UNIVERSITY OF LIVERPOOL

SUSTAINABLE BUILT ENVIRONMENT INVESTMENT FRAMEWORK

April 2023

Contents

Executive Summary

The Sustainable Built Environment Investment Framework is both an investment aid and a design guide with high level principles in eleven key topic areas concerning the impact of the built environment within the University of Liverpool on the sustainability of the environment, society and the University itself.

This document outlines the principles for an environmentally and socially sustainable built environment but economic sustainability is also vital – it runs through all of the topic areas and is a basis for creating this investment framework and, as the world changes, acting sustainably becomes an economic as well as a social and environmental imperative.

These principles are not a set of targets that set a ceiling for aspiration, but a set of guidelines which will help shape thinking and allow a set of stretching targets to be derived within each project that will then drive design interventions and guide the implementation throughout the project. Tangible commitments need to be derived from the immutable principles set out in this document.

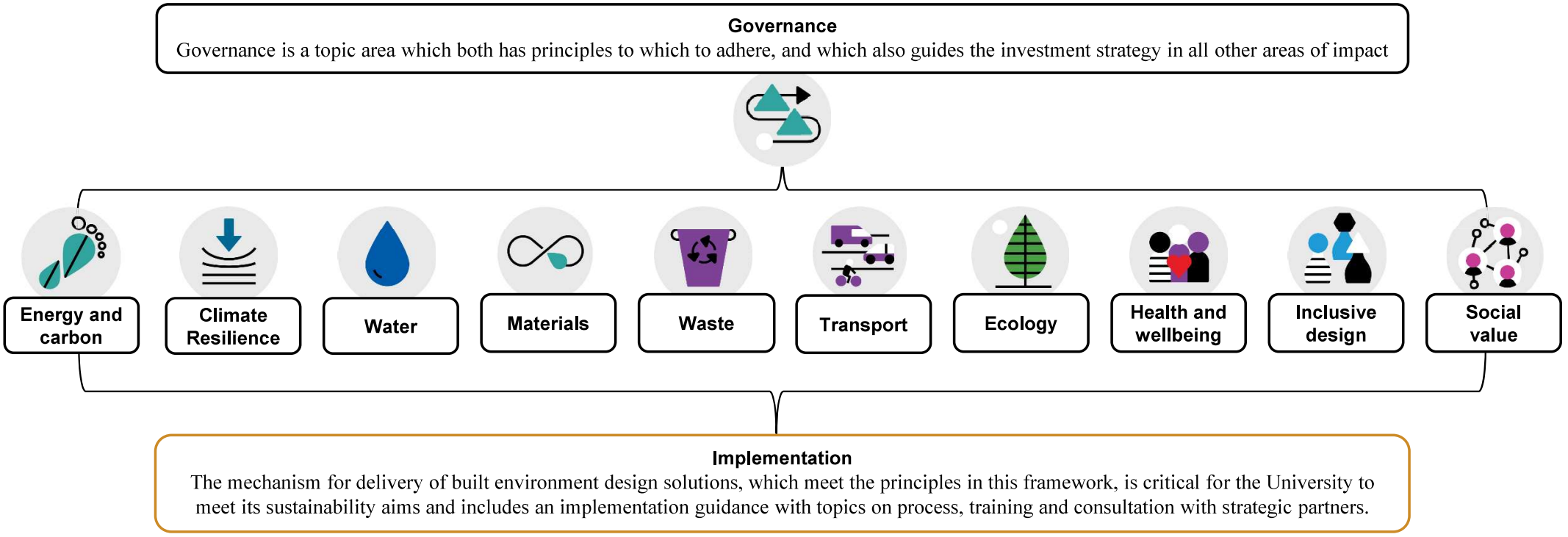
The topic areas are highly interrelated. Governance is critical to the reduction of impacts in all the others though there are other interdependencies (such as between ecology and health and wellbeing). Therefore this framework cannot be split and needs to used as a whole. None of the topic areas are higher priority than any other and the implementation of these principles in entirety across the built environment needs to be considered as underpinning the fulfilment of the University's sustainability aims and addressing the UN sustainable development goals.

The design principles in this framework apply to all built environment at the University of Liverpool whether new build, refurbishment, maintenance, public realm or below ground infrastructure.

Culture shift towards genuine sustainability requires ownership from everyone and this framework should not only guide investment and design, but also thinking and behaviours, throughout project lifecycles in all areas of the built environment.

Executive Summary - framework

The Sustainable Built Environment Investment Framework is a design guide with high level principles in governance and each of ten other topic areas concerning impact of the built environment within the University of Liverpool on the sustainability of the environment, society and the University itself. The framework is to be viewed alongside the implementation plan, which outlines guidance on process needed to implement these principles.



Sustainability Overview

Sustainability frameworks all fall into social, environmental and economic realms. This document outlines the principles for an environmentally and socially sustainable built environment but economic sustainability runs through all of the topic areas and is a basis for creating this investment framework and as the world changes, acting sustainably becomes an economic as well as a social and environmental imperative.

Environmental sustainability principles

The guidance in this document relates to a range of environmental impacts of the built environment in the following themes:

- Energy and carbon
- Climate adaptation and resilience
- Water
- Materials
- Waste
- Transport
- Ecology and biodiversity

Social sustainability principles

This document gives high level overview of range of social impacts of the built environment in the following themes:

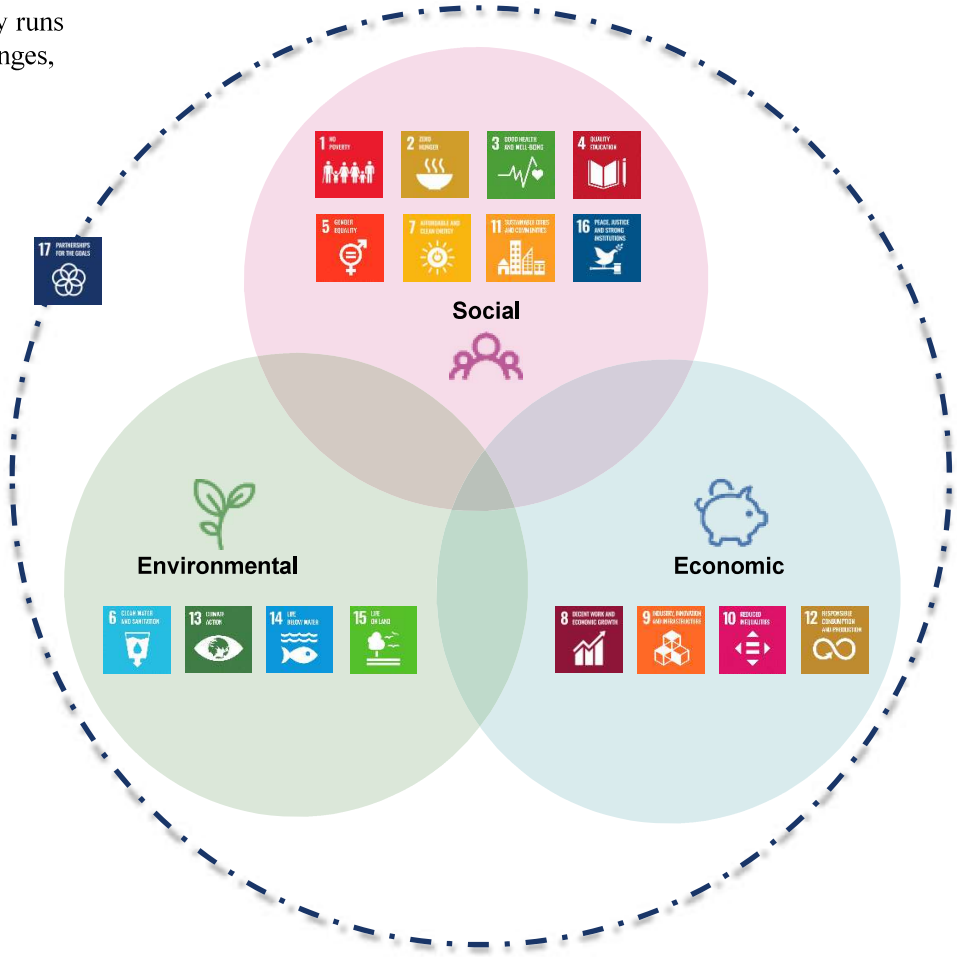
- Health and wellbeing
- Inclusive design
- Social value

Economic sustainability principles

- Consider whole life cycle cost (including future risk analysis)
- Consider buildability
- Sustainability principles *cannot* be valued engineered out – need rather to remove or reduce complexity, finish, size or proportion
- Maintainability = lower life cycle cost
- Consider life cycle renewal – individual component longevity – increase durability, repairability – see circular economy guidance

Partnerships

UN SDG 17 relates to creating partnerships for the implementation of the other goals. Internal and external collaboration is critical to implementing the principles of a sustainable built environment.



University of Liverpool Strategies

These statements from the University of Liverpool's overarching strategy and sustainability strategy are included here as a reminder that the principles in this document are contributing to a wider aim and to the University's main sustainability goals.

The University of Liverpool's overarching strategy principles include;

"Principle 3: We will deploy our resources creatively to maximise our positive impact locally, nationally and internationally whilst being mindful of our contribution to the realisation of the UN Sustainable Development Goals, including the drive toward a zero carbon future.".

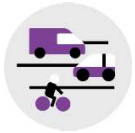
The University's sustainability strategy states that ***"Addressing the UN Sustainable Development Goals is our central mission."*** and sets some high level sustainability targets:

- ***We will achieve net zero carbon by 2035***
- ***We will reduce our waste by 50% by 2025***
- ***Every student will have the opportunity to undertake a sustainability-related module, extra-curricular activity, or learning by 2022.***

Biodiversity:
To be a species and habitat rich campus, supporting biodiversity to thrive by enhancing the quality, extent and management of green spaces across our University estate.

Built environment:
To be a thought leader in practical and theoretical issues surrounding the sustainability of the built environment, using live projects on our estate to develop, test and design sustainability and assessment tools that can be adopted by industry.

Climate action:
To be a climate resilient campus that has minimal negative and maximum positive environmental impact, achieving net zero carbon by 2035.



Travel and transport:
To be the most active travel friendly campus in the UK by improving cycle and walking infrastructure, reducing single occupancy car journeys, and making a cultural shift to wider use of digital technologies.

Responsible consumption and production:
To be a supporter of the local circular economy through managing our waste as valuable resource, adopting a whole life cycle approach to ensure the efficient use of natural resources, and influencing for environmental excellence across our supply chain.

Culture and community:
To be a sustainably conscious University community, with an engrained culture of sustainability activism to support delivery of our Sustainability Strategy.

Document Outline

The Sustainable Built Environment Investment Framework contains a set of sustainable design guidance principles to be applied to all built environment and asset management at the University of Liverpool. This relates to asset and lifecycle investment decisions and must be used to inform investment strategy in addition to setting standards for built environment assets. These principles must also be used by design teams to create sustainability targets against which to create solutions which meet the university's sustainability aims.

This guidance document forms one of a suite of interrelated documents published by the university, such as inclusive design guide, green space design principles and others, which align with the University of Liverpool Strategy, University of Liverpool Sustainability Strategy and Policy, Environmental Policy and Masterplan Estate Strategy.

This guidance is not time limited as it is a live document, pointing to a continually shifting set of best-practice and standards in a rapidly developing arena. Consequently, where a set of standards are recommended (such as from BREEAM, LETI, RICS etc) the source material must be checked for updates and the latest version used. There are also new standards in development, such as the UKGBC net zero buildings standard, which must be incorporated when they are live. The speed of technology, legislative and standard shifts within built environment sustainability puts the onus onto the users of this document to ensure that the latest standards are referenced.

The guidance applies to work across the range of implementation typologies; New Build, Refurbishments, Maintenance, Public Realm and Infrastructure. Whilst the content of this document may apply to New Build more often than to the other typologies, there is no thematic area which doesn't have impact in every type of project and the investors, project managers and designers need to take responsibility for implementing the contents across all typologies.

Document Structure

This document presents a high level summary of framework principles for each of the topics areas, an SDG impact matrix and a set of principles in each of the 11 topic areas from which to derive project specific targets.

Principles apply to all of the overarching implementation typologies:
New Build, Refurbishments, Maintenance, Public realm, Infrastructure. However, not all of the principles will be equally applicable to every typology, and the judgement of the investors, project managers and designers, needs to be applied to use the highest possible sustainability standards in each, when setting targets.

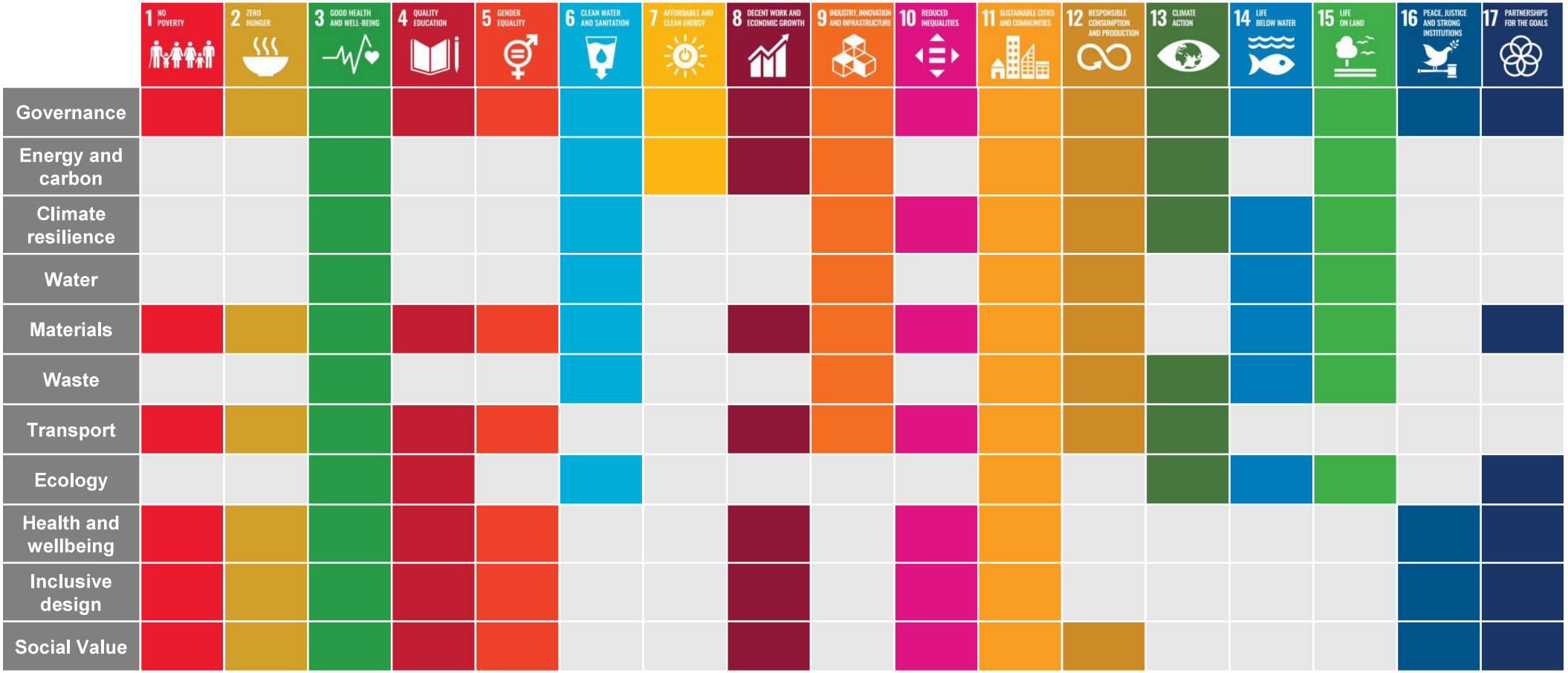
New Build | **Refurbishments** | **Maintenance** | **Public Realm** | **Below ground infrastructure**

Therefore when targets are created, these will be specific to the implementation type and the specific project.

There is an implementation guidance document to support the change management and processes which are required to implement these principles. Methodologies for target setting against these principles, and the skills sets for delivery, need to be developed within the university to ensure that projects align with the broader sustainability goals of the University of Liverpool.

UN sustainable development goals impact matrix

This matric shows the main United Nations Sustainable Development Goals impacted by the topic areas in this document, however it is worth noting that when considering the whole value chain of upstream impacts of material purchasing choices and downstream impacts of waste and design, all topic areas in this document will likely have some affect on all of the SDGs.



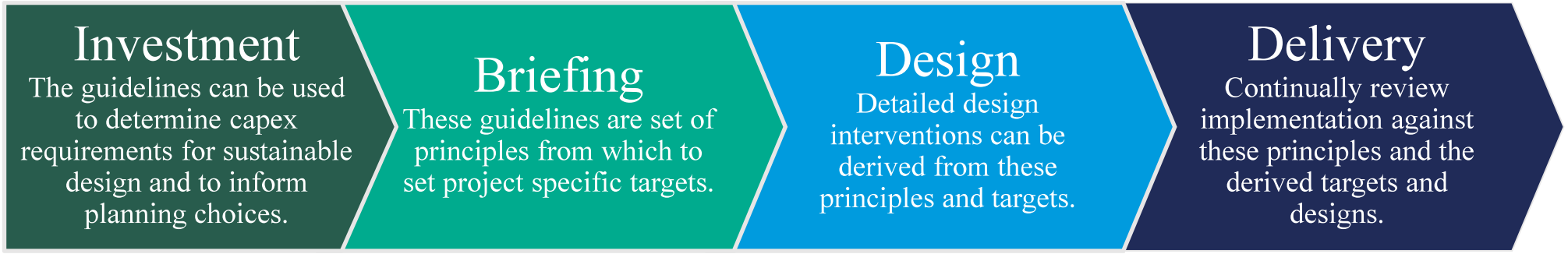
The principles in this framework are to be delivered through using them in each of the phases of a project as outlined below.

The Sustainable Built Environment Investment Framework guidelines need to be embedded into the **investment**, **planning** and **design** processes and adopted by the whole University. In order to do this a separate implementation strategy is being created to outline delivery mechanism across each of the broad phases outlined below.

The implementation of these principles to the built environment needs to be considered as underpinning the fulfilment of the University of Liverpool's sustainability aims and addressing the UN sustainable development goals.

They are not a set of targets to which to aim and do no more than that, but a set of guidelines which will help shape thinking and with which to form a set of baseline targets within each project, to then derive design interventions and to guide the implementation, throughout the project. The delivery of projects designed in line with the principles in this framework aim to go well beyond business as usual.

The implementation guide will set out the governance process for embedding sustainability in a project, considering aspects such as desired project outcomes, reporting routes, design reviews, sign-off procedures, and team roles and responsibilities. It will also outline training, consultation and implementation requirements.



Sustainable Built Environment Investment Framework

Governance

Governance of sustainability implementation is critical to outcomes. The solutions for a sustainable built environment are already out there, what is lacking for implementation is the direction and drive to make sustainability principles a high enough priority. This involves a culture shift at all levels in the design process. Creating targets which encourage multi-stakeholder ownership can help to shift behaviours. However it is key to think beyond sustainability certification and into regenerative design.

Financial Governance

Funding for sustainability initiatives and the principles in this document must be considered as a minimum.

Non-financial return on investments must be considered alongside financial as part of the project approval process.

Masterplanning and Systems Thinking

Reference the site wide baseline understanding of each building, in particular the energy performance and carbon emissions, when determining priorities for each project.
Each of the sustainability targets derived from the principles in this document must be derived with a whole campus understanding, for example you must review ecological gains at a masterplan level, in reference to a whole campus ecological survey, or similar, when deciding on each project investment into biodiversity improvements.

Whole Life Cycle Cost Assessments

Decisions must be based on whole life cycle cost not only on capital expenditure. This approach is a key sustainability principle which underpins a lot of other thematic areas and needs to be applied across projects/campus. This approach can be viewed as long term value/efficiency rather than increased CapEx.

Ownership

Ownership must be assigned for all workstreams, which means setting targets against all of the principles in this document and ensuring that there are clear lines of responsibility to roles and named individuals.

Process and implementation

There must be processes in place to ensure that targets can be effectively derived from these principles and measured against them robustly. This should include university wide data collection, clear milestones and gateways, and clarity in sign off and incentives/performance management.

There must be confidence in the capability to deliver projects against these targets with capability and capacity gaps addressed prior to project inception.

Capturing lessons learned

Piloting and testing cycles need to be embedded into the project mindset to ensure that improvement in both meeting targets and capability is iterative.

Lessons learned need to be clearly cycled into continual process development as well as delivering clarity of understanding improvements against targets and capability/skills development.

Declaration of continuous improvement

Investors, project managers and designers must use these principles to drive regenerative sustainability and agree to continuously learn from each project to drive improvement in the next.

Best practice and benchmarking

Built environment sustainability certification has the benefit of being robust and verifiable and a clear measure of progress against industry standards. Assure that project/industry best practice certifications (such as the ones listed below), agreed University Specified targets and other forms of industry benchmarking are considered for use on every project.

The university will, as a minimum, always meet statutory obligations but we will aim for the latest best practice in each of the topic areas in this document. These may not be covered by the tools/accreditation and methodologies, or may be covered to a lower standard. It is incumbent on the designer to make the best use of these tools to support project sustainability and record where the university can improve on the standards outlined.

Certification Schemes and methodologies to be considered, as a minimum:

Passivhaus Institut
EnerPHit
Ska rating
NABERS UNITED KINGDOM
fitwel
INTERNATIONAL WELL BUILDING INSTITUTE
UK Net Zero Carbon Buildings Standard
UK GBC
BREEAM
SOFT LANDINGS
LONDON ENERGY TRANSFORMATION INITIATIVE
IStructE
RICS
RIBA Royal Institute of British Architects
CIBSE

Energy and Carbon

To achieve the ambitious University of Liverpool Net Zero Target by 2035, the University must prioritise the carbon and energy impact of new buildings, refurbishment, maintenance requirements, public realm and behaviour as well as new and existing energy infrastructure.

Whole Life Carbon

To get a true picture of a building's energy and carbon impact it is necessary to understand the interrelationship between operational and embodied carbon emissions to optimise relative impacts.

Whole Life Carbon assessments are to be completed for all new and retrofit buildings. Outcomes must be used as a central decision-making factor informing optimal low carbon solutions.

Operational Energy

To achieve the 2035 Net Zero target, all new build and retrofit buildings are to be 100% Net Zero Operational Carbon with no offsets. There will be a new UKGBC Net Zero standard in 2023.

Net Zero must be achieved by first reducing the energy consumption of the design to a minimum using appropriate targets (such as those in the PassivHaus standard) before supplementing energy use via on-site renewable energy.

Regulated and unregulated energy consumption must be calculated based on NABERS, CIBSE TM54 methodology or equivalent & this model used to evaluate the energy impact of design decisions.

Enhanced commissioning processes, soft landings, and detailed energy monitoring and fine tuning during early occupation will be undertaken in order to identify and remedy any deviations from target performance.

Energy Procurement

Off-site Renewable energy procurement will meet the UKGBC principals of Energy Attribute, Renewable Sourced and Additionality.

Embodied Carbon

A major component of the embodied carbon in buildings is the upfront carbon associated with construction. This must be minimised to best practice or exemplar level set out in industry guidance such as LETI, and must significantly inform early project decisions on setting the project brief with regard to extent of new-build. The reuse and refurbishment of existing buildings must be considered and the impact on embodied carbon estimated to help inform the choice of new build vs reuse.

Equipment replacement (e.g. CHP, LEDs) must be in line with end of life to reduce embodied carbon impact, unless significant carbon benefit can be proven in Whole Life Carbon Assessment.

Renewable Technologies

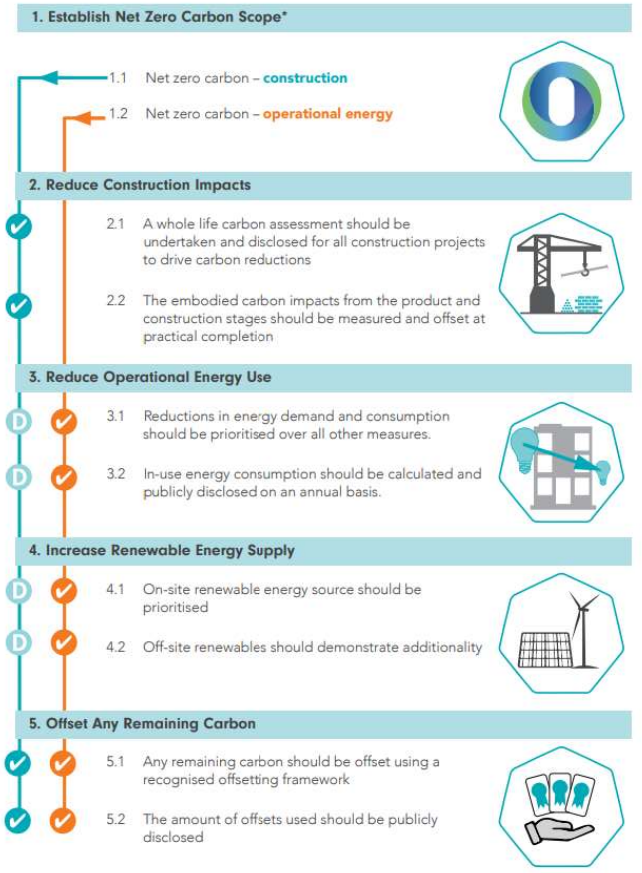
All energy consumption must be met by 100% renewable energy. On-site renewables are to be maximised to amount technically feasible before reliance energy procurement contracts. Opportunities for large-scale generation or energy sharing must be maximised.

Net Zero Operational Energy UKGBC Definition

When the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative. A net zero operational carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset.

UK Net Zero Carbon Buildings Standard

The UK's first Net Zero Carbon Buildings standard is in consultation, due to be made available in 2023. Once this is made current the UKGBC zero carbons framework on the right is likely to be retired. The University of Liverpool needs to use the most up to date standard for meeting its aims to achieve its net zero target in a robust and verifiable way.



Source: UKGBC Zero Carbon Buildings Framework

Sustainable Built Environment Investment Framework

Energy and Carbon

To achieve the ambitious University of Liverpool Net Zero Target by 2035, the University must prioritise the carbon and energy impact of new buildings, refurbishment, maintenance requirements, public realm and behaviour as well as new and existing energy infrastructure.

Low GWP Refrigerants

'Fugitive emissions' from refrigerant leakage can be significant. All replacement systems must use low-GWP refrigerants and volumes must be minimised.

Social and Governance

Investment projects must engage in the energy / carbon management governance structure including as part of the procurement evaluation process and the dissemination of energy performance data.

Building form and fabric

Building orientation must be optimised to minimise energy loads, maximise free solar energy, enhance daylighting, thermal comfort and the potential for natural ventilation.

The fabric performance of buildings (including refurbishments) must be maximised by low U-values and high air tightness which dictate the thermal performance of the fabric. Energy benefits of accessible thermal mass to be investigated.

For retrofit buildings, whole life carbon and life cycle cost impact must be considered for fabric (U-value) upgrades.

Glazing must be high-performance, include features to limit solar gains, with glazed area optimised to minimise energy use (e.g. 25-40%).

Ventilation should be mixed mode and demand-controlled, where possible, free cooling opportunities should be maximised.

Lighting and equipment efficiencies

Use of natural light must be maximised to reduce need for artificial lighting. All lighting design must use LED fittings with appropriate occupant controls and automatic sensors.

New plant and equipment must meet the Energy Technology List criteria or achieves energy label rating A. Heat recovery to be installed on all mechanical/mixed mode systems to reduce energy consumption.

Metering and Monitoring

Meters and sub-meters must be designed in accordance with the methodology set out in CIBSE TM39 and the Better Buildings Partnership Metering Toolkit. Systems must include carbon dashboards at building level and mobile apps to monitor performance.

Ensure existing University platform for energy and carbon eSite is extended to all new and refurbished buildings

Metering and data collection is required as a minimum. For energy intensive applications, sub-metering must also be utilised.

Controls

The building controls must allow users to control their internal environment or must be smart and optimised based on occupancy with both systems using appropriate zoning.

HVAC plant must have a full read/write control interface with university BMS systems to enable future control refinement.

Temperature set points should be relaxed and behaviour change encouraged e.g. limiting air conditioning set points to between 20-26ºC.

Supply Chains

Ensure conversations are held with suppliers at early stages to allow and support compliance.

Sustainable Built Environment Investment Framework

Climate Adaptation and Resilience

As the climate changes, it is expected that there will be an increasing frequency of various climate impacts. Adaptation refers to adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli. Ensuring the University of Liverpool has buildings and infrastructure resilient to the effects of climate change will limit the impact of future expensive adaptation requirements, and prolong the lifetime of future investments.

Social and Governance

Carry out Climate Change risk assessment for all existing assets and set out an asset adaptation strategy.

Carry out a climate adaptation risks survey for future assets incorporating scenario building for optioneering

Anticipate future systems and technology deployment e.g. car parking electric points, 5th generation heat networks.

Complete a baseline environmental impact assessment to buildings.

Blue Green Infrastructure

Blue Green Infrastructure (BGI) are strategically planned networks of natural and semi-natural areas with other environmental features designed and managed to deliver a range of sustainable services, including reduce risks related to climate change.

Examples include:

- Provision of green roofs and walls, shading with mature trees
- Increased number of parks (grass, trees) and use of biophilia
- Provision of mini wetland/water features to improve local microclimate
- Use low maintenance, robust and natural materials

Overheating

Carry out a TM52 or TM59 calculation using 2030 future climate scenarios. Achieve 25-28ºC maximum for 1% of occupied hours

Limit window area to 25-40% (Balance daylighting and overheating by optimising glazing percentages).

Provision of shading (can be by vegetation or man-made) for public realm seating/leisure areas and exposed walkways. Replace or install internal or external shading on buildings where possible.

Consider the use of cool materials (materials with high solar reflectance and infrared emittance) on facades, roofs and pavements to reduce urban heat island effects.

Energy Modelling

Energy modelling must include a range of scenarios and sensitivity studies (including those related to climate change) as part of the total energy consumption calculations. This must include in depth understanding of use cases and the effects on energy.

This includes weather data for assessing overheating risk based on the UKCIP09 climate change scenarios at 2020, 2050 and 2080 conditions for medium and high emissions scenarios.

Energy modelling must also look to consider the impact of urban heat islands.

Flood Risk

Complete a site-specific flood risk assessment, demonstrating how flood risk will be managed over the asset's lifetime considering climate change.

Consider modelling surface water run-off using adapted factors for future climate scenarios.

Employ storm water management systems t ensure water discharge is effectively managed for example SuDS, swales, increased foliage and permeable landscaped surfaces.

Urban Configuration

Consider reducing building density and increasing height to improve outdoor thermal comfort

For new buildings and projects in the public realm, building and street orientation and configuration must be optimised to improve outdoor thermal comfort.

Image Source: UK Gov

Water

Water management is a significant aspect of net zero carbon design, developments must be pushed to minimise water use.

Leak Detection

Leak detection systems and flow control devices must be installed to minimise the risk of water leaks from sanitary fittings and water infrastructure.

Water Consumption

Water consumption must be minimised through the use of water efficient sanitary fittings, such as dual flush WCs and low flow taps.

All new products must meet the Water Technology List criteria to encourage the use of water efficient products.

The use of waterless/composting WCs must be considered and installed where deemed suitable and maintainable.

Water Monitoring

Water metering systems must be installed to enable water consumption to be monitored and managed, and therefore encourage reductions.

High water consuming areas must be sub-metered to help to influence occupants' behaviour by providing them with a clear indication of their water use.

Water Recycling

Greywater and rainwater recycling systems are to be used to off-set non-potable water demand from systems that would otherwise use potable water.

Greywater and rainwater systems must be used for campus irrigation.

Surface Water Run-Off

Surface water run-off must be avoided, reduced and delayed to limit the impact of the development and minimise discharge to drains.

Developments must incorporate appropriate sustainable drainage systems to ensure that the post-development peak rate of run-off from the site shows an improvement compared to the pre-developed site. These results must be reported back to the University.

Water Pollution

Measures must be taken to prevent watercourse pollution and particular attention must be given to areas that present a risk of watercourse pollution, such as: car parks, delivery/storage areas, waste disposal facilities, and plant areas etc.

Petrol and oil separators are to be installed in water surface drainage systems where there is a high risk of spillage or contamination.

Construction Water

The water consumption during construction phases must be monitored and reported on a monthly basis to help raise awareness of the water use and encourage water reduction measures.

Materials

Design Teams can reduce the impact of a project through careful selection of materials and circular economy principles in strategy and design.

Materials Impact Plan

Design teams must create project specific Materials Impact Plans which set out how the project aims to holistically reduce the environmental impact of the materials used on site.

This must include, but not be limited to, the following as a minimum:

- A schedules of project materials, estimated costs and embodied carbon emissions
- Robust QS guidelines to measure excess new materials to ensure material efficiency
- Identification of targets and priorities in relation to material procurement such as timber chain of custody certification.
- Reference to the requirements for applicable credits sought under BREEAM and WELL buildings schemes
- Procedures for checking and verifying that Material Impact Plan Targets are met
- Consideration of what circular economy measures can be incorporated into the design
- Materials selected to improve fabric performance over other considerations (such as insulative values)
- Materials from local or regional sources must be prioritised

Life Cycle Assessments

A Life Cycle Assessment is a methodology for assessing the environmental impacts associated with all the stages of the life cycle of a product, process or service.

Key materials must be identified (e.g. large quantities, high carbon and energy impact, hazardous) and life cycle assessments must be undertaken and used for key material selection. These consider the impact of mineral extraction, manufacturing, transport and end of life disposal of construction materials, helping to reduce environmental impacts across a buildings life.

Circular Economy

Circular economy principles must be considered from an early stage including appraisal using the Circular Building Toolkit (or similar) and digital materials passports.

Build Nothing

- Refuse new construction

Build for Long Term Value

- Increase building utilisation
- Design for longevity
- Design for adaptability
- Design for disassembly/deconstruction

Build Efficiently

- Refuse unnecessary components
- Increase material efficiency

Build with the Right Materials

- Reduce the use of virgin materials
- Reduce the use of carbon intensive materials
- Design out hazardous/ polluting materials

Embodied Carbon Design Principles

Embodied carbon design principles can be followed from the LETI embodied carbon primer.

Build Less

- Design out the need for component or material

Build Light

- Design to reduce the quantity needed of the component or material

Build Wise

- Audit of existing site to identify opportunities for material re-use or direct recycling
- Robust and maintainability requirements for materials

Build Low Carbon

- Use of reclaimed materials or materials with recycled content
- Use of materials with low embodied carbon
- Regional/local sourcing of materials

Build for the Future

- Consider potential to lease short lived components
- Select products that are designed for disassembly
- Use of materials with circular economy certifications (C2C, Natureplus etc.)

Build Collaboratively

- The social, ethical and environmental impacts of the sourcing and supplying of raw materials and products must be considered as part of the material selection process.

Waste

Waste management is critical to reducing environmental impact, both in terms of minimising emissions from production, waste transportation and processing and in terms of reducing local and global pollution. University of Liverpool has an ambition to reduce waste by 50% by 2025. This requires both policy change and effective facility design.

Designing Out Waste

Conduct a pre-demolition audit of existing assets being considered for demolition.

Consider off site construction

Utilise circular economy design principles

See Materials section under circular economy/recycled content for further strategies.

Construction Waste

Every project must develop and implement a Resource Management Plan.

All projects must monitor and report on all demolition and construction waste and divert waste from landfill.

Material take back must be enabled through supplier contracting, where this isn't feasible, onsite reuse must be enabled through a university wide circular buildings scheme.

A whole life cycle approach must lead to tracing subcontractor waste management in addition to waste under direct control of the University or ULCCO.

Waste minimisation and circularity principles must be included within procurement criteria

Operational Waste Management

Bins

Well designed recycling bins for effective waste segregation to be designed in accordance with the waste streams collected by the waste contractors used.

Composting facilities

Designed to minimised odours and vermin. Collection facilities must be designed into every area where there is food waste.

Composting must be carried out on site where possible.

Waste storage and processing facilities

Effectively screened waste storage and management areas, suitably sized to weigh, collect and store recyclable materials.

Reducing Operational Waste

Kitchen

Kitchens needs to be designed with storage and washing facilities for reusable containers
Bins need to be designed for collecting reusable containers

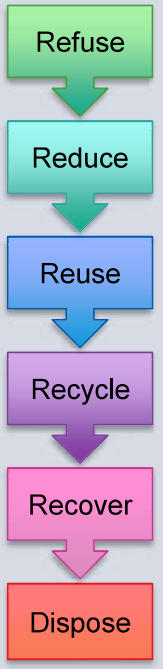
Bathrooms

Hand dryers must be specified over paper towels (lower life cycle impact per usage) as well as less waste.

Procurement

Ensure that facility design supports low waste procurement – e.g., storage of packaging for return

Hierarchy of Waste Management



Questions every purchase: Do you need it?
Design for longevity. High quality, robust.
No single use items policy.

Choose low waste packaging/suppliers.
Choose low waste catering contractors.

Repair, clean, refurbish, repurpose.
Create existing asset register when refurbishing.
Reuse on site where possible or redistribute.

Ensure waste management strategy includes both physical elements and process/education/culture change.
Include composting facilities in all catering.

Waste to energy - anaerobic digestion, energy from incineration

Landfill or incineration without energy

Transport

Transport is one of the largest sources of UK greenhouse gas emissions. Hence, it is crucial that the University of Liverpool pursues a comprehensive transport decarbonisation strategy to achieve both their and the Government's net zero targets.

Promote Active Transport

A modal shift to active transport is the most effective method for achieving transport decarbonisation targets.

Within buildings, facilities must be incorporated that enable people to pursue active transport. Space allowances for changing rooms, lockers and showers are essential. For cyclists, secure bicycle storage and access to maintenance equipment must also be provided.

A campus masterplan must be developed that concentrates on well connected cycling and pedestrian infrastructure. These routes should be segregated from other road traffic to ensure the safety of user groups.

Pedestrian areas must be designed to minimise particulate and other pollution from vehicle traffic.

Enable Use of Public Transport

The University of Liverpool should capitalise on its central location to encourage the use of public transport. The primary objective must be to make the campus a hub for an extensive public transport network that serves all keys areas.

Built environment projects must enhance access to public transport and contain public transport information to inform occupants of transportation options.

Electrification

The reduction of carbon emissions associated with transport methods that traditionally burn fossil fuels can be tackled through electrification.

To support private users of electric vehicles, charging provisions must be incorporated into every development with parking. The necessity of car parking must be carefully considered on a case-by-case basis including completing transport surveys if required.

Any new acquisitions to the University of Liverpool's vehicle fleet (included any shuttles) must be electrified and carbon emitting vehicles must be phased out.

Ensure grid and site electrical incomer capacity has been considered.

Sustainable Built Environment Investment Framework

Ecology and Biodiversity

The preservation, and restoration, of ecology and biodiversity is a fundamental aspect of sustainability. By addressing this matter, the University of Liverpool will ensure that the local ecosystem is enhanced and campus users will benefit from improved the health and wellbeing and improved local climate conditions.

Site Selection

An essential mechanism to limit any negative impacts on biodiversity is careful site selection. As the campus is largely urban, connection to wider green and blue infrastructure must also be considered.

Ecological Restoration

As part of any campus development, an ecologist must be appointed to establish the ecological value of the site prior to project commencement to ascertain existing habitat value and identify the best methods to enhance the site's biodiversity.

The maximum biodiversity gain and ecological value outlined in planning documentation must be targeted. This can be partially achieved if nature-based solutions (for example green walls) are incorporated as standard practice during building design.

To enhance the public realm, the retention of existing trees must be prioritised and new trees must be planted where feasible. All planting must be native, naturalistic and regenerative.

Management and Maintenance

Any vegetated area must be maintained to ensure that the ecology prospers. As such, an appropriate campus wide management strategy must be developed.

If considering green roofs, low maintenance planting must be specified except where appropriate maintenance can be guaranteed, whilst balancing biodiversity improvements.

Biodiversity Action Group Green Space Design Principles

The following are outlined in more detail in the biodiversity action group green space design principles, these must be considered as a part of the wider system considerations and principles:

Green spaces should;

- support delivery of UN Sustainable Development Goals and Aichi biodiversity targets
- be created and managed to foster long-term benefits to biodiversity
- support the delivery of important ecosystem services
- improve student and staff wellbeing and health
- embed educational and cultural value
- incorporate a variety of habitat types
- include tiered vegetation layers
- be large, and contiguous, where possible
- be spatially connected with each other and
- enhance native biodiversity in urban environments

Integrated solutions

An integrated approach to biodiversity must be taken to understand the value of biodiversity in the public realm at the University of Liverpool. Biodiversity and ecological enhancements support species loss mitigation, climate change mitigation, health and wellbeing, enhanced staff and students experience and social value.

A range of habitat types must be considered to maximise this value and the University can show leadership to help the local community enhance wider green infrastructure.

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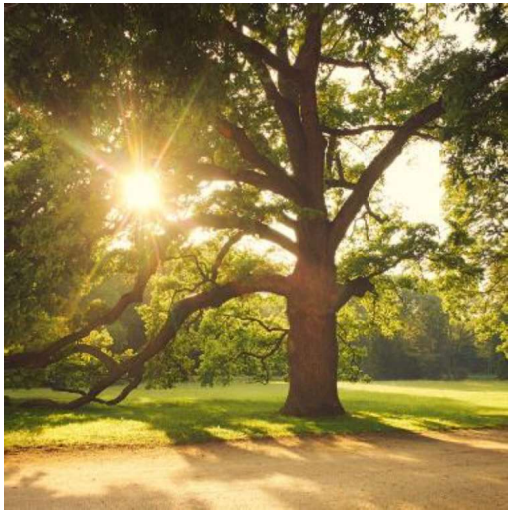


Sustainable Built Environment Investment Framework

Health and Wellbeing

The design and quality of University Buildings can directly contribute to the health and wellbeing of the staff and students. Providing comfortable internal environments can boost productivity and employee satisfaction.

Daylight and Visual Comfort

The design must maximise the use of natural daylighting by completing daylight calculations (including opportunities in existing buildings).

Glare must be eliminated through building layout/form or controlled by shading devices and surface reflectance chosen to provide visually comfortable workspaces.

Thermal Comfort

Thermal comfort of buildings must be modelled and reported for all new build and major refurbishment projects with CIBSE TM52 or 59 used to assess the risk of overheating. Occupant-controlled environments (such as opening windows) provide greater perceived user comfort.

Consider local controllability and user feedback as part of BMS system.

Air Quality

The design of any internal spaces and associated air-supply systems must reduce internal pollutants of elements such as particulates, carbon monoxide and dioxide and oxides of Nitrogen.

Materials must be chosen to minimise negative impact on air quality (such as reduction of VOCs and other pollutants).

Providing feedback to building users on the environmental conditions including temperature and CO_2 levels must be considered.

Movement

Sit stand desks must be incorporated into office and other long term working spaces.

Visually prioritise stair routes in design to encourage active use of the building (whilst balancing easy access lifts).

Nourishment

Food preparation spaces must be designed in such a way to enable the preparation and consumption of fresh foods.

Food consumption spaces need to be designed with adequate space and furniture to encourage mindful eating.

Access to Water

Drinking water fountains and water bottle refilling stations must be available in communal areas.

Mental health

The inclusion of restorative spaces within a whole building design must be considered to improve mental wellbeing.

Develop a biophilia plan that sets out how the project will incorporate access to nature for wellbeing. This can include features such as indoor planting, natural patterns, gardens, water features etc. As with all design measures, the needs of all users needs to be considered, for example considering design for neurodiversity in pattern choices.

Noise Pollution

All projects must consider the impacts of internal and external noise pollution and incorporate measures to minimise an impact.

Acoustics must be incorporated into design at all stages, particularly for teaching spaces, and design must demonstrate that design choices are reducing internal noise pollution to ensure optimum productivity and learning.

Certification

WELL Building standard and Fitwel are both healthy building standards by which buildings can be certified to demonstrate the University of Liverpool's commitment to health and wellbeing and must be considered on all building projects.

Sustainable Built Environment Investment Framework

Inclusive Design

Inclusive design is a critical part of creating a sustainable built environment where accessibility and inclusivity underpin design decisions. 'Inclusivity' goes above and beyond 'accessibility' and requires thought and engagement to provide the best design for the lived experience of all possible users. Inclusive design must consider users' circumstances and identity, including (but not limited to) ability, age, gender, sexuality, faith, race and ethnicity.

The University is committed to accessibility, equality, diversity and inclusivity and this is highlighted in *the Estates Masterplan, The Built Environment Inclusivity, Accessibility Policy* and the *Inclusive Design Guidance*. The *Inclusive Design Guidance* and associated policies must be followed.

Public Engagement

Communicate academic research publicly through engaging communications, sculpture, demonstrations, information panels and/or interactive displays.

Seek representative consultation and co-design in all processes, consider who may be impacted beyond the University and user groups who might be disproportionately affected by design interventions.
Conduct an Equality / Diversity Impact assessment.

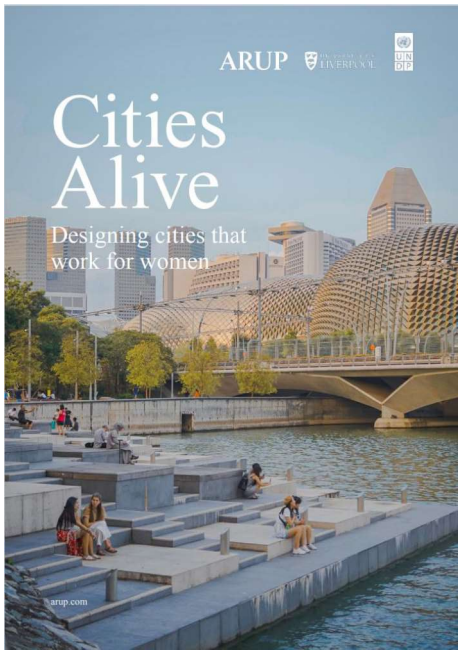
Wayfinding and Orientation

Promote uncluttered streetscapes with consistent wayfinding and signage clearly visible and accessible. Anticipate desire lines leading people towards amenities.
Clearly define logical arrangements of safe pedestrian priority pathways, landmarks and signage. Use colour coding, contrast, and lighting design to retain accessibility at night.
Clarify that University spaces are open and available to members of the public.

Inclusive Public Realm

Design in diversity through encouragement of pedestrian flow and space to dwell and sit, softening of soundscapes and visual environments, including representation of marginalised groups through allowing interventions from local groups representing a variety of people.

Shift the narrative of public monuments, street names, building names and symbols away from the dominant perspective.



The University's involvement in producing the *Cities Alive: Designing cities that work for women* report particularly highlights a commitment to gender equality in the built environment.

Universal Building Design

The centre for universal design set out 'The 7 Principles of Universal Design', (referenced in the University *Built Environment inclusivity and accessibility policy*), which instructs that the design:

1. Equitable Use

Is useful and marketable to people with diverse abilities

2. Flexibility In Use

Accommodates a wide range of individual preferences and abilities

3. Simple and Intuitive Use

Is easy to understand, regardless of user experience, knowledge, language skill, or concentration level

4. Perceptible Information

Communicates necessary information effectively to the user, regardless of ambient conditions or their sensory abilities

5. Tolerance for error

Minimizes hazards and the adverse consequences of accidental or unintended actions

6. Low Physical Effort

Is used efficiently and comfortably and with a minimum of fatigue.

7. Size and Space Approach

Provides appropriate size and space for approach, reach, manipulation and use regardless of user's body size, posture or mobility.

These principles address accessibility, however inclusivity will go beyond these to consider wider user experience.

Social Value

Social Value is a measure of the benefits that the asset, both during construction and in-use, bring to people and the community in which it is located. This can enhance the building or site value in the locality and make the local neighbourhood more resilient.

Design Opportunities

Creating flexible spaces for the local community use, both serves them and enhances engagement, collaboration and ownership for a mutually supportive and more resilient campus.

Spaces can be co-created with and for use by the local community and local businesses as well as outdoor leisure and fitness.

Outreach programmes can involve local schools and communities in STEM programmes and ecological restoration programmes.

Local identity can be fostered through integration of local heritage culture and artwork.

Construction Opportunities

Implementing the Considerate Constructors code of practice scheme must be a baseline for all contractors to guide positive change.

Fair payment – the Construction Supply Chain Payment Charter sets outs aims and targets for transparent payment practices on construction projects.

Employing local labour increases the skills, training and work opportunities in the Liverpool City Region (LCR), contributing to wider economic resilience.

Apprenticeships and work placement programmes, local training opportunities and skill development sessions can deliver structured work-based training. Targets for these programmes must be set in line with LCR policies to ensure that local needs are addressed.

Ensure that time is allocated for apprenticeships + placements to mentor and train.

Reuse of surplus of waste construction materials in community projects

Socially sustainable procurement

Construction procurement policies to set out how desired social value outputs and outcomes are to be progressed/delivered.

All contractors to have modern slavery statements, transparent supply chains and use sustainable materials.

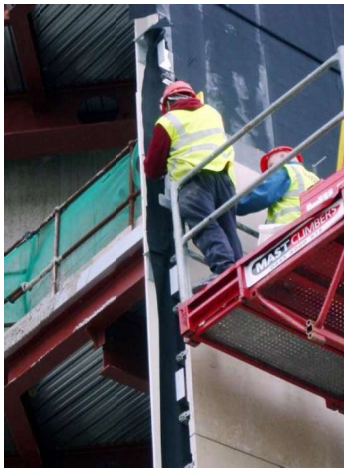
All contractors to prioritise local procurement and the building of long term supplier relationships within the Liverpool City Region.

Principles of social value delivery

Principles of Social Value provide the building blocks to inform decisions in order to increase equality, improve wellbeing and increase environmental sustainability.

- **Tailored, place-based approach**
- **Understand local needs and assets**
- **Define outputs and outcomes**
- **Collaborate with community partners**
- **Target and measure impact**

There are a range of social value frameworks that could be used by the University to set out social value input, output and outcomes and measure and report on impacts. Alternatively the University may wish to set up a bespoke –inhouse approach



UNIVERSITY OF LIVERPOOL

THANK YOU

We are the projects
that make headlines
And people that
make history

We are the original redbrick