Institution: University of Strathclyde

Unit of Assessment: 16 Architecture, Built Environment and Planning

a. Context

Our research is structured around three key themes in **Design & Sustainability; Energy Systems; and Urban Design.** The key groups and users of our research are those who are closely aligned as architecture and built environment firms, professionals and policy makers:

- Architecture Practice & Built Environment Companies
- Architecture and Built Environment Professionals;
- Community Groups and Housing Associations
- Local Authorities, the Scottish Government and the UK Government

The unit's impact over the REF period has been dominated by changes to architectural, engineering, scientific and professional practice nurtured through a strong relationship with the City of Glasgow, high profile national architectural and urban design practices, the construction industry, and government planning and construction agencies (largely through the unit's engagement with the **Architecture Policy Unit (APU) and Architecture + Design Scotland (A+DS).**

b. Approach to impact

Impact is generated not only from the unit's three core themes of Urban Design, Energy Systems, and Design and Sustainability, but also from the emergent areas of 'health & well-being', 'sustainability' and 'conservation' reflecting the wide expertise of our staff and the breadth of useful research they produce.

The unit's approach to impact is exemplified by activities undertaken within the Urban Design theme (UDSU) where members of the group are engaged with both the civic society and institutional organisations as an integral part of their research work. **CPD courses** are provided for local authorities and seminars organised for the profession and community groups. UDSU also invite community groups and stakeholders to attend **discussions with experts** on issues of relevance to local groups. A recent event in July 2012 was **an International Conference** on the Application of Research in the Built and Natural Environment to Practice and Policy Making, where a session was organised for community members of deprived areas in Glasgow to meet international researchers and share problems and ideas. The strategic work done with various Scottish Councils has been on a **consultancy basis**, whereby UDSU would work with students on an educational project, but at the same time produce studies and proposals for areas of strategic interest to the Councils who commissioned the studies.

UDSU regularly presents its research to private practice which often produces follow-up impact activities, e.g. the development of a joint KTA venture with Adam Architecture (2010-current) on gentrification in London. In this case, the KE is now being transformed into an assessment and design platform for commercial use in masterplanning and as a research tool for engagement between UDSU and professional practices. The intention is to use evidence on the relationship between gentrification patterns and physical form to guide future investment and policy in urban renewal. UDSU has also systematically collated and organised, within a comprehensive design approach, all its current research work on community participation, urban morphology, modelling and masterplanning. This output is offered to the profession as an alternative educational model to current planning practice, as well as a more socially and environmentally responsive placemaking approach.

It is anticipated that from the combination of educational and design practice changes, a significant impact will be exercised at the policy level both directly (design guidance and standards) and indirectly (through the training of the profession). UDSU is also currently developing new potential

applications of Multi-Centrality Assessment (MCA) to tie it to both socio, health-related and economic factors, and is of significance to the NHS and Government agencies. UDSU has very recently embarked in research on the psychological benefit stemming from the direct engagement of people in situations of severe stress and trauma when they are directly involved in the construction of their residential environment. Furthermore, UDSU is currently involved, through its students, in the construction of an orphanage in Rwanda and is developing its expertise in the broad area of construction therapy. Plans are under way to develop an International Centre for Construction and Therapy based at the University of Strathclyde.

Similar approaches to impact and mechanisms of engagement are used in relation to the other main research themes. Examples that illustrate the range of beneficiaries of the unit's research and knowledge exchange activity are given below:

Professional practice & industry

- Research outcomes on Domestic ventilation rates, indoor humidity and dust mite allergens resulted in The Chartered Institution of Building Services Engineers (CIBSE) incorporating the findings into their design guidelines (Technical Memorandum 40) instructing their members to ensure environmental systems were designed to maintain relative humidity below 60% in all buildings to avoid house dust mite colonisation and proliferation **(Howieson).**
- Research outcomes have been promoted to the international research and practitioner community at key conferences and through innovative knowledge exchange. A major project in the latter category assisted 250 UK Architectural Practices and Energy Consultancies (mostly SMEs) to embed energy simulation within their business as a means to address the emerging opportunities relating to a low carbon built environment. Individuals within these organisations were assisted in applying simulation to schemes that targeted energy use reductions of the order of 75-90**%. (Clarke, Kelly, Strachan, Tuohy).**

Local Authorities, Regional and National Government

- A significant achievement during the review period was the encapsulation of **ESRU's** ESP-r's computational engine within several third party products as a means to enhance their rigour, application scope, and future extensibility. Examples include the Carbon Trust's biomass boiler design tool (200 current users with an estimated £4M capital and £1M running cost saving per annum over all projects) **(Clarke, Kelly, Strachan, Tuohy).**

Community Groups and Housing Associations

- Commissioned by the Scottish Arts Council (2003), **Frei** and **Romice** produced a flexible step-by-step Handbook to help local neighbourhood groups develop scenarios, prioritise interventions, draft design requirements and select professionals. This Handbook, available online, is used by Glasgow Housing Association and UDSU **(Porta & Romice)** to generate consensus around design commissions, and is now being updated with GHA.

c. Strategy and plans

The unit has developed strong industry linkages with national and international partners through multi-disciplinary research that integrates sustainable design, engineering, and technology at both the building and urban scale. We will continue to focus our efforts on areas where nationally and internationally recognized research has produced impact, and to nurture, support and encourage colleagues through dedicated Departmental and Faculty KE co-funding. The University also presents us with opportunities to both celebrate and enhance our work, and 'Engage with Strathclyde' will continue to be used by colleagues as a way of cementing existing relationships and fostering new ones with external partners. We also seek to be recognized by external bodies - within practice, industry, government and policy-making organisations - for our provision of high quality knowledge and expertise, and to be known to work effectively with partners to enhance the quality of life in society. Our strategy is to embed knowledge exchange pathways and professional

expertise within all the research projects conducted within UoA 16. Indeed, we view knowledge exchange activities as opportunities to contribute to public debate and to enhance knowledge and learning within and among communities of practice. The impact of our research contributes to the development of those working in the fields of architecture, the built environment and urban planning, and shapes future policy formation.

In 2013 the university underlined its support for this aspect of academic work by making KE a fourth strand of our annual review (alongside research, teaching and citizenship). Knowledge Exchange is now a recognized promotion path for academic staff. Our future plans place increasing emphasis on KE work, with support already in place to allow for our aspirations to be realised. In addition, we will be continuing to pursue established areas of impact success through existing and new relationships. In this regard, we will continue to support staff to attend international conferences as it is at such events that the beginnings of what can become impact often take place.

Plans for Strathclyde's UoA16 to achieve further impact will include:

- Expanding the recently established themes in Architectural Conservation identified as having significant long-term, inter-disciplinary potential within the Faculty and University;
- Strengthening collaborative links with national/international partners where there is potential for knowledge exchange activity;
- Facilitating links to the Technology Innovation Centre;
- Facilitating links to the Institute for Future Cities

The design process is both complex and diverse, moving from analysis (research) through visualisation (prototyping and testing) to planning (programme and time management) and finally execution (construction and POE), with the theoretical and technical strands intertwined around this armature. This is reflected in the many areas in which impactful research can be manifest. The impact case studies chosen have arisen because dedicated knowledge exchange support has been embedded in our research strategy over a number of years. We are actively building on the successes of these and other case studies to maximise on-going impact and to inform revision of the processes by which we will achieve future impact from our research.

d. Relationship to case studies

The submitted case studies reflect our approach to impact, revealing relationships with partners in professional practice, industry and policy-making groups.

The **Urban Design** case study on spatial research that improved community engagement on the use of urban resources, exemplifies how collaboration with **Community Groups and Housing Associations** can lead to policy changes and significant levels of engagement in planning decision making.

The **Energy Systems** case study on building performance simulation to realise a low carbon built environment illustrates how inter-disciplinary engagement with **Professional practice & industry** can result in environmental impacts via reduce energy demand and job creation.