



# Sustainability Fit Out Guide Offices

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# 1 Introduction

This guide provides advice to occupiers who are carrying out fit-out works and is aligned to The Crown Estate's relevant sustainability principles as follows:

1. Materials
2. Water
3. Waste
4. Carbon in operation

In addition, we have included a number of other important fit-out considerations which fall under the headings of 'Management & Procurement'; 'Health & Wellbeing'; and 'Transport & Travel'.

Many of our recommendations are also of relevance where buildings are being assessed using an environmental assessment methodology such as BREEAM or Ska ratings.

## 2 Context

### 2.1 Corporate Sustainability at the Crown Estate

Our commitment is to nurture and grow our business, taking a long term view of our total contribution and making a positive impact.

To achieve this we have introduced the following philosophy:

- **INTEGRATION:** That there is no separate sustainability strategy, but simply one business strategy incorporating sustainability principles.
- **EMBEDDING:** Business groups take direct responsibility for developing sustainable business objectives and targets that achieve our corporate vision and are relevant to their area of the business.
- **RESPONSIBILITY:** Individual employees are empowered to innovate.

We have identified 14 material issues for our business. Although sustainability runs through all of these, four can be singled out as particularly relevant:

- **The Effect of Climate Change** - Climate change presents physical, financial and regulatory risk and opportunity to our business and society as a whole.
- **Maintaining effective stewardship** - Our responsibility to take care of the long-term management of the assets we look after on behalf of the nation.
- **Successful place-making and creating amenity value** - We aim to create successful places where people want to be.
- **Availability of natural resources** - There are limited natural resources to supply increasing demand – impacting cost and stretching supply chains.

### 2.2 Integrating sustainability in the Urban Business

To address the Crown Estate’s significant issues directly relevant to sustainability, the following Sustainability Principles have been developed for the Urban Business.

Significant Issue	Sustainability Principles for the Urban Business
<b>The Effect of Climate Change</b>	<b>Carbon in operation:</b> To not only deliver developments that are low carbon in design, but also to enable them to become low carbon in operation.
<b>Maintaining effective stewardship</b>	<b>Community:</b> To pro-actively engage with our stakeholders and find ways to benefit the local community in terms of both employment and facilities.
<b>Successful place-making and creating amenity value</b>	<b>Landscape:</b> To maximise the positive contribution we can make to public realm, ecology, micro-climate and storm-water attenuation.
<b>Availability of natural resources</b>	<b>Materials:</b> To minimise the impact of the materials we use, both on our building occupants, and the wider environment. <b>Water:</b> To minimise water demand and maximise opportunities for reuse on-site. <b>Waste:</b> To eliminate waste both in construction and operation.

To support implementation of these Principles we have developed the following tools:

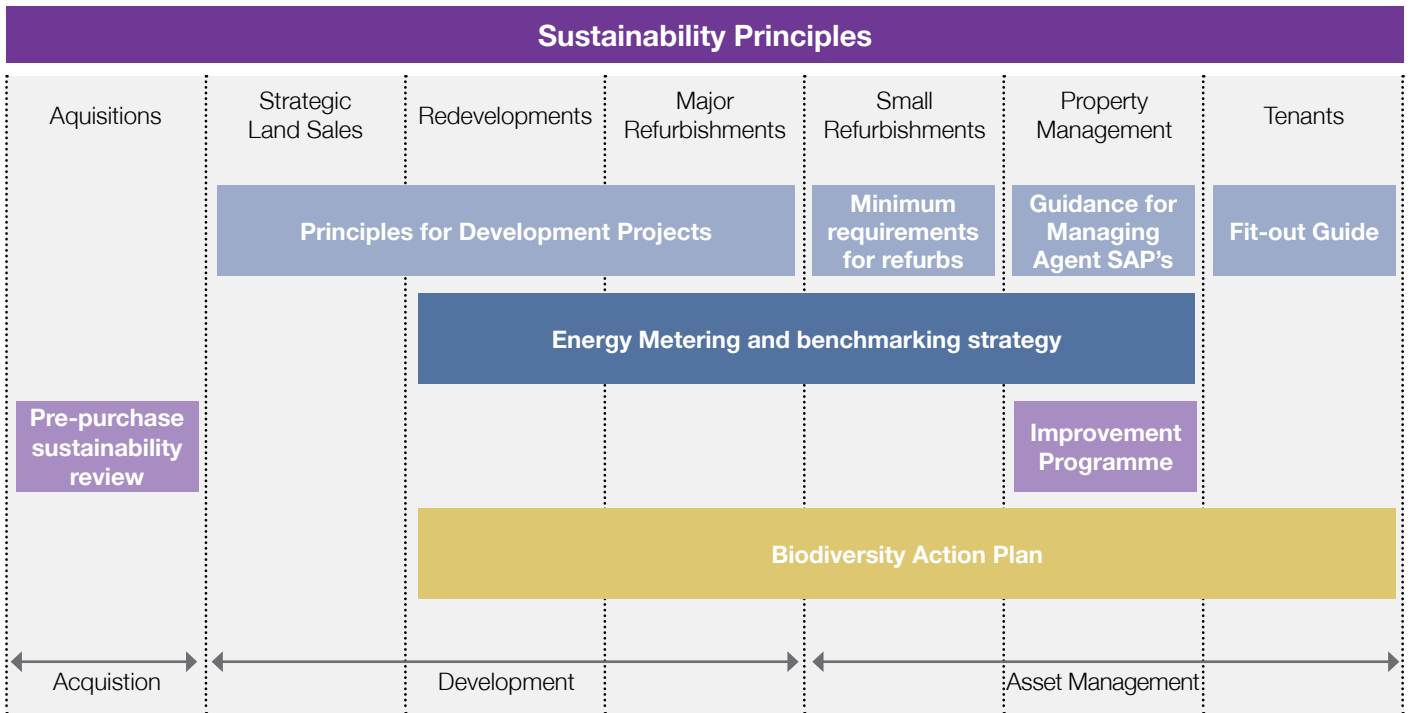


Figure 1 - Sustainability Tools Map

## Contractual Measures

The following measures within our guidance are contractual for all fit-out work across our estate:

Sustainability Requirement	Action Required
Timber Procurement	Confirm that all timber products are legally and responsibly sourced in accordance with the UK Government's Timber Procurement Policy - <a href="http://www.cpet.org.uk/uk-government-timber-procurement-policy">http://www.cpet.org.uk/uk-government-timber-procurement-policy</a>
Volatile Organic Compounds	Assess products such as paints, varnishes, coatings, adhesives, sealants and any composite wood products. Specify low-VOC alternatives where available and practical.
Water-efficient sanitary equipment	Where sanitary fittings are being replaced or upgraded, select options such as: <ul style="list-style-type: none"><li>• Dual and / or low flush WC's</li><li>• Waterless urinals</li><li>• Low flow taps with automatic shut off</li></ul>
Site waste management	Ensure that a fit-out waste management plan is developed in line with the waste hierarchy to identify key fit-out waste streams and additional options for reuse, recycling or other management. Above all, avoid sending waste to landfill.
Energy-efficient lighting	Minimise energy demand associated with artificial lighting requirements, particularly during daylight hours.  Select energy-efficient lighting options - for example, LED fittings should be used where appropriate.

# Materials



**Principle: To minimise the lifecycle impact of construction materials both on the building occupants and the wider environment**

When selecting the right materials for your fit-out it is important to consider environmental impacts throughout their whole life cycle including manufacture, construction, finishing, operation, demolition and disposal. Whilst the manufacture and supply chain affects embodied

impacts, specifiers should also consider issues such as maintenance requirements and replacement intervals during operation.

The principles of materials resource efficiency suggest that design decisions should first seek to reduce the total quantity of new materials required, through efficient design or reuse. Consideration should then be given to minimising the environmental impact of specific products over their lifecycle.

Sustainability Requirement	Rationale	How to benefit
Use materials and products as efficiently as possible	<p>The efficient use of material resources helps to reduce costs, whilst also minimising environmental impacts associated with raw material extraction, manufacture and supply chain.</p> <p>For existing buildings, there may be opportunities to make use of materials which are already there, rather than stripping out completely and starting from scratch.</p>	<ul style="list-style-type: none"> <li>• Carry out an analysis of existing materials and components to determine potential for reuse and/or refurbishment.</li> <li>• Carry out a design review to identify any unnecessary materials specification.</li> <li>• Maintain a system for identifying materials and furniture in your existing buildings which have the potential to be reused.</li> <li>• Consider leasing items such as furniture and floor finishes.</li> <li>• Implement measures to minimise over-ordering.</li> </ul>
Design for flexible layout and functions	<p>Significant cost and resource savings can be achieved by designing your fit-out to allow for flexible layouts or reconfiguration in order to allow for changing business requirements or functions.</p> <p>In addition, costs associated with moving staff between different locations can be reduced by standardising space planning, furniture and partitioning systems. It is also essential to consider both current and future requirements for small power and data connections.</p>	<ul style="list-style-type: none"> <li>• Use elements which are designed for demountability and reconfiguration - for example, consider demountable partitions so that the size of internal spaces can be adjusted when required.</li> <li>• A number of proprietary systems are available with standardised materials and sizes. This allows components to be more easily re-used when they become redundant.</li> <li>• Optimise occupancy through use of open plan space; rationalising space standards; managing storage and minimising secondary on-floor circulation.</li> </ul>



Sustainability Requirement	Rationale	How to benefit
<p>Base material procurement decisions on life cycle costs / impacts</p>	<p>The specification of materials should take into account environmental impacts and added value in whole life terms, rather than just concentrating on the construction delivery phase.</p> <p>Any additional costs associated with more durable materials choices or additional protection measures need to be balanced against the benefits of extended refurbishment or replacement intervals and lower maintenance requirements.</p>	<ul style="list-style-type: none"> <li>• Select materials based on their life-cycle performance - balance any additional upfront costs with reduced maintenance and repair requirements.</li> <li>• Ensure that adequate protection is provided for vulnerable parts of your building - for example, protection rails, kick plates, hard wearing flooring etc.</li> <li>• Use the BRE Green Guide to Specification or 'greenspec' websites to assist with low-impact materials selection.</li> </ul>
<p>Prioritise recycled content and recyclability</p>	<p>Specifying products made partly or wholly from recycled content can significantly improve the resource efficiency of your fit-out works. Recycled materials and products usually have much lower environmental impacts than those made from raw materials, whilst also helping to reduce the volume of waste sent to landfill.</p> <p>Selecting products which can be recycled in the future presents further opportunities for resource efficiency by reducing 'end of life' impacts associated with disposal.</p>	<ul style="list-style-type: none"> <li>• Select materials with higher levels of recycled content where available. The Waste Resources Action Programme (WRAP) provides information on the availability of a variety of fit-out materials with higher levels of recycled content (<b>rcproducts.wrap.org.uk</b>).</li> <li>• Consider adopting a benchmark figure for overall recycled content.</li> <li>• Select materials and products which can easily be recycled when they come to the end of their useful life. Discourage the use of composite materials which are difficult to separate and recycle.</li> <li>• Explore opportunities with a furniture recycler such as Greenworks.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
<p>Select products and materials from suppliers who can demonstrate responsible sourcing credentials</p>	<p>Considering the origin of fit-out products and their supply chain is important for understanding their overall sustainability including environmental, economic and social impacts. Effective responsible sourcing methodologies analyse a product from the point at which its base materials are mined or harvested, through manufacture, use and onwards to end of life.</p> <p>Properly managed forests can provide some of the most sustainable, renewable construction materials, and timber products can enhance the design of your fit-out with positive impacts on the health and wellbeing of building occupants. However, it is essential to ensure that any timber products you use are legally and responsibly sourced.</p>	<ul style="list-style-type: none"> <li>• Prefer suppliers with a certified environmental management system (e.g. BES6001; ISO 14001 or EMAS) to ensure that they have systems in place to manage their environmental impacts in a comprehensive and systematic way.</li> <li>• If suppliers don't have such certification, find out if they publish environmental performance data.</li> </ul> <p><b>CONTRACTUAL MEASURE:</b> Confirm that all timber products are legally and responsibly sourced in accordance with the UK Government's Timber Procurement Policy - <a href="http://www.cpet.org.uk/uk-government-timber-procurement-policy">www.cpet.org.uk/uk-government-timber-procurement-policy</a></p>
<p>Procure materials and services locally</p>	<p>Sourcing materials from local suppliers reduces the distance that materials have to travel. For bulky materials in particular, this helps to minimise transport emissions and can also result in significant cost savings.</p> <p>Using local businesses also helps to enhance the link between your own business and the area, supporting the local economy. Where local materials are used in your fit-out, this may even help to reflect and preserve the character of the neighbourhood.</p>	<ul style="list-style-type: none"> <li>• Where feasible, set a target/ requirement for the amount of materials that must be sourced locally.</li> <li>• Consider local availability of skills as part of your procurement process –include relevant questions in a supplier questionnaire.</li> </ul>



Sustainability Requirement	Rationale	How to benefit
<p>Select materials with lower levels of harmful emissions (e.g. low VOC content)</p>	<p>The choice of finishing materials can have a significant impact on the health and wellbeing of building occupants. Sick building syndrome is officially recognised as an illness by the World Health Organisation and includes a wide range of symptoms which can be linked to internal finishes and fittings.</p> <p>Materials which result in harmful emissions, such as volatile organic compounds, should be avoided wherever possible. Formaldehyde, one of the best known VOCs, is found in many types of common fit-out materials such as plywood and MDF.</p>	<ul style="list-style-type: none"> <li>• <b>CONTRACTUAL MEASURE:</b> Assess products such as paints, varnishes, coatings, adhesives, sealants and any composite wood products. Specify low-VOC alternatives where available and practical.</li> </ul>
<p>Account for embodied energy and carbon emissions</p>	<p>Embodied carbon is the carbon emitted during resource extraction, transportation, manufacturing and fabrication of a product - it is separate from 'operational carbon' which is generally easier to measure through the use of energy consumption data.</p> <p>For construction projects embodied carbon can represent up to 30% of the emissions over the whole life of a building.</p>	<ul style="list-style-type: none"> <li>• Undertake an assessment of the embodied carbon utilising the RICS Embodied Carbon Information paper or other robust methodology.</li> <li>• Where available, consider alternatives to products with higher levels of embodied carbon.</li> </ul>

# Water Use



**Principle: To minimise water demand and maximise opportunities for water re-use on-site**

Water stress is an increasingly important consideration as the climate becomes more unpredictable and we are likely to experience longer periods of drought, particularly in the South East of England. As major consumers of potable water during both construction and operational phases, buildings therefore have an important part to play in managing and reducing overall demand. High density office buildings can make very significant demands on water infrastructure.

However, water use can often be reduced using low-cost components that do not affect the quality of service. Money invested in water saving initiatives or design features can also result in significant cost savings relating to supply and sewerage.

Sustainability Requirement	Rationale	How to benefit
Measure and monitor water use related to the fit-out works	<p>Construction site activities often place very high demands on water supplies. Identifying specific activities associated with high water demand is the first step to understanding and reducing consumption. It may even be possible to choose more water-efficient design solutions.</p> <p>Even where water requirements are minimal, project managers should be aware of any potentially wasteful practices.</p>	<ul style="list-style-type: none"> <li>• Be aware of water consumption associated with fit-out works (e.g. particularly ‘wet trades’). Ideally this should be measured and monitored.</li> <li>• Site staff should be made aware of high consumption activities and opportunities to reduce consumption and waste.</li> </ul>
Measure, monitor and set targets for operational water use	<p>Even if you will not be specifying new water-consuming equipment, it may still be possible regulate water use with careful monitoring and simple measures to reduce consumption.</p> <p>With a proper understanding of how much water is being used and where, it is possible to identify wasteful activities, areas or equipment and more easily plan for successful water conservation strategies.</p> <p>As an indication, best practice is considered to be 1.5m<sup>3</sup>/person/year in office buildings.</p>	<ul style="list-style-type: none"> <li>• Identify where your meters or sub-meters are located and take regular readings.</li> <li>• For sites with a building management system, investigate the potential for automated readings and reporting.</li> <li>• Set challenging but realistic targets for reducing water consumption.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Ensure leaks can be identified and managed	<p>Huge amounts of water are wasted in buildings through leaks, many of which are not noticed until a great deal of waste has occurred, or significant damage caused. Even a dripping tap can waste as much as 90 litres/ week.</p> <p>Putting in place systems for identifying leaks is therefore essential, not just for water-efficiency, but also for preventing losses associated with water damage.</p>	<ul style="list-style-type: none"> <li>Investigate whether your building has a major leak detection system and what to expect if it is activated.</li> <li>If not, any significant increase in water usage (as recorded on meters) may suggest a leak.</li> <li>Regularly check for leaks from overflows, pipes, radiators and storage tanks and arrange any repairs immediately.</li> <li>For minor leaks, look into the installation of solenoid valves/ presence detection so that water supply is isolated when specific areas are not in use (e.g. toilets).</li> </ul>
Specify water-efficient sanitary equipment and fittings	<p>Older sanitary fittings are often associated with heavy, often wasteful, demand. Newer, more efficient alternatives can significantly reduce water consumption and often come at minimal additional cost compared to 'standard' options.</p> <p>For example, installing dual-flush or low-flush toilets can save more than half the water used for flushing, potentially cutting a building's total water demand by up to 30%.</p> <p>Even if the specification of sanitary equipment does not fall within your fit-out works, a number of simple measures can be put in place to improve water efficiency. This includes making sure that existing fittings are working effectively.</p>	<ul style="list-style-type: none"> <li><b>CONTRACTUAL MEASURE:</b> Where sanitary fittings are being replaced or upgraded, select efficient options such as: <ul style="list-style-type: none"> <li>Dual and/ or low flush WC's</li> <li>Waterless urinals</li> <li>Low flow taps with automatic shut off</li> </ul> </li> </ul> <p>Alternatively, it may be possible to retrofit devices to existing fittings including:</p> <ul style="list-style-type: none"> <li>Flow restricting valves</li> <li>Tap inserts to convert to spray/ aerated flow</li> <li>Low flow showers/ showerheads</li> <li>Proximity detection (e.g. PIR) devices for urinals (which could also be linked to lighting and/ or extractor fans)</li> </ul> <p>Where fittings cannot be changed or upgraded, ensure that they are frequently checked for drips, leaks or wasteful settings (e.g. press taps that stay on for too long).</p>

# Waste



## Principle: To eliminate waste both in construction and operation

Construction is the biggest consumer of material resources in the UK. Although the sector is making significant progress in reducing the waste it is responsible for, the figure is still enormous - a total of 77.4 million tonnes in 2010 (Defra). The strip out and fit-out of commercial buildings plays a very significant part in this.

Whatever the nature and characteristics of different waste streams, they all have the following in common: a loss of resources, waste of money and therefore, reduced sustainability. However, the opportunities for designing out waste, and diverting residual waste from landfill have never been greater. Due to the increasing costs of disposal, reducing waste can also be a significant way of increasing profits.

Sustainability Requirement	Rationale	How to benefit
Facilitate sustainable waste management practices during your fit-out works - aim for zero waste to landfill	<p>Lack of early construction waste management planning could mean that many opportunities for reducing a project's waste impact will be missed. All types and sizes of construction projects should therefore put in place a waste management strategy to help understand the potential waste levels and identify measures to help reduce overall waste, whilst diverting the remainder from landfill.</p> <p>Landfill waste, is associated with a large number of potential environmental impacts including groundwater contamination, methane emissions, local air pollution and nuisance from rodents and insects. Indirect impacts include noise pollution and emissions from transport and machinery.</p> <p>Rising landfill taxes mean that reducing these waste streams, or diverting waste for reuse, recycling or reprocessing can also result in significant cost savings.</p>	<ul style="list-style-type: none"> <li>• If available, review any existing site waste management plan for the building to identify opportunities for reducing waste and diversion from landfill.</li> <li>• If your fit-out involves any demolition or removal of existing building elements, an audit should be carried out to focus on materials and products which can be reused, either onsite or elsewhere.</li> <li>• <b>CONTRACTUAL MEASURE:</b> Ensure that a fit-out waste management plan is developed in line with the waste hierarchy (see Figure 2) to identify key fit-out waste streams and options for reuse, recycling or other management. Above all, avoid sending waste to landfill.</li> <li>• Appoint a waste champion responsible for site waste management and reduction.</li> <li>• Train the site workforce on how to implement sustainable waste management procedures.</li> <li>• Provide adequate space and storage for segregation of waste. Contractors should be required to sort and separate construction waste into key waste groups (e.g. metal; plasterboard; wood; general waste; and inert waste) either on site or through a licensed external contractor.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Avoid waste associated with over-ordering products and materials	It is not unusual for fit-out contractors to over-order materials by 10% or more to allow for uncertainties or breakages. Many of these new, unused materials may well end up in landfill representing a significant waste of resources and money.	<ul style="list-style-type: none"> <li>• Calculate quantities accurately.</li> <li>• Use suppliers who agree to take back any unused, excess products or materials.</li> <li>• Prefer local suppliers with the ability to provide additional supplies quickly.</li> <li>• Store and re-use offcuts from materials such as plasterboard and tiles.</li> </ul>
Work with suppliers to minimise/eliminate packaging where practical	<p>According to the Waste Resources Action Programme (WRAP) packaging waste accounts for over a third of construction site waste.</p> <p>As well as material resource efficiency benefits, reducing packaging waste indirectly helps to reduce the following impacts:</p> <ul style="list-style-type: none"> <li>• Energy consumption associated with manufacture.</li> <li>• Air pollution resulting from burning (a common form of disposal).</li> <li>• Waste handling and disposal costs.</li> <li>• Some packaging includes hazardous waste.</li> </ul>	<ul style="list-style-type: none"> <li>• Work with manufacturers and suppliers to reduce packaging - consider including packaging requirements in contract documents and material specifications.</li> <li>• Where packaging cannot be avoided: <ul style="list-style-type: none"> <li>• Prefer 'reusable' packaging where practical (e.g. plastic boxes; pallets etc).</li> <li>• Use packaging with lower environmental impact (e.g. recycled materials; non-synthetic adhesives; lower embodied carbon etc).</li> <li>• Ensure any timber-based packaging is certified to Forest Stewardship Council (FSC) standards.</li> <li>• Choose packaging which maximises space utilisation and therefore transport efficiency.</li> <li>• Reduce the weight of packaging materials.</li> </ul> </li> </ul>

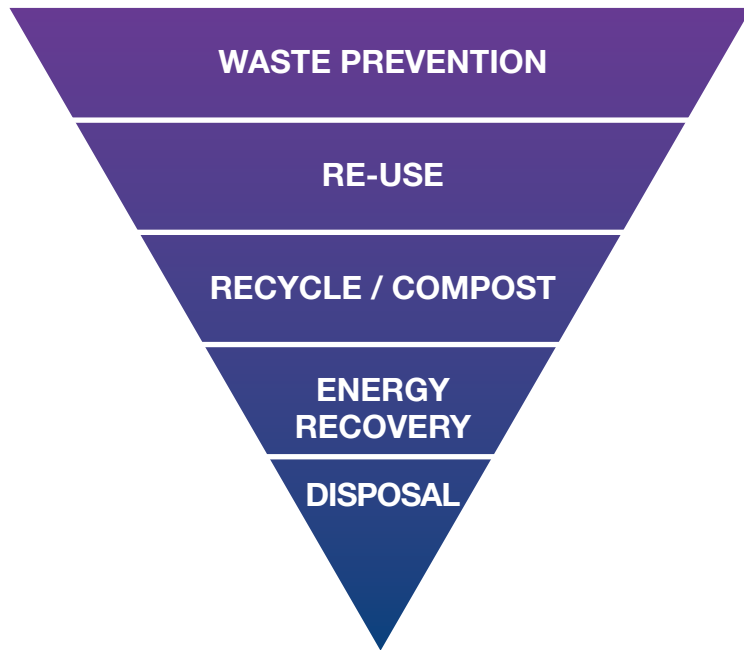


Figure 2: Waste Hierarchy





# Carbon



**Principle: To not only deliver developments that are low carbon in design, but also to enable them to become low carbon in operation**

Buildings in the UK are responsible for the largest proportion of total energy use and Government figures suggest that the construction sector can influence almost half (47%) of UK carbon emissions, of which 83% are from buildings in use (BIS).

Whilst a building envelope and key systems will have a major influence on overall energy consumption, thoughtful planning and design of a building fit-out can also offer significant opportunities for the management and minimisation of energy use allowing major savings in both carbon emissions and operational costs.

Sustainability Requirement	Rationale	How to benefit
Understand the impact that fit-out design choices may have on the efficient operation of the building.	As well as the business impacts resulting from increased energy costs, the demands of regulation and corporate responsibility make it increasingly important to account for associated carbon, and other emissions which contribute to climate change.  Fit-out design choices relating to layout, materials use and lighting will all play a role in operational energy requirements and related emissions.	<ul style="list-style-type: none"> <li>An energy strategy should be created for each building to ensure energy saving opportunities are maximised.</li> <li>Understand how the layout; choice of materials; and subdivision of spaces impacts on heating or cooling demand.</li> </ul>
Provide low-energy lighting which also creates a healthy working environment.	<p>Good levels of interior lighting are necessary for safety; the performance of visual tasks; and also the creation of a comfortable working environment. Optimising the use of natural daylight can also enhance the mood and productivity of building occupants.</p> <p>However, artificial lighting is usually responsible for a significant proportion of a building's energy consumption. In many office buildings much of this energy is wasted due to lights being left on when not required or inefficient zoning.</p>	<ul style="list-style-type: none"> <li><b>CONTRACTUAL REQUIREMENT:</b> Minimise energy demand associated with artificial lighting requirements, particularly during daylight hours</li> <li><b>CONTRACTUAL REQUIREMENT:</b> Select energy-efficient lighting options - LED fittings should be used where appropriate.</li> <li>Provide appropriate glare control but avoid blinds and shading options which block out sunlight excessively</li> <li>Use controls which turn off, or dim the lights when they are not needed (e.g. timers and presence detectors)</li> <li>Zone lighting so that adjustments can be made where it is not always needed (e.g. close to windows).</li> <li>Lighting levels should be provided in accordance with industry best practice guidelines (e.g. CIBSE Lighting Guides).</li> <li>Any fluorescent or compact fluorescent lighting fittings should be fitted with high frequency ballasts to eliminate flicker.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Reduce and de-carbonise energy demand	<p>Commercial buildings alone in the UK are responsible for 17% of our carbon dioxide emissions (UKGBC). National and international targets for reducing these emissions make it increasingly important for all businesses to consider their own operations.</p> <p>With a number of regulatory frameworks already linked to measuring and reporting, progressive businesses will pre-empt future requirements to reduce operational carbon emissions - or face potential penalties for not doing so.</p>	<ul style="list-style-type: none"> <li>• Carry out an energy audit to determine options for improving the energy efficiency of various systems in the building.</li> <li>• For buildings which do not have direct use of on-site or near-site renewable energy, negotiate a green tariff with energy suppliers in order to help reduce the carbon intensity of your operations.</li> </ul>
Focus on heating & cooling	<p>Heating and cooling demand can account for 40% of the energy use in UK commercial buildings. As we experience a changing climate, demand for the latter in particular is likely to rise sharply.</p> <p>However, simple and cost effective measures can often result in major energy savings.</p>	<ul style="list-style-type: none"> <li>• Provide additional shading/ blinds to reduce over-heating during the summer.</li> <li>• Ensure that sufficient draught-proofing is provided.</li> <li>• Avoid potential conflicts between systems used for heating and cooling. Make sure that different areas are zoned appropriately.</li> <li>• Identify wasteful heating and cooling and work with building managers to optimise systems and controls.</li> <li>• Ensure water heating does not exceed demand.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Specify energy-efficient equipment	<p>The specification of energy-consuming equipment may be one of the key ways that you can influence energy demand.</p> <p>There are a number of energy performance rating systems which can be used to guide the procurement of items ranging from white goods to printers, resulting in lower carbon emissions and energy costs.</p> <p>Examples include:</p> <ul style="list-style-type: none"> <li>• The EU Energy rating system most commonly associated with white goods (A to G rating)</li> <li>• The US Energy star rating: wider range of products including heating and cooling systems; computers; servers and various appliances</li> <li>• European Ecolabel flower: covers best in class products including electronic equipments and lighting</li> <li>• ECA Energy Technology Product List: provides a list of more energy-efficient heating, cooling, ventilation and lighting technologies eligible for the Enhanced Capital Allowance (ECA) scheme.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that procurement policies require electrical products with an EU Energy label, or equivalent (e.g. A or A+ rated as a minimum).</li> <li>• Ensure that standby settings are enabled to conserve energy when equipment is idling. Shut down fully at night/ when not in use.</li> <li>• Implement a planned, cost-effective replacement and upgrade programme - consider standby and running costs in the selection processes.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
<p>Understand and adjust controls for main energy consuming systems where possible.</p>	<p>As well as specifying energy-saving equipment, significant energy savings can often be achieved through effective monitoring and management of demand.</p> <p>Where relevant, energy requirements for heating, lighting, cooling and any other significant energy-consuming systems should be constantly kept under review so that adjustments can be made to maximise efficiency.</p> <p>Even where the control of building systems falls beyond the scope of your responsibilities, it will still be beneficial to understand energy demand, and communicate opportunities for additional efficiencies to building managers.</p>	<ul style="list-style-type: none"> <li>• Facilitate seasonal commissioning to ensure that any systems under your control are operating at maximum efficiency levels throughout the year and according to different levels of demand.</li> <li>• Focus on heating, ventilation and air conditioning systems, ensuring that thermostats are set at appropriate levels.</li> <li>• Ensure energy use is kept under constant review by building/ facilities managers to identify wasteful settings and make appropriate adjustments. Ideally this should form part of an ongoing annual energy audit.</li> </ul>

## Additional opportunities for a sustainable fit-out...

In addition to The Crown Estate's five key sustainability principles, this section sets out a number of additional opportunities for sustainable outcomes which can be influenced during a fit-out.

Implementing the right project management and procurement procedures is an essential first step in optimising the overall sustainability of your building, with early actions providing some of the greatest, and most cost effective, opportunities. An approach which simply prioritises price and quality rarely achieves the most sustainable outcomes in terms of environmental impacts, occupant satisfaction and, crucially, the potential for lifecycle cost savings.

Careful planning and design is also essential to the health & wellbeing of building users and should take

into account issues such as environmental zoning and controls; materials selection; the provision of amenities and services; and inclusivity. Such considerations play a crucial role in promoting a sense of well-being, raising productivity and even reducing absenteeism.

Finally, the location of a building in relation to public transport facilities and local amenities will clearly be an important factor in the transport patterns of building users. However, the ways in which a building or site is managed and the information made available to occupants can also help to reduce the impacts associated with travelling to work. A range of measures are available to help promote more sustainable transport choices - encouraging walking, cycling and the use of public transport whilst discouraging the use of private cars.

Sustainability Requirement	Rationale	How to benefit
<b>Management &amp; Procurement</b>		
Develop a sustainable supply chain	<p>Construction clients have an increasing responsibility to ensure that the products and services that they procure come from sustainable sources.</p> <p>Embedding sustainability requirements within procurement documentation can be an effective way of encouraging improvements in supplier organisations as well as demonstrating corporate responsibility.</p>	<ul style="list-style-type: none"> <li>Develop contractual clauses which require specific sustainable outcomes. For example, it may be appropriate to require specific levels of resource efficiency in areas like energy use/ carbon, water use, materials use and waste. The Waste Resources Action Programme (WRAP) has developed guidance and provides support in this area.</li> <li>Use a supplier questionnaire to determine the sustainability credentials of manufacturers and suppliers where appropriate.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Use a 'whole life' approach when making procurement decisions	<p>All too often, procurement decisions are based on capital cost alone, with little or no consideration of longer term benefits which can often include significant cost savings over the course of a lease.</p> <p>Taking a 'whole life' view can help identify operational cost savings, or other benefits, which will improve long term sustainability and help to justify higher upfront costs.</p>	<ul style="list-style-type: none"> <li>• Take a 'whole life' approach to procurement – assess options based on issues such as longevity, maintenance and replacement intervals.</li> <li>• Carry out lifecycle cost appraisals to support decision making (consider using the international standard, ISO 15686).</li> <li>• For energy-consuming equipment, calculate the difference between any additional upfront costs and the savings that can be expected during the course of your lease.</li> </ul>
Adopt a sustainable maintenance strategy	Regular maintenance can help to optimise energy and water consumption as well as saving the associated costs. Similarly, the specification of more robust or 'long life' components helps to increase replacement intervals and associated labour costs.	<ul style="list-style-type: none"> <li>• Implement a maintenance strategy including a planned preventative maintenance regime for mechanical and electrical systems which are the tenant's responsibility. Look at CIBSE's 'Guide to ownership, operation and maintenance of building service'.</li> <li>• Operate an inspection programme to detect systems which are broken, inefficient, poorly adjusted or at risk of failure.</li> <li>• Use components with a longer operational life (e.g. LED lighting).</li> </ul>



Sustainability Requirement	Rationale	How to benefit
Use an environmental assessment methodology	<p>Carrying out an environmental assessment of your building can help to highlight and optimise the benefits of 'greener' design decisions. A number of widely recognised methodologies are available to help rate the overall environmental performance of buildings and, in certain cases, these form part of statutory requirements.</p> <p>You may be required to provide evidence that your fit-out meets specific standards as part of a green lease agreement, or to meet planning requirements for new buildings - for example where a BREEAM rating is required.</p>	<ul style="list-style-type: none"> <li>• For new buildings or major refurbishments, find out if a BREEAM rating is required. If so, you may be required to provide evidence that your fit-out complies with specific issues.</li> <li>• 'Ska' assessments are designed specifically for fit-outs and may help to highlight and encourage additional beneficial measures.</li> <li>• For carbon footprinting consider the Carbon Trust Standard which provides a standard methodology for assessing carbon performance.</li> </ul>
Post-occupancy evaluation	<p>Post-occupancy evaluation is an essential part of ongoing building commissioning because it helps to recognise where systems may need adjusting in order to optimise areas such as user and energy efficiency. It also helps to improve building management and reduce costs associated with wasteful activities.</p> <p>Effective evaluation methodologies will seek detailed feedback from building users on how the working environment can be improved.</p>	<ul style="list-style-type: none"> <li>• Commission a post-occupancy evaluation, ideally to be carried out by a third party organisation.</li> <li>• Ensure that the process includes interviews with building occupants.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
<b>Health &amp; Wellbeing</b>		
<p>Ensure that building users have appropriate control over their working environment</p>	<p>Providing building occupants with appropriate levels of control over their working environment helps to improve comfort levels. In turn, this can enhance productivity and reduce absence rates. With careful planning and guidance, it can also help to prevent the wasteful use of energy for heating, cooling and lighting.</p> <p>However, it is essential that controls are matched to the way in which buildings are used and managed. This can be particularly challenging in buildings which high occupancy levels and different uses of space.</p>	<ul style="list-style-type: none"> <li>• Zone lighting to allow separate occupant control for discrete functional areas, and within larger spaces (e.g. open plan offices).</li> <li>• In appropriate areas (e.g. cellular offices), provide thermal comfort controls so that building users have independent control over heating and cooling within set limits.</li> <li>• Ensure that occupant controls are simple and designed to reduce wasteful behaviour such as frequent temperature adjustments and potential conflicts between systems.</li> </ul>
<p>Optimise building security</p>	<p>The careful planning of your fit-out, together with implementation of robust operational procedures is essential for optimising building security.</p> <p>It is important to follow local and national guidelines and ensure that appropriate security measures are implemented. Secured by Design, for example, is a police initiative which supports the principles of 'designing out crime'. It encourages measures to reduce opportunities for crime and fear of crime.</p>	<ul style="list-style-type: none"> <li>• Where security recommendations have already been provided as part of a shell &amp; core development, ensure that these have been properly implemented and that fit-out choices do not present a conflict.</li> <li>• If not, it may be appropriate to consult with the local police Architectural Liaison Officer/ Crime Prevention Design Advisor in relation to optimising security provision related to your fit-out works.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
Drinking water	<p>The provision of adequate, clean drinking water to employees is a legal requirement, as well as being essential for health &amp; wellbeing. However, bottled water and free-standing water-coolers (with large bottles) which require constant refills are environmentally unfriendly because of materials use and delivery requirements - as well as being more costly.</p> <p>Appropriate 'plumbed-in' systems offer low maintenance and cost effective provision of drinking water.</p>	<ul style="list-style-type: none"> <li>• Provide chilled, mains-fed, point of use water coolers for staff at convenient locations in the building.</li> <li>• Avoid water fountains, which are more difficult to keep in a hygienic condition.</li> <li>• Where provided in public areas facilities should be attached to the wall and floor to prevent damage/ vandalism.</li> </ul>
Ensure that noise levels are controlled	<p>Fit-out works can have a major impact on the overall acoustic performance of the building and should always be carefully considered in relation to the existing building shell.</p> <p>Decisions about materials use, layout and occupancy must be carefully planned so that unwanted noise can be kept to a minimum. This is particularly important in central urban locations, or where there are higher levels of external traffic noise.</p>	<ul style="list-style-type: none"> <li>• Commission, or refer to existing, acoustic calculations or reports when selecting fit-out materials and considering layout options.</li> <li>• If necessary, seek additional guidance from a suitably qualified acoustician on how to optimise acoustic performance.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
<b>Transport &amp; Travel</b>		
Adapt or develop a travel plan which takes into account the needs of your building users	<p>Using a site-specific transport survey can help to identify a range of practical measures to help reduce car journeys to and from work and for business-related travel.</p> <p>By setting up a travel plan, your organisation will help reduce the environmental impact associated with transport, and can help reduce the costs of commuting. A well-designed plan should take into account all building users including employees, customers and suppliers.</p>	<ul style="list-style-type: none"> <li>• Where possible, carry out a survey of existing building users to understand transport challenges and opportunities in relation to your employees.</li> <li>• Find out if there is an existing travel plan and implement its recommendations, or update as necessary.</li> <li>• Keep the travel plan under review during building occupation and adapt as and when required.</li> </ul>
Incentivise walking and cycling	<p>Cycling or walking to work offers clear environmental benefits by reducing the impacts associated with cars and public transport. It also offers health benefits.</p> <p>Depending on building location and existing provision, it may be appropriate to provide additional facilities or incentives to encourage walking and cycling.</p>	<ul style="list-style-type: none"> <li>• Where possible, ensure that convenient facilities are provided for cyclists such as: <ul style="list-style-type: none"> <li>• Secure cycle parking</li> <li>• Lockers and changing facilities</li> <li>• Showers</li> <li>• Drying room for wet clothes</li> </ul> </li> <li>• Consider providing incentives such as cycle to work schemes and loans; or free/subsidised safety equipment.</li> </ul>
Enhance amenities for building occupants	Where buildings are located away from key local amenities, occupants will be more likely to make multiple short car journeys for food and day-to-day services. Providing such amenities on site (where possible) will help to reduce such journeys and the associated impacts in terms of noise, air pollution and congestion.	<ul style="list-style-type: none"> <li>• Arrange lunchtime food deliveries from a local catering business.</li> <li>• If available, join an existing consolidated delivery or collection scheme which will also help to minimise vehicle movements.</li> <li>• Where practical, provide additional amenities such as a food outlet, cash machine or post box on site.</li> </ul>

Sustainability Requirement	Rationale	How to benefit
<p>Minimise the need for travel in the first place</p>	<p>As well as reducing the proportion of journeys made by private car, for some businesses it may be appropriate to implement measures to help avoid the need for travelling at all.</p> <p>As well as the clear benefits for the environment and local congestion, this can also improve business efficiency through reduced transport costs and travel time.</p>	<ul style="list-style-type: none"> <li>• Provide adequate audio and video conferencing facilities and minimise the number of 'face-to-face' meetings.</li> <li>• Consider the potential for allowing certain employees to work from home some of the time.</li> </ul>

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