Institution: Newcastle University		
Unit of Assessment: 13 Architecture, Built Environment and Planning		
Title of case study: Testing Ground: Co-Producing Sustainable Buildings to Co-Produce Sustainable Communities in Rural Northumberland		
Period when the underpinning research was undertaken: 2000 – 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
Graham Farmer	Professor of Architecture	1998-2004, 2010-present
Period when the claimed impact occurred: August 2013 – December 2020		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact

This case study describes how interdisciplinary research into sustainable design and a related body of experimental practice-based research has positively contributed to environmental and social sustainability initiatives in rural Northumberland. The co-production of a series of award-winning design-build artefacts has enhanced public understanding and education through the provision of new facilities, learning resources, community involvement and participatory research and engagement activities. The research process and the constructed artefacts have informed new approaches and practices in public, private and third sector organisations and they have positively contributed to the local economy by developing and widening access to new public infrastructures and improved visitor facilities that have also enhanced the experience and conservation of Northumberland's unique landscapes and ecologies.

2. Underpinning research

The impact is underpinned by influential cross-disciplinary research developed by Farmer and Guy dating back to 2000 that contributed a unique socio-technical perspective to the understanding of sustainable architecture. Their 2001 paper published in a special edition of the JAE guest edited by Kenneth Frampton won the prestigious American Collegiate Schools of Architecture (ACSA) annual research award in that year. The research introduced a social constructivist perspective on the development of sustainable architecture and highlighted the contested nature of ecological design and the related implications for architectural practice, research and education (**PUB 1**). Subsequent case studies of completed green buildings helped to reveal the social processes underpinning the development of sustainable architecture and the relationships between diverse technical design strategies and their local deployment and use. This work highlighted the importance of contextual understandings of environmental and technical innovation (**PUB 2, PUB 3**). Related research into the ethics of sustainable design has explored how the philosophy of pragmatism provides a useful analytical and moral framework that connects the environmental ethics of sustainability to the design, construction, and subsequent use of buildings. This pluralist understanding of environmental design acknowledged the primacy of practice, situational diversity and the co-evolution of environmental values within particular contexts (**PUB 4**). The research suggested that sustainable design be understood as a transformative socio-technical practice where new design and environmental knowledge emerges from reflective design activity located in particular contexts when designers, constructors and communities confront environmental problems, learn about their (and others') values, beliefs and practices to progressively enhance the ecology of built environments.

Written publications have provided the foundation for the development of an experimental design research approach that explores the synergies between research, pedagogy and practice and which position the researcher as simultaneously educator, design practitioner, and self-builder. Farmer has been involved in the construction of several award-winning full-scale research-led prototype buildings exploring ultra-low energy and zero carbon design, community-based design, responsible specification, ultra-local materials and technical innovation with limited resources. These practical design-build experiments have provided wider opportunities for critical reflection on the processes and products of sustainable design as well as exploring how future professionals can be educated with the knowledge, attitudes and values that will promote sustainability in their own future practices (**PUB 5, PUB 6**). Testing Ground is an extension of these earlier design-build experiments and was established by Farmer in 2013. The programme utilises the methods of

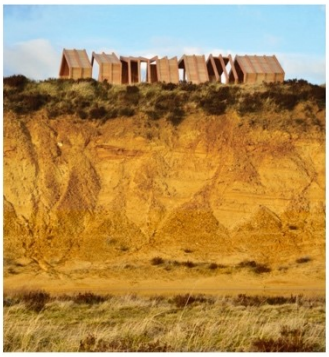
constructive design research and deploys design and construction action as particular a mode of place-based inquiry in which the making of artefacts codifies a situated understanding of existing contexts whilst also providing a way of investigating alternative environmental futures. It is exploring expanded methods for co-producing environmental knowledge and is grounded in the understanding that sustainable design should actively seek out the proximate knowledge of varied local actors who have the latent abilities to imagine and re-imagine how technologies, buildings and spaces can operate sustainably within a specific context (selection of images of Testing Ground projects below).











3. References to the research

All of the publications cited are published in internationally recognised journals or in a high-quality edited book and have all undergone peer review. As of December 2020, the papers listed have a combined citation count of over 500. **PUB 1** has been awarded a major international research prize (ACSA research award).

PUB 1: Guy S, Farmer G. Reinterpreting sustainable architecture: The place of technology. *Journal of Architectural Education* 2001, 54(3), 140-148. https://doi.org/10.1162/10464880152632451.
PUB 2: Farmer G, Guy S. Hybrid Environments: The spaces of Sustainable Design. *In:* Guy, S., Moore, S, ed. *Sustainable Architectures: Cultures and Natures in Europe and North America*. London; New York: Routledge, 2004, pp.15-30. Available on request.
PUB 3: Farmer G, Guy S. Interpreting Green Design: Beyond Performance and Ideology. *Built Environment* 2004, 28(1), 11-21. https://www.jstor.org/stable/23288547.
PUB 4: Farmer G, Guy S. Making Morality: Sustainable Architecture and the Pragmatic Imagination. *Building Research and Information* 2010, 38(4), 368-378. https://doi.org/10.1080/09613218.2010.482236.
PUB 5: Farmer G. Re-contextualising design: Three ways of practising sustainable architecture. *arq: Architectural Research Quarterly* 2013, 17(2), 107-119. DOI: 10.1017/S1359135513000468.
PUB 6: Farmer G. From Differentiation to Concretisation: Integrative Experiments in Sustainable Architecture. *Societies* 2017, 7(35), 1-23. DOI: 10.3390/soc7040035.

4. Details of the impact

Northumberland is England's most sparsely populated county and is home to some of its remotest communities. The area has witnessed dramatic environmental changes, from sheep farming to large-scale commercial forestry, the construction of the Kielder reservoir, the establishment of the Northumberland National Park and more recently the founding of the Northumberland Dark Sky Park in 2014, Europe's largest area of protected Gold Tier night sky. The area is characterised by dramatic landscapes, natural beauty, rare ecologies and a high quality of life but it also faces substantial socio-economic challenges and has been slow to recover from the economic downturn.

The Kielder Water and Forest Park Trust defines its role as promoting sustainable economic growth, employment creation and supporting tourism in the Kielder Valley which plays a major role in the local economy (**IMP3**). As part of its overall strategy the Trust recognises the strategic value of cultural activity and it established an 'Art and Architecture' programme almost 25 years ago. However, from 2009 onwards opportunities to secure capital funding for arts-based regeneration projects were substantially reduced due to the financial crisis and changing funding policies nationally and regionally (**IMP1, IMP2**). It is against this background that *Testing Ground* was established in 2013 as a collaborative research partnership and educational programme (**IMP1, IMP2**) and as an innovative way of providing support to organisations and communities whilst simultaneously experimenting with sustainable design principles and practices and delivering interesting and engaging built work within a rural context.

Activities leading to Impact

Since 2013 Testing Ground has developed a unique, ambitious and sustained programme of constructive design research that has creatively supported and influenced a range of stakeholders through innovative methods and practices. Seven permanent artefacts have been constructed in different locations spread across the Kielder Water and Forest park and the Northumberland National Park. Six of the projects are fully accessible to members of the public, and the seventh is located on the Calvert Trust site and provides enhanced infrastructure for the Trust's guests. The outcomes of the research have been to develop a creative practice that co-produces interesting and engaging artefacts situated within rural contexts that contribute to an understanding and celebration of local places, for residents and visitors alike. The approach empowers and supports local people to act positively on their environment, with limited resources and in sensitive environmental and ecological contexts.

In summary, the impact associated with these creative research practices has been to:

- Co-produce new public infrastructures and facilities in rural contexts that would otherwise not have been possible (**IMP1, IMP4**)
- Instigate a change of practice within organisations allowing them to widen their reach and community engagement activities (**IMP1, IMP2, IMP3, IMP4**)
- Enable, develop and extend cultural and eco-tourism initiatives and activities that play a major role in the local economy (**IMP3, IMP4**)
- Provide practical support to rural communities and assisting third sector groups to take advantage of design and practical expertise, secure additional funding and develop new activities and income streams (**IMP5, IMP8, IMP9**)
- Generate new understandings and participatory approaches that seek to address sustainability and biodiversity within local communities and organisations' (**IMP3, IMP2**)
- Develop an educational dimension to the work of rural organisations which in turn has created enhanced opportunities for young people and supported the education of future design professionals (**IMP1, IMP2, IMP10**).

Impacts from processes and practices

Testing Ground (TG) has influenced and supported new approaches and working methods in various rural organisations from across the public, private and third sectors. It's focus on environmentally responsible design and specification allied to participatory and co-production techniques has influenced the Kielder Water and Forest Park Trust to change their existing processes for curation and for commissioning artists and architects and has contributed to a substantial broadening of their existing community engagement activities (**IMP1, IMP2**). TG has supported the Trust in building closer relationships with the various communities within Kielder and this has "transformed the way in which the Trust is perceived within communities" (**IMP1**). The work of TG has also enabled the Trust to engage with wider audiences and to geographically expand its activities beyond Kielder and to spread their influence by supporting wider communities in the National Park and wider Northumberland (**IMP1**).

Northumbrian Water have highlighted the contribution that TG has made in helping them to establish new partnerships, in supporting their social purpose activities as well as enhancing the way in which the company engages with wider communities (**IMP3**). According to their CEO, the company uses the TG programme as an exemplary precedent of partnership working to: "*show how you can get something really, really good at the end of it, that adds value… either from a tourism point of view, or potentially an employment point of view, or the sustainability of the communities, all of which this programme does. So, you can wax lyrical about this amazing experience that this particular installation had and how it worked and how the community bonded with it."* (**IMP3**).

Forestry England have described the TG programme as providing "long lasting legacy" and as being "exemplary" in the way that it is "connecting different fields and themes" and demonstrating an attitude to sustainability and the "purposeful use of timber." They describe how the projects have stimulated creative thinking in Forestry England and have suggested that it is helping to them to promote their work nationally. TG projects have featured prominently on the national website and in publicity materials and social media campaigns and as a result the work is beginning to feature in timber journals and the trade press. They suggest that TG is; *"seen as some of the best practice in Great Britain, because its…out working with the community, its doing the design, working with the environment, understanding what environmental issues there are out there, how they can work in harsh weather conditions, how can they take on board the community aspirations, but with the constraints of the land manager, and the sustainable use of timber."* (**IMP4**).

The UK Woodland Assurance Standard (UKWAS) who are an independent certification standard for verifying sustainable woodland management in the UK have suggested to Forestry England that TG "is one of the best things they've seen, probably internationally, but certainly in Great Britain." (**IMP4**).

The Calvert Trust have suggested that the co-production processes developed by TG have been transformative in the way in which they think about their own buildings and the development of

their estate. It has also helped them to think differently about the wider processes and practices involved in designing for disability (**IMP6**). TG has also provided practical support to rural communities and third sector groups and has made positive impacts by providing revenue generating opportunities as well as supporting bids to secure further funding (**IMP5**). Local residents have pointed to the positive contribution TG has made to community cohesion and sense of community and how it has inspired the development of a whole range of new community activities (**IMP8, IMP9**).

Impacts from co-production and the artefacts

The new facilities developed through TG are supporting tourism initiatives that play a major role in the local economy. The programme is making a positive impact on tourism by enhancing the reputation of Kielder as a visitor destination (**IMP4**). According to the CEO of Northumbria Water, it has enhanced the visitor offer and in particular it has helped to develop new tourism around cultural activities and in particular helped to develop public "knowledge and understanding of architecture" (**IMP3**). TG has also helped to generate new visitor activities including curated tours of projects, design workshops and architectural events. In doing so TG is generating more activity, footfall and presence and as a result is contributing to the economic sustainability of the region (**IMP3**).

Similarly, the Northumberland Wildlife Trust (NWT) testify to the transformative impacts that Testing Ground has generated at the Bakethin Conservation Area, Kielder by making ecological education, wildlife watching or wildlife experiences more accessible at Kielder (**IMP7**). The new nature-watching infrastructure developed by TG has helped the Trust to engage with new users and made a difference in how visitors perceive and use the site (**IMP7**). This has increased the appeal to visitors and widened the demographic of those visitors, also resulting in an increase in visitor numbers and in particular a greater number of families using the site and facilities. The work at Bakethin is now informing the future development of facilities and has contributed to new thinking and approaches within Wildlife Trusts, supporting a shift in ethos away from nature reserves for experts and enthusiasts towards wider public engagement (**IMP7**).

Finally, the unique design-build pedagogical approach developed through Testing Ground which develops collaborative and situational learning – often in challenging or ecologically sensitive contexts has had a transformative impact on the sixty or so architecture students who have been directly involved in the programme to date. A key aim of the programme has been to develop reflective practitioners and future professionals furnished with the knowledge, attitudes and values that will promote sustainable, socially responsible and context-sensitive work in their own future practices. The Royal Institute of British Architects recognised TG by highly commending the Rochester Roundhouse in the 2017 MacEwen Award for high quality design as well as "teaching how to be socially responsible architects and contractors" as well as its "teaching and learning programme to produce architecture graduates with experience working on live, budget-conscious projects from beginning to end." They described the graduates of the programme as "future architectural giants." (**IMP10**).

5. Sources to corroborate the impact

IMP1: Signed testimonial, Director, Kielder Water and Forest Park Trust.
IMP2: Signed testimonial, Curator, Kielder Art and Architecture.
IMP3: Signed testimonial, CEO, Northumbrian Water.
IMP4: Signed testimonial, Tourism Manager, Forestry England.
IMP5: Signed testimonial, Manager, Kielder CIC / campsite.
IMP6: Signed testimonial, Director, The Calvert Trust.
IMP7: Signed testimonial, Estates Manager, The Northumberland Wildlife Trust.
IMP8: Signed testimonial, resident 1, Stonehaugh Village.
IMP9: Signed testimonial, resident 2, Stonehaugh Village.
IMP10: Working in the Round. The MacEwen Award, Highly Commended. RIBA Journal, 27 January 2017. https://www.ribaj.com/buildings/the-rochester-roundhouse-commended.