

## 12.0 Flexible and Adaptable Buildings



### 12.1 Introduction

12.1.1 New buildings should be designed so that they are flexible and adaptable from the outset, enabling them to respond to changing socio-economic and environmental conditions. Such buildings can adapt to changing needs and lifestyles of the occupier and allow for a variety of uses over time. Equally, they can respond to the impacts of climate change. Buildings that can successfully adapt to changing circumstances will prove more robust over time and are less likely to require demolition.

### 12.2 Building Design

12.2.1 Buildings should be designed to facilitate adaptation, conversion and extension in the future. In general, open plan forms with a steel and concrete frame construction can create broader spans which make reconfiguration of internal space easier. Cellular forms with load-bearing internal walls tend to be less flexible. The option to extend in the future can also be incorporated into the original design of the building.

12.2.2 Commercial developments are more likely to require conversion by successive occupiers, while dwellings commonly need to adapt to

changing needs and lifestyles. In respect of the latter, developers are encouraged to have regard to the Lifetime Homes Standard<sup>26</sup>. This standard seeks to deliver houses that are accessible, functional and convenient for a wide range of people, including some wheelchair users<sup>27</sup>, elderly people with reduced mobility and families with young children. It also introduces some adaptability into the housing layout and design so that simple adaptations can be undertaken to suit any changing needs of the household. For example, in addressing the needs of an individual with reduced mobility, a home can be adapted by converting a room into a downstairs bedroom, or by providing a stair lift or downstairs toilet and shower room. Any future adaptations should be more cost-effective as the original design accommodates for their provision from the outset.

### 12.3 Adapting to Climate Change

12.3.1 The UK Climate Impacts Programme<sup>28</sup> (UKCIP) predicts that by 2080 Wales will experience:

- greater warmth all year round by between 2 and 4°C;
- greater summer maximum temperatures by between 3 and 6°C;
- greater winter minimum temperatures by

<sup>26</sup> <http://www.lifetimehomes.org.uk>

<sup>27</sup> It should be noted that many wheelchair users will require purpose designed wheelchair housing.

<sup>28</sup> Figures are based on central estimate of the medium emission scenario from the most recent UK Climate Projections, published in June 2009. See <http://www.ukcip.org.uk>

between 3 and 4°C;

- lower summer rainfall by between 10 and 40%;
- greater winter rainfall by up to 30%;
- more variability from year to year; and
- more frequent and more violent storms (involves increased rain intensity).

12.3.2 The effects of climate change should be considered over the lifetime of a development, especially with regard to its location and design. The long term sustainability of a development will largely depend on the adaptation measures adopted as they reduce the risk of buildings being too uncomfortable to live in or too expensive to run and maintain in the future.

12.3.3 The key issues to consider for adapting to climate change are set out in the table below<sup>29</sup>. It should be noted that many of the adaptation measures highlighted are discussed in more detail within other chapters of this Guidance.

<b>Location</b>	Particularly in respect of flooding, higher temperatures and water resources. Developers should establish flood risk designations with Natural Resources Wales, undertake flood risk assessments and incorporate green spaces and natural shading in the design of schemes.
<b>Site layout</b>	Particularly in respect of heat gain and the provision of outdoor spaces. Developers should minimise solar gain in summer, maximise natural ventilation, maximise natural vegetation and provide adequate private outdoor space wherever possible.

<b>Buildings</b>	In terms of structure, developers should ensure that buildings are: strong enough for increased wind speeds; capable of incorporating ventilation and cooling techniques/mechanisms; and of an appropriate thermal mass for the intended use. In relation to the physical envelope of the structure, developers should ensure that: drainage systems and entrance thresholds have the capacity for more intense rainfall; there are opportunities for green roofs/walls; the exterior reduces heat gain in summer; the overall envelope is sufficiently air tight to avoid infiltration from increased wind and temperatures; and cladding materials are able to withstand higher wind speeds. In respect of materials, developers should ensure that materials specified will perform adequately in the climate throughout the lifetime of the development.
<b>Ventilation and Cooling</b>	Developers should ensure that buildings are capable of delivering comfortable temperatures through ventilation and cooling systems (including natural and low and zero carbon based systems) throughout the lifetime of the development.
<b>Drainage</b>	Particularly in respect of surface run-off, flash floods and traditional drainage systems. Developers should incorporate sustainable drainage systems into the design of the development wherever possible.

<sup>29</sup> Greater London Authority. 2005. *Adapting to Climate Change: A Checklist for Development. Guidance on Designing Developments in a Changing Climate* (London, GLA).

<b>Water</b>	Particularly in respect of water services, water efficiency and water recycling. Developers should consider net water consumption of the development under normal and water conservation (drought) conditions, water efficiency measures, rainwater collection and grey water recycling.
<b>Outdoor Spaces</b>	Particularly in respect of demand for public and private outdoor spaces, types of surface, natural shade, soils, vegetation, water features and waste storage.

<b>Connectivity</b>	Particularly in respect of infrastructure resilience and impact on neighbours. Developers should ensure that there are safe access routes in the event of a flood, consult with utility companies and others over the resilience of services and infrastructure to the development, and work with neighbouring developments to identify immediate and cumulative impacts.
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