

Sustainability Criteria		Minimum Standard	Best Practice	Innovative	Pioneering	Notes
Building and operational targets	Proposed Building Regulations	2010 Part L Regulation	2013 Part L Regulation	2016 Part L Regulation	2019 Part L - 'Zero Carbon'	'Zero Carbon' not yet fully defined
	1 CO₂ Emission design target	95kg CO ₂ /m ² /yr	70 - 80kg CO ₂ /m ² /yr	50 - 60kg CO ₂ /m ² /yr	0 kg CO ₂ /m ² /yr "Carbon Neutral"	CO ₂ emission, DEC Rating and consumption figures are heavily dependent on area of building air-conditioned, particularly area to art preservation standards and visitor numbers. Heating and cooling requirements are also dependent on visitor numbers. Figures not applicable to archives
	2 DEC rating	G - D rating	F - D rating	F - C rating	A rating	
	3 Energy consumption					
	Heating & hot water	180 kWh/m ² /yr	120 kWh/m ² /yr	50 kWh/m ² /yr	20 - 40 kWh/m ² /yr	
	Mechanical cooling	45 kWh/m ² /yr	37 kWh/m ² /yr	20 kWh/m ² /yr	0 - 10 kWh/m ² /yr	
	Lighting	60 kWh/m ² /yr	40 kWh/m ² /yr	30 kWh/m ² /yr	<10 kWh/m ² /yr	
	4 On site energy generation	Up to 20% based on local planning	>20% on site renewables	50 - 100%	> 100% on site generation or agreed off-site generation	Highly site specific
	5 U-values (W/m²K)					
	Wall	0.35 (Part L 2010)	0.2	0.15	0.1	
	Average window	2.2 (Part L 2010)	1.4	1.1	0.8	
	Roof	0.25 (Part L 2010)	0.15	0.12	0.1	Difficult to pass 2010 building regs using minimum regulation values: 20% 30% improvement in U-values and airtightness typical
	Ground floor	0.25 (Part L 2010)	0.15	0.12	0.1	
6 Airtightness	10 m ³ /h.m ² at 50Pa (Part L 2010) Archives repositories - 2ac/day (BS5454)	3.5 m ³ /h.m ² at 50Pa (BCO guide) Archives repositories - 1ac/day (BS5454)	2 m ³ /h.m ² at 50Pa Archives repositories - 0.5ac/day	1 m ³ /h.m ² at 50Pa Archives repositories - 0.5ac/day		
User and operational interaction	7 Controls, Metering and Monitoring	Seasonal Commissioning. Produce DEC, report to senior management	Commissioning company retained to monitor over 1st year. Post occupancy evaluation. Action plan to respond to annual DEC	Integrated monitoring and management structure with responsibilities for reading, reviewing, actioning changes defined. Anonymised external reporting. Departmental energy targets	Continual monitoring and fine-tuning. Formal external review. Results published to industry. Energy use reward/penalty system.	Evaluations show actual performance KPI's (eg in energy and water), are usually much greater than those predicted during the design stage.
	8 User Involvement	Facilities Staff trained at building handover. Building Log Book provided with O&M Manual	Facilities staff involved in commissioning. Non-technical user guide produced and all staff inducted. Energy use fed back to staff and visitors	Soft landing framework followed (see note). Interactive online user guide. Energy use on interactive display screen and online	Departmental energy use feeds into personal carbon trading (eg. WSP's PACT scheme)	Often a result of poor commissioning, training & management. www.softlandings.org.uk
Design considerations and strategies	9 Environmental design criteria	Control to fixed point with small variations (so called "international standards") in most art exhibition areas. (Archives - conditions as stated in BS5454)	Conditions appropriate to needs of collection and as agreed with client. Consider working to Government Indemnity Scheme (GIS) conditions. (Archives - work to GIS conditions where National Advisory Service accreditation not required)	Work within a broad defined range of temp and RH (such as GIS conditions or those proposed by the Bizot Group). Allow set-points to change seasonally. (Archives - work within GIS conditions where National Advisory Service accreditation not required)	Work within GIS or Bizot Group's recommendations for all display areas, both permanent and temporary. Micro climates for very sensitive objects. Consider seasonal display of exhibits as RH changes throughout year (e.g. moisture sensitive objects not displayed in winter). (Archives - work within GIS conditions. Re-write BS5454)	GIS conditions: 16-24°C, max 4°C cycle in 24hrs 40-65% RH, max 10% cycle in 24hrs Bizot Group - comprises the directors of the world's leading museums and galleries
	10 Environmental design strategy	Full temperature and relative humidity (RH) control in most building areas. (Archives - full control of both temperature and RH)	Full environmental control to art exhibition and art handling areas only. Zoning between temporary and permanent display galleries. (Archives - thermal and moisture inertia along with air-conditioning plant to trim conditions)	Arrange building to allow environmental zoning between areas. Nat vent in non-art display areas. Buffer spaces between a/c and non-a/c areas to avoid need for doors. (Archives - passive control only using thermal and moisture inertia. No a/c plant, conservation heating only)	Zone display areas based on sensitivity of exhibits and for seasonal display	Unlike archives which have very low occupancy, sole use of passive control difficult because of number of visitors in museums and galleries (but still beneficial during unoccupied hours)
	11 Methods of environmental control	Full air-conditioning plant using high energy sources of cooling/dehumidification and heating (eg air-cooled chillers and gas fired boiler plant). Constant volume mixing system. Heat recovery systems may be provided	Full a/c plant using higher efficiency sources of cooling/dehumidification and heating such as GSHP. Consider variable volume displacement system if appropriate and more efficient. Heat and moisture recovery systems. Consider evaporative cooling on exhaust air and condenser heat recovery	Coupled (in-room) temperature and moisture buffering. Conditions trimmed using low grade cooling and heating sources, long with desiccant dehumidification. Use variable volume displacement system	None or little mechanical a/c to general art display areas. Use of natural ventilation and coupled and de-coupled thermal mass and moisture buffers	
	12 Daylighting	No daylight or windows of any orientation covering only part of a bigger gallery space, with or without blinds	Rooflights with fixed solar shading / aspect / geometry that exclude direct sun - i.e. northlight only, plus blinds for black out	Consider modulating control of skylight for different gallery conditions. Integrated natural and artificial lighting control	Automatic controls responding to sun position and sky conditions to use both diffused sunlight and northlight to maximise availability of natural light in all conditions and to provide varying colour temperatures. Target of no artificial light 80% of daytime	Daylight in display areas not essential. Unless carefully designed and controlled natural light may be a higher energy solution due to high heat gains
	13 Artificial lighting and controls	50W/m ² max installed load. Indiscriminate use of lighting with combined display and ambient lighting. Predominately tungsten halogen sources. Individual dimming	25W/m ² max installed load. Separate display, ambient and work lighting systems, individually controlled. Consider LED (and metal halide) sources for display lights	15W/m ² max installed load. Exclusively low energy sources. Dimming control working with daylighting strategy. Work lights controlled with occupancy sensors outside of gallery opening hours	5W/m ² typical installed load. Highly directional, very efficient sources - i.e. LED, plasma. Occupancy sensors throughout	

Sustainability Criteria		Minimum Standard	Best Practice	Innovative	Pioneering	Notes
Construction materials	1 Embodied carbon in fabric	Embodied carbon not assessed. Preference stated for locally sourced materials	Structure engineered to minimise material mass. Cement replacements used, e.g. GGBFS in concrete heavy materials. Materials specified to be from local sources and provenance rigorously checked during construction	Detailed life cycle analysis of embodied carbon in structure including assessment sourcing and transportation energy. Results used for material selection. Structure engineered to work at 90% capacity [Wise]	Structure made from entirely low embodied energy materials, with known and mainly local provenance. Building serviceability regulations challenged [Wise]. Carbon Profiling technique utilised and used to inform building design and material selection [Sturgis]	Highly building specific and metrics not sufficiently standardised to allow benchmarks to be used as meaningful targets. Wise, June 2010, Building.co.uk, "What if everything we did is wrong" 2010, Sturgis Associates, "Redefining Zero".
	2 Building and materials re-use	Preference for standard sizes of elements such as steel beams/columns or precast units	Future flexibility of building considered. High grade materials designed for recyclability. e.g. Using lime mortar. Different material layers made identifiable or visible	Flexibility of future use demonstrated by typical conversion example designs. Avoid composite materials. Consider fastenings for easy dismantling	Flexibility and future use drives design. Label & log or e-tag main elements	
	3 Recycled and reclaimed Content	15% recycled content likely as standard.	30% recycled content	45% recycled content	60% recycled content	Only applies to relevant materials
	4 Material Toxicity	Avoidance of high VOC content paints, sealants etc and all ozone depleting materials including insulation	PVC cabling exchanged for LSF. Non petro-chemical based insulation materials. All 'C' rated materials avoided	'B' and 'C' grade materials avoided. VOC-free paints and timber. Natural materials where possible. Eliminate PVC	Use only natural materials where products exist. 80% of materials 'A' or 'A+' rated	Ratings refer to BRE Green Guide
Climate change adaptation	5 Climate change adaptation	No considerations beyond those embodied in regulatory compliance	Potential impacts reviewed with client, strategic principles discussed and reported concerning key risks	Design is influenced by climate change adaptation implications	Design approach driven by climate change adaptation implications	See TSB report 'Design For Future Climate', 2010, & UKCIP for further guidance
Landscape & biodiversity	6 Landscape and biodiversity	Local planning requirements met. Mitigate against negative biodiversity impacts where feasible	Consult an ecologist on biodiversity enhancement, giving preference to local species. Integrated landscape and water strategy with landscape management plan provided	Attach equal weighting to biodiversity as for water, M & E and people, in overarching Green Infrastructure strategy. Landscape works in harmony with design and climate including deciduous planting to reduce summer urban heat island and internal solar gain where appropriate	Biodiversity enhancement key driver in Green Infrastructure Strategy. Landscape significantly influences building design.	Biodiversity is the variety of species within an ecosystem, used as a measure of the health of biological systems.
Water	7 Mains water consumption	> 5.5 m ³ /person/yr	4.5 - 5.5 m ³ /person/yr	1.5 - 4.5 m ³ /person/yr	<1.5 m ³ /person/yr	based primarily on staff numbers rather than visitor numbers
	8 Drainage systems	Carry out Flood Risk Assessment No increase in stormwater run-off.	Thorough site hydrological characterisation, design responds to environment, including SUDS where appropriate. Rainwater harvesting for WCs and irrigation.	Drainage system fully integrated into the environment. Consider reedbed treatment for irrigation.	Closed loop water system. Waste-to-Energy plant or alternatives to water base foul drainage	Highly site specific
Waste	9 Construction waste minimisation	Contractor to produce Site Waste Management Plan (SWMP) to identify waste streams and areas for segregation on site or post collection.	Establish waste streams during design, set key KPI's early on. Waste reviews on design team meeting agendas. Divert 75% by weight of non hazardous project waste from landfill.	Implement Modern Methods of Construction throughout design. Account for site conditions impacting waste. Materials logistics plan.	Achieve zero net waste for project.	see WRAP for guidance on SWMP's and waste minimisation strategies
	10 Operational waste recycling	Adequate space for storing recyclable waste.	Managed recycling processes involving space for separating and collecting recyclables. Encourage occupants to recycle.	Provide incentives for recycling. On site composting for biodegradable waste.	Waste stream feeds on or off-site anaerobic digestion for biogas production.	
Transport issues	11 Transport	Some covered cycle storage.	Full cycling support provisions as part of travel plan. Utilise video conferencing. Access considered in site selection.	Fully site specific travel plan covering site infrastructure and awareness raising. Electric vehicle charging points. Utilise virtual video conferencing.	Accessibility drives site selection. Feed transport into personal carbon trading scheme.	Adequate provision of storage lockers for change of clothes, helmet etc, can require a significant amount of internal space
Management	12 Stakeholder involvement and design process	Use of industry Standards. Standard client briefing.	Early consultation with stakeholders with the declared intention that this may affect design proposals. Stakeholders fully understand standards and design	Open design process with published response to stakeholder proposals. Design strategy tested with stakeholders. New boundaries set	Feed back results into industry standards	
	13 Construction site management	Main contractor has CCS or alternative certification. Energy use in construction metered	Main contractor has 32 pts under CCS or an alternative certification. Main contractor operates EMS including monitoring and setting targets for energy use	Main contractor has CCS score 36 or more. Energy and water use targets are met and results published	A significant proportion of construction energy is generated on site with temporary renewables.	
	14 Sustainable procurement of consumables	Sourcing of office supplies and cleaning products considered	Sustainable procurement of office supplies and cleaning products and food and monitoring of consumption.	Mostly paperless organisation. All consumables sustainably procured. Some food grown on site	Some organic food grown on site, with the rest seasonal, local.	
Productivity & health	15 Healthy environments	Building has no or only a slight negative impact on productivity. Meet regulation for internal comfort including air quality.	No impact on productivity. Connection to outside. Air quality monitored.	Slightly positive impact on productivity. Psychological and social impacts assessed during design.	Building has noticeable positive impact on productivity. Strive to create a 'sense of place'. occupied spaces have a unique character that engenders a sense of pride, purpose and dedication for individual occupants	Productivity a highly subjective measurement. See http://www.cibse.org/pdfs/8aratcliffe.pdf for further guidance