

TICCIH Congress 2025, Kiruna, Sweden, 25 -30 August, 2025

Industrial Heritage as a Catalyst for Sustainable Education

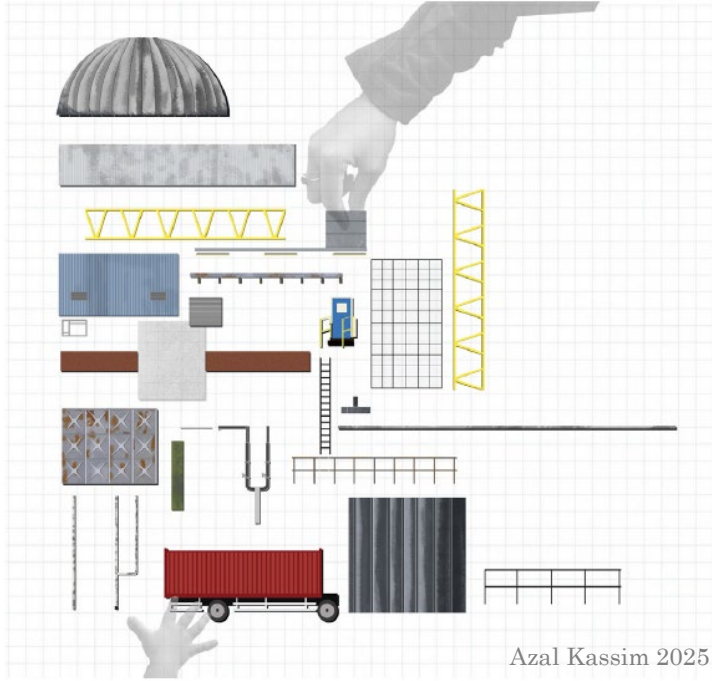
Dr Christopher Whitman, Senior Lecturer, Lead of History, Heritage and Conservation Research and Scholarship Group

Dr Lui (Radium) Tam, Lecturer of Architectural History

Emma Halford, Design Tutor, Principal Regeneration lead, Swansea Council

Welsh School of Architecture , Cardiff University, United Kingdom

Concepts of heritage, sustainability, and education



(Industrial)
Heritage



Just
Transition

Sustainability

Education

Different types of education related to heritage/industrial heritage



Amgueddfa Cymru n.d.

As public education



Amgueddfa Cymru n.d.

Civic engagement (schools, communities)



Azal Kassim 2025

Using industrial heritage instrumentally for education

Current research and why we are talking about this

*“If the climate crisis is in large part driven by historical harms, and their denial, then those who work historically – who understand **confronting history as a precondition for building a just future** – stand at the center of the fight against climate change.....Connecting communities and their granular local histories in participatory public memory can build **a dynamic, national understanding of the historical harms that need to be righted for a Just Transition.**”*

Conclusion of Ševčenko, L., 2023. Toxic Heritage and Reparations: Activating Memory for Environmental and Climate Justice. In Toxic Heritage (pp. 306-320). Routledge.

Toxic Heritage

Legacies, Futures, and Environmental Injustice

Edited by Elizabeth Kryder-Reid
and Sarah May



Key Issues in Cultural Heritage



Transitioning Landscapes of South Wales

'Moonscape' (1977)

Onllwyn open cast colliery ©Cartographical Services Ltd. 1977



'Re-landscape' (1985)

Onllwyn re-landscaped 1985 ©J.A. Story and Partners 1985



'Greenscape' (2024)

Banwen Angling Pool 2024 ©Davis 2024



Onllwyn Capel ©Cwm Dulais Historical Society. 2007



©Isherwood 1985



©Ntzani 2024

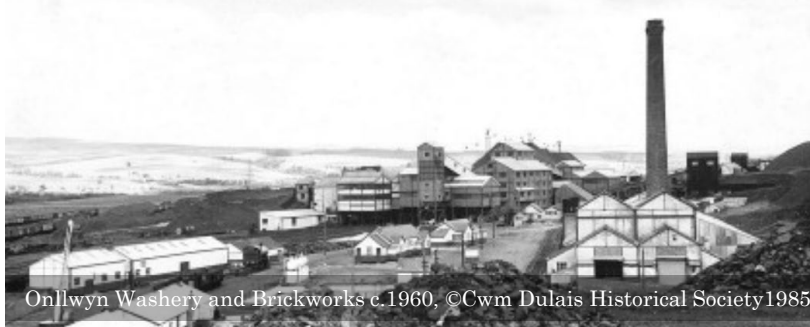
DOVE Workshop, Banwen



Neath, Dulais and Swansea Valleys' Miners support Group 1985 ©Tim Exton 1985



Hafina Hengon, Miners Support Group. Welcoming address at Summer Fete, ©DOVE Workshop 1987



Onllwyn Washery and Brickworks c.1960, ©Cwm Dulais Historical Society 1985



Banwen Community Centre ©DOVE pre-1993



Banwen today ©Whitman 2025



DOVE Workshop ©DOVE 2024



Ecological teaching space, DOVE Workshop ©Whitman 2025



Community University of the Valleys

CANOLFAN BANWEN CENTRE

This building was donated by the National Coal Board (Open Cast Executive) in 1986 to Onllwyn Community Council which designated it as a centre for adult education and cultural development. In 1987 a unique partnership began between the Community Council, the DOVE Workshop - a local women's education and training group founded during the 1984-85 Miners' Strike - and the University of Wales Swansea.

In 1993 the Centre was significantly improved and extended assisted by European funding and in the Autumn of that same year the first ever community based degree scheme was launched here. In June 1994, eighteen adult students successfully completed their first year of studies at this Community University of the Valleys.

is a branch of the South Wales Miners' Library



d.o.v.e. workshop



Y Brifysgol a'r Werin 'The University and the People': a new venture in South Wales



It's given me a new sense of direction in life - it's opened up a complete new world for me." That's how David Thomas describes the Community University of the Valleys, a pioneering higher education project for Wales. David is 41, he went down the local pit after leaving school and was a miner for some 20 years until an accident underground forced him to retire. That was nine years ago and he was left contemplating an empty future. There was one ambition he nourished - to broaden his education - but in his South Wales mining valley that wasn't easy. It was a 40-mile round trip to the Adult Continuing Education Department of the University of Wales College of Swansea, and that was out of the question for someone in his state of health. David wasn't the only one in need of fresh aspirations: since the end of the miners' strike in 1985, pit after pit in South Wales had closed, depriving thousands of men in their 30s and 40s of a reason to get out of bed in the morning. And not just men! Women, many of whom had found a voice in the activities of the support groups during the strike, also sought wider horizons but with children to look after and other responsibilities, going back to school seemed an unrealistic dream. So, the university had to come to the people at first with 'back to study' courses, then, after the closure in 1990 of Blaencant, the last pit in the Dulais Valley, with 'Access to Higher Education' courses. Now, the Community University of the Valleys has been launched, offering degree courses to students who need to study within their own community.

"It's opened up a complete new world for me."

It has been made possible by years of collaboration between Swansea's Adult Continuing Education Department and the self-help organisation DOVE (Dulais Opportunities for Voluntary Enterprise), which evolved from those women's support groups.

The project is run by women from a community centre in the village of Banwen and now boasts classrooms, a library, a minibus for students without transport and, most crucial, a crèche. The cost of these extra facilities was met by the European Regional Development Fund, which recognised the devastating effect of pit closures on the area.

Thanks to DOVE, the Community University of the Valleys has been able to establish its first study-centre in Banwen and it's hoped that more will follow, building on partnerships with other former mining strongholds such as the Amman and Rhondda Valleys.

Here in Dulais, 25 students have begun courses in Modern Welsh Studies, Modern European Studies and Environmental Studies. In five years, David Thomas could have a BA in Humanities from the University of Wales. "I've got a real goal to aim for now - instead of languishing at home, vegetating, it's given me something to do with my time."

There is a long tradition of adult education in the South Wales mining valleys, as Rob Humphreys, the co-ordinator of

the Community University project, recognises: "We're building on that tradition. I'd like to think that it's also a tradition which is open to change and to innovation - we're creating something which is new and fresh, something which is relevant to the 1990s and to the 21st century." The students range in age from late twenties to early sixties, and many are women. Thirty-eight-year-old Wendy Headon says she's "fulfilling a dream" by studying for a degree. With two children under three and a third at school she couldn't have managed without the free crèche and certainly couldn't have travelled to the university in Swansea.

"A reaffirmation of the wider role of a university."

If getting a degree means she has a better chance of a job, she will be delighted, but she says that's not the main reason for studying: "This is going to increase my prospects - it can only help. I think - but I'm doing it for the sake of doing it really. This is something that a lot of men, especially, can't understand, they've got to see a goal at the end of it. Well, for me, it doesn't really matter if I don't get a job out of it, I'm enjoying actually doing it."

The director of the Department of Adult Continuing Education at Swansea, Hywel Francis, would applaud her sentiments. He wants to encourage what he calls a "learning environment", in which education is seen as something lifelong, not simply a means to an end. To him, the Community University is "a reaffirmation of the wider role of a university, demonstrating that higher education is not 'the exclusive preserve of a particular age group and social class taking place in a particular location'."

For Professor Francis, the Community University is important because "it empowers individuals and communities." At present, the tutors come largely from his Department, but colleagues in other disciplines are keen to participate and the Open University in Wales is becoming involved as a partner.

It's still early days: the students of the Community University of the Valleys are in their second term, but there are more waiting to follow their lead. It's hoped at least to double the intake in the next academic year, bringing the number of first-year students close to 50.

And for Hywel Francis there's a deeply satisfying sense of completion in giving back to the people something which was already theirs.

"We have a motto in the University of Wales - Y Brifysgol a'r Werin - 'the university and the people'; in other words, recognising that the penuries of the poor in the late 19th century, the wealth that was created in Wales from coal and steel, gave birth to the University of Wales. The working people of Wales, through their own efforts, created that national institution. What we're trying to do, in the 1990s, is make that national institution much more accessible to those people."

David Thomas (centre) and friends in the shadow of the pit-head in the days when coal was king.

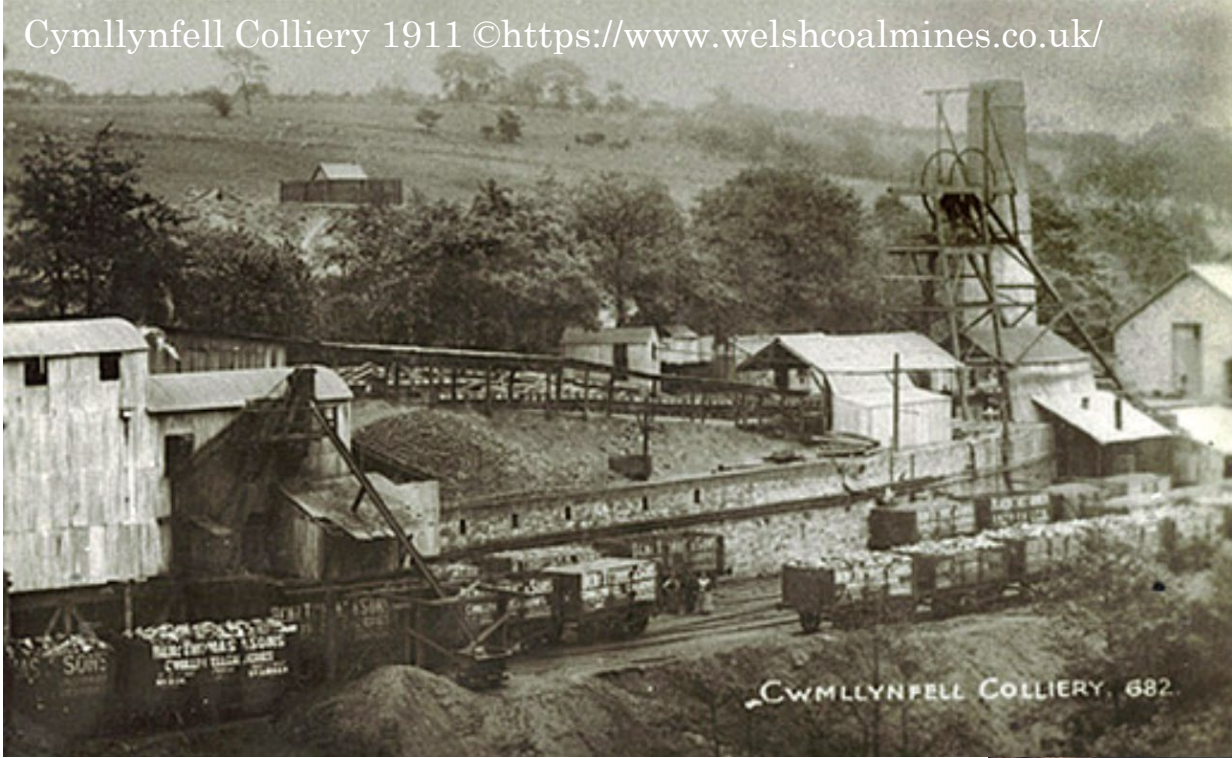


Welsh School of Architecture



Awel Aman Tawe

Cwmlllynfell Colliery 1911 ©<https://www.welshcoalmines.co.uk/>



Awel Co-op 2.35MW Enercon wind turbines ©AAT



Henlllys Vale Colliery and Quarry, Cwmlllynfell ©RCAHMW 2015



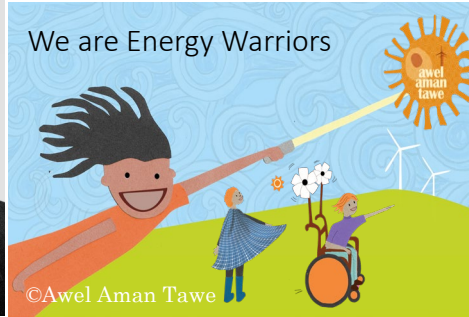
Awel Aman Tawe



Terry Pugh
©Awel Aman Tawe



Climate Hero
©Rankin 2021



©Awel Aman Tawe



©Awel Aman Tawe



©Awel Aman Tawe

CHART - Centre for Heritage Research and Training

Co-creating placemaking



Wellbeing of Future Generations (Wales) Act 2015 Goals



Outdoor, inter-generational crafting at Craig Gwladus Country Park, building health and resilience amongst the park community. © Richard Manning

Langlands, Alexander 2024. Putting the making in place-making: the role of traditional crafts skills and community-led conservation in the re-framing of historic environment services. – Making cultural heritage. Studia Vernacula 16, 12–35.





CHART - Centre for Heritage Research and Training

Co-creating placemaking

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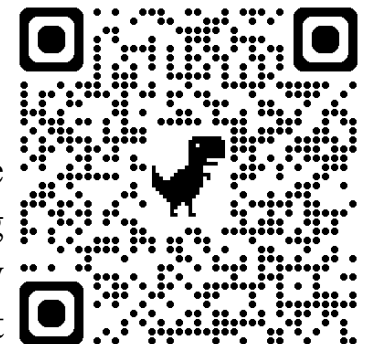
Craig Gwladus Country Park in the Vale of Neath, South Wales.



CHART
Canolfan Ymchwil a Hyfforddiant Treftadaeth
Centre for Heritage Research and Training



YouTube
Video of Craig
Gwladus Country
Park Project



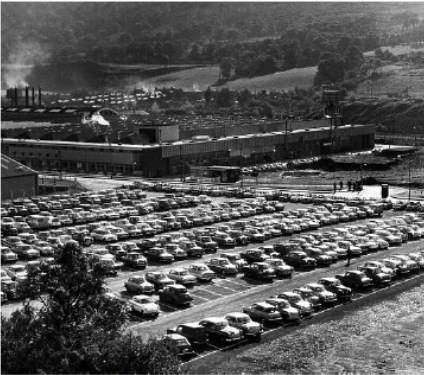
Undergraduate teaching – Welsh School of Architecture

02: New Town Beacon

Our site this year will be Merthyr Tydfil in South Wales, where we will be exploring its potential for expansion and transformation under Labour's current New Town policies.

The specific site of investigation will be the former Hoover Factory in Merthyr Tydfil, on the site of an earlier ironworks. Once the industrial beating heart of the town, employing 5,000 people, Hoover ceased its operations in 2009, and the vast building is now falling into disrepair. The local council has earmarked the site for future development, due to its strategic placement in the town alongside a railway line and river. The council have proposed to demolish the building, but we will question whether there are alternative strategies.

You will work in groups to understand the site at both the individual building and town scale. This will begin with desk research investigating the town, its history, current condition and plans for the future, as well as research into the former Hoover Factory.



Hoover factory in Merthyr Tydfil, with housing in the background



Hoover factory interior

Unit 4 2024/25

HOOVER FACTORY AT MERTHYR TYDFIL

where the Hoover Electric Working Machine is being made



AS IT WILL BE WHEN IT IS COMPLETED



Hoover factory main entrance facade and signage

Applied Theory

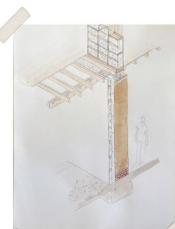


An accurate 1:5 detail model shows the connection of the new wall with the existing roof. This model also shows how the ceiling insulation can be hung with netting, exposing the sheep's wool to the users. The materials in the model are as true to the design as possible, using corrugated steel, plywood, up-cycled netting and raw sheep's wool, supplied by Ryan and his flock. The steel truss which is integrated into the new structure, is made of MDF, allowing the whole model to be easily de-constructed and recycled in the future, reflecting the design philosophy of Re-Factory. The roof insulation, inspired by David Kahn's White Building, shows off the wool's properties rather than hiding it behind plaster or other finishes.

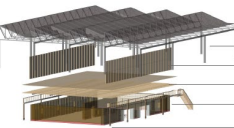


The White Building by David Kahn Architects

Structural Concept



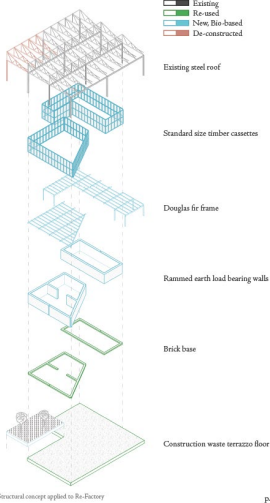
Early construction sketch



Library - isolated and exploded



1:5 Roof connection (detail 1)



p.28

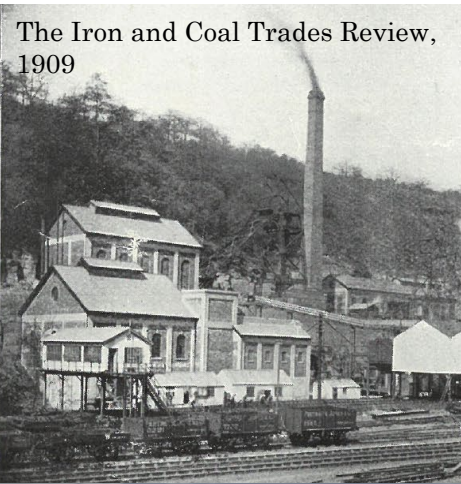


Nick Wade 2024

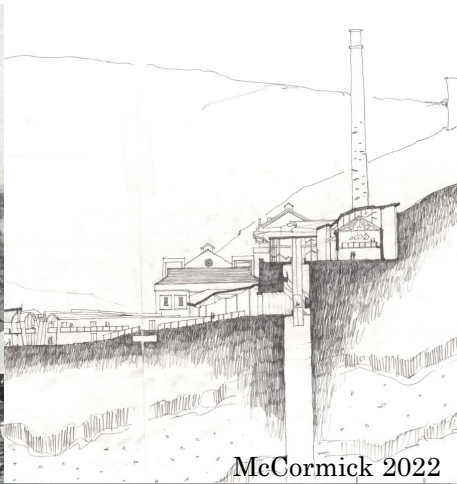


Carbon Pasts, Low Carbon Futures.

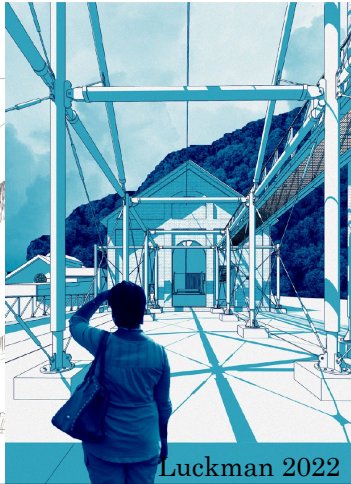
Crumlin Navigation Colliery 2021/22



The Iron and Coal Trades Review, 1909



McCormick 2022



Luckman 2022



Whitman 2023



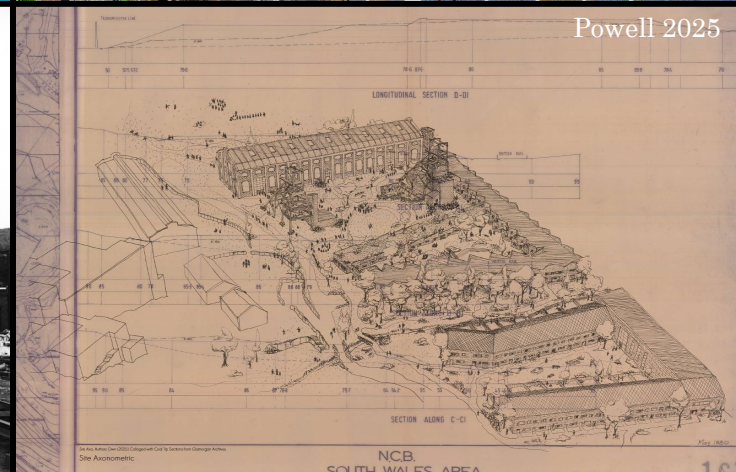
Bryan 2024



Taylor 2023



The People's Collection 1973

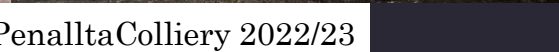


Powell 2025



Whitman 2024

Cefn Coed Colliery 2022/23



Penallta Colliery 2022/23

Conclusions

- We have identified examples with clear links between both tangible and intangible industrial heritage and sustainable education.
- Its potential to act as a catalyst for sustainable education further adds to the importance of conserving our tangible and intangible industrial heritage.
- So far, we have limited our focus to our immediate surroundings of the South Wales Coalfield, however we now intend to widen our study and welcome suggestions and collaboration.



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Carbon Pasts, Low Carbon Futures: Industrial Heritage and Low Carbon Architectural Pedagogy

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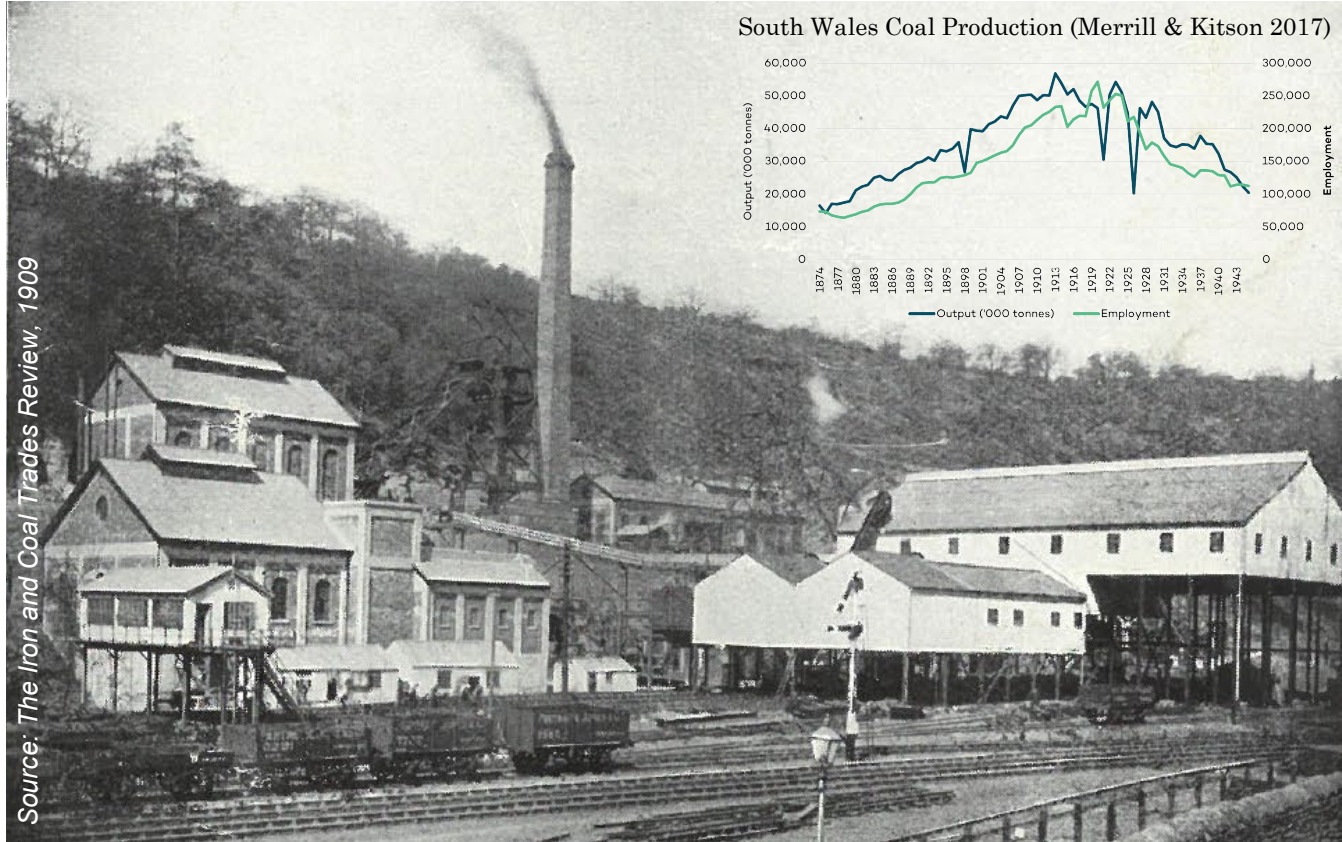
Welsh School of Architecture , Cardiff University, United Kingdom



CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYDD

Carbon Pasts, Low Carbon Futures.



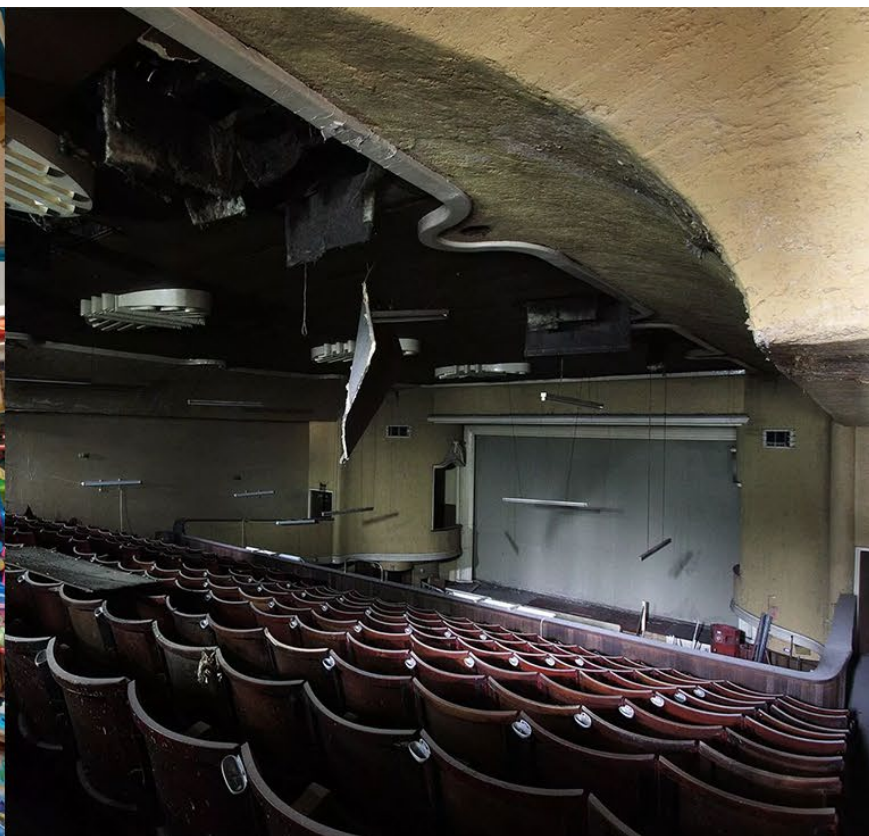
Cardiff and The South Wales Valleys
(source: Digimap 2024)



Crumlin Navigation Colliery. Academic year 2021/22 (*Whitman, 2021*)



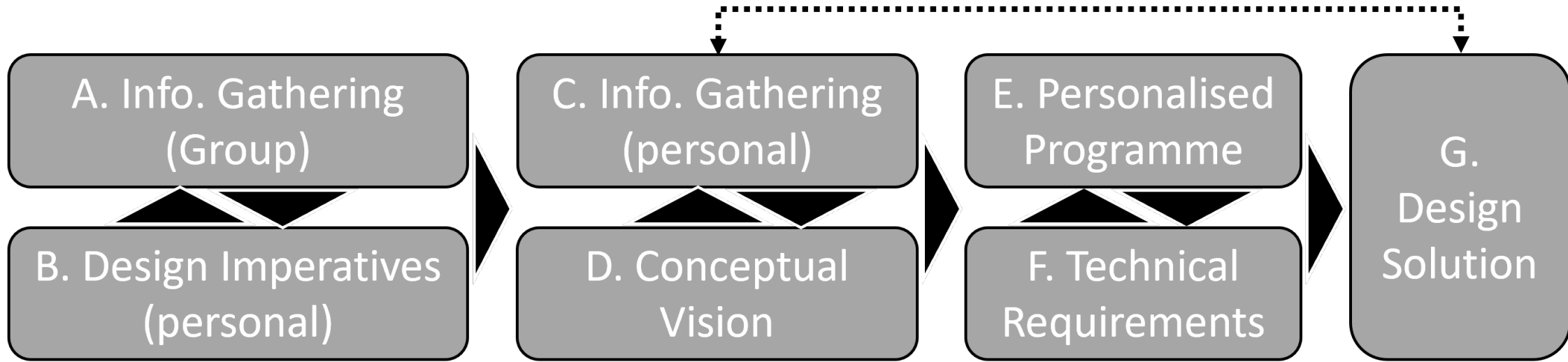
Cefn Coed Colliery (museum until 2020). Academic year 2022/23 (*Whitman, 2022*)



Pontypridd Market and Town Hall Theatre. Academic year 2023/24 (*Whitman, 2023*)



Penallta Colliery, Engine Hall and Pithead Baths. Academic year 2024-25 (*Whitman, 2024*)



Pedagogical approach – Parallels with the “Double-layered Asymmetrical Model” proposed by Goldschmidt (1983), as described by Salama (2015).

Goldschmidt, G., *Doing design, making architecture*. Journal of Architectural Education, 1983. 37(1): p. 8-13.

Salama, A.M.A., *Spatial design education : new directions for pedagogy in architecture and beyond*. 2015, Farnham, Surrey ; Ashgate.

“Live-Project Teaching” also bridges the gap between mainstream architectural education and professional practice.

Morrow, R., *Live Project love: building a framework for Live Projects*, in *Architecture Live Projects: Pedagogy into Practice*. 2014, Taylor and Francis. p. xviii-xxiii.

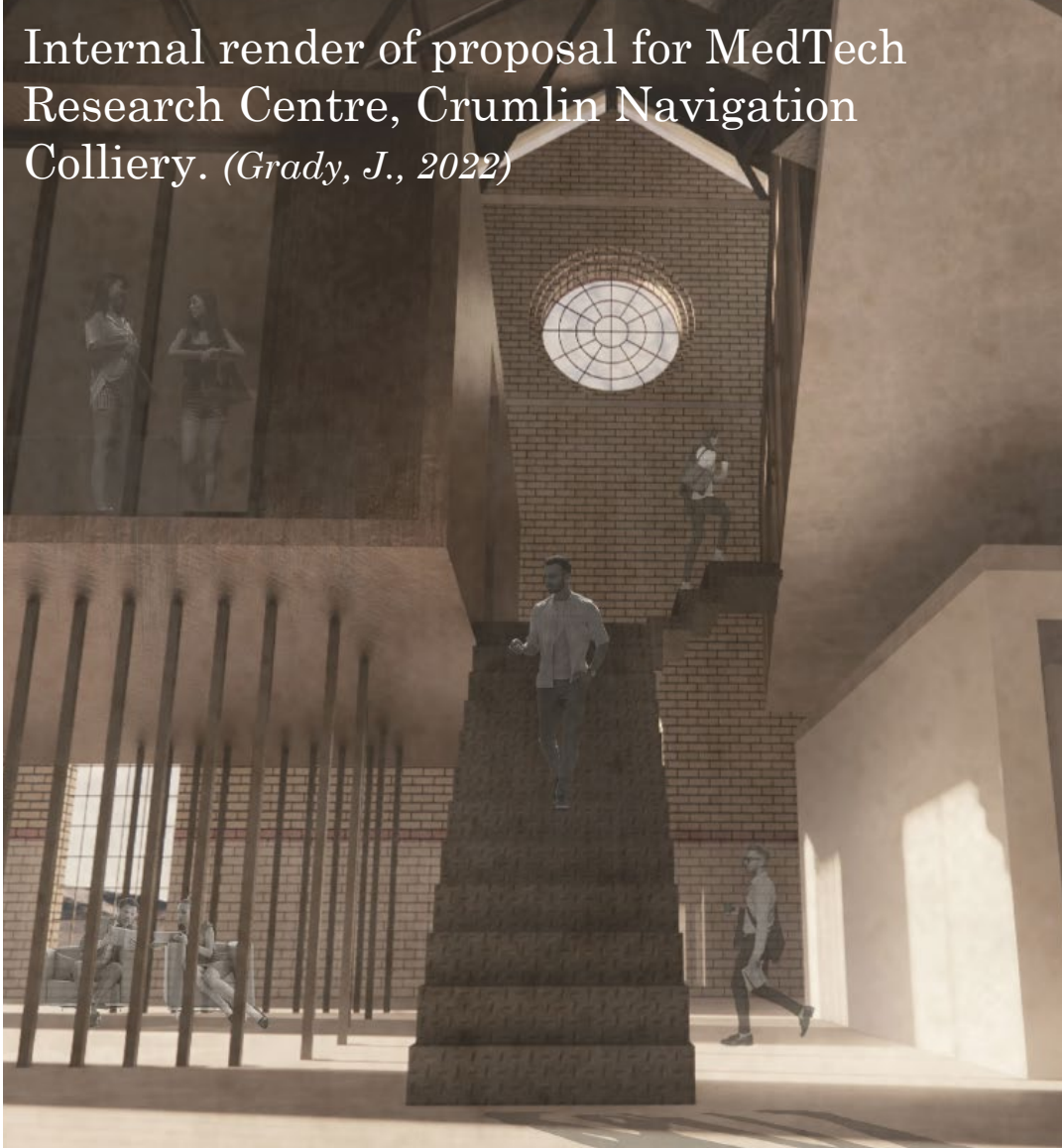
Education

Real-life problems &
3rd party involvement

Practice

Live Project Teaching

Internal render of proposal for MedTech Research Centre, Crumlin Navigation Colliery. (Grady, J., 2022)



Architectural programmes have included:

- Renewable energy production, storage and distribution
- Reuse and recycling centres
- Low carbon manufacture
- Education and knowledge sharing
- Wellbeing facilities and intergenerational living
- Nature conservation
- Innovation and research centres
- Community Governance and Support

| Low Carbon Theme | % of students |
|----------------------------|---------------|
| Reuse | 90 |
| Bioclimatic Strategies | 88 |
| Low Energy Retrofit | 74 |
| Low Carbon Materials | 69 |
| Renewable Energy | 62 |
| Design for Disassembly | 43 |
| Biophilia | 17 |
| Phytoremediation/Rewilding | 14 |

CARDIFF UNIVERSITY
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Welsh School of Architecture
Ysgol Pensaernïaeth Cymru

CARBON PASTS, LOW CARBON FUTURES:

VISIONS OF A SUSTAINABLE FUTURE FOR CRUMLIN NAVIGATION COLLIERY

You are invited to join us at Crumlin Navigation Colliery to view the work of final year March students from the Welsh School of Architecture.

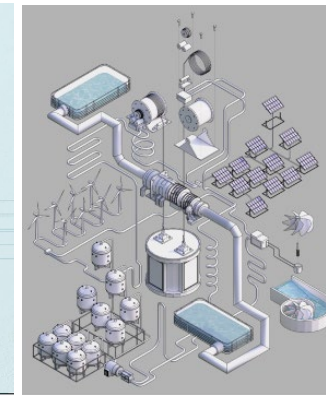
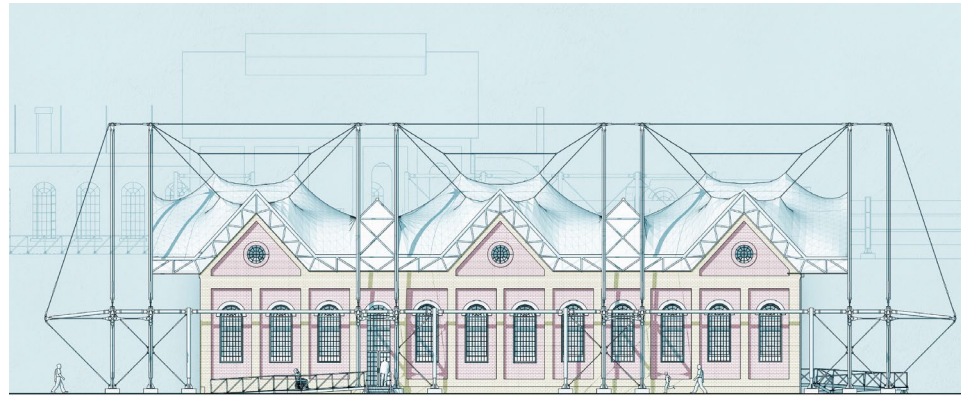
SUNDAY | 26 JUNE | 2022
11:00-16:00

THE POWER HOUSE, CRUMLIN NAVIGATION COLLIERY

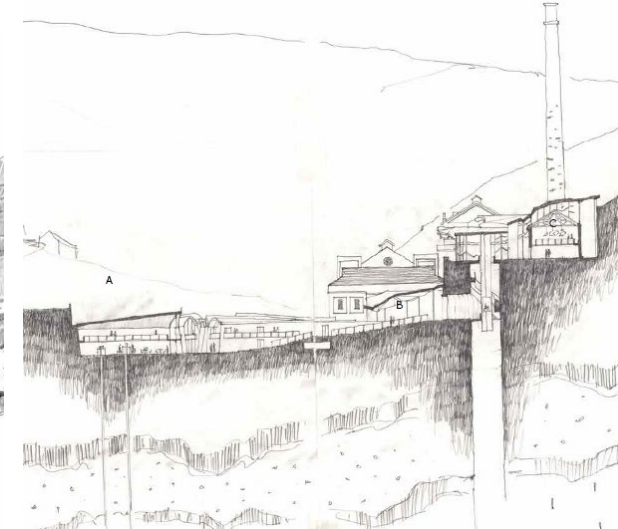
The student's designs explore their visions of how this historic site might be brought back to life and play a role in Wales's fight against climate change.

Whilst fictitious, it is hoped that their architectural proposals will inspire others to see the potential of this historic site. The exhibition will also include an update on current real initiatives, with participation from Friends of the Navigation, Cardiff Business School, Cardiff University Civic Mission Innovation for All, ARC Academy, The Coal Authority and more.

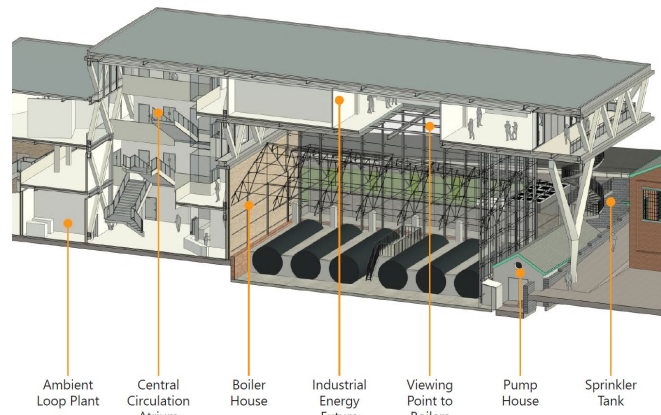
For further information, contact:
ARCHITeachingOffice@cardiff.ac.uk @cardiff.ac.uk

Left and right – Public Exhibition poster and photos. Above - Renewable Energy Storage Facility (*Luckman, R., 2022*). Below – Subterranean and global coal connections and Mine Water Heat Recovery Research Centre and National Coal Archives (*McCormick, A., 2022*).



March2 Design Unit – Carbon Pasts, Low Carbon Futures 2021/22 – Crumlin Navigation



Left and Above – Proposal at Cefn Coed Colliery for National Museum of Energy and Renewable Energy development Park (*Taylor, M., 2023*). Winner of University Architecture Medal 2023 and nominated for Royal Society of Architects in Wales (RSAW) Silver Medal.

Right – Meeting with Neath-Port Talbot County Borough Council and end-of-year show.



March2 Design Unit – Carbon Pasts, Low Carbon Futures 2022/23 – Cefn Coed Colliery (former museum)

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Welsh School of Architecture
Ysgol Pensaernïaeth Cymru

CARBON PASTS, LOW CARBON FUTURES:

Visions of a Sustainable Future for Pontypridd Market Quarter

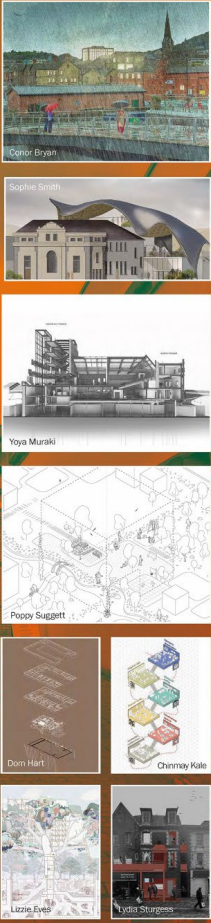
You are invited to join us to view the work of final year MARCH students from the Welsh School of Architecture.

SATURDAY 1 JUNE | 10AM-5PM

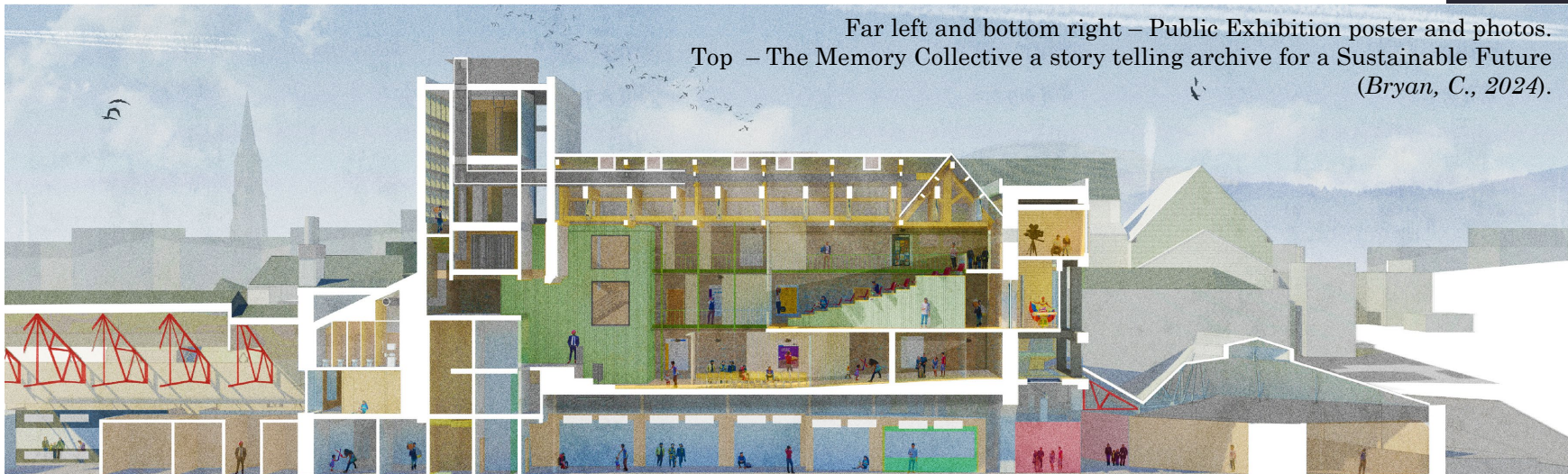
VENUE: Canolfan Calon Taf,
Ynysangharad War Memorial Park
Pontypridd CF37 4PF

The student's designs explore **eight visions** for the future of the Market Quarter and how its vacant spaces, including the Town Hall Theatre, might be brought back to life to play a role in Wales's fight against climate change. Whilst fictitious, it is hoped that their architectural proposals will inspire others to see the potential of this historic location.

whitmanj@cardiff.ac.uk



Far left and bottom right – Public Exhibition poster and photos.
Top – The Memory Collective a story telling archive for a Sustainable Future
(Bryan, C., 2024).

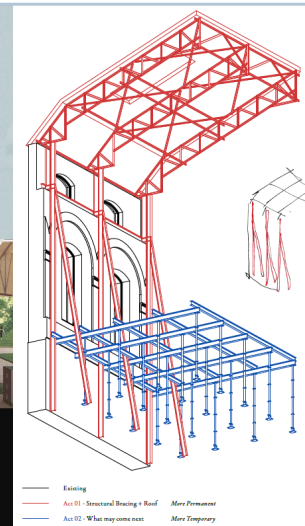
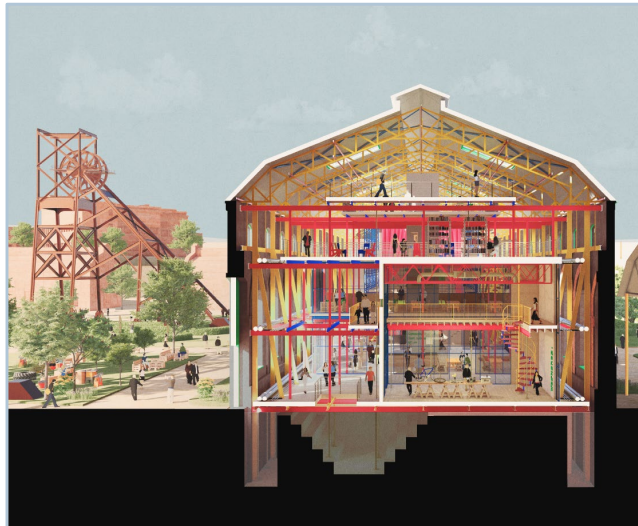


Left - Conversations with nature: (re)connecting with nature, our wasted spaces, and each other. Rewilding and Green Social Prescribing (Suggett, P., 2024)

Right – Public Exhibition, Pontypridd, Ynysangharad Park, June 2024



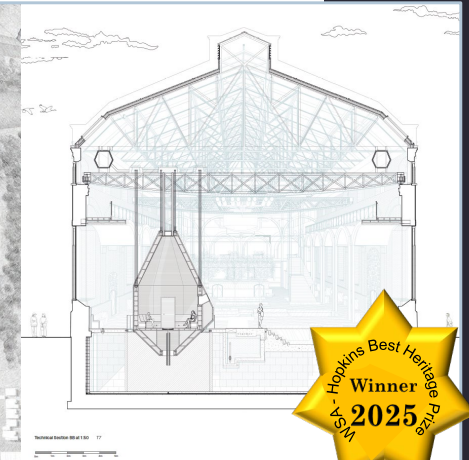
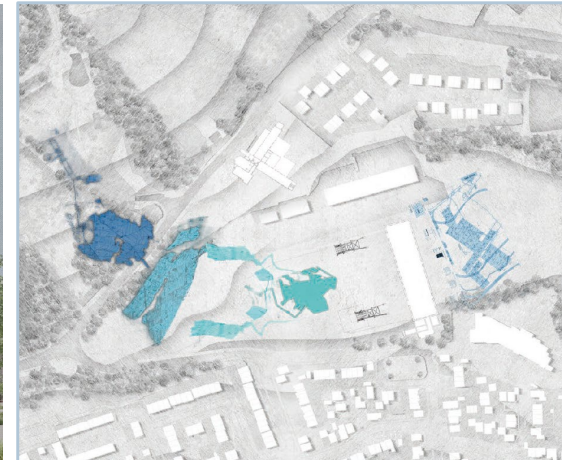
MARCH2 Design Unit – Carbon Pasts, Low Carbon Futures 2023/24 – Pontypridd Market Quarter



Above left– Reviving the Heart of the Community (*Davies, B., 2025*), Above centre- A Repair Society (*Worrall, M., 2025*), Above right- Penallta Energy Community (*Birch, R., 2025*).

Right – The Collective Story – storytelling for the climate crisis (*Jessop, E., 2025*). Far right– Uniting Heritage, Community and Nature Through Water (*Forrester, S., 2025*)

Left– Presentation to Caerphilly County Borough Council Planning and Regeneration Team.

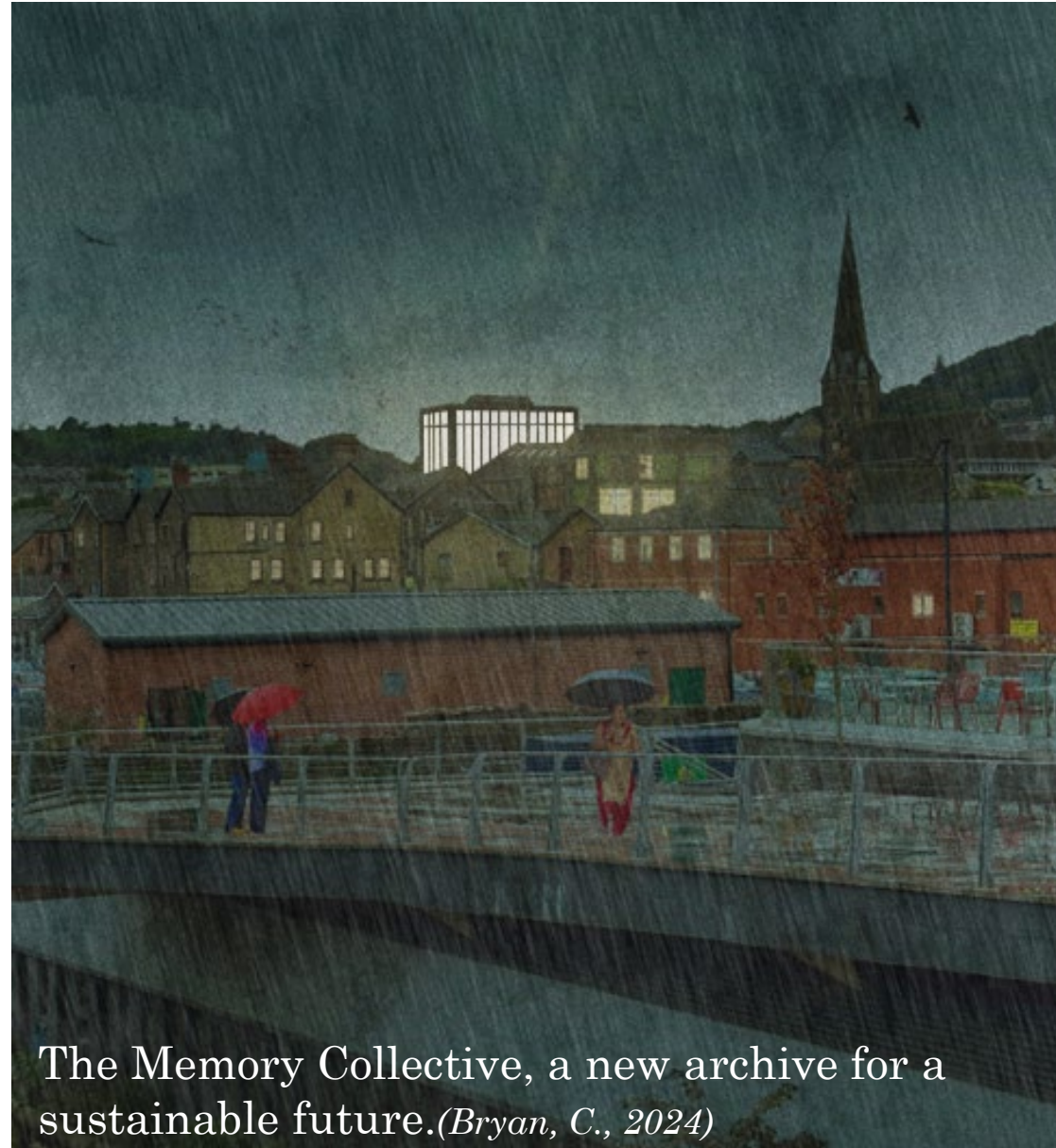


MARCH2 Design Unit – Carbon Pasts, Low Carbon Futures 2024 – 2025

Penallta Colliery

Conclusions

- Sites tied to the UK's historical carbon legacy, provide inspiration to develop innovative responses to the climate and ecological crises.
- The importance of engaging architectural students with industrial heritage in the context of teaching low-energy design.
- The students demonstrate a growing interest in challenging the predominant cycle of demolition and new-build.
- Maximising the reuse of embodied carbon is paramount. Industrial heritage has an exciting part to play in achieving this goal.



The Memory Collective, a new archive for a sustainable future.(Bryan, C., 2024)

Thank you!

