Coalitions of the Willing – Unlocking Modern Methods of Construction Supply Chains to Deliver Better New Affordable Homes in Wales

7th November 2024

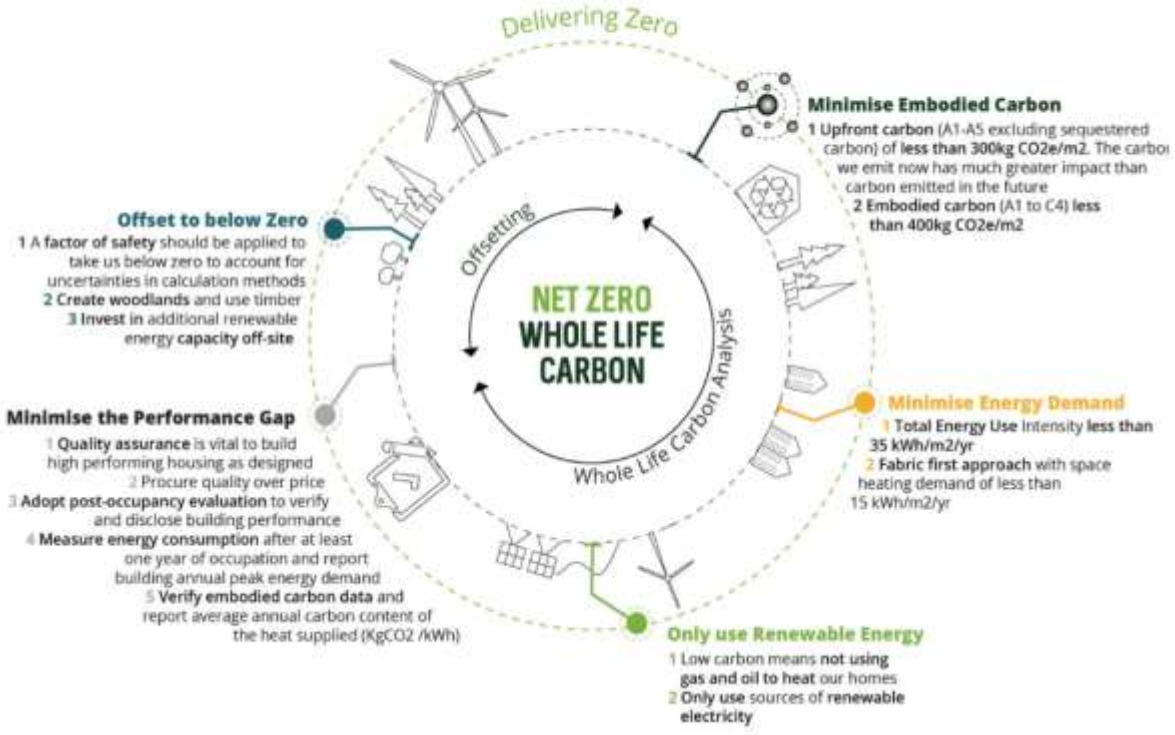
Steve Cranston Delivering Net Zero Project Lead

Problem Are We Trying To Solve?

- Help address housing crisis
- Build better homes
- Address climate
- Nurture a capable supply chain
- Unlock wider wellbeing benefits from investment

Build Better Homes

Net Zero Whole Life Carbon Homes



[Zero Carbon Homes—Zero Carbon Timber Solutions for Wales - Woodknowledge Wales]

Coalition of the Willing

wrexham County Borough Council / Cyngor Bwrdeistref Sirol wrecsam

Cardiff / Caerdydd

Coastal Housing Group

Cyngor Abertawe Swansea Council

Cyngor Sir Gâr Carmarthenshire County Council

united welsh

Caerphilly County Borough Council / Cyngor Bwrdeistref Sirol Caerffili

Vale of Glamorgan

Cyngor sir ddinbych denbighshire County Council

Powys

Pembrokeshire County Council / Cyngor Sir Penfro

Cyngor Sir Ynys Môn Isle of Anglesey County Council

North Wales Housing / Tai Gogledd Cymru

MHA

Caredig People · Homes · Communities

Trivallis.

Tai Tarian

Cyngor Sir y Fflint Flintshire County Council

ClwydAlyn

Cartrefi Conwy

Merthyr Valleys Homes

RHA

Cymoedd i'r Arfordir Valleys to Coast

Coalition of the Willing

- 11 Welsh councils who have retained their council housing Caerphilly, Cardiff, Carmarthenshire, Denbighshire, Flintshire, Isle of Anglesey, Pembrokeshire, Powys, Swansea, Vale of Glamorgan and Wrexham

- 12 housing associations Caredig, Cartrefi Conwy, Clwyd Alyn, Coastal, Merthyr Valley Homes, Monmouthshire Housing Association, North Wales Housing Association, Rhondda Housing Association, Tai Tarian, Trivallis ,United Welsh and Valleys to Coast

If you want to go fast – go alone
If you want to go further – go together

African proverb

Design Team

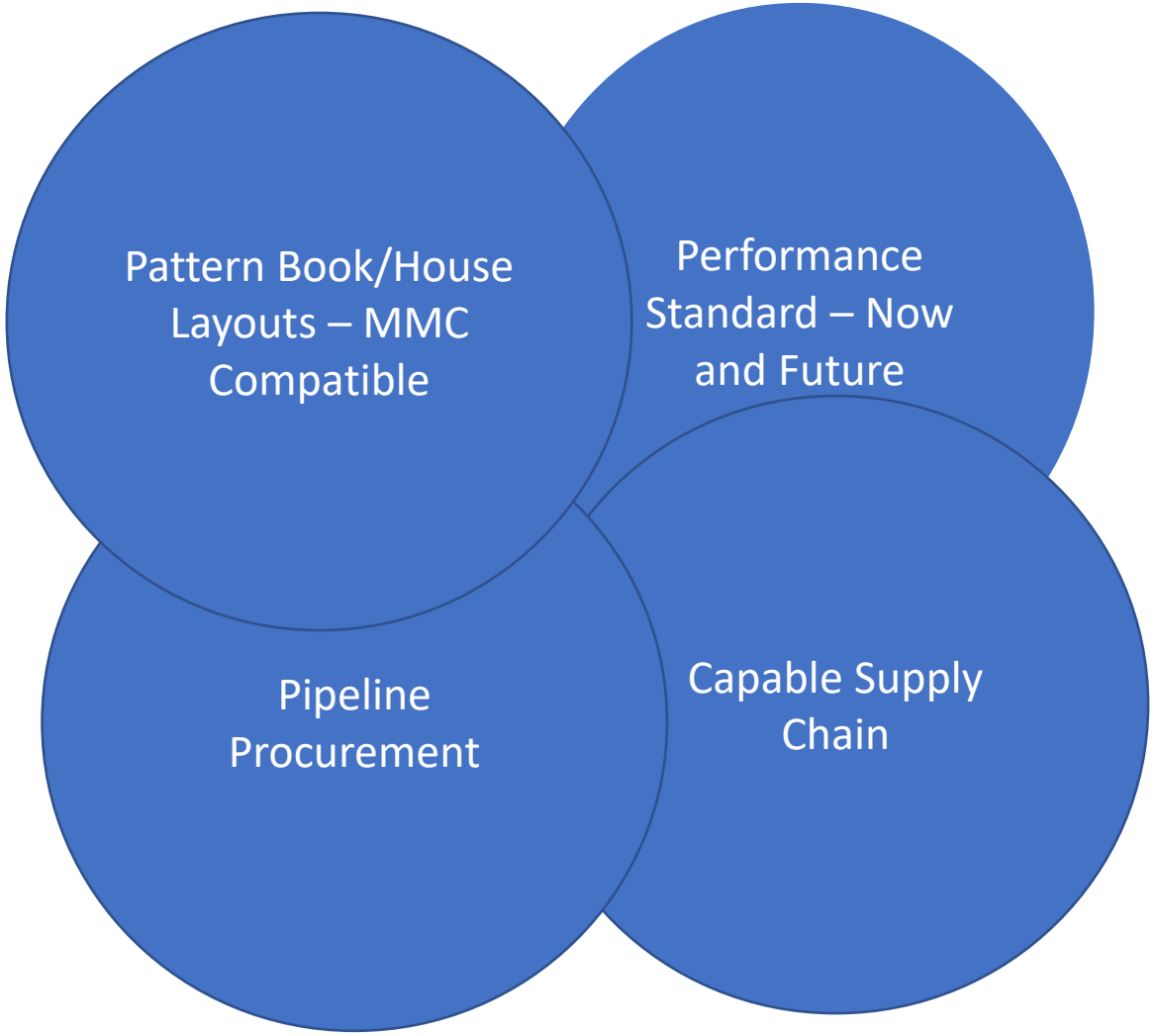
- Stride Treglown - Lead
- Hoare Lee
- Arda Consulting
- Gleeds

Warming Stripes for Wales 1884 to 2020

Project Deliverables

- Pattern Book - 15 house types
- Common design, performance standard and metrics
- ‘How to Use’ Guide and Technical reports - renewables generation, energy and embodied carbon, lighting, overheating etc
- Warmed up Welsh main contractors and supply chain
- Plan to trial/test early use of pattern book.
- Ways of aggregating pipeline potential

Collaboration - Aggregation - Standardisation



1.5 Pattern Book Matrix

Aim :

- Determine the most common house and flat types built by member organisations.
- For the most common house types model sufficient variants and formats to account for real world scenarios.
- All types compliant with WDQR, Lifetime Homes and Habinteg Wheelchair Housing Design Guide (for Wheelchair homes).
- All homes audited with Welsh Government technical scrutiny team.
- Representative of 95% of house typologies utilised in Wales.

House type Ref. and (Variant No.)	WDQR Required GIA (sqm)	Beds	Occupancy (persons)	Dwelling Format	Stories	WDQR compliant	Lifetime Homes compliant	Habinteg's Wheelchair Design Guide
7P4B House	114	4	7	Detached	2	●	●	
6P4B House	110	4	6	2 unit Semi-detached block	2	●	●	
4P2B House (V1) – narrow fronted	83	2	4	4 unit Terraced block	2	●	●	
4P2B House (V2) – narrow fronted	83	2	4	2 unit Semi-detached block	2	●	●	
4P2B House (V3) – wide fronted	83	2	4	Detached	2	●	●	
4P2B House (V3) – wide+narrow	83	2	4	2 unit Semi-detached block	2	●	●	
5P3B House (V1) – narrow fronted	93	3	5	4 unit Terraced block	2	●	●	
5P3B House (V2) – narrow fronted	93	3	5	2 unit Semi-detached block	2	●	●	
5P3B House (V3) – wide fronted	93	3	5	Detached	2	●	●	
5P3B House (V4) – wide+narrow	93	3	5	2 unit Semi-detached block	2	●	●	
4P3B House	88	3	4	2 unit Semi-detached block	2	●	●	
3P2B Bungalow	58	2	3	2 unit Semi-detached block	1	●	●	
2P1B Flat	50	1	2	9 unit block	3	●	●	
3P2B Flat	58	2	3	9 unit block	3	●	●	
2P1B Walk-up Flat	53	1	2	2 unit block	2	●	●	
3P2B Walk-up Flat	65	2	3	2 unit block	2	●	●	
2P1B - Ground Floor wheelchair Flat	56	1	2	9 unit block	3	●	●	●
3P2B - Ground Floor wheelchair Flat	74	2	3	9 unit block	3	●	●	●
2P1B - Wheelchair Bungalow	78	1	2	2 unit Semi-detached block	1	●	●	●

House Layout Feedback

WDQR 2021 Areas

General feedback is to align with WDQR 2021 areas as much as possible, to ensure build costs are kept affordable – particularly for the most commonly built house types.

The following types are a concern:

- 2P1B Walk-up flat.
- 3P2B walk-up flat.
- 'Wide fronted' versions of 4P2B and 5P3B - however, general acceptance these will be less efficent and less commonly built.
- 7P4B house.

Staircases

Strong preference is for straight stairs where possible, or as straight as possible to minimise the costs of installing a future stairlift.

Stairs with turnings/landings need to allow enough space for furniture movement.

MEP Plant Cupboard

Plant – Is the area sufficient? Further detail on M&E strategy and equipment required.

- Space for PV inverter, MVHR, Water cylinder, ASHP/ GSHP, allowance for Sprinkler pump.
- Co-locating all plant is prefered to avoid compromising general storage provision.

WHQS

Strong feedback from DNZ members wishing to see WHQS followed. In particular; Living space; Kitchen; furniture requirements based on occupancy levels of the home.

Wheelchair accommodation

Re-visit plans which appear under sized for compliance with Welsh Government ACG for wheelchair allowances which stipulate additional space requirements guidance of 25m² per home over WDQR.

Kitchens

Kitchen areas appear are far too tight to accommodate sockets and cubic capacity.

- Do layouts give enough space for appliances (WM, DW & TD)
- OTs don't like straight kitchen runs – much prefer L / U shaped kitchens – for elderly tenants or for people with mobility issues.
- Having to cross through the working triangle should be avoided

MEP Cupboard Location

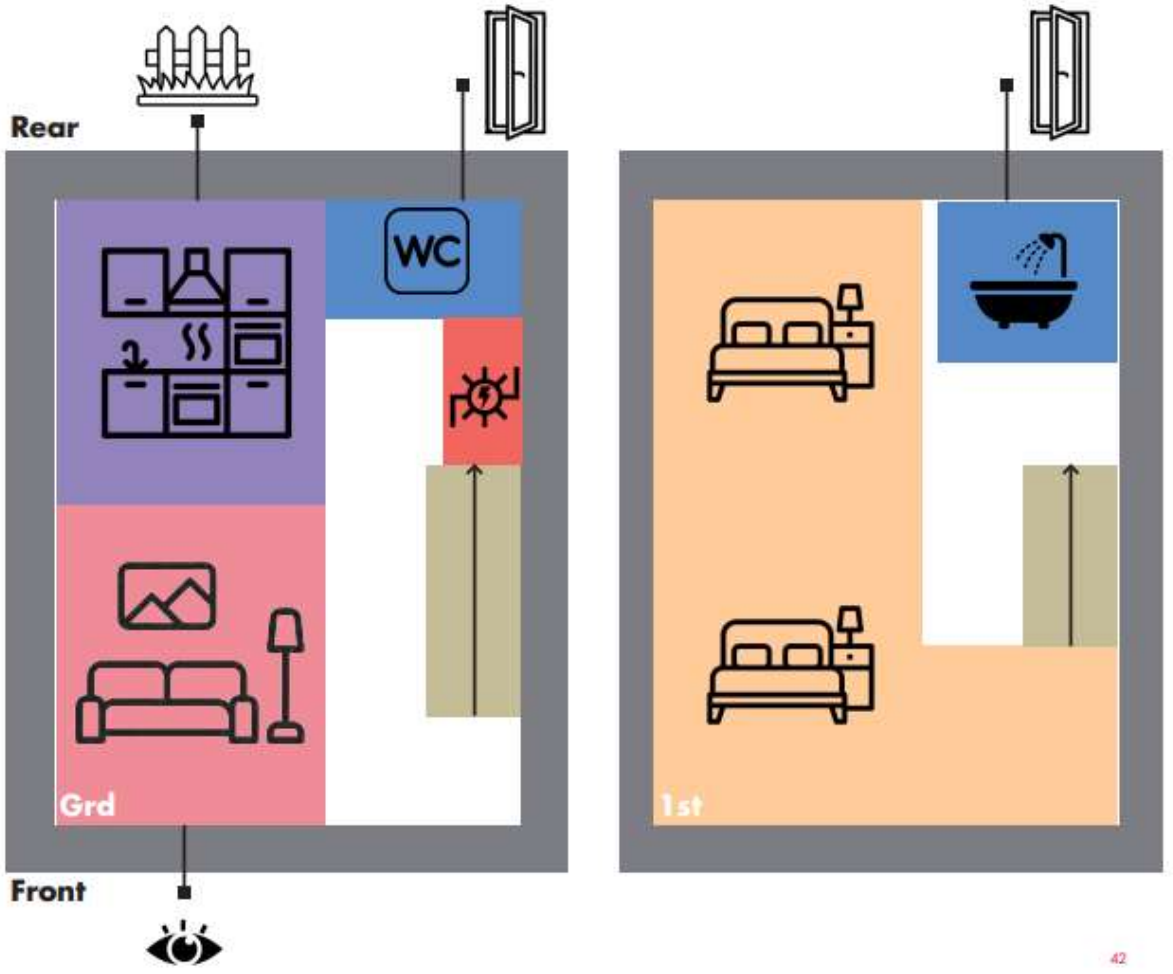
We understand the logic in locating the plantroom next to the front door to minimize ductwork runs and prevent maintenance needing to access the whole property to maintain plant, however query whether this is a fire risk?

- Can plant rooms be moved to the rear of the dwellings so that pipe work doesn't need to divert around stair wells
- Can we move plant rooms off party walls?

General House Layout Principles

Aim : We don't need to reinvent the wheel. Simple homes that work well with well proportioned rooms.

- Living rooms are located street side to aid natural surveillance in the community.
- Kitchen & dining rooms located at rear with connection to garden.
- Combined plant room off hallway.
- Straight stairs avoiding changes in direction where possible.
- Wet areas stacked vertically between ground and first floor.
- Where practical wet areas have an openable window.



REVISED CONCEPT PLAN
4P2B HOUSE

Staircase

Now changed for straight stairs to minimise the costs of installing a future stairlift and allow for easy furniture movement.

Plant Cupboard

Now co-locatinged to avoid compromising general storage provision.

Moved to the rear of the home so that pipe work doesn't need to divert around stair wells.

Moved off party walls.

WHQS Kitchen requirements

The kitchens design has been revised and storage increased and to meet the functional design requirements:

Living Space

Now changed so 12m² (required for 4 person occupany) is met.

Footprint Changes

This 4P2B home is 85.7m²

Note the WDQR reference size for a 4P2B home is 83m²

Given space requirements of the living room and accessibility space around furniture this represents a very efficient layout which meets the combined standards for DNZ.

Kitchen Storage Volumes		
Description	Count	Storage Volume
3 drawer base unit 600mm	1	0.22 m³
Corner (straight) base unit, 1200mm wide with 600mm door	2	0.82 m³
Single base unit - 600mm	1	0.20 m³
Single wall unit - 450 x 720mm	2	0.16 m³
Single wall unit - 600 x 720mm	3	0.32 m³
		1.71 m³

Area Schedule (GIA)	
Level	Area sq.m
Level 00	42.85 m²
Level 01	42.85 m²
Total Area	85.70 m²

4P2B Ground Floor (based on WDQR 2021 and WHQS 2023)

1.7 Building Standards Comparison
Study by Good Homes Alliance

This study was commissioned by the Good Homes Alliance and Woodknowledge Wales to understand the outcomes and consequences between low energy building standards for new homes, when comparing them to a net zero (operational) outcome target in 2020 through to 2050.

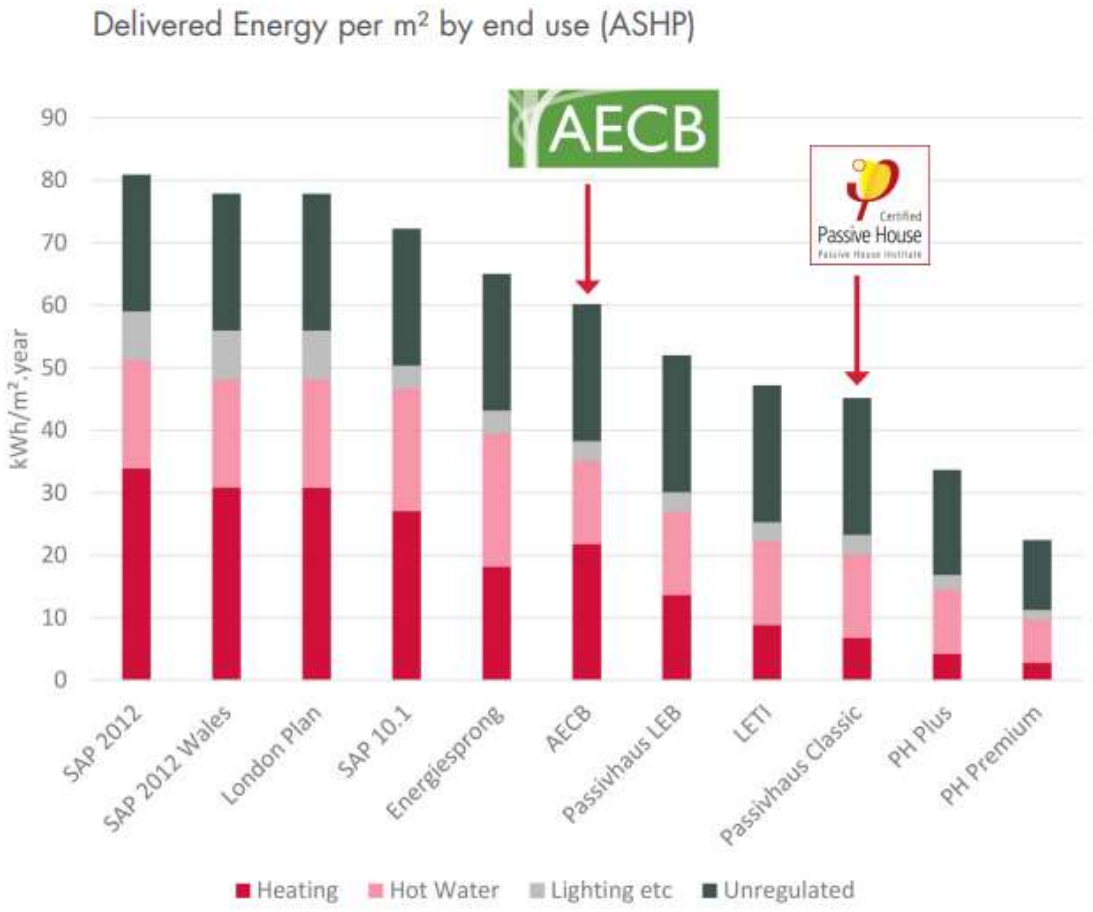
The study seeks to illustrate clearly how the choice of selecting a building standard affects the amount of renewable energy generation that is required to comply with a net zero operational outcome. The report does not take into account embodied energy/carbon. All energy and carbon modelling is illustrative but based upon real archetypes and factoring a realistic performance gap for each standard.

The AECB building standard follows Passivhaus principles and criteria, with a target space heating demand of 40 kWh/m2.year.

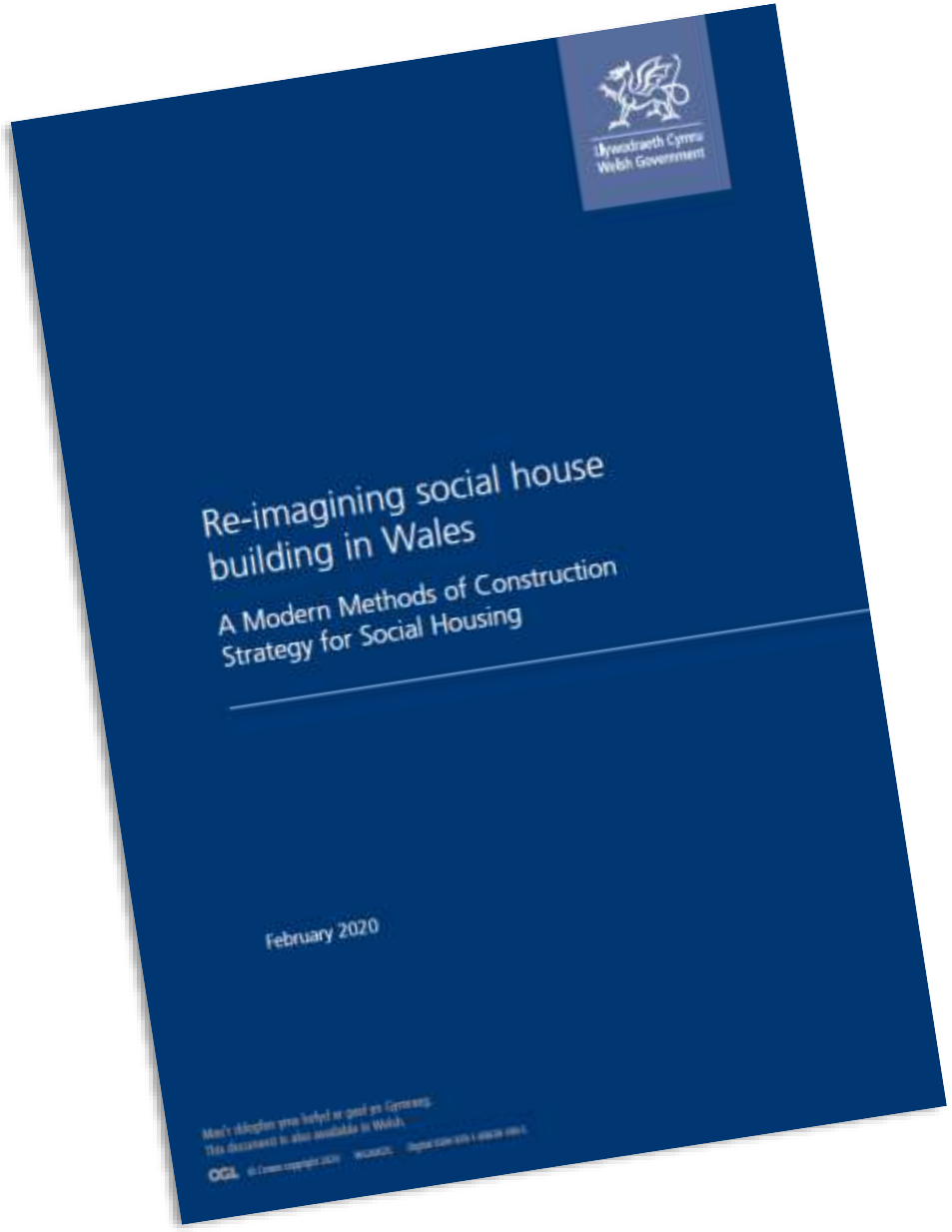
Whilst evidence is required to support a certification claim, this is a self-certified scheme which is reliant on the project's energy consultant to provide a formal declaration. Whilst this is likely to provide much better quality assurance than a typical project, it is not likely to achieve full compliance in all cases as would be expected from an independently assessed scheme. The performance gap for this standard has therefore been assumed at 20%.

The Passivhaus Classic standard has a specific target for space heating demand and then an overall primary energy target for all energy uses. Whilst this can be achieved in several ways, a typical average sized dwelling has been modelled.

There is considerable evidence that the space heating demand of a Passivhaus in use correlates almost exactly (on average) with the modelled demand. The performance gap for this standard is therefore set to zero.



Source: Good Homes Alliance | Building Standards Comparison to a Net Zero Operational Target | September 2020



25 FEB 2020

‘Factory-made’ modular housing should be used to quickly increase supply in Wales – Julie James

Dylai tai modiwlar wedi eu ‘cynhyrchu mewn ffatri’ gael eu defnyddio i gynyddu’r cyflenwad tai yng Nghymru ar fyrder – Julie James

Factory-made ‘modular’ housing should be used to quickly increase the number of high-quality social and affordable homes being built across Wales - part of a new Welsh Government strategy to kick-start the modern methods of construction industry, Housing Minister, Julie James will announce today.

Modern Methods of Construction

- Offsite manufacture
- On site assembly
- Smart construction

Modern Methods of Construction

Industry benefits
Productivity
Embodied carbon
Energy use
Employment
Social value

Project benefits
Speed
Productivity
Safety
Waste
Quality

"You wouldn't try and precision engineer a car in a field, so why would you dream of thinking we should build quality homes there?"

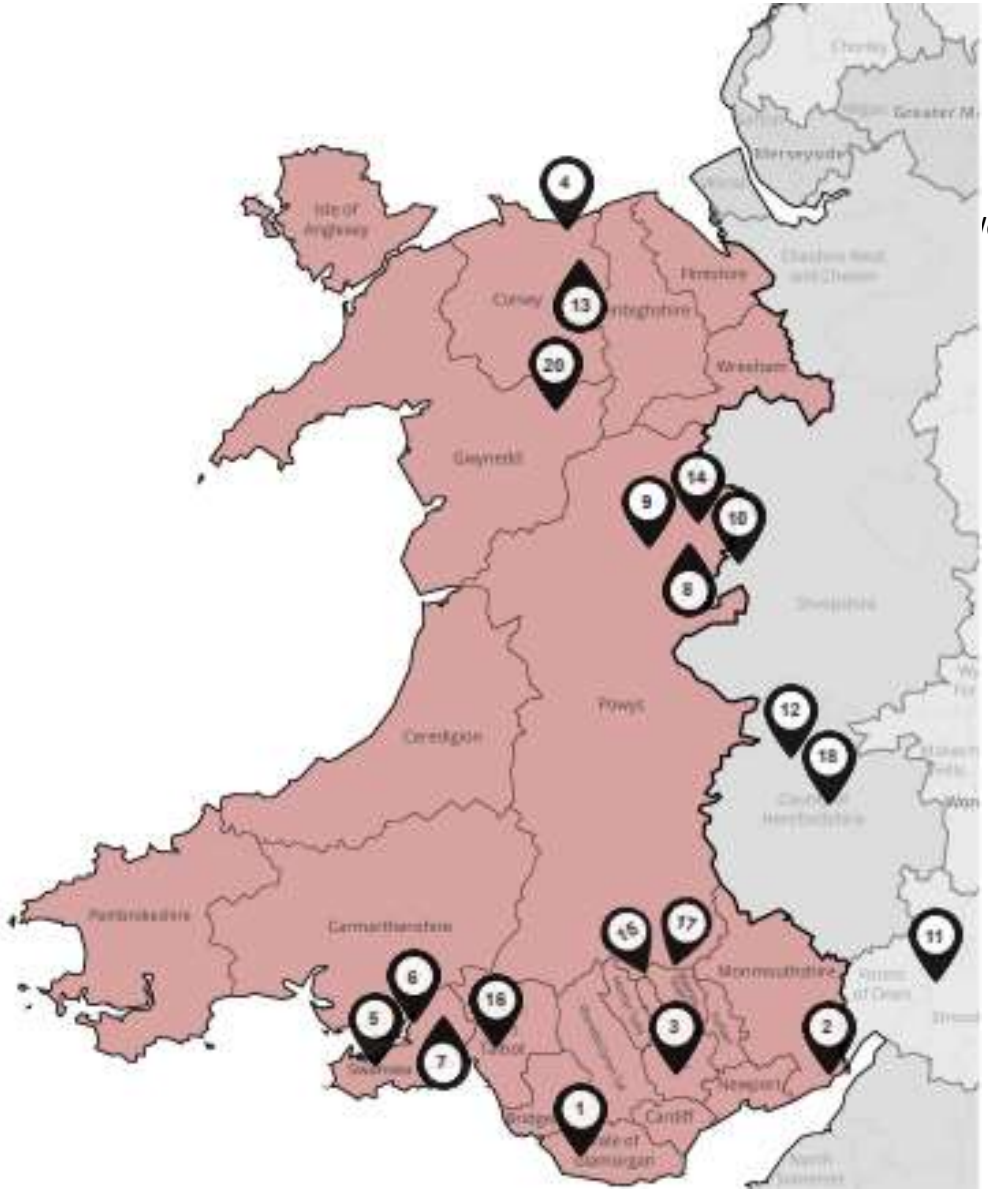
Mark Farmer, UK Government MMC Champion, 2019.

Capable Supply Chain

3.1 Timber frame manufacturing sites
Wales and border locations

Mapping of existing timber frame manufacturing sites has been undertaken to establish the potential supply chain locations that could serve construction of the DNZ Pattern Book homes.

1. Ashdown Construction Group
2. Benfield ATT
3. Celtic Offsite
4. Creating Enterprise
5. Down to Earth Project
6. Fforest Timber Engineering Ltd
7. HEDS Timberhome Ltd
8. Huws Gray Timber Engineering
9. Kenton Jones
10. Lowfield Timber Frames Ltd
11. MBC Timber Frame UK Ltd
12. Merlin Timber Frame Ltd
13. PK Joinery
14. PYC Construction
15. Rae Timber Frame Ltd
16. SO Modular
17. Target Timber Systems
18. Taylor Lane Timber Frame Ltd
19. TRJ Construction Ltd
20. Williams Homes Bala Ltd



Deliver Net Zero Pattern Book | Stage 2 report

'ood
Wales

Warming Stripes for Wales 1884 to 2020

Offsite Timber Manufacturer Feedback

What they said to Wood Knowledge Wales about social landlords in 2021……. -

- ‘You involve us in your schemes far too late’
- ‘Every scheme we do for you is bespoke’ opportunities to standardise/ repeat are very limited
- ‘You talk about your pipeline - we can’t see it’ …… ‘its opaque’

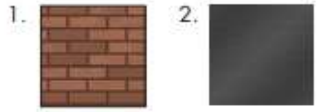
Contractor and Timber Frame Workshops – Feedback from Workshops Sept 2024

‘the industry is chaotic –
everyone is doing their own thing’

- We embrace standardisation agenda
- Need to see clear performance standards
- Want consistent house designs
- Want pipeline visibility
- Are commitment to learning and improving house designs
- Want a level playing field – transparency on pricing

PLACEMAKING
ONE HOUSE-TYPE - MANY POSSIBILITIES

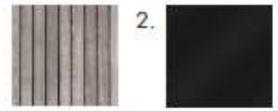
Materials



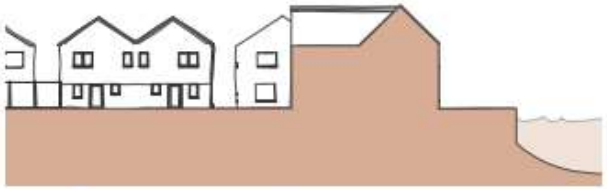
1. Standard Red Brick and Brick Protrusions
2. Grey Powder Coated Aluminium

1. Stone
2. Rose Gold Anodized Aluminium

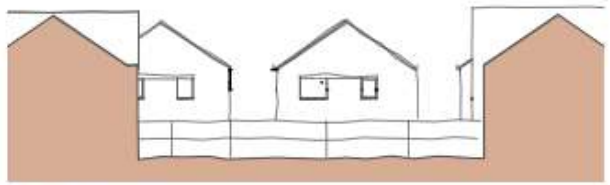
1. Buff Brick
2. Timber Panel
2. Green Anodized Aluminium



1. Timber Panel
2. Black Anodized Aluminium



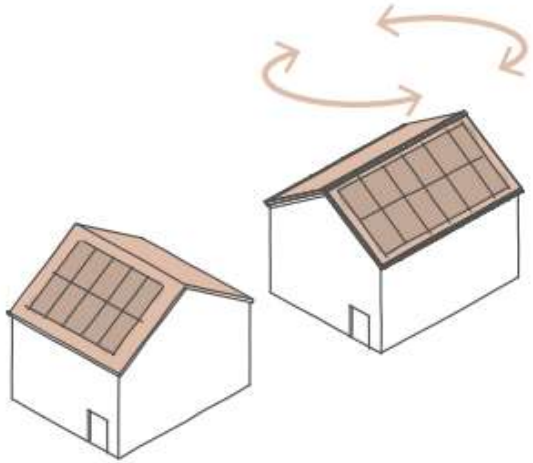
Coastal locations provide the opportunity to respond to the landscape and scale of the waterfront



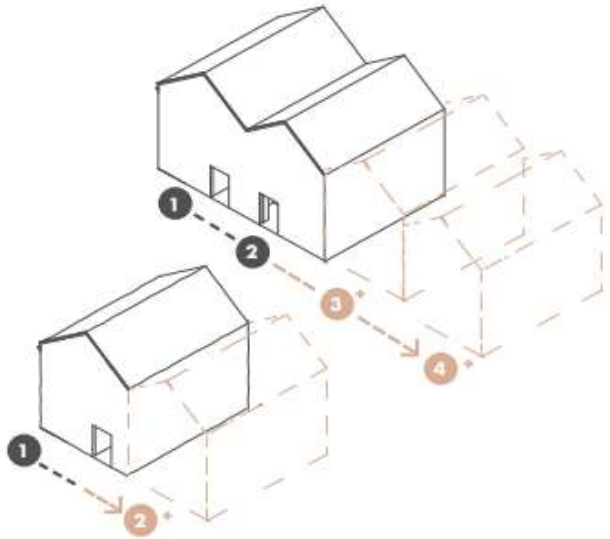
Suburban developments can create places at a smaller scale than tat of an urban context.

Urban sites that offer a larger scale can have historical buildings that add to the contextual palette.

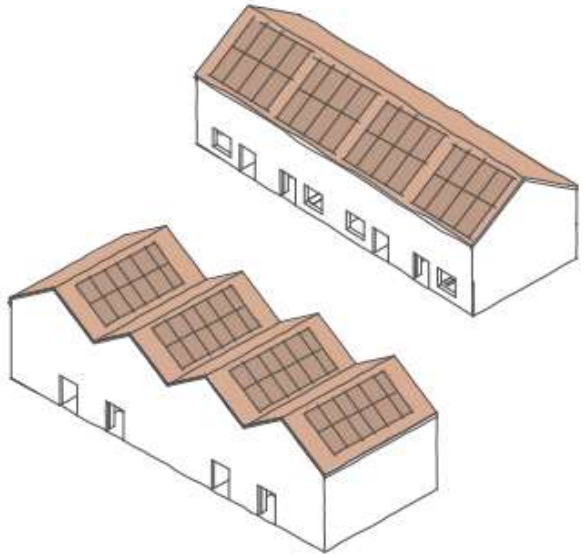
PLACEMAKING
ORIENTATION AND [GABLE] END-LESS POSSIBILITIES



Gable Front Elevations Eaves front elevations can be orientated to Gable to accomodate Solar Panels on South facing elevations as well as for placemaking.



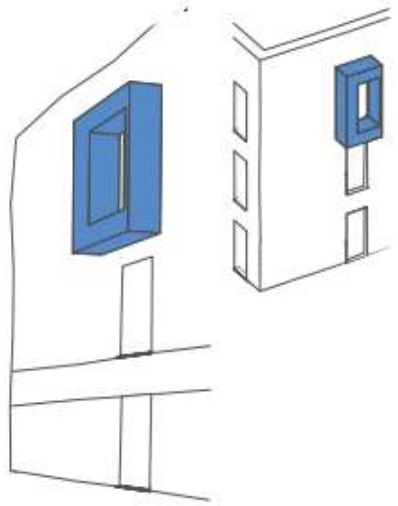
Multiple House Types House Types can be used individually or multiplied to form streetscenes for placemaking.



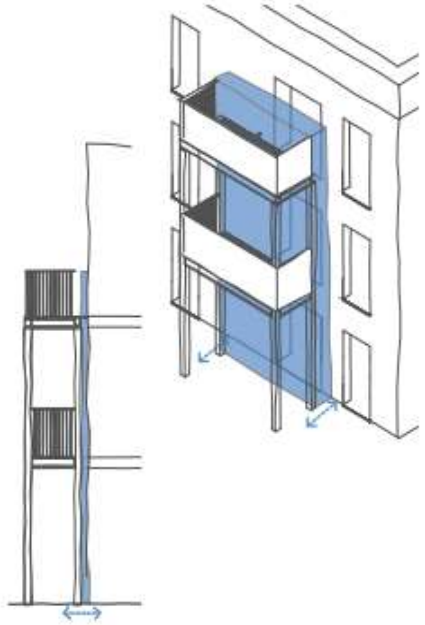
Terraces comprising multiple house types can create varied street scenes by repetion of standard house types.

St Chads, Thurrock Council, Essex by Bell Phillips Architects. Placemaking through Components and building orientation.

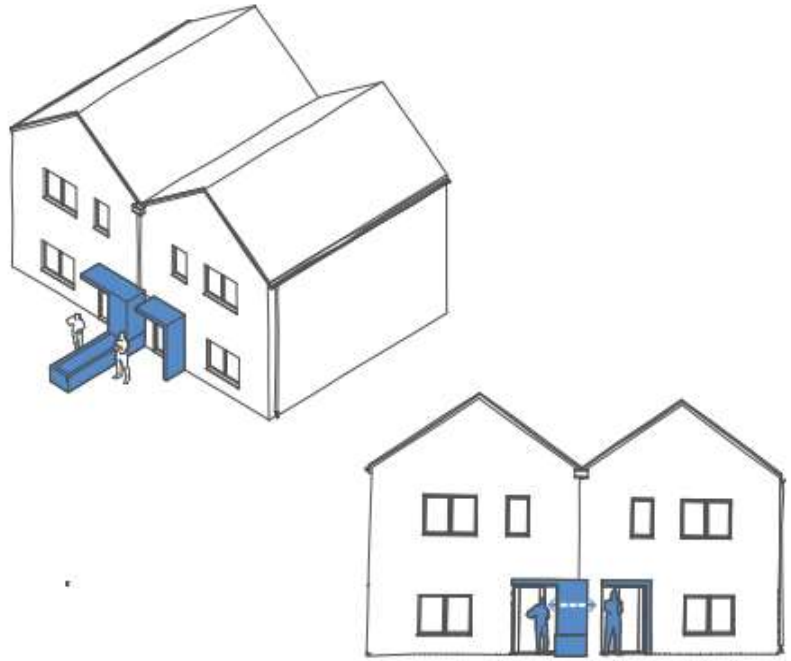
PLACEMAKING
PLACEMAKING COMPONENTS



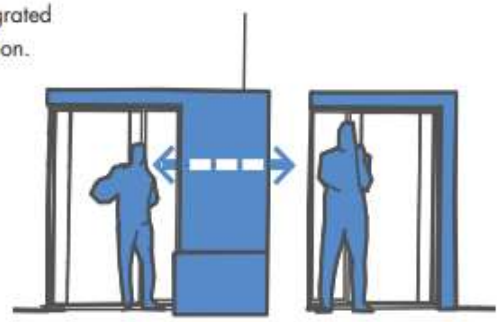
Feature Surrounds are one of many elevational interventions that can be adopted in order to create a sense of place and a dynamic setting.



Balconies and terraces are free standing and do not interfere with the fabric of the building.

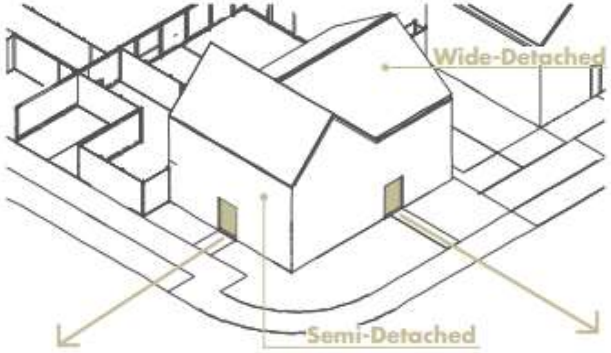


Canonpies can be varied in form to shelter from the elements, act as storage, form intergrated planters and foster neighbourly interaction.

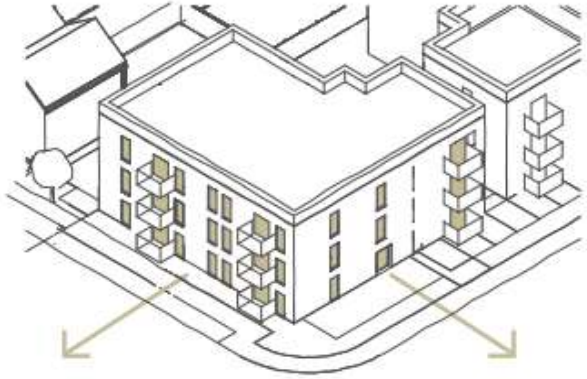


Stride Treglown.
Marmalade Lane, Cambridge.

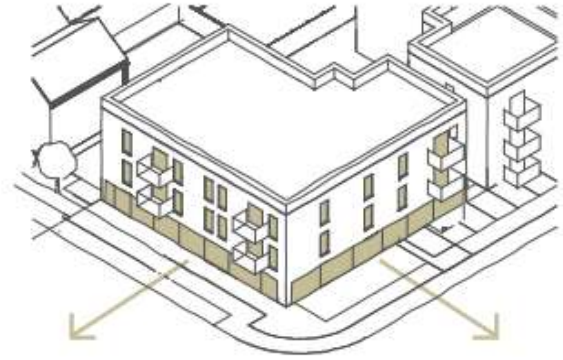
PLACEMAKING
CORNERS & PARKING



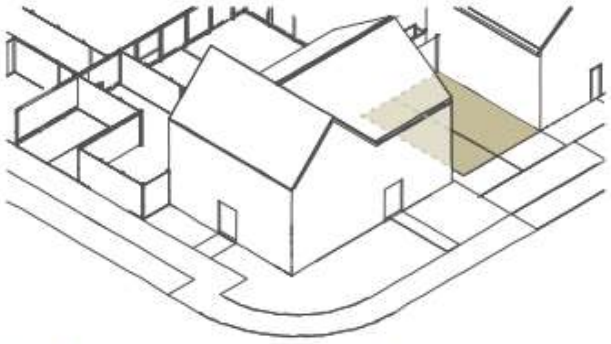
Corner House Types comprising two house types engage with corners to create active streetscenes .



Apartment Block Types can engage with corners, having entrances and active frontages to facilitate dynamic spaces.

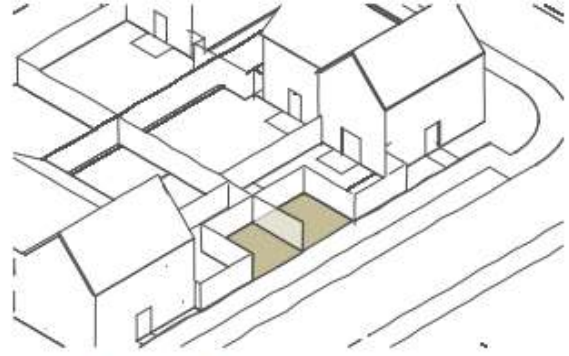


Apartment Block Types can incorporate commercial units on Ground FLoor to provide dynamic and active spaces.



Inter House parking spaces provide parking for households between detached and semi detached properties.

Front Parking can be used on streets with a deeper width where space can be utilised for easy access parking.



Rear parking behind house types can be concealed from the front street and incorporated into rear garden space for seclusion and convenience.

Next Steps

- Pattern Book handover Dec 2024
- Project Launch January 2025 in Swansea
- How to Use Guide – Including placemaking guidance
- Momentum – Early 2025 prototyping of house designs across Wales
- Identify procurement routes options to deploy the pattern book at scale
- Post occupancy evaluation framework for members

- Vale of Glamorgan County Council - Andrew Freegard
- Monmouthshire Housing Association - Simon Davies
- Stride Treglown Architects– Rob Wheaton
- Tai Tarian - Steve Tucker
- Caredig - Stephen Yancek
- Cast - Daryl Coughlan, Anthony Friis
- Coastal - Adam West
- United Welsh – Claire Canning
- Consultant – Keith Edwards
- Powys Council – Vince Hanly, Tom Simmons, Wayne Welsby
- Edinburgh Homes Demonstrator/Scottish Futures Trust – Ryan Cossar
- Welsh Gov – Richard Baker, Simon Inkson, Stuart Fitzgerald, Paul Frowen, Campbell Lammie, Darren Hatton, Nick Sullivan, Robin Staines
- Wood Knowledge Wales – Rachel Cook, David Hedges, James Moxey, Gary Newman

Thank You

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