYMRU
CONSTRUCTING EXCELLENCE IN WALES

Agenda

■	Introduction	-	WRW Construction Ltd - *Jon Williams*
■	Architectural Design	-	Austin Smith Lord - *Andrew Lewis*
■	Ground Conditions	-	CB3 Consult - *Dylan Gravell*
■	Mechanical & Electrical	-	Saba Consult - *Philip Mead*
■	BREEAM	-	Melin Consultants - *Matthew John*
■	Client Perspective	-	Carmarthenshire County Council - *Paul Roberts*

Introduction

Jon Williams
WRW Construction Ltd



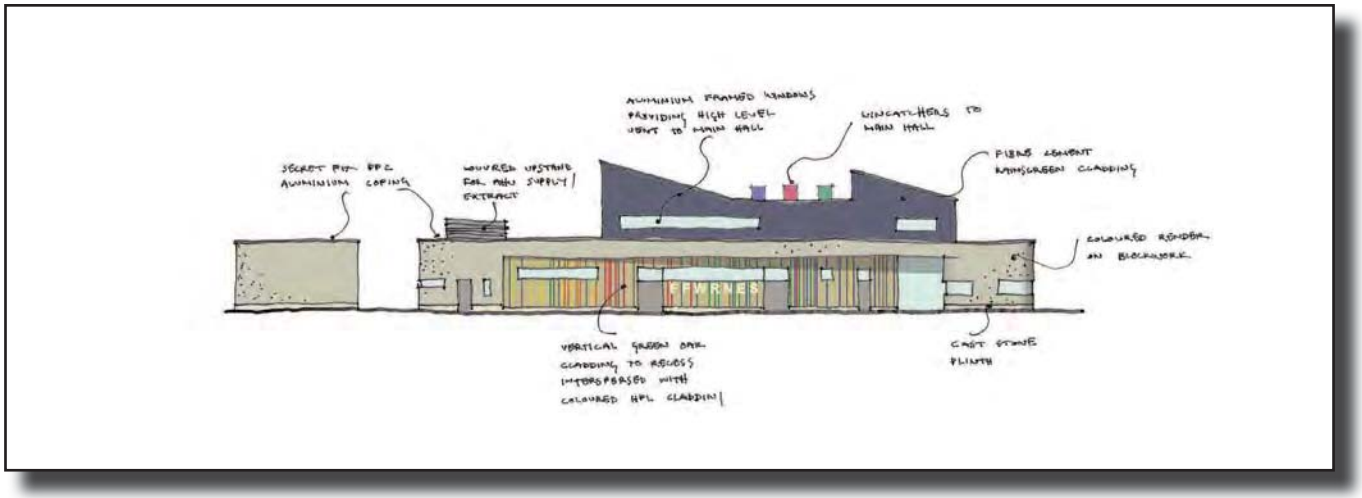
Architectural Design

Andrew Lewis

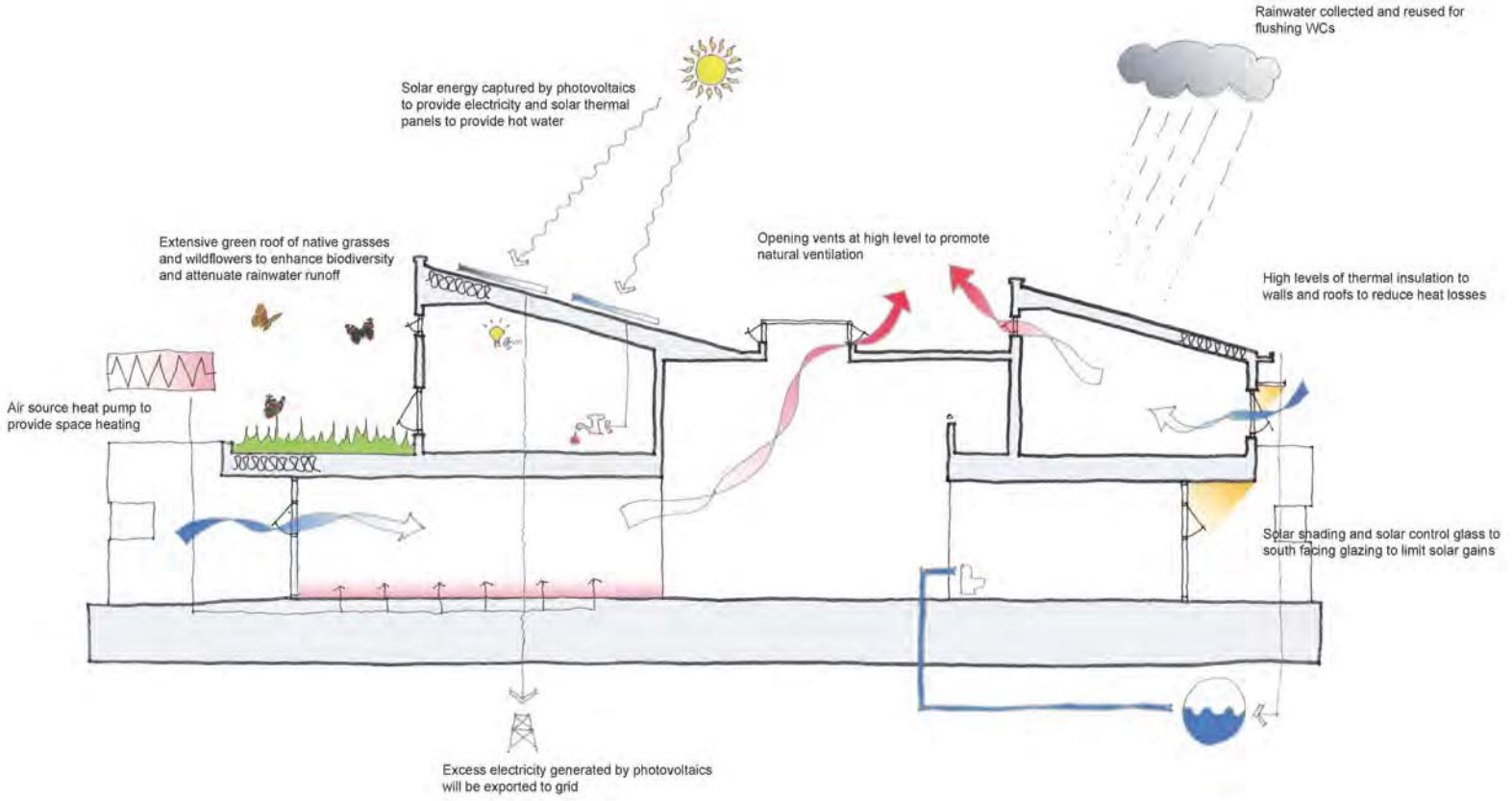
Austin Smith Lord

PROJECT OVERVIEW

- 420 pupil Primary School + Nursery
- WRW team appointed at Stage D
  - BREEAM 'Outstanding'
  - Input prior to planning
  - Simplified servicing strategy
  - Alternative substructure design
- Design Team Ownership
  - Challenging site
  - Ownership
  - Ground conditions
  - Watercourse
  - Ecology



ENVIRONMENTAL SUSTAINABILITY



LAYOUT

OUTCOMES

- Team collaboration - Early contractor involvement
- Limited construction phase changes
- BREEAM ‘Outstanding’ achievable
- Successful, repeatable design
- Happy staff and pupils

Improvements

- Colour and activity on the play terrace
- Earlier SFS subcontractor design
- Air tightness

Ground Conditions

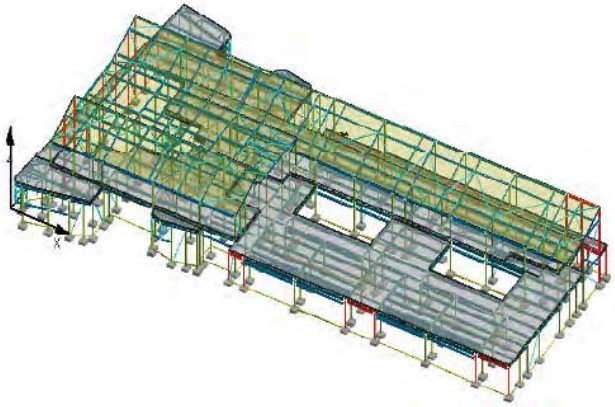
Dylan Gravell
CB3 Consult

SITE SELECTION

Item	Ideal Site	Furnace Site	Solution
Ground Conditions	Bearing Capacity of 150kN/m2 – 200 kN/m2 at around 1m – 1.5m below ground level.	Bearing Capacity of 75kN/m2 at 1.5m below ground level.	Precast piles used to support off the underlying rock.
Ground Water	Ideally not present at shallow depth.	Present at 1.7m below ground.	Foundations kept above ground water level supported on precast piles
Services	Ideally none crossing the building footprint.	DCWW adopted sewers and water main crossing the site.	Approval given by DCWW to site location and easement sizes.
Drainage	No restrictions on foul connection. Surface water disposal via soakaway or attenuated flow to watercourse.	Within the Burry Inlet scheme required to comply with MOU. Surface water to be removed to accommodate foul flows. Surface water attenuated and discharged to watercourse.	Surface water from Cricket Club and Tennis Club removed from combined DCWW sewer to accommodate foul flows. Surface water flows fed into new attenuated system for the school.
Contamination	Not present	Elevated heavy metal and TPH in play areas.	Capped with hard paving or soft landscaping.
Ground Gases	Not present	Due to presence of worked coal seams considerable testing undertaken. No gases found.	Significant testing and monitoring.

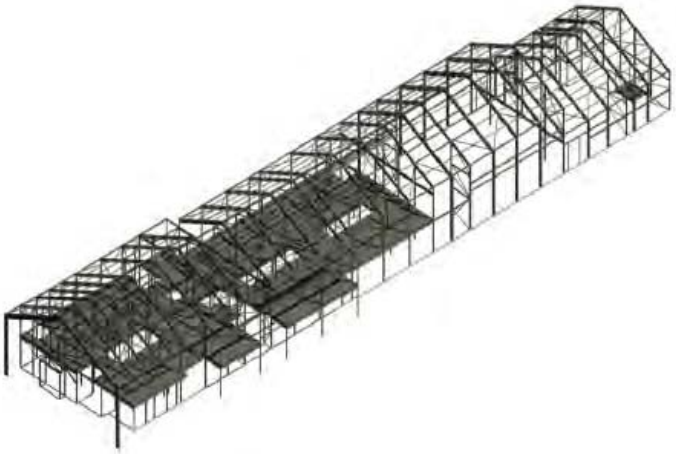
WHAT WOULD WE DO DIFFERENTLY?

- Design modelled and analysed using Fastrak Building Designer.
- Drawings produced using AutoCAD in 2D.



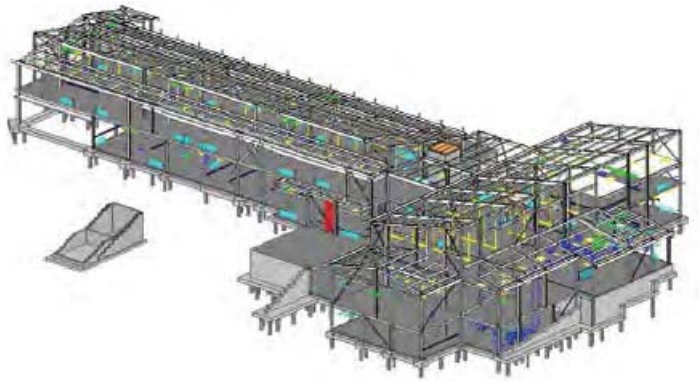
YSGOL BRO DINEFWR

- Model produced in Revit and input into Fastrak Building Designer to analyse and design.
- Results re-inputted to Revit using ifc files.
- 2-D Plans, elevations and sections produced using Revit model.



YSGOL CARREG HIRFAEN

- Model produced in Revit and input into Fastrak Building Designer to analyse and design.
- Results re-inputted to Revit using ifc files.
- Architects and M&E engineers model inputted and clash detection undertake using Naviswors.
- 2-D Plans, elevations and sections produced using Revit Model.
- Revit model inputted into Tekla to produce fabrication drawings.



M&E

Philip Mead

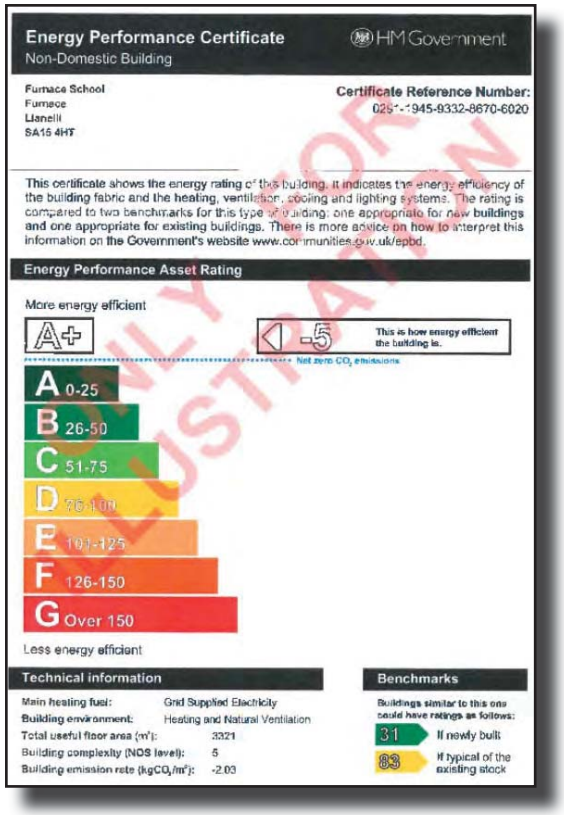
Saba Consult

RENEWABLE SYSTEMS

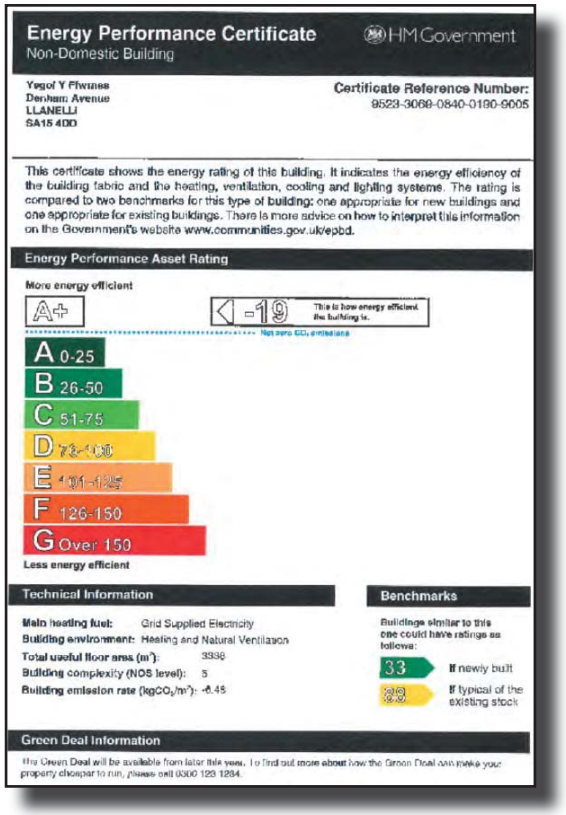
- Photovoltaic Panels - 700m²
- Air Source Heat Pumps - 3 No 30kW Units
- Rainwater Harvesting System - 20000 litre storage tank

PROJECT AIM

- Zero Carbon School
- Achieved Utilising Low and zero carbon technologies, Air Source Heat Pumps, PV Panels in conjunction with good building U-Values and target air permeability rates.
- Design Stage EPC achieved - 5
- “As-Built” EPC Achieved - 19



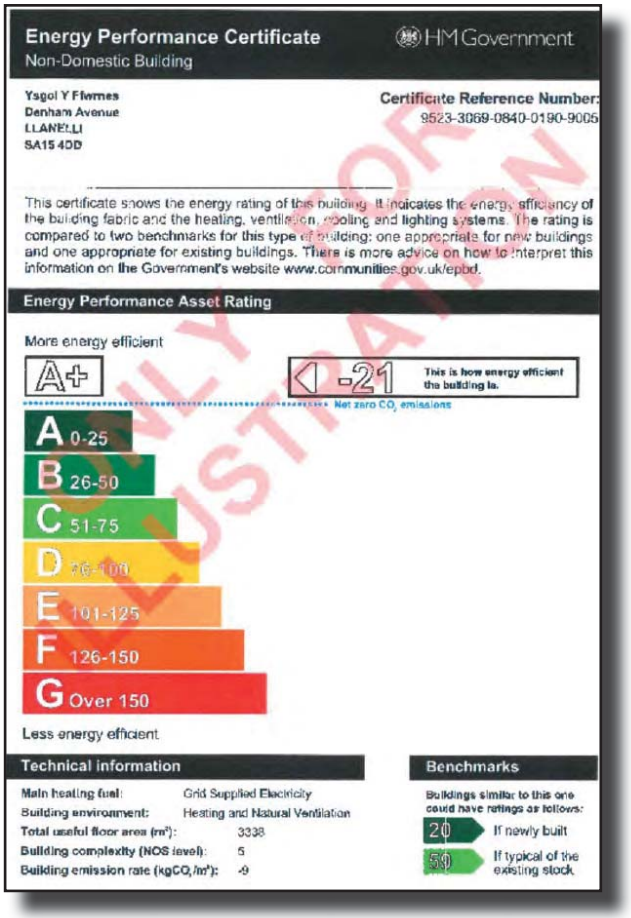
Design Stage EPC



“As Build” EPC

COMPARISON TO CURRENT STANDARDS

- Building Regulations Part L2A Updated in 2014.
- Based upon the new Building Regulation Part L2A 2014 (Wales) Requirements the building achieves an EPC rating of -21
- Building Primary Energy Targets added
- Target Primary Energy Consumption 69.49 kWh/m².annum
- Building Primary Energy Consumption 61.85kWh/m².annum



BREEAM

Matthew John

Melin Consultants

BREEAM OVERVIEW

- Melin assisted WRW with tender submission
- BREEAM 2008 Education Assessment
- Planning requirement - 'Very Good'
- Client requirement - 'Excellent'

DESIGN TEAM APPROACH

- Frequent progress meetings where BREEAM is retained as an agenda item
- Continuity of project team through to completion
- Site Team involved early in design
- Regular communication

Stage of Assessment	BREEAM Score	BREEAM Rating
Interim - Design Stage	87.64%	OUTSTANDING*

* Please note: there are requirements additional to achieving a score of 85% or more for an Outstanding Rating (refer to the scoring section of the assessment manual)

Minimum BREEAM Standards

Rating Level	Pass	Good	Very Good	Excellent	Outstanding
Minimum Standards Achieved	YES	YES	YES	YES	YES

Building Performance by Section

	Environmental weighting	Credits available	Credits achieved	% Achieved	Weighted Score
Management	12.00%	20.00	19.00	95.00%	11.40%
Health & Wellbeing	15.00%	16.00	15.00	93.75%	14.06%
Energy	19.00%	21.00	21.00	100.00%	19.00%
Transport	8.00%	9.00	4.00	44.44%	3.56%
Water	6.00%	8.00	7.00	87.50%	5.25%
Materials	12.50%	15.00	12.00	80.00%	10.00%
Waste	7.50%	7.00	5.00	71.43%	5.36%
Land Use & Ecology	10.00%	12.00	7.00	58.33%	5.83%
Pollution	10.00%	11.00	9.00	81.82%	8.18%
Innovation	10.00%	10.00	5.00	50.00%	5.00%
				Total BREEAM Score	87.64%

SPECIFIC CREDITS

Man 6 /7 - Consultation / Shared Facilities

Man 6	Consultation	One credit where evidence provided demonstrates that consultation has been, or is being, undertaken and feedback given to the local community and building users. Two credits where, in addition to the above, evidence provided demonstrates that the consultation process is being, or has been, undertaken using an independent method such as DQI, DQM or School Works, facilitated by a third party.		2		2
Man 7	Shared Facilities	One credit where evidence provided demonstrates that shared facilities have been provided as a consequence of consultation feedback. Two credits where, in addition to the above, evidence provided demonstrates that these facilities can be accessed without compromising the safety and security of the building and its occupants.		2		2

- DQI consultation with project stakeholders.
- Shared facilities incorporated into design.

SPECIFIC CREDITS

Ene 1 - Reduction in CO^2 Emissions

Energy				
Ene1	Reduction of CO^2 Emissions	Up to fifteen credits where evidence provided demonstrates an improvement in the energy efficiency of the building's fabric and services and therefore achieved lower building operational related CO^2 emissions.	15	15

- 15 credits achieved, plus 1 exemplary credit for an 'as built' EPC with a CO^2 index of -19.

SPECIFIC CREDITS

Mat 1 - Materials Specification

Materials				
Mat 1	Materials Specification (major building elements)	Up to six credits are available, determined by the Green Guide to Specification ratings for the major building finishing elements.	6	6

- 6 credits achieved for the majority of major elements being ‘Green Guide to Specification’ A+ rated.

DID WE ACHIEVE WHAT WE SET OUT TO DO?

Enhanced performance in Ene 1 - Reduction of CO^2 emissions ('As built' EPC -19)

Considerate Constructors Scheme - Exemplary Credit achieved with CCS score of 44/50

BREEAM 2008 vs BREEAM 2011

How would the building perform?

Ene 1 Reduction of CO2 Emissions - Requires a 40% improvement of BER over TER

Thermographic Survey

Post Occupancy Evaluation

Air Quality Plan & VOC Testing

Energy monitoring (3 years after occupation)

Ene 8 - Specification of Energy Efficient Equipment

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BREEAM 'Outstanding'

Achieving the standard:

- Contractor Driven
- Experienced Project Team
- Client buy in
- Early involvement of BREEAM Consultant
- Regularly monitored


BREEAM

Code for a Sustainable Built Environment

Interim Certificate – Design Stage

This is to certify that:

Ysgol Ffwrnes,
Denham Avenue,
Llanelli,
Carmarthenshire,
SA15

has been assessed by:

BREEAM 2008: Education

by a licensed assessor for:

Carmarthenshire County Council

and has achieved a score of 87.64%

Outstanding

Certificate number: BREEAM-0045-5865 Issue: 02

Building CO2 index: -4
Ene 1 Reduction of CO2 emissions credits achieved: 15

28 August 2013

Matthew John
MJ09
Melin Consultants
WRW Group
CB3 Consult
CCC Property Projects & Design Section

Richard Hardy
Austin Smith Lord
SABA Consult
Carmarthenshire County Council

BREEAM

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Gwasanaethau Eiddo Cyngor Sir Gâr Carmarthenshire County Council Property Services

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Client Perspective

Paul Roberts

Carmarthenshire County Council

‘ON REFLECTION’.....

Success

- The design, procurement and construction process have contributed to a successful end result
- A great teaching and learning environment for the staff and children for many years to come
- That will lead to improved outcomes in the future.

Key to success

- Clients high aspirations
- The right level of funding
- Appropriate time during design & construct programme
- Procurement approach - Framework

..... this project was truly a good demonstration of **how ‘things should be done’**

‘Back in the day’.....

- WAG’s guidance and CCC’s business cases were focused on Innovation, Sustainability, Community Benefits and Best Practice etc.
- This allowed the design team a degree of artistic license and allowed areas such as the inner courtyards, roof terrace, green roof, landscaped areas and Izc technologies to be incorporated ....
- Which makes the school what it is today ... A light and airy building with a variety of learner settings that is user friendly and efficient.

‘Current day’....

- WAG’s guidance has changed with more of an emphasis on Best Value & Efficiency Savings
- CCC are keen to embrace Best Value whilst maintaining the principles that were deemed to have contributed to the overall success of this project.

The Core Principles to 'take forward'

- **Careful site selection** - safe routes to school -future funding exclusions
- **Community involvement** - DQI process
- **Sustainability** - whole life costing - reduce revenue costs
- **Early contractor involvement** - collaboration, continuity of design team, partnering ethos.
- **Community Benefits** - shared facilities, local suppliers, Apprentices, Trainees etc.
- **Soft landings** - training of end users & maintenance dept

Design Review ....

Feedback on areas that are considered critical:

- Maintaining the classroom arrangements - direct access to cloakroom and toilets
- Maintain larger classrooms - future flexibility
- Maintain classroom stores - direct access and large enough
- Maintain direct access to external play / learning
- Maintain covered areas directly outside classroom

Feedback on areas that are considered to be underutilised:

- Changing rooms
- Community suite
- Rooms identified for dual purpose
- Reduced Areas
- Emphasis now on wifi - opportunity to reduce hard wired data and power

Future Design Solution ....

These lessons have now been applied to our next project :

cynllun o'r llawr gwaelod ground floor

llawr gwaelod ground floor
01 prif fynedfa main entrance
02 derbynfa / swyddfa reception / office
03 dosbarth meithrin nursery classroom
04 dosbarth derbyn reception classroom
05 dosbarth blwyddyn 1 year 1 classroom
06 dosbarth blwyddyn 2 year 2 classroom
07 ystafell athrawon staffroom
08 ystafell beiriannau plant room
09 cegin kitchen
10 neuadd fwyta dining hall
11 prif neuadd main hall
12 atriwm / gofod hyblyg atrium / flexible space

cynllun o'r llawr cyntaf first floor

llawr cyntaf first floor
13 bwyd / gwyddoniaeth / dt food / science / dt
14 dosbarth blwyddyn 5 year 5 classroom
15 dosbarth blwyddyn 4 year 4 classroom
16 dosbarth blwyddyn 3 year 3 classroom
17 dosbarth blwyddyn 6 year 6 classroom
18 amgylchedd dysgu awyr agored outdoor learning environment
19 canolfan adnoddau dysgu learning resource centre

Standardisation

- As can be seen there are many similarities to the New Furnace School in terms of layout and adjacencies
- Re-using successful design approaches
- All primary schools need classrooms, hall spaces and administration facilities
- We are currently seeking to standardise these 'building parts' as part of an Employers Requirements package
- We can then Assemble them as a 'kit of parts' according to site constraints and opportunities
- Ever improving and cost effective school buildings in the future

End of Presentation

Site Tour