

Environmental Sustainability

In order to meet the UK's commitment for decarbonisation, our construction industry must fundamentally change its approach to design, performance and construction of our built environment. Wales has committed to a framework of carbon reduction including the systematic revision of Building Regulation standards particularly in regard to energy performance but we like many others believe that this does not go far enough quickly enough to meet the obligations established by the Welsh Government's climate emergency declaration. We must be delivering projects today that are future proofed and offer a truly sustainable long-term solution. Consequently the proposal developed for the Visitor Centre seeks to improve on current building regulations and consider the whole life of the development.

In considering the nature of these objectives we have prepared and taken into consideration with the design team a number of factors -

- analysis of the site's physical and environmental constraints and opportunities including sun path and shading, the natural and built environment, accessibility, ecology and vegetation.
- analysis of the project's use and users, considering when the various elements will be in use, for how long and for what type of activities.
- a knowledge of existing construction standards and potential future changes specifically in regards to the national and regional low carbon strategies.
- the client's environmental policy including an objective understanding of its approach to capital and whole life costs.

The UK General Building Council's Net Zero Building Framework Definition sets out a useful framework for considering and categorising sustainability priorities. It adopts 4 categories in order of application;

- Reduce Construction Impacts
- Reduce Operational Energy Use
- Increase Renewable Energy Supply
- Offset Any Remaining Carbon.

Regardless of whether a project attains to be 'Net Zero Carbon' or not, the framework sets out a sensible categorisation of sustainability objectives for all projects. High aspirations for sustainability does not have to increase the cost of development, and if considered in a holistic manner will often dramatically improve whole life costs - that being the cost of construction, operational costs including energy and maintenance, and cost of demolition, disposal and / or reuse.

In this context, the following sets out some of the principles that are relevant to the brief development.

Reduce Construction Impacts

Carbon emissions during the construction phase will be considered throughout the design development process:

- Materials, systems and skills will be sourced locally as far as realistically possible, reducing embodied carbon through transportation and ensuring investment in the local economy.
- Innovative offsite construction methods will be used offering potential to dramatically improve efficiency over traditional onsite construction through;

- the reduction of waste materials;
 - improving quality control to strictly limit the design : as built performance gap and reduce defects;
 - reducing the impact of construction activities including noise, ground disturbance and on and offsite vehicle movements.
- Low carbon construction materials and systems will be at the centre of the construction solution. Rejecting materials generated from the petrochemical industries such as insulation products and PVC based windows and doors not only reduces the associated high embodied carbon, but also encourages the use of natural, recycled and recyclable materials - materials that can offer a significant impact on occupant' health and wellbeing through improvements in acoustics and indoor air quality and comfort.
 - Careful consideration will be given to material performance during construction, in use and at the end of life. Materials will be selected that are durable within the proposed context, ensuring that there is no loss of performance throughout the lifetime of the intervention.

Reduce Operational Energy

Energy demand and consumption throughout the project's life will aim to be reduced through a holistic consideration of the design, specification and construction of the development. The proposed scheme has therefore looked to address sustainable principles from the outset by adopting a general approach that sequentially looks to:

- Reduce the amount of energy that the building uses;
- Maximise the free gains that are available to the site;
- Address the energy source.

A 'fabric first' approach will be adopted which prioritises a high-performance fabric incorporating high levels of insulation and dramatically reducing drafts and heat loss through air gaps and thermal bridging.

The approach has looked to maximise the opportunities for natural daylighting, prioritising the key habitable dayrooms where relevant, with necessary artificial lighting provided by low energy systems.

To meet the residual demand for energy, not met via heat gains provided by the inhabitants, technologies and solar gains, highly efficient systems will be combined to achieve occupant comfort. These will draw on available sources that are largely renewable through the generation of onsite electricity via solar panels and the use of air source heat pumps and mechanical heat recovery. The principle of this energy strategy going forwards will be to minimise demand and maximise efficiency whilst delivering comfort levels through user friendly smart systems. Careful analysis of the project's proposed function will provide the building specific characteristics for user comfort and requirements to ensure that the capacity and nature of energy systems are effectively tailored.