STBA
SUSTAINABLE TRADITIONAL
BUILDINGS ALLIANCE

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Environmental Audit Committee
Sustainability of the built environment
c/o https://committees.parliament.uk/committee/62/environmental-audit-committee/

12th May 2021

Dear EAC,

Introduction to STBA for reference

1. The Sustainable Traditional Buildings Alliance (STBA) is a UK-wide collaboration of sustainability, heritage and construction industry organisations that acts as a forum for sustaining and improving traditional buildings. We work together to minimise risks and maximise benefits to traditional buildings and their occupiers. We combine technical expertise with a holistic approach promoting quality of life.

2. STBA has produced research reports and guidance for DECC and BEIS. Our 2012 Responsible Retrofit report for DECC led to it commissioning the BRE Solid Wall Study. This identified approximately 35% of dwellings in the UK as heritage buildings. Historic England has published STBA's Gap Analysis in the Energy Efficiency of Traditional Buildings. Our work has changed awareness of performance of solid wall buildings, and of moisture in them, prompting the formation of the UK Centre for Moisture in Buildings.

3. STBA pioneered the Whole-House approach to retrofit. This was embraced in the Each Home Counts report which led on to PAS 2035. We are acting as technical advisor to BEIS for the new Social Housing Decarbonisation Demonstrator Fund, which takes a Whole House approach. We are piloting a large-scale Whole-House retrofit project under the BEIS Thermal Innovation Fund, in partnership with Melin Homes.

4. STBA contributed to development of PAS 2035:2019 which sets the standard for domestic retrofit and is mandatory for publicly funded projects. In this, STBA was instrumental in getting the health of buildings and occupants, and heritage considerations embedded into energy efficiency guidance. We have written the new Annex E for the PAS on Significance Assessment for non-protected traditional buildings. We are now contributing to PAS 2038 for non-domestic buildings, which is currently under development.

5. In contrast to the costly Government guidance (PAS 2035 etc) which is only available from the British Standards Institute, STBA has produced freely-available web-based guidance including the Retrofit Guidance Wheel and the Whole house approach.

STBA
SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

6. STBA is independent, inclusive, and not aligned to any pressure group or commercial entity.

7. STBA is contributing to the work of the international Climate Heritage Network in the lead up to COP 26.

8. While STBA's technical work has focused on individual buildings, our approach is holistic, and our research and collective experience have prompted reflection and review at a much broader scale. This includes places as well as buildings, and the value (or lack of it) given to the heritage and quality of life in solutions being promoted for tackling climate change.

9. We are particularly mindful of the need for a whole-life approach which takes account of embodied carbon in existing buildings, and of the carbon and financial costs of retrofit measures.

STBA Responses to EAC Questions:

To what extent have the Climate Change Committee's recommendations on decarbonising the structural fabric of new homes been met?

The STBA responded to the Future Building Standard and noted that there is still no real impetus regarding timescales and requirements for improved standards. Zero carbon standards have been well known for decades and yet are still to be implemented. The longer the delay the higher costs both to the environment and homeowners as they will be forced to retrofit 'new' homes in the future.

How can materials be employed to reduce the carbon impact of new buildings, including efficient heating and cooling, and which materials are most effective at reducing embodied carbon?

Carbon impacts of materials, and of retrofit measures, need to be considered over their whole life cycle if emissions are to be minimised. The Government could show an overdue, and urgently needed, commitment to a whole life approach by requiring the use of British Standard BS EN 15978:2011 which sets out key sustainability considerations over the whole life of a construction project.

The Government urgently needs to apply the principles set out in its 2018 Resources and Waste Strategy to the construction industry. It should urgently deliver on its promise, in this

strategy, to "establish a definition of zero avoidable waste in the sector and develop an ambitious route map by 2020 setting out how and when this can be achieved".

The route map should require existing buildings and their materials to be re-used wherever possible. All new buildings should be constructed so as to enable future repair and adaptation, with maximum re-use of materials in their original form (e.g. masonry re-used as masonry, rather than going directly to final use as hardcore) and minimum waste of materials. The best material is to have no new material. The embodied carbon of existing buildings and of their new build replacements can be largely 'saved' by effective retrofit of old buildings.

Use and re-use of natural products is the best way of reducing embodied carbon. There are a number of options ranging from: timber and plant-based products (CLT, natural fibre insulations etc); products that have not be 'fired', e.g. unfired bricks and blocks; products made from 'recycled' materials that can act as a replacement for otherwise mined / refined materials e.g. plastics; alternative lower carbon products e.g. lime rather than cement; or products made from 'waste / by-product' materials. E.g. GGBS rather than cement. Use of lime rather than cement mortar would enable the re-use of fired and quarried materials, retaining their embodied carbon; this should be the industry norm, not the exception.

Natural cooling can be achieved by the use of planting in developments e.g. Bosco Verticale in Milan.

What role can nature-based materials can play in achieving the Government's net zero ambition?

Nature based materials should be key to the implementation of the net zero carbon ambition. The rationale for this is four-fold:

Embodied carbon. Natural materials generally have less embodied carbon associated with them because of fewer industrial transformation processes required in their manufacture.

Sequestered carbon. By using carbon-based materials this embeds physical carbon into the built environment, thus acting as a carbon sink.

Moisture open. Many of these products are also moisture open and hence applicable to traditionally constructed buildings. This ability can ensure that retrofit is undertaken correctly and hence lower risk.

Applicability and associated impact on skills. Given that natural products can be used across virtually all of the building stock it does mean that a smaller 'palette of measures' can be used, and this has an impact on the skills required by industry. Having a workforce that has less variety using lower risk materials should accommodate quicker, safer, and more reliable retrofit works.

What role can the planning system, permitted development and building regulations play in delivering a sustainable built environment? How can these policies incentivise developers to use low carbon materials and sustainable design?

There is an urgent need to join up planning requirements with Government energy efficiency requirements. Planning authorities should be enabled and supported by Government to set the highest possible standards in both new build performance and the re-use of existing buildings. All proposed new developments should be zero carbon on a whole life cycle basis, and all developments affecting existing buildings should comply with PAS 2035 (and forthcoming PAS2038), BS 7913:2013, and BS EN 15978:2011. Effective enforcement has to be in place to ensure that these standards are met, and in turn to drive urgently-needed radical changes in construction industry training. The wider requirement to use PAS2035 across all tenure types is important. The lessons learned from PAS2035 could be applied to a new way of working in the industry. The requirement to assess issues like 'moisture open/closed' and to design appropriately should mean that more 'moisture open' products are specified. PAS2038 should have a similar effect on non-domestic buildings.

Fundamental conflicts have to be recognised between the Government's desire to de-regulate and to free up the planning system on the one hand, and the need to save carbon on the other. Minimising carbon emissions requires skilled input in both specification and on site, in delivering the "whole building" approach which the Government is rightly encouraging. But the fragmentation of Building Regulations, with many works in the hands of licensed installers and approved inspectors, is the direct opposite. This leads, too often, to specifiers and installers dealing with only a part of the problem and sometimes not even understanding that – with the ultimate consequences being shockingly apparent at Grenfell Tower, in the Cavity Wall insulation fiasco, and in the equally horrific waste of money and carbon in the failed retrofits at Fishwyck, Preston.

The more "permitted development" is extended, the less scope there is for using the planning system to incentivise low carbon materials and sustainable design. There also needs to be effective coordination of the Planning and Building Control regimes to ensure that high energy efficiency specifications and performance required under Building Control

are not subsequently negated by “permitted development” works. Examples of such problems could include the application of impermeable paint to “vapour-open” insulation on a building of traditional construction (with consequent inevitable moisture trapping, poor performance and eventual failure), or the erection of a “permitted development” loft extension overshadowing and negating solar PV panels.

The Government has to face up to the challenge that change on the scale required and in the time required can only be achieved by increased, and properly resourced, regulation to ensure that every construction project is both designed and delivered in ways which minimise carbon emissions.

The forthcoming Building Safety Bill and the Building Safety Regulator will have a significant impact on the design, specification, installation and performance in use and will have a significant impact on the education, training and experience necessary to operate as a competent person at all levels.

As such there is a need to develop a competency framework for retrofit works and should align with national frameworks and PAS 8670 and eventually when published; 8671, 8672 and 8673.

Retrofit Performance of Building and Buildings: The use case for a competency framework
The purpose of a Competency Framework is critical to achieving transformation in the construction sector and a dramatic increase in the level of competence. This is unlikely to occur without a common understanding of the competencies needed across the range of roles and specialties involved in the design, construction and operation of the built environment.

The overarching objective would be to develop an easy to navigate resource to support industry and those involved in training, educational and academic programmes, to align curriculum, training, skills and upskilling relating to issues like fire safety, to a recognised standard of performance, knowledge and skills.

An outline of a successful framework is set out in the attached appendix.

An associated registration scheme for all builders (Trustmark) would help to address the issues of unqualified builders from the industry. FMB and others have worked on proposals for this. https://www.fmb.org.uk/resource/raising-the-bar.html

There is also a new suite of qualifications developed by CITB to address the knowledge, skills and experience of construction managers and supervisors for retrofit and conservation works and these qualifications should be embedded within the system to demonstrate the competence of individuals to undertake specific functions.

Introduction to a standardised rating system (as proposed by LETI) for embodied carbon in non-domestic buildings may help with incentivising retrofit over new builds. This type of system could also be employed in the longer term in building regulations, so not only is there a standardised in-use performance specification, but also an embodied carbon set of requirements too. This could be used to incentivise elements – CO2 max per window to encourage timber frames or for the whole house, or indeed a combination of both. A requirement to have EPD's for products would then follow from this.

What methods account for embodied carbon in buildings and how can this be consistently applied across the sector?

Unsure about question. Application of BS EN 15978:2011 should be required for all construction projects. If referring to how to account for embodied carbon, then the use of EPDs would seem the most appropriate, along with the use of ICEs database.

Many retrofit measures only save a limited amount of carbon, and/or may have a limited life, so it is essential to account for the carbon embedded in the materials and their installation in order to determine whether the measure is justified - especially bearing in mind the 2035 and 2050 targets.

Should the embodied carbon impact of alternative building materials take into account the carbon cost of manufacture and delivery to site, enabling customers to assess the relative impact of imported versus domestically sourced materials?

This is difficult to do above and beyond national level. Products made within the UK rarely go from manufacturing centre to site directly. Most will go through central distribution points, then to more local distribution before eventually then going to site. Given that these 'touch' points are spread across the UK it would seem appropriate to approximate impacts on a national / regional scale e.g. Wales, NI. Scotland and 4 English regions (North / Midlands / SE / SW?). Wider afield the scale would need to increase, so suggestions of: Western Europe / Baltic, Eastern Europe, Middle East / N Africa, Rest of the World.

The idea behind encouraging local products is especially important for bulky or heavy goods as these tend to have a higher carbon intensity associated with their transportation.

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SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE

How well is green infrastructure being incorporated into building design and developments to achieve climate resilience and other benefits?

The CCC's Progress Reports show that issues like flooding and overheating are not being well incorporated into buildings design. Much more needs to be done in terms of use of SUDS (best applied at development level rather than individual buildings), individual buildings rainwater system sizing, large scale water retention programmes, rainwater capture in heads of river catchments and the potential for associated micro hydro.

There seems to be little emphasis on the more extreme weather events and how the infrastructure might be designed to both cope and exploit these. For example, longer spells of dry weather will require more water storage, when correctly managed this same storage could be used reduce the flooding associated with high rainfall events.

Roads and pavements and other hard landscaping areas should also use porous surface technology so that this avoids concentrating rainwater into drains and the sewage system, this would help with surface water flooding and also help retain natural aquifers.

Overheating and the need for cooling is not being reflected into any actions within local plans. The ability to require solutions should be available to those areas at most risk (e.g. South and Midlands)

How should we take into account the use of materials to minimise carbon footprint, such as use of water harvesting from the roof, grey water circulation, porous surfaces for hardstanding, energy generation systems such as solar panels?

There must be a balance struck between pushing responsibilities onto individuals and addressing solutions at a wider community scale. For example, PV panels on roofs is good for EPC ratings, but a much more cost-efficient way of providing renewable energy is via large solar farms or wind turbines. Porous surfaces on driveways and associated water storage are costly per sq. m compared with all roads slowly being replaced with porous materials. So, scale needs to be part of the thinking here. Often making changes at large organisations can have a much larger impact that individual actions. Ecological Footprinting models show that 'institutional' impact far outweighs the ability of an individual to affect their impact. The focus therefore has to be on all levels of infrastructure.

In terms of individual buildings / retrofit then there are several factors at play.

1. Getting things right first time negates the need to re-do / retrofit and hence is the most carbon efficient.

2. Making buildings right for the future is important around physical aspects of life e.g. energy, overheating, extreme weather, etc, but it is as important to address the softer social issues like health, social change, lifetime homes, comfort, safety, security, beauty etc. Buildings need to be places where people want to life, not just highly efficient boxes.

3. Using standardised data like EPDs and the ICE database for measurement / comparison is probably the only viable way forward in terms of products.

4. Systems must be viable, so no point in mandating certain systems if those systems ultimately will create more carbon, cost, or maintenance, or where the wider infrastructure is not capable of sustaining them. E.g. individual rainwater harvesting systems are costly to install, require regular maintenance, energy to pump water to house, increase risk of failure, have limited uses, etc, compared to the ease and relative efficiency of the mains water. So maybe better to invest in improving the overall efficiency of mains water (or creating a community-based system) rather than loading issues onto individual homeowners. Grey water systems have all these limitations plus additional risks from pathogens so require costly disinfection processes so have limited value in comparison t rainwater harvesting.

5. “Materials to minimise carbon footprint” has much more to do with the selection of construction materials than with services such as rainwater harvesting.

How should re-use and refurbishment of buildings be balanced with new developments?

Existing buildings are inherently less carbon ‘capital’ than new builds. Given that this is a time when we need to reduce carbon emissions a rush to build new efficient buildings is probably not for now. Most existing buildings can be made efficient as long as the works are undertaken in a holistic manner. The issue can be more to do with practically how these works can be undertaken whilst the building is occupied. This is currently a major problem in relation to the Government’s consultation on the trajectory to band B for non-domestic private rented sector buildings, which proposes totally unrealistic “Compliance windows” with no apparent thought as to the implications for the tenant business/es.

The is a potential key role in the use of a Building Passport in the UK. If all works are to be undertaken using PAS2035, then Medium Term Improvement Plans could be used to

stipulate works that are required by certain dates. So, anyone buying a house would be aware that there was an upcoming or current retrofit stage requirement on the property and the associated costs of this. They would then be able to use this to advise on their purchase budget and a moving in date. Undertaking works whilst a property is vacant is not always necessary, but at least this would be a mechanism to encourage 'deep retrofit works'.

Undertaking an independent assessment of carbon prior to any demolition of buildings should be able to identify the relative benefits of each option. Calculating and comparing how much carbon would be expended on the capital works and a period of 'in-use' occupation (e.g. 50 years) of retrofit vs. demolition and new build should give good guidance on the best option. However, care needs to be taken that the wider agendas of sustainability are not lost, so again we don't want to have people living in sealed, dark, energy efficient boxes with poor mental health. So, some sort of 'like for like' comparison algorithm would be required.

Buildings can also form part of a positive social network, so again significance needs to be part of any decision-making process. It clearly has a different impact on the community to remove a 20th century steel framed industrial unit compared to a Victorian brick warehouse.

What can the Government do to incentivise more repair, maintenance and retrofit of existing buildings?

Creating Building Passports using the PAS2035 process as part of the conveyancing process would be a major step in the right direction. These logbooks for homes can then give people much better information on any new purchase rather than the current weak system that relies on inadequate data. A Medium Term Improvement Plan attached to this then highlights the need for improvements, associated carbon impact and costs. Again, knowing what the costs are likely to be when buying a property means that this can be budgeted for and hence more likely to be undertaken.

Community led regeneration / retrofit projects must be encouraged as they have roots into people's lives that can be used to create trust and drive quality. Projects like Carbon Co-op, Retrofit Works, Cosy Oxford etc have shown that retrofit done collaboratively and correctly can greatly increase uptake in the Innovators and Early Adopter market. This then should embed systems, knowledge, and quality into the sector so that the later adopters get a more efficient service.

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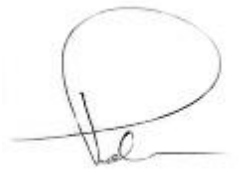
BUILDINGS ALLIANCE

Accreditation and registration for all works by a competent builder is a key element that needs to be addressed as this can build confidence, help remove the black market from the industry and drive-up quality of workmanship.

Lastly, the issue of VAT rating is really key. It makes more sense to have VAT on new buildings as they are responsible for more carbon emissions and then make Trustmark / PAS2035 retrofits, and all like for like building repairs, zero rated. The level of VAT on new build would be a matter of debate, but effectively making retrofit 20% cheaper would be a big incentive for the UK populace.

Yours sincerely,



Peter Draper – Director
On behalf of the STBA

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Appendix 1

A successful competence framework will:

- increase the standardisation of training and education;
- increase the consistency of training and education and thereby support greater collaboration through shared knowledge and understanding;
- support greater uptake of Fire safety by aligning the understanding of competency between training and education providers and employers
- support individuals in assessing their current competence and identify appropriate training or education offerings to increase it.

It is important that a "T-shaped" approach is adopted for Core and Role-Specific competency. Under this model, there are shared competencies, required by all those operating in the built environment, regardless of their role – this forms the horizontal bar of the "T". The vertical bar represents the competencies, which are specific to each role in a project team.

A fully competent individual is someone who possesses all the core competencies as well as their role-specific competencies.

Horizontal Core competencies: These are the personal traits, professional knowledge and technical abilities required by all those undertaking the range of roles included in the framework. This will be focused on knowledge-based competency.

Vertical Role competencies: These are the personal traits, professional knowledge and technical abilities required by those undertaking each specific role included in the framework. These are more strongly focused on the specific skills and behaviour competencies required for each role.

Bottom up or Top Down: Existing competency frameworks cluster competencies in different ways. Some begin with a "bottom up" approach identifying individual activities that must be undertaken across a whole building lifecycle, and then tend to cluster these into functions. Others begin with a "top down" approach identifying specific professions and then clustering competencies, which are typically undertaken by a profession.

The approach recommended here is to cluster competencies according to the key roles undertaken in a project. For example, someone who is undertaking a project management

role in a project will need a certain cluster of competencies. This person may be qualified as a surveyor but is not undertaking a surveying role in the project.

CORE COMPETENCIES Mostly knowledge-based Breadth (Horizontal)
ROLE-SPECIFIC COMPETENCIES Mostly skills and behaviour based Depth (Vertical)

Competency-based Framework: Competency Definition:

The UK Government's definition: "Competencies are the skills, knowledge and behaviours that lead to a successful performance." These skills, knowledge and behaviour are required to deliver certain activities for successful performance. Activities are an inherent part of the proposed framework but not used as a primary structuring device.

Strongly aligned to UK standards – The competencies included in the framework should be those required by individuals to successfully design, construct, operate, manage use and change and deconstruct buildings. The framework should reflect the structure and terminology of the core suite of standards in the UK.

Simple and accessible –The framework adopts a structure and terminology that is easily understandable, accessible online and aligned to current industry models and approaches.

Scope: Guidance not course content – The framework sets out the specific competencies but should not provide course content or prescribe how to provide education or training for these competencies.

Specific competencies – The framework should only address specific competencies and not include generic industry competencies. The framework includes related competencies, rather than a broader range of skills.

Structure: the framework includes:

- Core and role-specific competencies
- Competencies are tagged with additional information and can be filtered according to:
    - competency type (Knowledge / Skills / Behaviours) and stages in the building life cycle.
    - Education, professional standards and competency (Knowledge, skills and attitudes and behaviour)

It is important that there is common understanding of the differences and relevance of education, professional standards and competency.