Finance Committee

Scottish Futures Trust/ NPD Programme

Submission from Ryderarchitecture

Looking at SFT via Hub North and Hub East Central which are the vehicles by which we have engaged with the Trust, we now have five years involvement but with only one project in eight completed (2014) thus far. These projects are mainly educational but also judicial and government; where the Hub has been used as a specific SPV to expedite implementation of the projects. Information from Hub North Benchmarking Report of July 2015, in summary:

As part of the Scottish Schools for the Future programme hub North Scotland Limited have been appointed to deliver £292,525,000 of Secondary Schools.

The programme takes over 9100 children out of poor condition unsuitable accommodation and 95,000sqm of school accommodation and 15,000sqm of Community, Assisted Support Needs and Vocational accommodation is being constructed.

Working in collaboration, Local Authorities and hub North Scotland Limited have developed a superblock Secondary School design that has:

1. Saved around 5,000sqm of accommodation on the Scottish Government metric

2. Saved on Lifecycle Maintenance and Facilities Management costs with a saving of £8,700,000

3. Delivered to £/pupil targets to the Scottish Government pilot school target.

The metric was developed at £1,900/m2 which equates to £22,123/pupil at 2nd Q 2011 prices, which is £25,893/pupil at 2nd Q 2015 prices. These targets are very challenging and the North Territory has responded positively to the combined m2/pupil and £/m2 metrics and £/pupil metrics.
The term a “high standard of ordinariness” was coined by an architect as a worthwhile antidote to the perceived push for excellence in all things. It is much more useful in that it is both attainable and democratic, as it raises the bar across a wider range of projects. This is the essence of the SFT objective. Although everyone tends to personalise the project in which he or she has an interest; to the extent of pursuing excellence in that alone without looking at a bigger vision – twenty great schools v five brilliant schools – always subjective anyway.

The Government’s commitment to SFT has ensured it is THE vehicle for public investment in our infrastructure – the only game in town, not quite but the big player playing the long game. In any project context matters. This is brought into sharp focus when working in the coastal regions and islands of northern Scotland. In the Scottish Schools for the Future (SSF) programme, Hub North Scotland, has a remit to deliver public sector projects across an area which extends from the Shetland Islands in the far north, to Campbeltown in the south.

The landscape and coastline this territory covers was memorably described by Dr Stuart MacDonald in the foreword to the 6000 Miles exhibition, commissioned as part of the Scottish Governments Policy on Architecture as one which “shapes our identity and delineates our image of Scotland – it is both topography and iconography. It is a point of entry and departure. It is margin and edge. It differentiates us from our neighbours, culturally as well as geographically”.

This sense of uniqueness of place, climate, history and setting presents a significant challenge in the context of the SSF programme, where considerable time and energy has been invested in the development of an exemplar secondary school model for the delivery of the Curriculum for Excellence. This exemplar is based on the idea of the superblock, a multi storey ring of teaching and support spaces arranged around a series of internal, top lit atria, which function as multi use spaces for dining, assembly, performance and informal teaching. The compact footprint and high level use of each space throughout the day helps drive significant efficiencies into the design, as well as creating good quality teaching spaces- maximising natural light and ventilation. The first iterations of this model at Eastwood and Lasswade in the central belt have now been in operation for an academic year.
Our projects within the SSF programme lie within a wide arc at the very edge of not only hub territory but also Europe itself. At Campbeltown, Oban, Wick and Lerwick. These places all have their own strong cultural and geographical identities, but share significant commonalities which has shaped our architectural response. All are situated within the coastal region in maritime climates. All the school sites have significantly greater variation in topography than would be found on sites in the central region. At all the locations, the secondary school building will be one of the largest built forms in the surrounding context. Finally, all these towns are long established settlements, with traces of historic and prehistoric occupation evident in the town planning and the landscape.

These broad similarities have led us to adopt a simple, but distinct approach to dealing with the exemplar model in the coastal setting. By recognising the unique qualities and characteristics of place, the SFT exemplar model is manipulated through a series of steps to provide a contextually appropriate design solution. The buildings must read as being modern, fit for purpose facilities which express the high value placed on learning by the local communities but beyond the programmatic response, the buildings must also respond harmoniously to the context and climate in which they are placed. The sense of place differs in all locations and the built form responds to the indigenous forms particularly in Shetland where the simplicity of the Nordic long hall has been the model.

The prevailing climate dictates detailing capable of dealing with high wind speeds and driving saline rain, creating a stripped down architectural language. Another key aspect of the climate is the changeability of the weather, and as a result, the varied and fleeting natural lighting conditions which occur over the course of a day. This too varies in quality between the latitudes of Shetland and the Mull of Kintyre. The material palette selected for the new buildings all respond to this by making use of texture to maximise the impact of shadow on surface, allowing them to be perceived differently under a range of weather and lighting conditions. The material palette selected must also be capable of weathering gracefully, as the climate is harsh on applied finishes.
Economies of scale are not being achieved because the implementing team are looking at standardisation, where in fact there is none beyond the obvious, rather than at a mass customisation approach which is embedded more in useful digital technologies. The process is proving unwieldy at the front end. Client and user perceptions and demands, legislation and procedures (ESA is a prime example) are taking the slack out of the process in terms of time and cost / income. This is driving an innovation of sorts but in the wrong way. Fostering or nurturing innovation of greater depth and perhaps capacity for initiating change would be a much better approach.

Significant abnormal costs adversely impact on the £/sqm of all projects. This is further compounded by the sqm/pupil efficiencies that have been delivered by the hub North Scotland designed projects, as the projects designed outwith hub North have a higher sqm per pupil and a lower £/m2 but a higher £/pupil comparison. Again the Hub report suggests:

On the basis of the benchmarking from the North Territory our analysis suggests that Local Authorities should plan on the basis of the following construction cost metrics including abnormal costs at 2nd Q 2015:

<table>
<thead>
<tr>
<th>School Capacity</th>
<th>North Territory Suggested £/sqm</th>
<th>North Territory Suggested £/child</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 — 400</td>
<td>£2,700+</td>
<td>£38,000+</td>
</tr>
<tr>
<td>400 — 800</td>
<td>£2,700 — £2,500</td>
<td>£38,000— £30,000</td>
</tr>
<tr>
<td>800 — 1200</td>
<td>£2,500 — £2,700</td>
<td>£30,000— £25,000</td>
</tr>
<tr>
<td>1200 — 1500+</td>
<td>£2,500 — £2,700</td>
<td>£25,000— £22,000</td>
</tr>
</tbody>
</table>

Removal of any slack or margin/profit de-incentivises the implementation team who seek to recover some of it through reduction in service or in specification. This in itself is counterproductive - a downward quality spiral. Looking at “standardisation” focused on the coastal secondary schools, we have a group of three, out of a pack of six – all based on the Eastwood / Lasswade exemplar. As a generic model yet with often large differences rather than just “nuances”, in location – climate, topography,
context; the schools role in the community and most importantly the local authority approach, true standardisation or “off the peg” is almost impossible. Further these variables which drive the “differences” in final product also have the greatest impact on budget / costs. Driving final outturn costs above the norm. We have to agree upon who is the client or the user (pupil), the school, admin, the ideal authority, the contractor, Hub, SFT or Central Government – the user first and last.

Mass customisation recognises the nuances, holistically the uniqueness of the products. Challenged by the recent economic crisis, the construction industry is seeking new orientation and strategies – the Government investigation into design led construction procurement (DLCP) is a part of that. In this mass customisation is a key strategy in helping to meet the challenge – the term denotes an offering that meets the demands of each customer most, being produced with mass production efficiency.

Based on “the long tail” the three different production paradigms of Mass Production, Mass Customization, and Individual Customization are identified. It is argued that construction in the 1950s and 1960s was driven by a “Mass Production” paradigm that gradually from the beginning of the 1970s was replaced by an “Individual Customization” paradigm in which construction became a matter of tailoring unique buildings to each customer. These two different paradigms have been driven by two partial articulated myths. In the 1960s buildings were viewed as standardized while from the 1980s onwards they have been viewed as unique.

It is arguable that these myths have had a substantial impact on the way we build. Consequently, today’s predominant view of buildings – as unique – implies that:

1. The nature of the construction processes is chaotic;
2. The buildings are realized through onsite project work rather than through offsite production; and
3. Project management is the fundamental management principle.

The result is that construction research the past 25 years has been constructing the long tail in a way that hinders radical development of the construction industry. However, if we allow ourselves to view buildings as both unique but also as
standardized we can create a new platform for developing the construction industry – a Mass Customisation paradigm.

Procurement generally is also an inefficient part of the process. In principle the position is clear at Financial Close (FC) there is a fixed specification, a fixed set of proposals and a fixed price agreement. The scope of service for the in the Architects Appointment demands that at Stage 2 the scheme is sufficiently advanced in design and documentation to permit the contractor to obtain pricing certainty; including pricing from sub-contractors. However this is limited to Stage 3 RIBA (Stage E) which is at odds with a contractor trying to price at 1% risk. Beyond this the only variables should be those contained in the RDD. The only outstanding information being the consolidation of the tender information to make it project and contractor/supplier specific. However in reality the contractor carries on with further market testing beyond this stage. This is not to the advantage of the project in improving value for money it is in creating that slack referred to above to maintain profit level where possible. Often this is also due to sub-contractor reluctance to participate in HUB Projects or at HUB pricing levels. More of that below. This requires the design team to revisit much of the construction documentation when in fact this is not allowed for in professional fee levels. In the old-style traditional competitive fee tendering operation at its most efficient the documentation was of necessity complete, enshrined within bills of quantities and tender documentation except for nominated sub-contractors. I doubt anyone want to return to the inefficiencies of that form of tender but it did ensure that post tender acceptance the architects role was mainly in contract administration. The hub system should ensure a similar simplicity in operation but rarely does so. Programme benchmarking from the North Territory projects is as follows:

<table>
<thead>
<tr>
<th>Project</th>
<th>Development Stage inc Approvals (RIBA A – F) (NPR Acceptance to FC/CC)</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverness Royal Academy</td>
<td>65 weeks</td>
<td>154 weeks</td>
</tr>
<tr>
<td>Wick Campus (3 – 18)</td>
<td>87 weeks*</td>
<td>123 weeks</td>
</tr>
<tr>
<td>Anderson High School</td>
<td>87 weeks</td>
<td>114 weeks</td>
</tr>
<tr>
<td>Project</td>
<td>Development Duration</td>
<td>NPR Duration</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Elgin High School</td>
<td>82 weeks</td>
<td>115 weeks</td>
</tr>
<tr>
<td>Alford Campus (3–18)</td>
<td>39 weeks*</td>
<td>104 weeks</td>
</tr>
<tr>
<td>South of the City</td>
<td>74 weeks</td>
<td>104 weeks</td>
</tr>
<tr>
<td>Oban High School</td>
<td>65 weeks</td>
<td>135 weeks</td>
</tr>
<tr>
<td>Campbeltown Grammar</td>
<td>65 weeks</td>
<td>125 weeks</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>71 weeks</td>
<td>122 weeks</td>
</tr>
</tbody>
</table>

*Excludes stage 1 as project is a legacy project.

Typically the development phase is taking around 16 months which is an efficient programme for revenue financed projects. To date the pre-NPR and NPR stages have varied and mechanisms need to be implemented to improve this stage by providing Local Authorities with useful information to set projects up to be procured more efficiently and effectively with programme and cost set a realistic and deliverable level.

Five of the projects noted above are being developed on existing operational school sites and this has resulted in abnormally long construction programme durations. Typically a new build on a clean site would take 104 weeks and a multi-phased project with demolition would take between 120 – 150 weeks.

The above timescales exclude the time required prior to NPR to consult and define the needs of the end users. Good examples of this include partnership working on the Argyll and Bute projects where the authority supported by hub North have achieved curriculum timetabling efficiencies of 90% pre-NPR. If this work is not completed early in a projects’ development journey then it can lead to programme delays and may result in the most efficient solution not being realised. During this period it is also highly recommended to invest a modest amount of capital to fully understand on-site and off-site constraints and this allows abnormal costs to be identified early. These early activities are essential to set a schools project up for success.

Neither do fee levels currently encourage direct innovation, instead it comes through necessity – finding new and more efficient means of production. This however is
self-limiting with little incentivisation beyond the self-evident. Greater investment would in my view pay for itself by producing more coherent interconnected innovation across the lifespan of the product. Further the drive for cost effectiveness through efficiencies driven by innovation has as a prerequisite collaboration as a means of interdisciplinary investigation – brainstorming but also by sharing the burden. Again giving a false picture.

By virtue of the massive level of investment by the Scottish Government more positive outcome has been secured, but longevity of these and sustainable or durability needs further investigation. Undoubtedly the catalytic effect is kick starting community engagement and investment but how robust is this fragile being. The vision has to be sustainable in all aspects. Innovation is evident in the exemplar projects which SFT undertakes but these should be classed as “experimental” rather as “exemplar” as this suggested that the industry can extrapolate general solutions from these which is difficult given that the budgets are often twice the norm. They are more unique than generic. Important test-beds for ideas but of little value beyond that.

As the commercial sector improves fee levels and pricing levels will be recalibrated but within new benchmarks as the last five years of public works and limited commercial section projects have driven these down, removing any elasticity in the process. Yet we are already seeing the impact of localisation in regional economics in terms of workload, pricing, apprenticeships etc. where the central belt ceases to become an economic barometer. Oban, Wick, Shetland and Barra all have differing influences operating some apparently positive facets being to the detriment of others – salaries v costs and overheads v apprenticeships.

In a similar vein, following the Zero Defects/do it once approach it is interesting the dominance of “removing wasteful redesign” and “reducing design reiteration and predictability risks” in other areas of manufacturing. The idea of performance based contracts is also interesting tying this into the RIBA Plan of Work. I think one of the big gaps that we fall into and, often unfunded, endeavour to compensate for on our own, is this “performance gap between design intentions and operational outcomes”. This performance gap can emerge at any stage in a project:
• at inception and briefing, where ambitions and requirements are set but may not be informed by experience and feedback from other projects
• at design, where specific performance targets are set and regulatory compliance achieved, but those targets are neither re-visited nor reality-checked during detailed design
• during construction, where budget shortfalls may compromise the best of intentions, and variations are made to the building and its technical systems that change how the building will be used
• during handover, when commissioning and end-user training may be rushed or abandoned to meet deadlines
• during initial occupation, where not enough support is available to occupants and the managers to ensure the building is set up for the long-term.

The UK Government is initiating the soft landings programme on all public projects. Soft Landings provides a step-by-step process for clients and their project teams to follow in order to avoid these pitfalls and deliver a better-performing product. It aims to create virtuous circles for all. No matter whether your project is attempting to achieve exemplary environmental standards, or is a simple extension or retrofit of an existing building, the Soft Landings culture can be applied to ensure outcomes match the client’s intentions.

https://www.bsria.co.uk/services/design/soft-landings/

Clients are rightly only interested in how their brief is reflected in the performance of the final product as delivered to them. The bit in between is our problem which is why we think more about the how and not enough about the why and the what. I think there are big opportunities here. However any of the new schools replace Victorian or buildings from the sixties. The SFT exemplar model provide new types of spaces (beyond the classrooms), and soft landings could be used as a mechanism to help introduce teaching staff on the potential the new building to maximise teaching potential

Soft Landings guidance defines these first stages as:

“The time for constructive dialogue between the client, the designers and the potential constructors about intentions, performance requirements and stakeholder
expectations. Embedding specific Soft Landings activities in the client’s requirements and tender documentation, and setting aside budget for aftercare and post-occupancy evaluation. Effort should be made to get key specialist advice earlier than would be the norm - controls specialists, commissioning engineers, facilities managers; key subcontractors - catering, ICT, lighting, and controls integrators; nomination of Soft Landings Champions to drive the process forward; and reviewing past experience to inform design.”

The title SOFT landings is not simply about eliminating the bumpy ride: “The term ‘soft landings’ refers to a strategy adopted to ensure the transition from construction to occupation is ‘bump-free’ and that operational performance is optimised.”

However, it is also about recognising the soft sciences and soft systems where the qualitative can be more difficult to measure than the quantifiable but needs measuring just the same. For example, the book Healing Spaces-The Science of Place and Well Being, focuses on Health design but also the idea of evidence-based design. It uses physiological and health-outcome measures-length of stay, amount of pain medication, complication rates, and patient stress, mood, and satisfaction indices-to evaluate the health benefits of architectural features in hospitals. Many projects around the country are gathering evidence to determine whether such design innovations will benefit patients, families, and hospital staff, and whether they will reduce healthcare costs by speeding recovery and reducing complications and medical error rates. The collaborators in these projects include healthcare architects, environmental psychologists, government agencies, private foundations, manufacturers, and hospital administrators.

**Summary**

**Continuing Research**

Secondary school design remains relatively conservative (particularly when compared to primary school design). The SFT superblock exemplar retains traditional cellular classrooms, with design innovation (and space efficacy) being achieved in the spaces in-between (atrium, library, dining, etc). Curriculum for excellence has moved many primary school designs from cellular classrooms to being open plan, and from ‘chalk and talk’ teaching to child focused learning enabled through interaction and activity. In secondary education, curriculum for excellence’s
focus is more the taught subject’s relevance and with the world outside, industry and life, and promoting interconnectivity between different subjects. Current secondary education’s examination system, and the measurable outcome of education being graded exam, arguably will require classroom teaching spaces to remain cellular in the near future. However, research into possible future changes in pedagogy could identify whether there will be less emphasis on classroom based activities to group or individual learning in the future – this could put more timetable pressure on shared atrium spaces, possible requiring more flexibility to be designed into classrooms to allow more multiuse of these spaces too, and in turn whether the exemplar design is flexible enough to accommodate any identified changes in teaching methods and if the exemplar will require adaption. This could range from a simple evolution of the exemplar, such as allowing a series of classrooms to open into one another or onto the atrium space, with careful selection of furniture (or design of new furniture) to allow for multi-use in classroom and flexible layouts utilising the same furniture, or possibly more fundamental redesign of spaces.

Notwithstanding the ambitious and clearly laudable objectives of the programme a number of inefficiencies are preventing everyone and every project realising their full potential in achieving high standard of ordinariness. From Fee levels to procurement methodology to post occupancy evaluations and feedback into the process. This is inhibiting true innovation and optimisation of the quality of the product which is being delivered. Despite that I believe everyone involved in the programme is using best endeavours to facilitate the implementation of that ambitious investment programme whilst trying to ensure the long term effectiveness of their businesses. The Scottish Government via SFT is putting money into the economy by investing in a spectrum of opportunities. At one end – the long term -investing in our grandchildren future. At the other providing enough income to all participants to ensure they too can invest in their own sphere of interest. That could be product or systems innovation, employment, regeneration, apprenticeships etc., but investment levels must support that further investment. Presently that is a hard task.

Since the programme was announced by Scottish Government significant lessons have been learnt:
- Identify abnormal costs and risks early in the process. This work should be considered at the point of site selection and should include early site investigation work, flood risk assessment, planning constraints and ground radar survey to understand if there are significant diversions. This work should be done prior to NPR under SPS vehicle.

- Adopt an economic and effective design solution. A multi storey superblock design has proven to be the most appropriate for secondary school buildings but further research is required.

- Identify off-site infrastructure requirements early in the process. This work should be considered at the point of site selection and should include potential access constraints and utility infrastructure upgrades.

- Model both £/pupil and £/sqm to ensure that there is appropriate financial provision within the budget from the start. The variations here are significant and outwith central belt norms.

- Early consultation and challenge of the use of space essential to achieve 90% curriculum timetable efficiency. Accommodation that is flexible allows spaces to have multiple uses and this is desirable. If this work is not completed early in a projects development journey then it can lead to programme delays and may result in the most efficient solution not being realised. This work can also reduce LCM and FM costs.

- Accept that sub-optimal sites may be the preferred option, however, implement early a mitigation strategy that reduces the impact of abnormal costs. More work required on site selection and more knowledge required to be input to evaluation.

- Prepare development budgets inclusive of all Local Authority direct costs at budget setting stage. Budgets need to include not only the construction costs but the off-site infrastructure costs, the client direct costs and location factors appropriate to the project.

- Monitor the BCIS cost index to ensure that the capital plan has an appropriate Tender Price Index allowance.

- Develop a realistic high level programme. A typical development programme period is 16 months and this does not include the 3 – 6 months pre-NPR work as identified in point 5 above. Construction periods vary from 104 weeks to
150 weeks depending on phasing not enough realism given to the procedures involved pre NPR.

- Focus on performance standards and simplify needs and this will allow the market to respond with the most cost effective solution at that time. There needs to be parameter established for a more information efficient method of achieving best price without “double handling” or duplication of information.

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