

<b>Institution:</b> University of Dundee
<b>Unit of Assessment:</b> 16 Architecture, Built Environment and Planning
<b>Title of case study:</b> Sustainable Built Environment SuBETool Framework
<p><b>1. Summary of the impact</b> (indicative maximum 100 words)</p> <p>This impact relates to the research and development of the SuBETool, a new framework and method for assessment of spatial master-plans. International use of this framework by planning professionals has set a new bench-mark for master-planning, and re-positioned master-planning as a critical stage in the development process.</p> <p>The SuBETool research has:</p> <ul style="list-style-type: none"> <li>• actively engaged industry in the SuBETool's design and roll-out;</li> <li>• demonstrated how an integrated approach assists in creating sustainable places;</li> <li>• changed perceptions and influenced professional and policy debates internationally (eg Scotland, Italy, UAE);</li> <li>• been applied in practice (e.g. Milan 2009, Greenwich 2011);</li> <li>• resulted in a university-industry partnership (AlWaer, Clements-Croome, Hilson Moran);</li> <li>• been disseminated at international conferences.</li> </ul>
<p><b>2. Underpinning research</b> (indicative maximum 500 words)</p> <p>Different urban environments are susceptible to diverse and often unanticipated socio-economic and climatic change. Since joining the University of Dundee in 2008, Husam AlWaer has sought to embed appropriate indicators of sustainability at the inception of a development project and to integrate bespoke weightings for environmental stewardship, economic growth and socio-cultural impact, according to regional differences and development priorities. The work critically examined the available methodologies of sustainable urban assessment and explored how integrated systems-based approaches can be used to advance master-planning knowledge and practice. The research involved Clements-Croome (University of Reading and advisor to the project) and Hilson Moran, an international multi-disciplinary engineering consultancy. A pilot phase was funded by the University of Dundee's School of the Environment and Hilson Moran.</p> <p>The research rationale was that the complexity of design, planning and development activities for new urban solutions necessitates a form of strategic forward planning that is itself resilient to change. Moreover, the strategic management of diverse private and public interests, coordination of operational processes, and professional team-working are of paramount importance in major development schemes. The initial research objective was to critically examine linear-sequential models of master-planning, which are predicated on a desired end-state and tend to comprise discrete physical parts, and to design a simple and responsive approach to sustainable master-planning sensitive to the dynamic nature of physical development and to the different stakeholder interests. Informed by iterative feedback loop thinking, the logic of the tool's design involves on-going assessment of the changing context; review of the performance of design proposals; and adaptation of the built response.</p> <p>A detailed and comparative view of the structure and operation of assessment methods/systems of master-planning worldwide identified a number of concerns:</p> <ol style="list-style-type: none"> <li>a. <i>Short-termism</i>: The available assessment systems focus on the installation phase, rather than taking a longer-term life-cycle perspective to ensure continued performance;</li> <li>b. <i>Narrow focus</i>: Few methodologies give equal weighting to environmental, socio-economic and cultural aspects of master-planning;</li> <li>c. <i>Limited stakeholder engagement</i>: The multi-factorial nature of master-planning requires a working consensus about critical issues and their relative importance;</li> <li>d. <i>Black Box Syndrome</i>: Assessment processes tend to lack clarity for individual users with methods typically offering answers, but lacking transparency and justification;</li> <li>e. <i>Poor transferability</i>: Available frameworks lack adaptability meaning that different regions cannot set priorities and rating systems relevant to specific socio-economic, cultural and</li> </ol>

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environmental contexts.

Based on the literature review and critical examination of assessment systems then in use by developers, the research:

1. re-conceptualised master-planning as a critical tool for framing strategic, integrative action and framed it as a key stage in development planning processes;
2. established a holistic framework comprising 75 social, economic and environmental Key Performance Indicators, a weighting process, and an assessment system, covering the total scope of urban sustainability;
3. piloted [Milan] the SuBETool Framework methodology for resolving multi-partner action and stakeholder communication (version 1, 2009);
4. developed case studies [Greenwich] demonstrating how effective communication of multiple variables and predicted impacts can be realised across diverse sets of stakeholders (version 2, 2011).

### 3. References to the research (indicative maximum of six references)

- 1 AlWaer, H., Sibley, M. and Lewis, J. (2008a) **Different Stakeholder Perceptions of Sustainability Assessment**. *Architectural Science Review*, 51(1), 47-58. DOI: 10.3763/asre.2008.5107.
- 2 AlWaer, H., Sibley, M. and Lewis, J. (2008b) **Factors and Priorities for Assessing Sustainability of Regional Shopping Centres in the UK**. *Architectural Science Review*, 51(4), 391-402. DOI: 10.3763/asre.2008.5143.
- 3 **SuBETool** (Version 1, 2009, version 2, 2011) A new proprietary framework and protocol for assessing the sustainability of master planning. This framework comes with a manual of guidelines which explain the 75 identified indicators, participation process and the compliance requirement for each indicator, and an assessment system. This practice-related output has been published internally by Husam Al Waer, Derek Clements-Croome, Hilson Moran. (listed in REF2)
- 4 AlWaer, H. and Clements-Croome, D. J. (2010) **Key performance indicators (KPIs) and priority setting in using the multi attribute approach for assessing sustainable intelligent buildings**, *Building and Environment* 45 (4), 799–807.
- 5 AlWaer, H., and Kirk, R.D. (2012) **Building sustainability assessment methods**. *Engineering Sustainability: Proceedings of the Institution of Civil Engineers*, 165(4), 241–253. DOI: 10.1680/ensu.10.00058  
<http://www.icevirtuallibrary.com/content/article/10.1680/ensu.10.00058>
- 6 AlWaer, H. (2013) **Improving Contemporary Approaches to Master Planning Process**. *Journal of Urban Design and Planning, Proceedings of the Institution of Civil Engineers*. DOI: 10.1680/udap.12.00022.  
<http://www.icevirtuallibrary.com/content/article/10.1680/udap.12.00022>
- 7 AlWaer, H., Bickerton, R., and Kirk, R.D. (2013) **Examining the components required for assessing the sustainability of communities in the UK**. *Journal of Architecture and Planning Research*. (in press).

### 4. Details of the impact (indicative maximum 750 words)

The development of the SuBETool has shaped the terms of sustainable master-planning debates. As theoretically informed, collaborative, applied research, use of the tool has been disseminated to developer, government and policy actors, who are direct and indirect beneficiaries. Specifically, the impact has shaped theory and practice through (section 5: 3,4,8,9,10):

1. re-framing sustainability assessment methodologies and master-planning;
2. setting new benchmarks and standards for sustainability, guiding planning and design decision making processes for large and medium size development;
3. informing the wider community of the benefits of master-planning processes for different locations and contexts; in particular aiding understanding of the significance of assessing sustainable master-planning;
4. developing an integrated approach linking sustainability assessment and master-planning

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- with Key Performance Indicators for environmental, social, cultural and economic factors;
- 5. demonstrating innovation in the use of an adaptable framework designed to allow different regions to set relevant priorities and rating systems;
- 6. strengthening academic-industry partnering relations.

The development of the SuBETool has gone through two phases to date. The level of impact has increased as the research matured. Diverse, complementary strategies were designed to enhance public, industry and government awareness of the SuBETool (version 1). These included dissemination through traditional web-based and professional publications, academic symposia, engagement with key professional groups, industry and government bodies, and industrial advisory panels (section 5: 1,3,4,5,6,7,8,9,10).

Between the start of the research in 2008 and SuBETool's first pilot case study in 2009 [Milan], AlWaer gave interim reports to organisations and professionals and disseminated early conclusions in several international conference/summit talks on sustainable master-planning. As a direct consequence of this exposure, a series of workshops were run by AlWaer at Hilson Moran (2009). The Director of Sustainability at Hilson Moran identified the potential of taking the work further in relation to the firm's master-planning activities. Three principal collaborators (AlWaer, Clements-Croome, Hilson Moran) subsequently developed the tool (Section 5: 1,8).

Hilson Moran adopted the SuBETool framework (version 1) as one of the main protocols for large developments; namely: a major master-plan in Milan (2009) and the King Abdullah City for Atomic and Renewable Energy in Riyadh, Saudi Arabia (2010). Version 2 (SuBETool) was then applied to the Greenwich Peninsular mixed use development, adjacent to the Millennium Dome (2011). Hilson Moran is committed to applying SuBETool to its master-planning activities to assess the sustainability of new developments, and the SuBETool team [Husam Al Waer, Derek Clements-Croome, Hilson Moran] are developing version 3: <http://www.hilsonmoran.com/sectors/urban-regeneration/> (Section 5: 1,8).

The SuBETool framework has led to changes in professional practice relating to designing and planning for large and medium size master plans, nationally and internationally. Based on the success of SuBETool, Scott Brownrigg has developed their own method to assess the sustainability performance of potential development land, called the Sustainability Appraisal for Land Development (SALD). It enables the practice's integrated master-planning, urban design and planning team to provide a robust site analysis service for both local authorities and private landowners. It is inspired by the BREEAM Communities, LEED Neighbourhood Development and SuBETool methods: [http://www.scottbrownrigg.com/design\\_research\\_unit/research\\_activities/sald/](http://www.scottbrownrigg.com/design_research_unit/research_activities/sald/) (Section 5: 2,9,10).

The research has had broader impact within the construction industry evidenced by AlWaer's invitation to sit on the steering committee of the master-planning group at Hilson Moran since 2008. These close academic-industry relations extend the profile of the Framework and its innovative contribution to thinking about the master-planning process.

A number of inquiries from national and international organisations and firms have been received for adapting the tool and applying it to new contexts (Section 5: 9,10). The Building Research Environment (BRE) offered to accredit the Framework as one of the world's leading assessment tools for sustainable master-planning. ADAM Architecture, leading practitioners of contextual urbanism in Europe, expressed interest in using the SuBETool.

As part of our impact strategy, SuBETool has been disseminated by Alwaer to (Section 5: 3,4,8,9,10):

- The World Future Energy Summit, Abu Dhabi 2009 and 2011.
- The European Future Energy Forum, Spain 2009.
- The international industrial conference ECOBUILD, London, 2010.
- Urban Design Skills, 2010.
- Turin City Council, Italy, 2010, 2012.
- Arab League Forum for Sustainable Urban Planning, Cairo, 2010, 2013.
- Scottish Government, 2011.
- EPSRC Event (IMPACT 360°: Success Stories from the Sustainable Urban Environment-

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(SUE) research programme) in 2011.

- Architecture+Design Scotland, Edinburgh, 2011.
- ARUP, Visualizing Building Performance, 2011.
- Ministry of Public Works and Urban Planning, UAE, 2011.
- Urban Design Group, London, 2012, 2013.
- ADAM Architecture and Urbanism, 2013.

This complements dissemination by Hilson Moran to the following organisations (Section 5: 8):

- The international industrial conference ECOBUILD, London, 2010.
- The World Future Energy Summit, Abu Dhabi, 2009.
- Ministry of Public Works and Urban Planning, UAE, 2011.

### 5. Sources to corroborate the impact (indicative maximum of 10 references)

#### A. Online Publication relating to the SuBETool

1. For more information, see the brochure 'Capability Statement, Urban Regeneration and Master-planning': <http://www.hilsonmoran.com/sectors/urban-regeneration/> & [http://www.urbansustainabilityexchange.org.uk/media/ISSUESevents/Hilson\\_Moran\\_Sustainable\\_Masterplanning\\_December\\_2011.pdf](http://www.urbansustainabilityexchange.org.uk/media/ISSUESevents/Hilson_Moran_Sustainable_Masterplanning_December_2011.pdf)
2. For the SALD tool, which Scott Brownrigg based on SuBETool, please see: [http://www.scottbrownrigg.com/design\\_research\\_unit/research\\_activities/sald/](http://www.scottbrownrigg.com/design_research_unit/research_activities/sald/)

#### B. Events and Conferences

3. EPSRC, 'Success Story': <http://www.urbansustainabilityexchange.org.uk/media/ISSUES%20Outputs/BS%20Success%201/DCOP%20SUBET.pdf>
4. ARUP, 'Visualizing Building Performance Conference': <http://www.ibpsa-england.org/news/visualizing-building-performance>

#### C. Online debate and Press release

5. Building for Change, 'Making the leap from research to mainstream': <http://www.building4change.com/page.jsp?id=657>
6. Press release, 'Hilson Moran launches a unique sustainable masterplanning tool': [http://www.hilsonmoran.com/News/Articles/Hilson\\_Moran\\_launches\\_a\\_unique\\_sustainable\\_masterplanning\\_tool/](http://www.hilsonmoran.com/News/Articles/Hilson_Moran_launches_a_unique_sustainable_masterplanning_tool/)

The Director of Sustainability in Hilson Moran explains, "This powerful tool offers a real breakthrough in sustainable masterplanning. It enables us to analyse over 70 different indicators of sustainability at the very inception of a project and to assess a proposed masterplan using bespoke weightings for environmental stewardship, economic growth and socio-cultural impact, according to the particular development's and country's priorities."

7. Press release, 'Sustainable Urbanism for the 21<sup>st</sup> Century': <http://www.genassistinternational.com/popupcommunication.php?id=131>

The Director of Sustainability in Hilson Moran, states that the framework, is "a paradigm shift in sustainable master planning which has contributed to the practice nationally and internationally.... SuBET allows stakeholders to decide what is most important and facilitates the development of a sustainable master plan...."

#### C. References

8. Regional Director Qatar, and Director of Sustainability in Hilson Moran, UK, EU and the Middle East.
9. Group Director, Scott Brownrigg, UK.
10. Director, The Urban Design Group, London.