WEST CAMBRIDGE

OUTLINE PLANNING APPLICATION

SUSTAINABILITY STATEMENT

UNIVERSITY OF CAMBRIDGE

JUNE 2016

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West Cambridge Outline Planning Application

Sustainability Statement

Rev No	Comments	Checked by	Approved by	Date
4	Issue for Planning Application	EO	AJC	June 2016

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Job No 60372730 Reference: Final report Date: June 2016

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West Cambridge – The Vision

The University of Cambridge ("the Applicant") is committed to creating a high quality, more flexible, efficient and better connected environment through the proposed development at the West Cambridge site ("the Application Site") ("the Proposed Development") in order to improve conditions for both existing and future academic research and partner commercial research communities in a financially viable way. The result will be to increase the amount of deliverable floor space, improve the public realm, provide greater amounts of social amenity and increase the quality of public transport in order to reduce the dominance of car-parking across the site as well as improve access, in particular to the city centre.

The University intends to put the wellbeing of those working and visiting the site at the forefront of the design of the Proposed Development. The aspiration will be for people to work in light-filled, energy-efficient buildings with easy access to amenities such as cafes, restaurants, crèches and shops and other convivial public spaces that encourage collaboration and chance meetings between different organisations. The aspiration is also to radically improve transport options to and from the site in order to reduce the need for car-parking and improve access to the city centre and other areas of amenity. This proposed reduction in car-parking will allow the site to be densified, giving it a more urban feel and making the place more welcoming to pedestrians and cyclists.

The site is primarily used for scientific research and it is known that the operational energy impacts of the University's scientific buildings are the highest of all its estate. For this reason the overall ambition for the Proposed Development is to pioneer the design of an authentically low carbon, sustainable academic community. Together with this, the aspiration for the Proposed Development is also to increase the amount of commercial research space to complement the University's academic buildings providing synergies between academia and industry. The sustainability aspiration for the commercial part of the Proposed Development will be equally ambitious and the University will work with commercial partners to secure the highest standards of sustainability across the entire site.

The Proposed Development offers a unique opportunity to put into practice a truly sustainable community that is consistent with the level of sustainable leadership that the University of Cambridge demonstrates academically. In this way, the Proposed

Development will be a showcase for sustainability standards in design and operation. It will aim to be a pioneer in the design of low energy research buildings. Without compromising the world class standards of work required in such a prestigious site, buildings will be orientated to make best use of sunlight and daylight and be narrow plan to promote the use of natural ventilation where possible. Floor to ceiling heights will be substantial to improve access to daylight and allow large duct runs for the ventilation systems that are a primary energy user in research buildings. Low carbon forms of energy supply will be used such as solar roofs and CHP. Novel forms of heat supply will be explored such as fuel cells and district heating and cooling.

Part of the ambition for the proposed development is to re-house a number of academic departments currently residing in older inefficient buildings in the centre of Cambridge or on the West Cambridge site and support academic departmental growth. Moving these departments to West Cambridge presents a once-in-a-lifetime opportunity to redesign how these buildings operate in order to make a substantial reduction in the University's overall energy use. In particular, the opportunity is to be taken to rationalise shared facilities such as teaching spaces, lecture theatres, break-out spaces, circulation, equipment and cafes/restaurants. Where the design of commercial buildings is under the control of the University the aspiration will be to design low-carbon, well-designed research buildings for its commercial partners. It is acknowledged that commercial reality means that these buildings may have to be actively cooled however the University will aim to incorporate as many low-carbon cooling options as possible including mixed mode approaches to ventilation.

An innovative approach to transport will be at the heart of the Proposed Development. As a minimum, cycle accessibility will be substantially improved, linking the site to North West Cambridge and improving connectivity to the city centre. A number of dedicated, ideally segregated, cycle parks will be provided together with provision for showers and lockers. West Cambridge will aim to be the catalyst for a step change in low carbon transport accessibility for the north and west of Cambridge with frequent and reliable public transport links between the site, the centre of Cambridge, the railway station(s) and Addenbrooke's Hospital. As a minimum, this is expected to include an expanded network of priority bus routes with much higher frequency services. But the University is prepared to be bold and innovative and will therefore explore responsive solutions such as bespoke taxi services, an extension to the guided bus route, and contracting of electric and hybrid car rental. In line with many other universities, the University may explore a system of bookable car park spaces across all of its estate. This would help with the development of a gradual reduction in car park provision at West Cambridge as the new solutions prove successful. The site will also include electric car charging systems.

The University will aim to limit the growth of water consumption across the Proposed Development site through the implementation of water efficient fittings and appliances as well as exploring the use of rainwater harvesting in individual buildings. The landscape design will focus on the use of drought tolerant and local species. Surface water will be managed through a series of landscaped drainage features including green/blue roofs, swales and ponds. Drainage features will be used to provide biodiversity and amenity. Low water consumption, green infrastructure and SUDS will ensure that the development is well adapted to potential climate change.

Construction operations on site will be significant for a period of time and careful planning and provisions should be introduced to avoid or minimise any adverse impacts. Low waste generation and landfill rates will be targeted in new buildings and contractors will be expected to segregate waste arisings and make use of supplier "take-back" schemes.

Each construction project will expect to target:

- Ultra-low waste generation rates
- Zero waste to landfill; and
- High rates of recycled and re-used materials

New buildings will be constructed using environmentally sustainable materials. The University expects to see designers strike the right balance between low environmental impact and the need for robustness, long life expectancy and low operational energy consumption. The key to this will be the design of flexible and adaptable buildings using materials that can be deconstructed and re-used at the end of their life (design for deconstruction) and materials that age gracefully such that they do not need frequent maintenance or replacement. Locally sourced and recycled materials will be prioritised. As a minimum designers will be encouraged to use materials with high ratings in the BRE's Green Guide to Specification.

Local ecology and urban biodiversity will be protected and improved through appropriate design, specification and long-term management. Site users and others will be encouraged to enjoy and support the site's biodiversity.

The design and operation of the Proposed Development will seek to maximise the wellbeing of those working and visiting the site. Buildings will be designed with healthy working environments in mind so that they include generous amounts of natural light and are naturally ventilated where possible. The Proposed Development will be designed around pedestrians to promote healthier lifestyles and will include the provision of amenities such as cafes

and restaurants, additional childcare, bank machines, external recreation facilities. Circulation spaces within and outside of buildings will be designed to maximise easy movement of people and promote dynamic meeting spaces. There will be a focus on radically increasing the level of interaction between people across the site, with enhanced provision of external amenity space for socialising and relaxing.

Community development will be key to the successful development of the Proposed Development and initiatives and new ideas will be explored such as promoting a proportion of sustainable and local food in the site's premises, use of communal spaces for community events and trading, identification of spaces for food growing, and promotion of graduate and young people's networks and activities. The design and development of the site should emphasise and promote positive relations with neighbours and adjacent sites.

An authentically low carbon, sustainable academic community at West Cambridge will require the site to be operated in a fundamentally different way and this will have an impact on the way in which the masterplan develops.

It is expected that, along with North West Cambridge, the area will become a magnet for those seeking to understand how to develop a truly sustainable University model. The aspiration will be to showcase the achievements of the two sites with facilities for environmental teaching and sustainable signage that will help those working and visiting the site(s) to understand how they have been built and operated in a sustainable way.

A strategy for sustainable governance of the Proposed Development will be developed, with measurement and communication of the environmental performance of the site through a web portal that includes a dashboard showing environmental key performance indicators as integral. Central to the success of such a dashboard will be monitoring equipment to be installed across the site including, importantly, extensive sub-metering of electricity, heat, cooling, water and gas.

Introduction

West Cambridge covers an area of 66 hectares and is located approximately 2 km to the north-west of the centre of Cambridge on the edge of the urban area. The site is bounded by the A1303 Madingley Road to the north, the M11 motorway to the west and agricultural land to the south beyond which is Barton Road. Emmanuel College Recreation Grounds, University Sports Grounds and residential properties framed the site to the east.

This Sustainability Statement conveys the sustainability strategy for the Proposed Development, providing examples of how the Application Site will meet the high sustainability aspirations of the Applicant.

Sustainability

The role of sustainability is becoming increasingly important to ensure our towns and cities are designed and planned in ways which minimise adverse impacts on the environment whilst developing social cohesion, and strengthening economic development and resilience.

True to this philosophy, the University of Cambridge's vision for the development of the Application Site considers not just the physical design and fabric of the buildings and infrastructure, but is also focused on the development of an innovative, viable and successful community. The 800 year history of the University of Cambridge sets an important precedent and developing a long term vision with the means to deliver it is one of the defining aspects of the development proposals. Flexibility of buildings and infrastructure designed to adapt to the needs of future users of the Application Site is a guiding principle.

The emerging Cambridge Local Plan 2014 states its support to the continued growth of the nationally significant Cambridge Cluster seeking to deliver new employment land at six key locations in Cambridge which include West Cambridge. Policy 18 of the plan identifies West Cambridge as an Area of Major Change. As part of the overall strategic need for further employment growth across the city, making more efficient use of existing employment sites such as West Cambridge is vital and the Local Plan supports the opportunity to intensify the site to provide a more efficient use of land, increased opportunities to meet employment needs, a different approach to place making and enable the provision of more shared social spaces and other ancillary support services to enhance the vibrancy of the area. But the policy acknowledges that the increased activity may put further pressure on the environment and the amenity of nearby residents and in particular the impact on biodiversity and noise and light pollution in the area must be taken into consideration as well as a successful integrated and accessible transport strategy.

A sustainability framework to inform design decisions for the Masterplan has been developed to ensure additional pressures and potential adverse impacts are avoided or minimised. The key drivers for the sustainability framework at West Cambridge are:

- To enable sustainability considerations to inform the development of the masterplan and the selection of the preferred option.
- To ensure sustainability is taken into account early on so that opportunities are not missed.
- To build on the innovative sustainability approach adopted for other University Estate's masterplans and developments.
- To develop a mechanism which provides a greater incentive for action than existing schemes such as BREEAM, recognising and valuing action, rather than promoting a criteria-driven approach.
- To demonstrate that sustainability has been taken into account in a transparent way in compliance with the Draft Local Plan.
- To ensure a coherent and harmonised approach to sustainability successfully fulfils the ambitions of academic and business and commercial research users as well as other shared facilities businesses that will support the development of a cohesive community at the site.

This report provides a summary of how the design of the Proposed Development is intended to deliver the sustainability aspirations and vision for the Proposed Development. It is structured as a framework developing twelve "sustainability principles" to harmonise all the different sustainability aspects for a successful, coherent site. The report further describes how the design responds to these principles and the overall framework upon which the site aims to be developed, and provides examples of measures which are proposed or will be considered during the detailed design.

During the next design stages, the measures in this statement will be explored in more detail and proposals will be included in the final design where they demonstrate positive benefits towards the delivery of the overall sustainability framework, and where they are technically achievable and financially reasonable.

The information presented in this statement is based on a large variety of detailed technical documents and design proposals. These documents are referenced and are submitted as part of the planning application. They should be referred to for more detailed information as required.

What isn't proposed?

There are many measures which can be taken to improve the sustainability of a site but it is not possible to incorporate all of them. There are many reasons for this including:

- Some measures may not be appropriate for the type and scale of the Proposed Development.
- There can be conflicts between different measures.
- The measure may not be viable or deliverable at this location.
- Some measures are not appropriate for consideration at outline planning and need to be examined as the design progresses.

This report provides examples of measures which may be included in the Proposed Development, and also others which have been assessed and as a result of a range of factors, excluded from further consideration.

This statement has been developed to accompany the application for planning permission and detailed proposals will continue to be refined in tandem with the Proposed Development itself over the coming years for each phase. Therefore this statement gives an outline of what is considered. Other measures will be examined in more detail as the design progresses.

Setting a sustainability framework

The masterplan has been developed within the framework provided by the main legal and policy drivers for sustainability on the Proposed Development. Further detail on these is provided in the Policy Review in Appendix 3 which provides descriptions of local and national policy, BREEAM requirements and other best practice and guidance.

Legal Drivers

The challenge of climate change and the need to stabilise CO_2 levels whilst enabling sufficient growth to support the UK's growing population has intensified. There is now a comprehensive range of legislation and policy at various scales which supports the implementation of measures and approaches to ensure new development is sustainable and 'low carbon' as a result of design, energy efficiency measures and appropriate selection of energy sources.

National Legislation

The UK **Climate Change Act (2008)** sets a legally binding target for reducing UK CO_2 emissions by at least 80% from 1990 levels by 2050. To achieve this, the Act introduced carbon budgets through the **Carbon Budgets Orders 2009 and 2011**. Four carbon budgets have been set in law and the **Carbon Plan (2011): Delivering our Low Carbon Future**, sets out the UK's approach to meeting the four carbon budgets.

The **Building Regulations Part L** set maximum limits for CO_2 emissions from buildings and provide minimum efficiency standards for fabric and building services. Part L is revised every few years to become more stringent. Initial phases at West Cambridge will have to attain at least the minimum standards required by Part L 2013 (with 2016 amendments), and other phases will need to meet future versions when announced.

Floods and Water Management Act 2010. The aim of the Act is to provide better, more comprehensive management of flood risk for people, homes and businesses. AS part of this, the **Surface water management plan technical guidance** has been written for Local Authorities to assist them as they co-ordinate and lead local flood risk management activities.

National Planning Policy

The main vehicle for delivery of sustainable development in planning at national level in England is the **National Planning Policy Framework 2012** (NPPF). The National Planning Policy Framework (NPPF) came into force in March 2012. This consolidated more than two-dozen previously issued Planning Policy Statements (PPS) and Planning Policy Guidance Notes (PPG) for use in England. The NPPF has a significant impact on local planning policy in respect of sustainability. It states that "development that is sustainable should go ahead, without delay – a presumption in favour of sustainable development that is the basis for every plan, and every decision".

The NPPF does not contain specific waste policies and national policy in this area is driven by the **Waste Management Plan for England 2013**.

Local Planning Policy Drivers

The main local policy that is guiding the West Cambdirge masterplanning proposals is the **Cambridge City Council's *Draft Local Plan 2014*,** which is expected to supersede the *Adopted Local Plan 2006* shortly[1]. Both documents have specific policies relating to sustainable development and policies focussing on the development of the West Cambridge site. For new non-residential developments, the *Draft Local Plan 2014* requires the following targets to be achieved, where technically or economically viable:

Year	Minimum BREEAM rating	On-site carbon reduction	Water efficiency
2014	Very Good	In line with 2013 Part L	Full credits for category Wat 01 of BREEAM
2016	Excellent	In line with 2016 Part L	Full credits for category Wat 01 of BREEAM
2019	Excellent	In line with national zero carbon policy	Full credits for category Wat 01 of BREEAM

In addition, major proposals are required to investigate the potential for connecting to or instigating district heat networks where viable, along with future-proofing the buildings for future connection where possible. This supports the City's aims of developing city wide heat networks and making use of low carbon heat sources.

It should be also noted that the *Draft Local Plan 2014* makes allowance for the use of, or development of, alternative sustainability assessment frameworks in place of BREEAM. This is discussed further in this document, but allows for greater flexibility in energy targets. Section 4 of this document discusses the impact of the proposed energy strategy on the West Cambridge Sustainability Framework.

The Cambridge City Council **'Sustainable Design and Construction' Supplementary Planning Document (SPD)** adopted in June 2007 lays down the principles of sustainable design in the context of Cambridge and provides design advice on how these can be met. The document is split into 'essential' considerations, and 'recommended' considerations, the latter being applicable for large sites. The SPD mandates a 10% CO_2 emission reduction through renewable technologies, though low and zero carbon technologies (LZCs) such as natural-gas combined heat and power (CHP) may partially contribute to this target. In this sustainability statement, the relevant elements of the Sustainable Design and Construction SPD and sustainability checklist are referenced in each section to show how the relevant issues have been addressed.

Appendix 5 sets out a response to Cambridge City Council Sustainable Design and Construction SPD Checklist

Environmental assessment methodologies

BREEAM 2014

The BRE Environmental Assessment Method (BREEAM) provides an overall rating for a building based on performance against different credits. Ratings are given from Pass to Outstanding. BREEAM is the most established assessment scheme for non-domestic buildings in the UK although there are other schemes available with a similar assessment and credit structure which are also used in the UK.

[1] Recent developments suggest that the adoption of the local plan will take place in 2017

Sustainability Framework and Principles

Setting sustainability principles

A sustainability framework has been developed to guide the design of the sustainability strategy for the Proposed Development. This is anchored on a set of twelve principles grouped under 4 categories, based around the BioRegional "One Planet Living" principles further developed for the 2012 Olympic Games in London as laid out in the Olympic Delivery Authority Sustainable Development Strategy. These are: Resources and Climate Change, Transport and Local Connectivity, People's Health, Social and Economic Wellbeing, and Land Use, Ecology and Local Impact.

The framework incorporates the best features from existing rating schemes such as BREEAM Communities, BREEAM New Buildings, and CEEQUAL, as well as in response to local and national policies such as the National Planning Policy Framework (NPPF), the GLA's Supplementary Planning Guide regarding Sustainable Design and Construction, the Cambridge Local Plan 2006, the Cambridge draft Local Plan 2014, the Cambridge Sustainable Development Supplementary Planning Guide, and the University of Cambridge's policies.

The 12 principles are incorporated in the Sustainability Assessment Matrix (SAM) which develops these by assigning aims, targets and other activities which need to be included in the detailed design proposals to be brought forward under any outline planning permission.

The broad topics encompassed by each principle have been developed so that each one has clear aims and a number of objectives to deliver that aim. The objectives set a series of targets or activities to be delivered.

The principles drive sustainability in the following areas:

1. Energy and Climate Change
2. Water
3. Materials
4. Waste
5. Transport and Mobility
6. Health and Wellbeing
7. Collaboration and Inclusion
8. Education and Knowledge Transfer
9. Employment Opportunities
10. Biodiversity and Ecology
11. Pollution and Local Environment
12. Reputation, Heritage and the City

It is increasingly recognised that one of the most important factors in delivering a successful development scheme is ensuring that sustainability is a key part of the brief and is therefore integrated into the design from the outset. Sustainable design and construction is concerned with the implementation of sustainable development in individual sites and buildings. It takes account of the resources used in construction, and of the environmental, social and economic impacts of the construction process itself and how buildings are designed and used.

(Cambridge Local Plan 2014 – Draft Submission Plan, Policy 27)

Illustrative masterplan of the Proposed Development showing indicative building layout and massing.

Principle 1: Energy and Climate Change

Deliver a pioneering approach and ensure development of low energy buildings as well as improving the performance of existing buildings.

Meet energy demands with low carbon sources.

Consider the impacts of climate change.

An energy statement has been produced which accompanies this sustainability statement and which includes the Appendix C1 SPD Energy Statement form with relevant information on carbon emissions calculations.

An innovative energy strategy has been developed to support the aims for this principle which is based on

- low and zero carbon energy generation and CO_2 reduction;
- optimisation of PV including on-building and off-building grid-connected arrays and stand-alone applications;
- identifying requirements for new site wide infrastructure and phasing;
- establishing performance standards for infrastructure and connection requirements for future and existing buildings; and to ensure there is flexibility allowed for the introduction of other potential future energy sources.

The energy strategy is based on a low temperature heat network using Combined Heat and Power which may incorporate heat pumps in future phases. In order to ensure maximum efficiency, grid balancing will be explored. This innovative strategy will be a feature used to inform users and visitors about sustainable energy. Flexibility will be central to the energy strategy. Although the combined heat and power system will be based on natural gas initially, centralising all the plant in one place means that the fuel can be substituted as availability/preferences change in the years to come.

To minimise the energy demand of future buildings all buildings will aim to incorporate passive design principles where viable. University buildings will be naturally ventilated with no comfort cooling except where specialist applications (e.g. research labs) require a controlled environment. All commercial buildings will aim to be passively managed where appropriate comfort conditions can be achieved for tenants and these will be contractually required to maintain a passive approach unless it can be demonstrated this is not technically viable.

In addition, adequate space will be provided between buildings to allow for good levels of daylight to all external building facades with building spacing allowing view of the sky from all occupied areas. This will support reduced use of electric lighting and a comfortable internal environment for occupants.

Refrigeration equipment will be aimed to use zero GWP refrigerants, unless not viable, where a GWP of 10 or less will be targeted for. Site-based vehicles (delivery, waste management, etc) should strive to be low or zero CO_2 emissions. A climate change adaptation strategy to ensure designs can provide comfortable and safe conditions under future climate scenarios has been developed to ensure designs demonstrate acceptable internal conditions with low overheating risk under projected 2050 conditions using passive measures. Designs should also seek to be flexible to allow inclusion of passive measures (such as external shading) where required to meet these conditions. Where measures are not initially installed, the University commits to regular reviews (at least once a decade) of internal conditions, and to fit measures when required.

Post-occupancy evaluation of the site will be mandated to monitor energy performance, user satisfaction, flexibility and maintenance. The BSRIA Soft Landings handover framework will be introduced for all new buildings for a period of 3 years post completion. Detailed requirements for monitoring and building performance evaluation will be examined at design stage and the University Estate Management will review and address monitoring reports.

The measurement of energy and CO_2 emissions will feature strongly in the ongoing educational and research aspects of the Proposed Development, with on-going monitoring and collection of data. This will be used by the Applicant for future research and on-site improvements. In addition, it will enable the education of users through energy displays and smart meters, allowing them to compare their consumption with the average via the community website, and allowing them to see how much less energy they use than other similar building types in the UK and/or abroad.

Examples of measures considered:

- Rooftop photovoltaic arrays systems are proposed
- Low temperature heat network is proposed providing heat to University and commercial buildings.
- Gas-fired combined heat and power (CHP) is proposed to provide low carbon heat to the energy supply network.
- An Energy Centre (central plant room) which aims to educate and inspire visitors, and which houses the CHP plant.
- High standards of energy efficiency with high levels of insulation and air-tight construction.

What isn't currently being considered and why:

- Wind turbines. There is insufficient space on the site for large scale wind turbines, and smaller turbines will make a negligible contribution to the site's energy and CO_2 reduction.
- Wood fuel biomass district heating or biomass-fired CHP. There are very limited supplies of biomass fuels without importing them from abroad and it is likely that by the time the Proposed Development is built, there will be virtually no available local resource. This presents a number of unknowns at the current stage and the situation will be monitored into the future.
- Zero carbon on-site. It would be technically difficult and uneconomic to incorporate enough low and zero carbon energy generation technology on site to offset all the site's CO_2 emissions. Investing in off-site CO_2 savings is more cost effective, resulting in greater CO_2 savings being achievable for the same cost.
- Connection of district heating to neighbouring sites. There are no direct benefits with the energy strategy of connecting to neighbouring sites.
- Anaerobic digestion. The amount of waste generated on site would result in relatively small amounts of energy generation from an anaerobic digestion scheme.

National Policy

- National Planning Policy Framework 2012
- Building Regulations Part L: L2A 2010 (2013 edition), L2B 2010 and 2013 amendments

Local Policy

- Cambridge Local Plan 2006
  - 3/1: Sustainable Development
  - 8/16: Renewable Energy in Major New Developments
  - 8/17: Renewable Energy
- Cambridge Draft Local Plan 2014
  - Policy 27: Carbon reduction, community energy networks, sustainable design and construction, and water use
  - Policy 28: Allowable solutions for zero carbon development
  - Policy 29: Renewable and low carbon energy generation
  - Policy 57: Designing new buildings

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.4: Energy
- SPD section 3.1: Adaptation to Climate Change

BREEAM

- Energy credits

References

- Sustainability Statement Appendix 2: Climate Change Adaptation. AECOM.

Principle 2: Water

Manage surface water and flood risk using site wide SUDs techniques.

Minimise operational water use through addressing both demand and sources of supply.

Minimise water consumption associated with construction activities.

An assessment of flood risk will be carried out and any adverse impacts will be minimised through site design by identifying areas of medium or high risk, ensuring that all buildings and infrastructure in these areas are designed to be able to cope with flooding and by considering the impact of climate change and future flooding events in the assessment. The Application Site is located within Flood Zone 1, where the annual probability of flooding from tidal or fluvial sources is assessed as being less than 1 in 1000. All land uses are deemed appropriate in this zone. For development sites greater than 1 hectare the vulnerability to flooding from other sources (e.g. overland run off, groundwater, sewers reservoirs and other artificial sources) need also to be considered a part of the flood risk assessment.

Densification of the Application Site will result in a substantial increase of impervious surfaces (car parking, roads, hard standings and roofs), which will increase both the rate and runoff of surface water. Surface water management techniques in accordance with the SUDs hierarchy will be considered to manage and mitigate any potential increase flood risk to the development itself and impact upon downstream catchments. Acceptable run-off rates will be agreed with Cambridge City Council and the Environment Agency which take into account future climate change and increased peak rainfall events by modelling the 30% above current agreed run-off rates scenario. Site-wide SUDs infrastructure will be considered which meets best practice guidance and achieves run-off targets. Requirements for future management and maintenance will be identified and the University will explore how upgrades may be needed to meet future changes in drainage requirement. All non-University site users and tenants will be contractually required to develop scheme proposals which meet the site wide drainage strategy.

The Proposed Development will aim to minimise both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour.

The design has been developed to ensure that no potable water irrigation is required for landscape planting, including during the establishment phases. Planting which is either low irrigation or which can use recycled water or rainwater will be prioritised.

The Proposed Development will aim to achieve a 55% reduction in mains potable water consumption per person for welfare uses in all buildings compared with baseline water consumption predictions, using the BREEAM WAT1 water calculator. This will include the impact of water recycling / capture, and the use of water efficient fittings.

Water efficient equipment will be given high priority during equipment selection for all significant process / research water uses. Ways to ensure process water is recycled where technically viable will be explored.

In the identification of building services strategies, priority will be given to those considering water consumption. Contractor requirements with respect to water consumption will be developed and lead contractors will be required to develop a water management plan for each scheme which adopts best practice water management. This should include assessment of water consumption, identification of mitigating actions, and setting out requirements for monitoring and continued improvement.

The University will evaluate and monitor contractors' water use performance on each scheme, and review and revise targets for future schemes to promote further savings. The measurement of water consumption and management will also form part of the ongoing educational and research aspects of the Proposed Development, with monitoring and collection of data. This will be used by the Applicant for future research and on-site improvements. As with energy, it will enable the education of users through displays and smart meters, allowing them to compare their consumption with selected benchmarks via the community website.

Examples of measures considered:

- High efficiency water fittings including aerated shower heads and taps (also helping to reduce hot water demand), dual flush toilets, and low water consumption appliances.
- Usage of geo-cellular storage, ponds and potential expansion/deepening of the lake will be considered as forms of surface water attenuation/storage.
- Rainwater collection taking water from roofs and filtering and storing it in underground tanks for non-potable demands, such as WCs.
- Green leases will increase the likelihood that that all tenants will continue to behave in a water efficient manner.
- Water for irrigation of communal landscaping will be supplied from rainwater or greywater.
- Smart water meters to allow central collection of data, monitoring and comparison.

What isn't currently being considered and why:

- Self sufficiency in water. The number of buildings on the Application Site means that self sufficiency in water is not achievable. Mains water comes from a much larger catchment area including the surrounding rural area.
- Bore holes. The Catchment Management Strategy (CAMS) shows that all water resources in the Cambridge Area are either over licensed or over abstracted; therefore it is unlikely to be feasible to develop a new water resource for the Application Site.
- On-site black water treatment including reed-bed filtration. The Proposed Development will be linked to the mains sewer system. Processing and treatment of black water at a large scale off-site can be more efficient than on-site at a smaller scale, and enables the use of energy recovery with anaerobic digestion at the water treatment works.

National Policy

- National Planning Policy Framework 2012
- Floods and Water Management Act 2010

Local Policy

- Cambridge Local Plan 2006
  - 3/1: Sustainable Development
  - 9/3: Development in the Urban Extensions
- Cambridge Draft Local Plan 2014
  - Policy 27: Carbon reduction, community energy networks, sustainable design and construction, and water use
  - Policy 31: Integrated water management and the water cycle
  - Policy 32: Flood Risk
- Surface Water Management Plan for Cambridge
- Strategic Flood Risk Assessment

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.3: Sustainable Drainage
- SPD section 3.2: Water Conservation

BREEAM

- Water credits

References

- Flood Risk Assessment & Drainage Strategy, Peter Brett Associates LLP
- Sustainability Statement Appendix 2: Climate Change Adaptation. AECOM.

Principle 3: Materials

Design buildings to be material efficient by adopting a whole life approach.

Ensure that materials are sustainably and responsibly sourced wherever possible.

The Proposed Development will aim to minimise the demand for new materials through the reuse of existing buildings, structures, and components, and consider designing for an appropriate life, for robustness and for low maintenance

Lifecycle assessments will be conducted through the design process for each scheme which will include realistic expected building useful lifetimes in order to allow the selection of appropriate construction materials and techniques. The assessments will also consider future maintenance and refurbishment requirements and consider that the design should allow minimal disruption on retained components through maintenance and refurbishment. Assessment of flexibility measures in the design to allow the building to adapt to future changes in use will be an important consideration. Lifecycle assessments will also include consideration for end of life dismantling and materials re-use and recycle. For all major components, options will be explored regarding their capability for incorporating re-used materials, using recycled materials, and ensuring they can be re-used or recycled for high grade uses at the end of life using current construction practices.

An approach to ensure responsible materials sourcing will be developed to guide the design of the proposals. As part of this, timber will be targeted to be 100% certified (FSC or equivalent) for the construction phase uses and building materials. Also, the development will aim to ensure major components to be A or B rated in the BRE Green Guide (80% by area). Unless not technically viable, the designs will try to incorporate existing structures, materials and components from on-site demolition. Materials for construction activities and building materials will seek to be responsibly sourced.

Construction approaches to minimise materials use will be adopted wherever possible. This will include best practice design, taking into account efficient design and ensuring that components are not over-engineered.

Examples of measures considered:

- Materials selection weighted towards off-site construction, re-usable materials, recycled content, recyclability, lifetime, and embodied CO_2.
- Materials selection aiming for high environmental ratings.
- Major materials responsibly and legally sourced from manufacturers with environmental management systems and materials chain of custody certificates where appropriate.

What isn't currently being considered and why:

- Materials selection will be based on a number of criteria, therefore it will not be possible for all materials to meet all of the aspirations including embodied CO_2, recyclability, etc.

National Policy

- National Planning Policy Framework 2012

Local Policy

- Cambridge Local Plan 2006
  - 3/1: Sustainable Development
- Cambridge Draft Local Plan 2014
  - Policy 27: Carbon reduction, community energy networks, sustainable design and construction, and water use

Cambridge City Sustainable Design and Construction SPD

- SPD section 3.3: Materials and Construction Waste

BREEAM

- Materials credits
- Management credits

Materials selection will consider a range of criteria, including recycled content and recyclability, sourcing, and overall environmental impact.

Materials selection and building design will be responsive to the need for a high quality environment which is sensitive to its surroundings.

Principle 4: Waste

Ensure the design and construction processes minimise waste arisings.

Provide waste infrastructure to allow high levels of recycling during site operation.

In February 2011, the Waste (England and Wales) Regulations introduced the legal requirement for organisations to apply the waste hierarchy when dealing with waste. This means that organisations must take all reasonable steps to prevent and reduce waste, and where waste does arise demonstrate that they deal with it in the most environmentally friendly way possible. When implementing a zero waste to landfill strategy it is not enough to simply ask a contractor for waste not to go to landfill. There is a requirement to have a full audit trail of where material ends..

Sustainable developments should address the potentially large effects of the construction phase which accounts for around one third of UK waste generation. The first step to achieve this is to minimise the amount of waste generated during design and construction. For this, waste generation will be considered during the design stage by assessing potential for all design and component options covering major components and identifying design changes to improve upon these. This could include for example making use of common size components.

Waste minimisation will also be pursued via the development of Site Waste Management Plans. Lead contractors for each scheme will be required to develop and maintain a site waste management plan (SWMP) with reviews during the design and construction process. This should monitor and assess progress, and aim for improvements during the project lifetime. The contractor will be required to report on construction waste to the University.

Waste generation targets have been developed to minimise the amount of construction waste generated and sent to landfill or for recycling. All non-hazardous demolition waste and construction waste (excluding excavation waste) by weight will be diverted from landfill wherever posisble. All excavation waste from earthworks will be either used on site (balance of cut and fill) or contractors will be required to use excavation waste for other construction purposes. A materials management plan will be produced for excavation waste to support this aim.

Materials suppliers will be required to adopt best practice including take-back and recycling schemes. The University will endeavour to coordinate any useful waste for recycling and excess materials on site, and to provide a storage facility for use on other local schemes. This should include fixtures and fittings.

A site waste management plan has been developed that will include consideration of infrastructure to reduce operational waste and increase recycling. Appropriate recycling facilities will be included in the design to support a reduction in operational waste going to landfill sites. The Proposed Development will aim to meet the University-wide zero waste to landfill target and achieve consistency with the overall strategy. At the same time, monitoring of operational waste generation will take place, reviewing targets on an ongoing basis, and engaging with occupants to improve recycling rates year on year.

Examples of measures considered:

- Materials selection heavily weighted towards assessment based on availability of re-usable materials, recycled content, recyclability, lifetime, embodied CO_2, and efficient manufacture.
- Materials selection appropriate for the location, building on the high quality image presented throughout Cambridge.
- Careful monitoring to minimise the amount of waste generation from the construction process to avoid landfill and encourage recycling.
- Requirements for commercial organisations to follow the site waste strategy through green leases.
- Contractors' selection criteria to include commitment to achieve zero landfill waste.
- Consideration to use providers of environmental compliance, recycling and sustainability solutions that would provide audit trails.

What isn't currently being considered and why:

- Anaerobic digestion. The amount of waste generated on site would result in relatively small amounts of energy generation from an anaerobic digestion scheme.
- On-site energy from waste using advanced thermal processes. These technologies work better at a much larger scale and require a significant amount of pre-processing. The Proposed Development would only produce a fraction of its energy from on-site waste and therefore additional waste would need to be imported.

National Policy

- Waste (England and Wales) Regulations 2011
- Waste Management Plan for England 2013

Local Policy

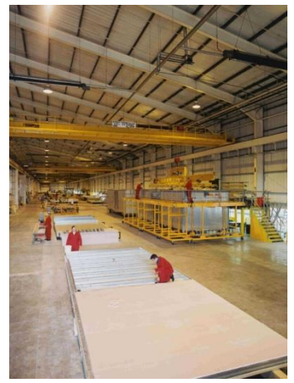
- Cambridge Local Plan 2006
  - 3/1: Sustainable Development
  - 3/12: Design of New Buildings
- Cambridge Draft Local Plan 2014
  - Policy 27: Carbon reduction, community energy networks, sustainable design and construction, and water use

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.5: Recycling and Waste Facilities

BREEAM

- Materials credits
- Waste credits



Consideration will be given to design and construction methods which minimise waste generation such as off-site construction solutions ((Image – Yorkon)

Principle 5: Transport and Mobility

Improve connectivity of the site with other sites, the City Centre, and transport hubs using sustainable transport modes.

Reduce car use and the need for people to drive to the site.

Cambridge is a compact and mostly flat city which, together with its historical character, has developed unique transport patterns, with walking, cycling and public transport having prominent roles These characteristics and heritage have contributed to a model where about one in three residents commute to work by bicycle and less than half commuting journeys are undertaken by car.

A Sustainable Transport Strategy has been developed to support the fundamental policy of preventing people driving by car to and from the Proposed Development when alternative, more sustainable options exist. The strategy incorporates assessments and requirements of current and future users and identifes potential for modal shift to sustainable transport modes. The strategy also establishes future requirements for ongoing monitoring and updating of targets.

At the same time, a framework travel plan has been developed across the site, which also incorporates requirements for current building users. Specific travel plans for each scheme will be developed which should demonstrate how the overall objectives of sustainable transport will be met. These will include requirements for tenants / occupiers to maintain and update travel plans, and the tightening of car use targets year by year.

The strategy will also incorporate a site logistics and servicing plan for each scheme which will identify all logistics and servicing needs and the impacts these may have on other travel modes. This should aim to remove conflicts between servicing needs and sustainable modes of travel.

The Proposed Development will strive to provide high quality access to public transport modes and reduce car use. A maximum number of commuting journeys using single occupancy car on peak periods of 46% will be targeted, reducing to a target of 26% by the completion of the development. Access by University staff to managed non-private car modes to other University sites will be examined.

To support the reduction of impacts from car use, electric charging points and dedicated access, electric pool cars and electric cycles will be provided where technically viable. Car share schemes for tenants based on uptake of more sustainable modes will be explored and performance measured against targets. Provision of priority car parking for low and zero emission vehicles and for car sharers will be explored.

The introduction of contractual commitments from commercial tenants to meet transport strategy targets will also be considered, together with the provision of improved bus links with access to the Cambridge Rail Station and new Chesterton Station when operational. Also, provision of dedicated public transport services linking the town centre and other University sites, using a low or zero CO_2 emissions vehicles, will considered.

A major aim for the Proposed Development will be to maximise access by walking and cycling. To support this, cycle storage for a range of site users will be provided, including short and long term visitors and staff. Storage for a range of types and locations will be considered to cater for the differing needs of the visitors and staff. High quality cycle storage will be targeted which is sheltered from the weather, containing racks where bikes can be securely and safely locked to. The distances for visitor cycle storage will be aimed not to exceed 100m to key destinations. For staff, storage areas be located in secured areas with sheltered access, where possible, to the main staff locations. Safe access to all storage facilities will be aspired to, and not to be combined with service vehicle access.

Assessment of need based on expected visitor and occupant numbers will form the basis for the distribution and numbers of cycle storage. The cycle parking strategy is also intended to support the travel demand management strategy for the Development. The Cambridge area already has a strong cycle culture, and the Development is well-located with respect to existing and proposed cycle facilities. Cycle parking spaces will be provided as a minimum in accordance with the standards set out in the Draft Cambridge Local Plan (2014), namely: for offices / commercial research space: 2 space for every 5 members of staff or 1 per 30 sq. m Gross Floor Area (whichever is greater) plus visitor parking. For Non-residential higher and further education: 2 spaces for every 5 members of staff, and cycle parking for 70 per cent of students based on anticipated peak number of students on site at any one time. In order to allow for cycles with large baskets, folding bikes and those with additional attachments, etc. a minimum of 20 per cent of the cycle parking spaces required should be of a Sheffield-type design. To accommodate the likely circa 3,600 students and 7,200 staff within the Key Phase One development, this phase would include around 7,000 cycle parking spaces to reflect these standards. The University and all site occupants should commit to annual monitoring of cycle storage and provision of additional storage as required.

Cycle facilities adequate for the number of cycle storage places will be provided for all staff in each main building of occupation and will include showering and changing facilities, lockers for clothes and equipment and drying facilities. Annual monitoring of cycle facilities and provision of additional facilities as required will be explored.

One or more cycle hubs will be provided for site visitors and occupants to ideally include bicycle and spares purchase, and professional repairs and servicing. The potential for introducing a cycle hire scheme will be investigated as well as the opportunities offered by potential liaison with other operators in the city to evaluate opportunities for linking to other schemes. The potential to introduce self-service cycle repair facility will be explored.

Segregated cycle and pedestrian routes will be developed across the site wherever possible to include cycle and pedestrian priority at all junctions over vehicular traffic.

Safe cycle and pedestrian priority routes will be maintained during all construction activities and a construction transport plan for each scheme will be developed to ensure that construction related vehicles do not adversely impact on cycle and pedestrian routes. The University will contractually require that all construction contractors will be members of the Construction Logistics and Cycle Safety initiative (Cambridge CLOCS) and all construction vehicles are fitted with cycle safety equipment.

Examples of measures considered:

- A Sustainable Transport Strategy has been developed to promote sustainable transport, aimed at increasing walking, cycling, and public transport, and reducing car use.
- Providing electric car charging points in car parks and on-street.
- Good public transport links and real-time information displays for public transport, bus stops, and linked from the University's website.
- Well-located on-site hopper bus services, to transport people through the Application Site to local and City destinations.
- An appropriate level of car parking to reduce car demand without impacting upon the quality of the Proposed Development.
- Segregated cycle and pedestrian provision to provide a safe environment for pedestrians and cyclists giving them equal priority of vehicles.
- Promotion of University Cycle purchase scheme to University employees.

What isn't currently being considered and why:

- Car free site. There will always be a need for some private transport, particularly for some commercial users and University staff living/travelling outside the City – lack of car access and parking may discourage to some extent the development of employment opportunities.

National Policy

- National Planning Policy Framework 2012

Local Policy

- Cambridge Local Plan 2006
  - 8/1: Spatial Location of Development
  - 8/2: Transport Impact
  - 8/3: Mitigating Measures
  - 8/4: Walking and Cycling Accessibility
  - 8/5: Pedestrian and Cycle Network
  - 8/6: Cycle Parking
  - 8/7: Public Transport Accessibility
  - 8/9: Commercial Vehicles and Servicing
  - 8/10: Off-Street Car Parking
  - 8/11: New Roads
- Cambridge Draft Local Plan 2014
  - Policy 5: Strategic Transport Infrastructure
  - Policy 57: Designing new buildings
  - Policy 80: Supporting sustainable access to development
  - Policy 81: Mitigating the transport impact of development
  - Policy 82: Parking management
  - Appendix L: Car and cycle parking standards

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.2: Transport, Movement, and Mobility.

BREEAM

- Transport credits

Segregated cycle and pedestrian routes will be developed across the site wherever possible

Cycling will be promoted on the Application Site through the provision of covered secure cycle storage, cycle facilities in buildings, and an extensive network of safe cycle routes.

Electric charging points at different location, including car park buildings and internal garages will be planned (image: Charging Points).

Principle 6: Health and Wellbeing

Design buildings and public realm spaces which promote the health and wellbeing of the occupants and visitors.

The Proposed Development will provide a healthy environment for users, both through the provision of extensive green leisure space and green gym facilities, and also through providing healthy buildings with good internal environments. Buildings will be naturally ventilated where practicable and provide good levels of natural daylight.

To achieve a high quality internal environment, designers will aim to target that 80% (by floor area per building) of all occupied areas achieve a daylight factor of 2% or more, with all work-stations areas aiming to comply with this. Designs will also ensure that consideration is given to implementing user-controlled glare control in all occupied areas.

The aim of the Proposed Development is to support occupiers and their organisations through provision of high quality facilities and amenities. Consultation will be carried out to establish user requirements/requests for facilities, assessing all proposed options and include them where viable. Where not included, a justification will be provided to explain why the facility is not proposed and what alternative arrangements may be available to occupants. The assessment of facilities will consider:

- Increased nursery provision
- Eating and drinking (e.g., cafe, restaurant, canteen, pub)
- Take-away / sandwich shop
- Small scale shops
- Banking/cash point facilities
- Bicycle shop / repair / hire (see Transport)

Creation of a secure, functional, pleasant and attractive external space for site occupants will be sought, with external spaces made freely accessible by all site occupants. The design considers:

- Hard and soft landscaped areas
- Formal and less formal areas
- Consideration of safety and security
- Split between publicly accessible areas and more private areas
- Assessment of external daylight accessibility
- Provision of access for all abilities

There will also be consideration of the impacts of future climate change, providing a comfortable environment in hotter summers. Incorporating infrastructure such as SUDs into external spaces in a manner which helps inform and educate occupants and visitors will be an important consideration, as well as developing a public art strategy which contributes to overall site principles and themes (infrastructure, biodiversity, sustainability) by being functional as well as beautiful.

Examples of measures considered:

- Naturally ventilated buildings where practicable.
- Innovative ventilation and daylighting strategies through design
- High levels of daylighting to minimise lighting use and provide a natural well lit internal environment.
- Consultation to identify site users' facilities and amenities requirements.
- External space which is secure, functional, pleasant and attractive, and accessible to all.
- Green leisure facilities including signed walkways and trails, and access to green gym facilities providing outdoor exercise opportunities.
- Designs and measures to avoid or minimise/mitigate overheating.

What isn't currently being considered and why:

- 100% of buildings to be naturally ventilated. Due to the highly complex and specific nature of some of the buildings (e.g. highly specialised laboratories) a degree of mechanical ventilation and cooling will be required to avoid undermining the research operations to take place in some of the developments.

National Policy

- National Planning Policy Framework 2012

Local Policy

- Cambridgeshire Health and Wellbeing Strategy
  - Priority 3: Encourage healthy lifestyles and behaviours in all actions and activities while respecting people's personal choices.
  - Priority 5: Create a sustainable environment in which communities can flourish.
- Cambridge Draft Local Plan 2014
  - Policy 67: Protection of open space.
  - Policy 68: Open space and recreation provision through new development.
  - Policy 73: Community, sports and leisure facilities.
- Open Space and Recreation Strategy

Cambridge City Sustainable Design and Construction SPD

- SPD Section 3.1 Adaptation to Climate Change

BREEAM

- Health and Wellbeing credits

Image: imgarcade.com

Principle 7: Collaboration and inclusion

Ensure the masterplan development and delivery is focused around collaboration by providing opportunities for site users.

Develop a site with a sense of community which is viewed as a destination in its own right for users and visitors.

Ensure that the site and buildings are accessible to all.

An inclusive development that foments collaboration is central to the ongoing sustainability of the Application Site.

Consultation has taken place during the remasterplanning process with existing site users (academic occupiers and commercial research organisations based on the site), potential future occupiers, in particular potential academic departments of the University which could move or expand at the Proposed Development, Cambridge City Council, and other external and statutory stakeholders such as the Environment Agency, Highways Agency, UK Power Networks. The applicant has also consulted with neighbouring residents and local communities through a West Cambridge Community Forum, the North West Cambridge Community Group and groups such as the Clerk Maxwell Residents Association. The consultation processes are summarised in the Statement of Community Involvement submitted is support of the outline planning application.

Extensive consultation will be conducted during the design and post construction stages between the design team, users, and neighbours. During the design of individual schemes, consultation with occupiers will be essential to identify the needs of users. This consultation should address all of the relevant sustainability principles and aims, to ensure that sustainability is embedded into the development of the schemes and addresses the specific requirements of all stakeholders: occupiers, visitors and neighbours. Feedback from the consultation will be considered and included in the design if possible and required, and rejected feedback will be identified and justification for exclusion provided.

Designs will encourage collaboration though shared services and co-location. Opportunities for collaboration have been explored and facilities which provide both, efficiency of use and work and leisure opportunities for university and commercial occupants have been incorporated.

Shared facilities considered include:

- A range of formal and less formal landscaped areas;
- Shared teaching facilities for University purposes;
- Shared services for University purposes;
- Catering facilities open to University, visitors, commercial occupants, existing residents and the general public.
- General meeting facilities (formal and informal) open to University, visitors, and commercial occupants will be included in schemes' designs.

Community activity hubs accessible to site users, visitors, and the general public will be developed. These will provide a range of facilities and act as a focal point for local events, promotions and day-to-day activities. The operation of the hubs should look to incorporate all of the sustainability principles in their operation, and actively develop activities around supporting sustainability on the site and providing education to visitors.

All designs will ensure focus on inclusion for all specialist needs. External spaces will be designed to be safely accessible by users of all abilities. Similar focus will be given to internal spaces during design of schemes, and an access consultant will be used to inform and assess the design proposals.

Examples of measures considered:

Consultation so far:

- A comprehensive public consultation process commenced in 2014 allowing the design proposals to be shared and providing a forum for discussion and feedback into later design iterations.
- Technical consultation with the relevant representatives from Cambridge City Council and Cambridgeshire County Council to ensure proposals meet the various planning requirements.
- Public website providing the latest information and contact details for questions and feedback.

Future consultation:

- The consultation process will continue throughout the design period and through each phase, so that local communities have their say in the proposals.

Design inclusivity:

- Support for users of all diversities in terms of abilities, ages, culture, religion, language and gender will be developed through different means including a public website portal.

National Policy
No reference
Local Policy

• Cambridge Local Plan 2006
  ▪ 3/1: Sustainable Development 8/2: Transport Impact
• Cambridge Draft Local Plan 2014
  ▪ Policy 43: University faculty development

Cambridge City Sustainable Design and Construction SPD
No reference
BREEAM
• Management credits

Image: i360institute.com

Principle 8: Education and knowledge transfer

Incorporate innovative practices within the redevelopment, making use of University experience and research skills.

Ensure the site is developed to optimise the transfer of knowledge amongst different users (academic and commercial; academic/commercial and research).

The enhancement and expansion of education and knowledge transfer within different University departments and between the University and commercial researchers is at the heart of the Proposed Development. This will aim to build upon this foundation, providing education and learning opportunities through both the design and occupancy phases.

Knowledge transfer is one of the main foundations of the Proposed Development, with a number of new academic teaching and research buildings planned as well as commercial high tech and research organisations expected to make this their base in order to cross-seed and benefit University research as well as offer commercial opportunities.

The Proposed Development itself will also be an education tool, engaging with site users to ensure effective operation and introducing a sustainable studying and working approach to site users and visitors. The sustainability features on the Application Site will be used as educational tools, with information displays explaining the operation of, for example, the district heating and CHP system, developing energy efficiency cross-saving programmes and activities to encourage learning and research in sustainability (e.g. via competitions and target settings).

A monitoring framework and implementation process will be developed for the design and development stage over the life of the scheme. Post occupancy monitoring may be conducted through the website and on-building displays, with data collected on items such as energy and water consumption using smart metering and occupancy surveys to assess the effectiveness of measures in relation to occupant activity. This will enable continual learning through monitoring of key performance indicators, analysis and reporting. Of particular importance could be the development of such programmes and evaluations for high tech and specific use buildings (e.g. laboratories) for worldwide benchmarking and knowledge transfer of successful measures identified for specific building and building activity uses. Consistent data from a site this large will form a valuable input to academic research within the University helping to drive future sustainable development principles and practices. Successful measures and lessons learnt during the development of the scheme should be used to provide feedback to future stages of the scheme.

Building users will be encouraged to behave in an energy efficient manner through the provision of, or recommended purchase of, equipment meeting certain efficiency standards, and through being educated about the benefits of reducing energy demand, with associated cost savings.

Innovative practices will be explored within the redevelopment, making use of University experience and research skills. A strategy and programme to identify and evaluate existing knowledge from within the University will be developed to inform the design where relevant. Suitable research collaboration opportunities at site wide and building scales will be identified and developed as appropriate.

Innovative design ideas which can be incorporated into the scheme will be identified with a view to evaluating performance. These could include design features, infrastructure, technologies, and materials. Liaison with product developers and organisations (such as Cambridge Cleantech) to identify potential innovative approaches could be explored to achieve this aim.

Monitor the site improvements in a qualitative way during the development of the scheme – lessons learnt. Analyse the findings and provide feedback to future stages of the scheme. Identify if any changes are needed to completed works to improve performance.

Examples of measures considered:

- Provision of simple building user guides for all occupants to ensure effective operation.
- Use of simple systems within buildings to help occupants control the building effectively.
- Regular sustainability training sessions and updates to building occupants to inform about site operation, and also provide additional information and support on wider sustainability issues, for example waste management and recycling at home
- Provide annual reviews to all site occupants and visitors on performance of the site against the sustainability metrics.
- Sustainability infrastructure on display with information available to the public on the design and operation of the systems. Opportunities to enhance this via occasional open days for the public and interested organisations.
- The University will take an ongoing role in the monitoring and assessment of the Application Site from a sustainability perspective. This includes publication of update reports providing information on the performance of the Proposed Development and effectiveness of the measures from which future developments can learn.
- Energy and water meters could allow centralised recording and monitoring of data. Information will be available to individual buildings and be compared to encourage competitive behaviour and exchange of energy information.
- Education and encouragement of behaviour change through green leases and provision of efficient equipment, combined with energy efficiency advice.
- Induction for all contractors on site explaining the sustainability principles behind the design and how the construction process contributes to this.
- Site sustainability coordinator to oversee sustainability on the Application Site during the construction phase and coordinate collection and monitoring of construction data.

National Policy
No reference
Cambridge City Sustainable Design and Construction SPD
No reference
BREEAM
No reference
References
No reference

Principle 9: Employment opportunities

Contribute to and benefit the local economy and provide opportunities to improve skills and deliver long term employment (service sector and construction sector).

Cambridge is an economic hub for the Eastern Region, and a nationally important area for scientific and hi-tech industries; The Proposed Development will provide a strategic employment location for the expansion of this existing base. It will provide additional employment opportunities for both the University and private sector companies in the service and professional areas.

The Proposed Development will aim to support the development of new skills, jobs, and local employment during the construction phases. Apprenticeships may be created to develop more local skills and jobs. On-site induction and training will be provided to educate construction teams on the sustainability features applying at the Application Site, providing knowledge which it is hoped will be passed on in future schemes.

Opportunities for employment and training to local companies and organisations, in line with wider University policy will be evaluated. Responsibility for this task and for identifying existing and potential links with local organisations with respect to training programmes will be assigned. This role will also explore how these opportunities can be exploited further, identifying how the redevelopment and operation of the site could support local employment and businesses for contracted out work.

Local sourcing and local employment will be included in guidelines and criteria for sustainable procurement when selecting service companies and facilities for use on the proposed Development.

Examples of measures considered:

- Local apprenticeships could be provided by contractors during the construction phase.
- On-site training on the installation and maintenance of low and zero carbon technologies to increase the local skills base. This could include links to local colleges such as the Cambridge Regional College, who provide training courses.
- Site sustainability coordinator to oversee sustainability on the Application Site during the construction and operation phase to ensure local sourcing and local employment criteria are applied to procurement.

National Policy
No reference
Cambridge City Sustainable Design and Construction SPD
No reference
BREEAM
No reference
References
No reference

Principle 10: Biodiversity and ecology

Ensure the redevelopment results in increased levels of biodiversity and ecology, alongside providing an environment which site users and visitors are actively encouraged to enjoy.

The current ecological baseline of the Proposed Development has been identified via an ecology survey and report which sets a baseline and notes any features of importance. All features of major ecological value have been incorporated into the design of the Proposed Development and will be protected during the construction process to add maturity and biodiversity to the final scheme. An biodiversity and ecology brief for the future development phases will be developed to increase the levels of biodiversity and ecology on the site from the baseline levels.

Where existing features of importance may be required to be removed, the scheme will aim to provide replacements with features of similar or higher value in addition to other improvements. Relevant experts within the University, including the Cambridge Conservation Initiative, will be identified and consulted on the proposals with the aim to identify and to incorporate best practice and current research.

50% of roof area across the site will be targeted to incorporate green roofs which will consider adequate planting type where this needs to be compatible with other uses such as PV panels or water retention (where possible, given plant and access requirements). Green walls will also be explored during design of future schemes.

The ecology design will also take into account future climate change conditions. The aim of the Proposed Development will be for any irrigation proposed to be from recycled water or rain water collection, and be in addition to the recycled / collected water needs for the buildings.

Site users and visitors will be encouraged to enjoy and engage with the biodiversity and ecology of the site. Facilities and measures which allow site occupants to engage with the site biodiversity and ecology will be identified and developed as possible.

There are no significant European designated environmental receptors on the site such as Ramsar sites or Special Protection Areas (SPAs).

Examples of measures considered:

- Existing features of major ecological value will be retained including trees and hedgerows where possible.
- Introduction of bird and bat boxes
- Landscape planting which increases the overall ecological value through extensive planting of a wide range native species.
- Retention and protection of existing significant ecology on-site during the construction phases with a biodiversity champion nominated by each contractor.
- Appropriate method statements to protect wildlife during construction and works carried out under licence to Natural England, where required.
- Planting will be drought resistant to withstand warmer and drier summers
- Planting that predominantly does not require irrigation will be identified and favoured.
- Signage and displays
- Educational measures and features
- Roof top gardens

National Policy

- National Planning Policy Framework 2012
- Planning for a healthy environment – good practice guidance for green infrastructure and biodiversity 2012

Local Policy

- Cambridge Local Plan 2006
  - 4/3: Safeguarding Features of Amenity or Nature Conservation Value
  - 4/4: Trees
  - 4/5: Protection of Sites of National Nature Conservation Importance
  - 4/6: Protection of Sites of Local Nature Conservation Importance
  - 4/7: Species Protection
  - 4/8: Local Biodiversity Action Plans
- Cambridge Draft Local Plan 2014
  - Policy 59: Designing landscape and public realm
  - Policy 70: Protection of priority species and habitats

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.6: Biodiversity

BREEAM

- Land use and ecology credits

References

Principle 11: Pollution and local environmental impact

Minimise the impact of pollution on the local environment during construction and operation.

The Application Site was largely comprised of agricultural fields during the late 19th and early 20th Centuries. In the early 1940s, the southern and western areas of the site were developed as a war time industrial facility (the Shorts site) used to repair bomber aircraft and salvage used parts from redundant bombers. After the war the site was vacated, with site buildings being used by the University, and by the Home Office for storage. By the late 1960s the Phase 1 buildings in the western area had been demolished and some laboratory buildings were shown. The Phase 2 site buildings in the southern area were still present at this time. The University of Cambridge School of Veterinary Medicine is shown in the central area of the site at this time. By the early 1980s, the M11 Motorway had been constructed and laboratory buildings, a university Design Centre and the "British Antarctic Survey" were present. The Phase 2 site buildings in the southern area were demolished in 1972 and this area of the site was taken over by the University Farm, used for grazing cattle or grass cutting. Other laboratory buildings were shown in the south-eastern area of the site at this time. Further university development has taken place since.

The aim for the Proposed Development is to identify and mitigate through design and/or other means all potential sources of pollution and adverse local impact. Sources of pollution evaluated include:

- Existing sources from the site
- Potential sources from new site occupants activities
- Other local sources which may impact on the site
- Sources associated with construction activities

The types of pollution and local impact assessed and reported in the Environmental Statement include:

- Ground contamination
- Water pollution
- Air pollution
- External noise impact on the site
- Noise generation from the site
- Night time light pollution
- Light impact on neighbours
- Impact of vibration
- Construction impacts (e.g. dust, noise, air quality, etc).

Ground: ground investigation reports have not identified gross or widespread contamination. The majority of the site was largely greenfield prior to development during the latter part of the 20th Century. The potential for widespread contamination in the remaining undeveloped areas of the site is considered to be low and no site wide remediation is deemed to be required.

Water: intensification of development on the Application site will generate additional wastewater flows, which will be discharged to the Anglian Water public sewer network, subject to formal agreement with Anglian Water on discharge rates and connection points. Research activities may generate flows which could require storage and pre-treatment prior to discharge to the receiving sewer.

Air: Good management during construction will ensure that nuisance to residents and impact to ecological receptors from dust will not be significant. The increase in traffic emissions and emissions from the energy centre are not predicted to result in any exceedances of national air quality objectives at any residences of designated ecological sites. Therefore there are no significant adverse effects during construction of operation of the proposed development.

Noise: the noise climate across the Application Site is dominated by traffic on the M11 to the west and Madingley Road to the north. Noise sensitive buildings and external amenity areas should ideally be located towards the centre of the site, as perimeter buildings and landscape buffer planting will provide noise attenuation. Internal noise level criteria are to be achieved with appropriate external building fabric including windows with high sound reduction performance, and through internal layout whilst enabling natural ventilation.

Light: the streets within the Application Site will be illuminated to create a secure environment and to minimise light pollution, energy consumption and any adverse effects.

Vibration: the site includes a number of high tech buildings with complex specialist uses and requirements in terms of sensitivity to vibration. Road traffic on internal site roads has been identified as a potential source of minor adverse impact due to the presence of speed bumps along Charles Babbage Road. Vibration due to vehicle movements using inner roads will need to be controlled and smooth road surfaces should be used without speed ramps or discontinuities to include any indoor and outdoor parking areas. Buildings housing vibration sensitive uses/equipment should be located as far as practicably possible from sources of vibration such as roads and the provision of vibration isolation measures should be provided where this is not possible.

Construction noise and vibration impacts affecting existing buildings with sensitive equipment will be a major constraint during future developments and contractors should develop and implement procedures to limit local environmental impact. A robust construction framework as part of the Construction and Environmental Management Plan (CEMP) should be developed to specify routine noise and vibration management controls. An assessment scheme such as the Considerate Constructors Scheme should be used and regular consultation with site occupants, neighbours and local residents carried out to manage and mitigate any potential adverse. There will be on-site monitoring in place, and construction periods will not exceed permitted times. Reporting procedures for occupants and neighbours will be put in place and monitoring of buildings (on-site and neighbouring) will be put in place to check for structural movement during construction. Any adverse impacts experienced and near misses will be recorded to inform future activities.

Operational procedures will be developed to prevent future pollution and adverse local impacts and regular reviews of potential local impacts will be implemented to allow the development of mitigation plans where required. Regular consultation with specific receptors such as the Institute of Astronomy will be carried out.

Examples of measures considered:

- Site layout designed to provide acceptable noise climates to open spaces and buildings.
- Design of internal layouts of buildings to take advantage of "quiet" facades.
- Site layout designed to reduce exposure to air pollutants generated by road traffic
- Source control features such as porous paving, swales, filter strips and soakaways to attenuate and improve the quality of runoff from paved areas where intercepted.
- Site control features such as retention ponds and linear wetlands to provide a secondary level of treatment and attenuation before the runoff is discharged to the existing watercourse at pre-developed rates.
- Rainwater harvesting and soakaways to intercept runoff from roof areas and to enable water recycling within buildings.
- White lighting sources to allow a lower lighting class to be used on residential streets, providing energy savings and reduced light pollution along with better 'quality' light. Automated switching, time controls, and photoelectric controls to reduce lighting times reducing energy consumption and light pollution.

What isn't currently being considered and why:

- The provision of an acoustic barrier along the boundary with the M11 may provide some attenuation of noise from road traffic; however, it would not provide any attenuation effects to multi-storey building façades which overlook the roads. Therefore, acoustic barriers may not be deemed an appropriate mitigation measure.

National Policy

- National Planning Policy Framework 2012
- Noise Policy Statement for England 2010
- Planning Practice Guidance Noise 2014
- The Environmental Noise (England) Regulations 2006
- The Control of Pollution Act 1974
- Control of Pollution (Amendment) Act 1989
- Groundwater Protection: Policy and Practice (GP3)
- Future Water - The Government's Water Strategy for England
- Environment Act 1995;
- Environment Protection Act 1990 Part II (as amended);
- Hazardous Waste (England and Wales) Regulations 2005; and
- Environmental Protection (Duty of Care) Regulations 1991 (as amended).

Local Policy

- Air Quality Action Plan for the Cambridgeshire Growth Areas
- Cambridge Area Water Cycle Strategy
- Cambridge Local Plan 2006
  - Local Plan Policy 4/13: Pollution and amenity
  - Local Plan Policy 4/14: Air quality management areas
  - Local Plan Policy 4/15: Lighting
- Cambridge Draft Local Plan 2014
  - Policy 33: Contaminated land
  - Policy 34: Light pollution control
  - Policy 35: Protection of human health from noise and vibration
  - Policy 36: Air quality, odour and dust

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.7: Pollution

Guidance and Standards

- British Standard 8233: 2014 ‘Guidance on Sound Insulation and noise reduction for buildings’
- British Council for Offices ‘Guide to Specification’
- World Health Organization, 1999 ‘Guidelines for Community Noise’
- World Health Organisation 2009 ‘Night Noise Guidelines for Europe’
- The Design Manual for Roads and Bridges – Environmental Assessment
- British Standard 6472-1:2008 ‘Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration Sources Other Than Blasting’
- Institute of Environmental Sciences and Technology Criteria
- British Standard 4142: 2014 ‘Methods for rating and assessing industrial and commercial sound’
- British Standard 7385: 1993 ‘Evaluation and measurement for vibration in buildings’
- British Standard 5228:2009 +A1:2014 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’
- Environment Agency’s “Guidance on Requirements for Land Contamination Reports”
- Contaminated Land in Cambridge Developers Guide April 2009.

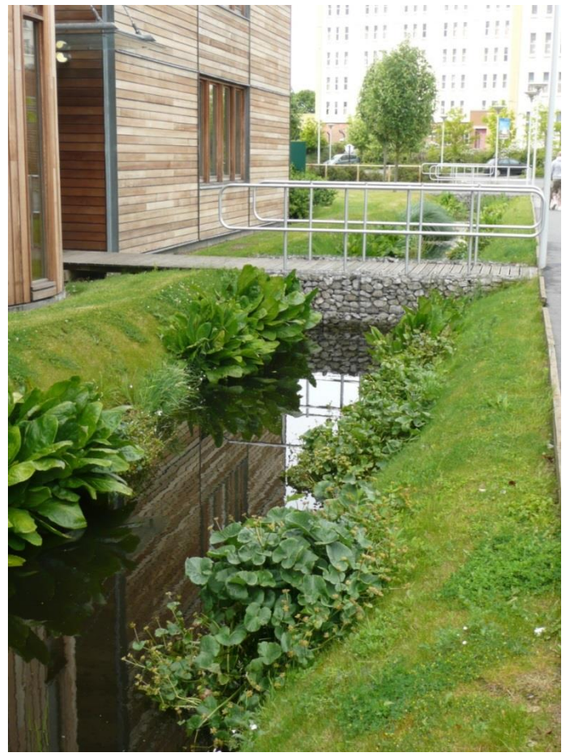
BREEAM

- Pollution credits

References

- Environmental Statement sections on ground conditions, water environment, air quality, noise and vibration:
- Flood Risk Assessment and Drainage Strategy

External lighting design will aim to minimise light pollution, directing light to where it is needed, and helping to maintain a dark night sky.



Sustainable urban drainage systems (SUDs) will be used to minimise the risk of flooding by reducing surface run-off in storm conditions. Interceptors will be used as part of the SUDs system to reduce pollution from hard landscaped areas such as car parks.

Principle 12: Reputation, heritage and the city

Ensure the site reflects the innovative and forward looking vision of the University.

Promote and develop the site's research focus and its collaborative approach with industry to maintain the University's globally competitive position as a leader in scientific research.

The City of Cambridge has a distinct character, having been shaped by the University over the last 800 years: the diversity of historic buildings and conservation areas, the colleges, the river, the commons, open spaces, natural features and habitats all contribute to the distinctiveness and uniqueness of the Cambridge's landscape.

The Proposed Development contains a mix of uses including education, research, shared facilities and amenities, and commercial spaces on one site, with many highly specialised and high tech uses at the cutting age of research and academic teaching.

The Proposed Development brings the city to the edge of the M11and provides a clear indication of the potential for a new urban fabric consisting of high quality buildings, public realm and open spaces. This urban theatre has the potential to hold increased activity and social interaction, both within the new public realm and shared facilities, and also to encourage interaction between users, developing routes to knowledge transfer and eventual commercialisation of knowledge.

The layout aims to create a series of identifiable areas, each with their own urban character and identity. This new urban structure serves to organise the site into smaller, more legible elements that will provide enclosure, identity, interaction and sociability. The aims are to deliver a new, urban environment which incorporates existing buildings and developments but re-orientates them to form frontage, streets and spaces and a strong definition between public and private/service space. A series of urban Precincts have been defined to aid legibility and create a series of individual characters across the site – adding variety and subtle identities.

The Proposed Development aims to expand the status of the University of Cambridge as a worldwide leader in scientific research and academic excellence and bring its historic character and reputation into the future. The site aims to represent the future thinking and cutting edge scientific work done by the University in conjunction with high tech quality partnering commercial organisations able to support the delivery of new ideas and a new world.

In this context, the Proposed Development aims to be a leader and pioneer in sustainable development. To this aim, the University will aim to deliver Signature Sustainable buildings which seek to include at least two exemplar University buildings to be highly visible and used by a range of site occupants and visitors. They should contain elements which are visibly exemplar in terms of sustainability and which are considered innovative at a UK level. These buildings will be aimed to achieve BREEAM Outstanding certification with all other buildings aiming to achieve BREEAM Excellent rating as a minimum.

A major focus of the Proposed Development will be to display and celebrate innovative measures and sustainable infrastructure for occupants and visitors to see and explore. Key opportunities for displaying sustainable site infrastructure and features to occupants and visitors will be explored, as part of the communications strategy, and designs will aim to be developed in combination with signage and information on sustainability features of the site to inform and educate site occupants and visitors about the infrastructure.

Improved connectivity and a step change in public transport access will be critical to achieve the potential for additional academic and commercial research development and enable the success in establishing these communities on the site. The enhanced public transport provision as well as new and better pedestrian and cycle links will enable the West Cambridge community to feel less remote and a more integrated part of this compact, evolving city. The establishment of a stronger pedestrian and cycling network will help integrate the site with its surroundings and reduce the perceived distance to Cambridge city centre.

Examples of measures considered:

- Incorporation of high quality materials and architecture to take design cues from the existing city.
- Development of cycling infrastructure to link the Proposed Development to the city and surrounding areas, and provision of significant on-site support for cyclists.
- Large open spaces for leisure and the hosting of events.
- Informal open space for gardens and leisure to provide facilities for socialising and relaxing.
- Innovative signage to deliver information around the Application Site to promote the innovative measures and sustainable infrastructure of the site

What isn't currently being considered and why:

- Separate specific cultural facilities such as a concert hall or theatre. Cambridge currently has a large number of cultural venues in and around the city, including University venues. However adaptable space, including lecture theatres where possible will be available for hosting cultural events as part of the Proposed Development.

National Policy

- National Planning Policy Framework 2012

Local Policy

- Cambridge Local Plan 2006
  - 3/1: Sustainable Development
  - 3/4: Responding to Context
  - 3/5: Mixed use Development
  - 3/6: Ensuring Coordinated Development
  - 3/7: Creating Successful Places
  - 3/9: Watercourses and Other Bodies of Water
  - 3/11: The Design of External Spaces
  - 3/12: The Design of New Buildings
  - 3/13: Tall Buildings and the Skyline
  - 4/9: Scheduled Ancient Monuments/Archaeological Areas
  - 4/12: Buildings of Local Interest
  - 5/12: New Community Facilities
- Cambridge Draft Local Plan 2014
  - Policy 55: Responding to context
  - Policy 56: Creating successful places
  - Policy 57: Designing new buildings
  - Policy 58: Altering and extending existing buildings
  - Policy 59: Designing landscape and the public realm
  - Policy 60: Tall buildings and the skyline in Cambridge

Cambridge City Sustainable Design and Construction SPD

- SPD section 2.1: Urban Design.
- SPD section 3.4: Historic Environment

BREEAM

- Health and Wellbeing credits
- Land Use and Ecology credits

Delivery of the sustainability principles

The University of Cambridge will retain long term ownership and control over most of the Proposed Development. This will help to maintain the ongoing sustainability of the Application Site. A number of proposals are made to help deliver and maintain a sustainable development as outlined below.

The overall structure for sustainability is set by this document, which includes the framework of issues to be addressed and links to other planning application documents.

However many issues within the framework are not appropriate to address in detail at the outline planning application stage and so must be taken forward to the design stages of the individual plots as they are brought forward.

The tables in Appendix 1 provide the checklist against which reserved matters applications will explain the sustainability credentials of the detailed proposals. These will be reported in a Sustainability Statement submitted in support of reserved matters applications.

Rating methodologies
All non-domestic buildings are required to achieve the relevant BREEAM Excellent rating. Meeting these standards will require assessment by accredited BREEAM assessors who will check information from both the design and construction phases, and carry out post construction reviews. This will provide independent verification of many features.

Tendering for services
When services are tendered for the Proposed Development, for example to developers of individual plots or buildings, sustainability principles will be embedded in the design briefs. All responses will be considered on the grounds of sustainable design proposals alongside other considerations.

Green leases
Green leases and contracts will be considered across the Application Site as required. These would require the building occupier / owner to operate within a certain framework. An example might be a requirement for a company to have a trained sustainability champion.

Management
The University Development team will maintain overall control of the nature of the projects brought forward, and put in place management procedures to track progress.

Where targets are identified for the whole site, they will manage the share of these across developments, to ensure the overall target is met. This will apply to issues like water use, site run-off, local energy generation where some projects will be better able to meet and exceed targets than other projects. The University will track the different projects and how they are meeting the performance targets.

Monitoring
Monitoring of the application of SAM is required:

- To satisfy the project team that a sustainable scheme is being developed
- To satisfy the Environment & Energy team in Estates Management that a sustainable scheme is being developed and delivered
- To meet the sustainability requirements of occupants and visitors
- To meet the sustainability requirements of the Cambridge City Council planners by demonstrating a suitable breadth of scope and rigour of application

There will be no overall rating and no credits as the scheme is not intended to replicate BREEAM in that way, although it refers to elements of BREEAM where the target or appraisal methodology is suitable. Examples of this referencing include:

- Use of the BRE's water calculator, with a minimum performance level required
- Use of the BRE Green Guide to Specification as a means of assessing materials, with a minimum performance level required
- Use of the Considerate Constructors Scheme as a measure of the performance of the appointed contractor.

As the designs progress, it will be important to be able to quickly determine progress so that attention can be focused on areas where the proposals are not addressing sustainability principles and there is no recorded justification for this. In order to facilitate a high level review of progress of this type, the following colour coding is proposed:

- **Action has been addressed (deep green)**
- **Action is being addressed (light green) but target not met in full**
- **Issue under consideration (orange), final action still to be determined**
- **Issue has not yet been considered (red)**
- **A review has concluded the target/action is not achievable for this scheme (purple)**
- **The issue is not applicable (grey)**

The highest level of monitoring will be to review all targets and ensure none are red. Orange targets will need further review and are expected to be made either green or purple. A fictitious example of use of the colour coding as a means of swiftly determining engagement and progress is shown below:

- **Renewable technologies not yet considered**
- **No use of on-site renewables as only suitable technologies are roof-mounted solar thermal and solar PV and the Conservation Officer will not approve a roof-mounted installation**
- **Discussions regarding acceptability of PV and/or solar thermal panels are scheduled with the Conservation Officer**
- **Limited unshaded roof area for PV so less than XX% CO_2 savings possible as part of the phase-wide energy strategy**
- **Design includes suitably located PV panels, and XX% CO_2 target is predicted to be met from the phase-wide energy strategy**

The example above illustrates how the reasoning behind decisions will also be captured. In addition to providing a means of tracking progress at a high level, the SAM provides the opportunity for decisions to be captured.

Appendices

Appendix 1: Sustainability Framework

Principle	Objective	Code	Target Overview		Status
Energy and Climate Change	Develop an innovative low carbon energy supply strategy	RCC 1.1a	Create an Energy Strategy that identifies targets for the following: • Low and Zero Carbon energy generation and CO_2 reduction • Optimisation of PV including on-building and off-building grid-connected arrays, and stand-alone applications. • Requirements for new site wide infrastructure and phasing • Performance standards for infrastructure and connection requirements for future and existing buildings. • Flexibility for future energy sources		Incorporated in final version of Energy Strategy
	Minimise the energy demand of future buildings.	RCC 1.2a	All buildings to incorporate passive design principles where viable. A hierarchy should be used to design and deliver buildings as follows: 1. Consider passive design principles and natural ventilation 2. Consider mechanical ventilation 3. Comfort cooling as and when necessary only Designers must demonstrate why a strategy is not viable before proceeding down the hierarchy. **All University buildings** must be naturally ventilated with no comfort cooling except where operationally essential. Internal conditions for occupants of academic buildings must follow the University's Thermal Comfort Policy. **All commercial buildings** to be passively managed where appropriate comfort conditions can be achieved for tenants and where is can be shown the strategy is commercially viable.		Incorporated in final version of Energy Strategy
	Minimise the energy demand of future buildings.	RCC 1.2b	Masterplan design to allow for good levels of daylight to all external building facades with building spacing allowing view of the sky from all occupied (office like) areas wherever possible.		Covered in Design Guidelines, section 1.2
	Minimise the energy demand of existing buildings.	RCC 1.3a	ECRP to review existing building performance and identify and implement cost-effective energy efficiency projects.		
	Mandate the undertaking of post-occupancy evaluation of the site in terms of energy performance, user satisfaction, flexibility and maintainability.	RCC 1.4a	Conduct the BSRIA Soft Landings handover framework for all new buildings for a period of 3 years post completion. Include requirements in masterplan documents, and subsequent commercial agreements for Soft Landings.		To be addressed at reserved matters stage
	Mandate the undertaking of post-occupancy evaluation of the site in terms of energy performance, user satisfaction, flexibility and maintainability.	RCC 1.4c	Post occupancy evaluation to be conducted on all buildings. Develop detailed requirements for monitoring and building performance evaluation at design stage and conduct monitoring post completion. University Estate Management to review monitoring reports and commit to make improvements in response to results.		To be addressed at reserved matters stage
	Address greenhouses gases other than CO_2 from energy use.	RCC 1.5a	All refrigeration equipment to use zero GWP refrigerants. Where demonstrated not viable or under exceptional circumstances, a GWP of 10 or less may be used.		To be addressed at reserved matters stage
	Address greenhouses gases other than CO_2 from energy use.	RCC 1.5b	Strive for site-based vehicles (delivery, waste management, etc) to be low or zero emissions.		Covered in Transport Assessment
	Develop and adopt a climate change adaptation strategy to ensure designs can provide comfortable and safe conditions under future climate scenarios.	RCC 1.6a	All designs must demonstrate acceptable internal conditions with low overheating risk under projected 2050 conditions using passive measures. Designs should be flexible to allow inclusion of passive measures (such as external shading) where required to meet these conditions. Where measures are not initially installed, the University commits to regular reviews (at least once a decade) of internal conditions, and to fit measures when required.		To be addressed at reserved matters stage
Water	Assess flood risk and minimise impact through site design	RCC 2.1a	Assess flood risk for the site and identify areas of medium or high risk. Ensure that all buildings and infrastructure in these areas are designed to be able to cope with flooding with no adverse impact. Consider the impact of climate change and future flooding events in the assessment.		Covered in Flood Risk Assessment
	Develop surface water management techniques in accordance with the SUDs hierarchy	RCC 2.2a	Identify and agree acceptable run-off rates with Cambridge City Council and the Environment Agency. This must take into account future climate change and increased peak rainfall events by modelling the 30% above current agreed run-off rates scenario.		Covered in the Flood Risk Assessment, section 6

	Develop surface water management techniques in accordance with the SUDs hierarchy	RCC 2.2b	Develop site-wide SUDs approach to integrate with existing infrastructure, which meets best practice guidance and achieves run-off targets.		Covered in the Flood Risk Assessment, section 6, and section 8
	Develop surface water management techniques in accordance with the SUDs hierarchy	RCC 2.2c	Set requirements for future management and maintenance and commit to maintaining infrastructure, and upgrading to meet future changes in drainage requirement.		To be addressed at reserved matters stage
	Develop surface water management techniques in accordance with the SUDs hierarchy	RCC 2.2d	Contractually require all new non-University site users and tenants to develop scheme proposals which meet the site wide drainage strategy for any future buildings.		To be addressed at reserved matters stage
	Reduce both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour	RCC 2.3a	Develop an approach to water capture and recycling to apply across the whole site. This should target the provision of all water for WCs and other non-potable uses across the site.		To be addressed at reserved matters stage
	Reduce both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour	RCC 2.3b	Ensure that no potable water irrigation is required for landscape planting, apart from during establishment phases. Provide planting which is either low irrigation, or which can use recycled water or rainwater.		Covered in Design Guidelines, section 1.1
	Reduce both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour	RCC 2.3c	Achieve a 55% reduction in mains potable water consumption per person for welfare uses in all buildings compared with baseline water consumption predictions (use BREEAM WAT1 water calculator for compliance). This should include the impact of water recycling / capture, and the use of water efficient fittings.		To be addressed at reserved matters stage
	Reduce both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour	RCC 2.3d	Give high priority to water efficient equipment selection for all significant process / research water uses (significant uses cover 80% of process water demand). Ensure that process water is recycled where technically viable.		To be addressed at reserved matters stage
	Reduce both overall water use and potable water use for welfare, process / research, building services and landscaping through efficient design, use of rainwater and greywater, and informed occupant behaviour	RCC 2.3e	Give high priority to water consumption when identifying building services strategies. Select strategies and plant with lowest water consumption where technically viable.		To be addressed at reserved matters stage
	Develop the contractor requirements with respect to water consumption	RCC 2.4a	Lead contractor to develop a water management plan for each scheme which adopts best practice water management.		To be addressed at reserved matters stage
	Develop the contractor requirements with respect to water consumption	RCC 2.4b	Lead contractor assesses water consumption, identifies mitigating actions, and sets out requirements for monitoring, and continued improvement though setting targets.		To be addressed at reserved matters stage
	Develop the contractor requirements with respect to water consumption	RCC 2.4c	University to monitor contractors' water use performance on each scheme, and review and revise targets for future schemes to promote further savings.		To be addressed at reserved matters stage
Materials	Minimise the demand for new materials through the reuse of existing buildings, structures, and components, and designing for an appropriate life, for robustness and for low maintenance	RCC 3.1a	Conduct and update a lifecycle assessment through the design process for each scheme. Include the following aspects in the lifetime assessment: • Identify and adopt an appropriate lifetime for assessment based on realistic expected building useful lifetime. Select construction materials and techniques accordingly. • Consider future maintenance and refurbishment requirements. Design to allow minimal disruption on retained components through maintenance and refurbishment. • Assess flexibility measures in the design to allow the building to adapt to future changes in use. • Include end of life dismantling and materials re-use / recycle in assessment.		To be addressed at reserved matters stage
	Minimise the demand for new materials through the reuse of existing buildings, structures, and components, and designing for an appropriate life, for robustness and for low maintenance	RCC 3.1b	For all major components (making up 80% of the building by value), assess at least three options for each component which include one or more of the following selection principles: • Incorporating re-used materials • Using recycled materials • Ensuring major components can be re-used or recycled for high grade uses at the end of life using current construction practices		To be addressed at reserved matters stage
	Develop an approach to ensure responsible materials sourcing	RCC 3.2a	All timber to be 100% certified (FSC or equivalent) for construction phase uses and building materials.		To be addressed at reserved matters stage

	Develop an approach to ensure responsible materials sourcing	RCC 3.2b	Aim for 80% by area of all major components to be A or B rated in BRE Green Guide. Incorporate existing structures, materials and components from on-site demolition unless demonstrated not technically viable. Source materials locally where possible.		To be addressed at reserved matters stage
	Develop an approach to ensure responsible materials sourcing	RCC 3.2c	Prioritise materials for construction activities and building materials which are responsibly sourced. Achieve at least 2 credits using BREEAM Mat 3 methodology.		To be addressed at reserved matters stage
	Adopt construction approaches to minimise materials use	RCC 3.3a	Consider best practice design to minimise materials use, taking into account efficient design and ensuring that components are not over-engineered.		To be addressed at reserved matters stage
Waste	Use methods of design and construction which aim to minimise waste generation	RCC 4.1a	Consider waste generation during the design stage by assessing waste generation potential for all design and component options covering major components (80% by building value), and identifying design changes to improve upon these. This could include for example making use of common size components.		To be addressed at reserved matters stage
	Minimise the amount of construction waste generated, and sent to landfill or recycling	RCC 4.2a	Lead contractor for each scheme must develop and maintain a site waste management plan (SWMP) with 3-month reviews during the design and construction process. This should monitor and assess progress, and aim for improvements during the project lifetime. The contractor is required to report on construction waste to the University.		To be addressed at reserved matters stage
	Minimise the amount of construction waste generated, and sent to landfill or recycling	RCC 4.2b	Target a maximum waste generation rate of 3.2 tonnes waste per 100m2 gross area or less at the outset of all projects. This is calculated before mitigation methods such as recycling etc. A waste generation of more than 6.5 tonnes per 100m2 must not be achieved.		To be addressed at reserved matters stage
	Minimise the amount of construction waste generated, and sent to landfill or recycling	RCC 4.2c	Aim to target 100% of non-hazardous demolition waste and construction waste (excluding excavation waste) by weight to be diverted from Landfill. Aim for excavation waste from earthworks to be either used on site (balance of cut and fill) or contractors required to use excavation waste for other construction purposes. A materials management plan must be produced for excavation waste.		To be addressed at reserved matters stage
	Minimise the amount of construction waste generated, and sent to landfill or recycling	RCC 4.2d	Mandate all materials suppliers to adopt best practice including take-back and recycling schemes.		To be addressed at reserved matters stage
	Minimise the amount of construction waste generated, and sent to landfill or recycling	RCC 4.2e	The University to investigate the creation of an area on site to manage surplus materials for use on other local schemes, to avoid sending sound materials to landfill. This should include fixtures and fittings.		To be addressed at reserved matters stage
	Develop an operational site waste strategy and incorporate infrastructure to reduce operational waste and increase recycling	RCC 4.3a	Include appropriate recycling facilities in the design which support a reduction in operational waste going to landfill sites		To be addressed at reserved matters stage
	Develop an operational site waste strategy and incorporate infrastructure to reduce operational waste and increase recycling	RCC 4.3b	Meet the University-wide zero waste to landfill target. Achieve consistency with the overall strategy.		To be addressed at reserved matters stage
	Develop an operational site waste strategy and incorporate infrastructure to reduce operational waste and increase recycling	RCC 4.3c	Monitor operational waste generation, review targets, and engage with occupants to improve recycling rates year on year. Develop revised targets based on previous actions. Achieve consistency with overall University policy.		To be addressed at reserved matters stage
Transport and Mobility	Develop a Sustainable Transport Strategy	TLC 1.1a	Develop a site wide sustainable transport strategy with the fundamental policy of discouraging people driving by car when alternative more sustainable options exist. This should include: • Assessment of current and future potential users, and associated transport requirements. • Assessment of available transport modes for current and potential users to identify potential for modal shift. • Identification of potential measures and targets to promote shift away from car use to sustainable transport modes (walking and cycling, public transport, and low impact car use). • Future requirements for ongoing monitoring and updating of targets.		Covered in Transport Assessment and West Cambridge Travel Plan

	Develop a Sustainable Transport Strategy	**TLC 1.1b**	Develop a framework travel plan across the site as part of the transport assessment report for planning, which subsequently informs future travel plans. This should also incorporate current building users. Produce a specific travel plan for each scheme which engages with specific building users / potential users. This should demonstrate how the overall objectives of sustainable transport will be met by each scheme, and include requirements for tenants / occupiers to maintain and update the travel plan on an annual basis, including the tightening of car use targets year by year.		Covered in the Framework Travel Plan
	Develop a Sustainable Transport Strategy	**TLC 1.1c**	Produce a site logistics and servicing plan for each site. This should identify all logistics and servicing needs and the impacts these may have on other travel modes. The plan should aim to remove conflicts between servicing needs, and sustainable modes of travel.		To be addressed at reserved matters stage
	Provide high quality access to public transport modes and reduce car use	**TLC 1.2a**	Aim to identify a target for a maximum of journeys to work using single occupancy car for commuting peak periods at 40% for commercial research and 30% for University academic reducing to 25% by 2020. Staff working at West Cambridge must have access to at least two managed non-private car modes to all other University sites. Mitigation measures must be committed to by the University if these targets are not achieved.		Covered in the Framework Travel Plan which targets 26% as the limit for single occupancy car usage across the site
	Provide high quality access to public transport modes and reduce car use	**TLC 1.2b**	The following measures should be included to reduce the impact of car use where technically viable, and should align with the travel plan: • Provision of electric charging points across the site with dedicated access. • Provision of car share scheme on site • Provision of electric pool cars and electric cycles • Priority car parking for low and zero emission vehicles • Priority parking for car sharers(2 or more car occupants). • Introduction of a managed car share scheme for all occupants. • Introduce variable car park charging for university staff based on uptake of more sustainable modes, and performance against targets. • Contractual commitments from commercial occupiers to meet transport strategy targets.		Covered within the Travel Plan But very small change needed
	Provide high quality access to public transport modes and reduce car use	**TLC 1.2c**	Provide improved bus links with access to the Cambridge Rail Station and new Chesterton Station when operational.		Covered in section 7 of Travel Assessment and in Public Transport Strategy
	Provide high quality access to public transport modes and reduce car use	**TLC 1.2d**	Provide public transport services linking the town centre, and other University sites, using a low or zero CO_2 emissions vehicles.		Covered in section 7 of Travel Assessment and in Public Transport Strategy

	Maximise the uptake of walking and cycling	**TLC 1.3a**	Provide cycle storage for a range of site users including short and long term visitors and staff. The storage should include a range of types and locations to cater for the differing needs of the visitors and staff. The cycle storage should have the following features: • Nearly all storage to be sheltered from the weather • All storage provides racks which bikes can be securely and safely locked to. • Staff bike storage is in secure areas. • Distances for visitor storage from external stores to visitor destinations should be minimised • Access from staff storage areas should be sheltered to the main staff locations. • Access to all storage facilities to have safe access in a prominent location . Access to facilities to not be combined with service vehicle access. Cycle storage distribution and numbers must consider an assessment of need based on expected visitor and occupant numbers. Storage for University buildings should be provided for 50% of visitors and staff using cycles, with an additional space allocated, or strategy for obtaining space allocated for future storage . The commercial areas should initially target 25%,of staff and visitors, with additional space allocated for increasing this to 50% in the future. The number should also meet the requirements of Cambridge City Council cycle storage guidance if greater. In addition, the number of cycle spaces should always exceed the number of car park spaces provided across the site, and for each building. The University and all site occupants commit to annual monitoring of cycle storage and providing additional storage as required.		Addressed in the Travel Plan and also the cycle stores within the Masterplan
	Maximise the uptake of walking and cycling	**TLC 1.3b**	Aim to provide cycle facilities for all staff in each main building of occupation or in close proximity: • Showering and changing facilities • Lockers for clothes and equipment • Drying facilities Facilities adequate for the number of cycle storage places should be provided. The University and all site occupants commit to annual monitoring of cycle facilities and providing additional facilities as required.		Covered in Travel Plan section 6.6.18
	Maximise the uptake of walking and cycling	**TLC 1.3c**	Provision of the following facilities should be considered: • Cycle and spares purchase • Investigate and include a Cycle hire scheme. Liaise with other operators in the city to investigate opportunities for linking to other schemes. • Cycle repairs (professional service) Self-service cycle repair facility.		Covered in Travel Plan in section 6.6.11 and section 6.6.16
	Maximise the uptake of walking and cycling	**TLC 1.3d**	Appropriate locations for segregated cycle and pedestrian routes will be developed across the site to include cycle and pedestrian equal priority at all junctions.		Covered in design guidance and Travel Assessment
	Maximise the uptake of walking and cycling	**TLC 1.3e**	Safe cycle and pedestrian priority routes will be maintained during all construction activities. A construction transport plan will ensure that construction related vehicles do not impact on cycle and pedestrian routes. The University will contractually require that: • All construction contractors will be members of the Construction Logistics and Cycle Safety initiative (Cambridge CLOCS) and; • All construction vehicles are fitted with cycle safety equipment.		Covered in Travel Plan
Health and wellbeing	Provide a high quality internal environment for site occupants and visitors	**PWB 1.1a**	Target that 80% (by floor area per building) of all occupied areas achieve a daylight factor of 2% or more. Relevant building areas are classified in BREEAM and are typically occupied for 30 minutes or more. In addition, all areas designed for work-stations areas must be compliant. Ensure that user-controlled glare control is available for all occupied areas.		To be addressed at reserved matters stage
	Provide a high quality internal environment for site occupants and visitors	**PWB 1.1b**	Target that where practical all occupied areas have access to natural ventilation, with inlets to be at least 10m from sources of external pollution (car parking, roads, plant exhausts).		
	Provide a high quality internal environment for site occupants and visitors	**PWB 1.1c**	Target that all internal finishes are classed as low or zero VOC and formaldehyde.		To be addressed at reserved matters stage
	Provide a high quality internal environment for site occupants and visitors	**PWB 1.1d**	Provide zoned temperature control for occupied areas based on analysis of user profiles and space use.		To be addressed at reserved matters stage

	Target the site supports occupiers and their organisations through provision of high quality facilities and amenities	**PWB 1.2a**	Establish user requirements/requests for facilities through consultation. Assess all proposed options and include where appropriate. Where not included, justify why the facility is not proposed, and what alternative arrangements may be available to occupants. Example of facilities to be promoted following consultation could include: • Increased nursery provision • Eating and drinking (e.g., cafe, restaurant, canteen, pub) • Take-away / sandwich shop • Small scale shops • Banking/cash point facilities • Bicycle shop / repair / hire (see Transport)		Covered in Statement of Communities Involvement
	Create a secure, functional, pleasant and attractive external space for site occupants	**PWB 1.3a**	Provide a range of external spaces which are freely accessible by all site occupants. The design should include: • Hard and soft landscaped areas • Formal and less formal areas • Consideration of safety and security • Assessment of external daylight accessibility • Provision of access for all abilities • Consideration of the impacts of future climate change, providing a comfortable environment in hotter summers.		Covered in Design Guidelines, section 1.1
	Create a secure, functional, pleasant and attractive external space for site occupants	**PWB 1.3b**	Incorporate site-wide infrastructure such as SUDs into the external spaces in a manner which helps inform and educate occupants and visitors.		Covered in Design Guidelines, section 1.1
Collaboration and Inclusion	Conduct extensive consultation during the design and post construction stages between the design team, users, and neighbours	**PWB 2.1a**	Develop and conduct a consultation programme for the evolution of the Proposed Development which draws on a range of existing site users, potential site users, and neighbours. Demonstrate through the masterplanning process that consultation responses have been taken into account during the masterplan design, with justification provided where responses have not been incorporated.		Covered in Statement of Communities Involvement
	Conduct extensive consultation during the design and post construction stages between the design team, users, and neighbours	**PWB 2.1b**	Consult with potential building occupants during the design of individual schemes to identify the needs of users. Demonstrate in the design process how feedback from the consultation has been included in the design within the Design and Access Statement submitted with each reserved matters application. Provide justification if any consultation responses requirements have not been incorporated. The aim of this target is not to meet all of the users requirements (some of which may not be desirable), but that suitable consultation has taken place, and appropriate consideration given.		To be addressed at reserved matters stage
	Create designs which encourage collaboration though shared services and co-location	**PWB 2.2a**	Promote collaboration through co-location, adjacencies and sharing of facilities. Demonstrate that the masterplan has considered the opportunities for collaboration and included facilities which provide both efficiency of use, and work and leisure opportunities for university and commercial occupants. Shared facilities should include: • A range of formal and less formal landscaped areas • Shared teaching facilities for University purposes • Shared services for University purposes • Catering facilities open to University, visitors, and commercial occupants. • General formal and less formal meeting facilities open to University, visitors, and commercial occupants.		Covered in Design Guidelines section 1.3 (Shared facilities for University)
	Create designs which encourage collaboration though shared services and co-location	**PWB 2.2b**	Develop community activity hubs. This should be accessible by a range of site users, visitors, and the general public. This should provide a range of facilities, and act as a focal point for local events, promotions and day-to-day activities. The operation of the hubs should incorporate all of the sustainability principles in their operation, and actively develop activities around supporting sustainability on the site and providing education to visitors.		Covered in Design Guidelines sections 1 and 2 (as Fcal points/social spaces)

	Create designs which encourage collaboration though shared services and co-location	**PWB 2.2c**	Develop a combined West Cambridge and North West Cambridge Website. This will be used as the conduit for sharing and exchanging ideas and information on the site, including for example all community activities, the operation of car share schemes, information about cycle hire and repair facilities, advertising for leisure classes, seminars (including sustainability sessions), etc. The website should be professionally developed and maintained, and have a core focus on sustainability and community activities. The website should also link to the commercial and academic aspects of the site to be the public face of West Cambridge and North West Cambridge as well as to the University website.		
	Create a consultative platform for engagement with local communities	**PWB 2.2d**	Develop a communications strategy to promote dialogue with local communities and stakeholders throughout the masterplanning process in advance of the outline planning application. Activities include consultative meetings with stakeholders, a website that share proposals and encourages dialogue and exhibitions		
	Design for inclusion for all specialist needs	**PWB 2.3a**	All external areas must be safely accessible by users of all abilities. An access consultant must be used to inform and assess the design proposals.		Covered in Design Guidelines - section 1.1
	Design for inclusion for all specialist needs	**PWB 2.3b**	All internal areas must be safely accessible by users of all abilities. An access consultant must be used to inform and assess the design proposals.		To be addressed at reserved matters stage
Education and Knowledge Transfer	Incorporate innovative practices within the redevelopment, making use of University experience and research skills	**PWB 3.1a**	Develop a strategy and programme to identify and evaluate existing knowledge from within the University, both on-site (existing and potential users) and elsewhere, to inform the design where relevant. Identify suitable research collaboration opportunities with the site development which have appropriate levels of risk, and minimal disruption.		
	Incorporate innovative practices within the redevelopment, making use of University experience and research skills	**PWB 3.1b**	Develop a process for identifying and selecting suitable opportunities for engaging with University programmes such as the "Living Lab" for short term projects. Include both student-led and academic staff-led projects in this process. Consider both site wide and building scale opportunities for collaborating on research.		
	Incorporate innovative practices within the redevelopment, making use of University experience and research skills	**PWB 3.1c**	Identify where innovative design ideas can be incorporated into the scheme, with a view to evaluating performance. These could include design features, infrastructure, technologies, and materials. Liaise with product developers and organisations (such as Cambridge Cleantech) to identify potential innovative approaches.		To be addressed at reserved matters stage
	Ensure there is continual learning through monitoring of key performance indicators, analysis and reporting	**PWB 3.2a**	Develop a monitoring framework and implementation process for the design and development stage, including personnel responsibility, over the life of the scheme. Monitor the site improvements in a qualitative way during the development of the scheme – lessons learnt. Analyse the findings and provide feedback to future stages of the scheme. Identify if any changes are needed to completed works to improve performance.		To be addressed at reserved matters stage
	Ensure there is continual learning through monitoring of key performance indicators, analysis and reporting	**PWB 3.2b**	Develop a monitoring framework and implementation process for the occupation phase, including personnel responsibility, over the life of the scheme. This should be a step change from current University practice and be embedded in the site governance and management. Personnel with responsibility for implementing the monitoring should report to the project board. Monitor occupant satisfaction and operational efficiency - quantitative and qualitative. Analyse the findings and provide feedback to future stages of the scheme. Identify if any changes are needed to improve performance.		To be addressed at reserved matters stage
	Engage with site users to ensure effective operation	**PWB 3.3a**	Engage with users and operators to ensure that buildings are operated sustainably, and that wider sustainability benefits are achieved. This includes University and commercial developers on site. The following must be provided: • Provision of simple building user guides for all occupants to ensure effective operation. • Use of simple systems within buildings to help occupants control the building effectively. For example, a lighting system to suggest when windows should be opened and closed. • Regular sustainability training sessions and updates to building occupants to inform about site operation, and also provide additional information and support on wider sustainability issues, for example waste management and recycling at home • Provide annual reviews to all site occupants and visitors on performance of the site against the sustainability metrics		To be addressed at reserved matters stage

	Engage with site users to ensure effective operation	PWB 3.3b	Implement and review wider University behaviour change activities on West Cambridge. Ensure these cover both university and commercial occupants where appropriate.		To be addressed at reserved matters stage
	Engage with site users to ensure effective operation	PWB 3.3c	All University buildings and occupants will be encouraged to engage with University-wide initiatives including the Environment and Energy Coordinator Network and Green Impact programme. Additional encouragement and support should be provided to commercial occupants to also engage and support the University programmes.		
Employment Opportunities	Support the development of new skills, jobs, and local employment during the construction phases	PWB 4.1a	Set appropriate targets in contractor's requirements for locally sourced labour		To be addressed at reserved matters stage
	Support the development of new skills, jobs, and local employment during the construction phases	PWB 4.1b	Set appropriate targets in contractors' requirements in terms of number of apprenticeships.		To be addressed at reserved matters stage
	Identify the local economic benefits associated with new employment on the West Cambridge site though the operation phases, and promote local employment and training arrangements	PWB 4.2a	Ensure that the University acts as a good local citizen, and offers opportunities for employment and training to local companies and organisations, in line with wider University policy. Assign responsibility for identifying existing and potential links with local organisations with respect to training programmes, and explore how these can be exploited further. Identify how the redevelopment and operation of the site could support local employment and businesses for contracted out work.		To be addressed at reserved matters stage
	Identify the local economic benefits associated with new employment on the West Cambridge site though the operation phases, and promote local employment and training arrangements	PWB 4.2b	Include local sourcing and local employment in sustainable procurement selection criteria when selecting service companies and facilities for use on West Cambridge.		To be addressed at reserved matters stage
Biodiversity and Ecology	Identify the current ecological baseline and maintain features of importance.	LEL 1.1a	Conduct an ecological survey of the current site to identify current baseline ecological value and features of importance to inform the proposed developmemt.		Covered in EIA
	Identify the current ecological baseline and maintain features of importance.	LEL 1.1b	Design the proposed development to allow retention of all important features Include features provided as part of previous development work e.g. bat corridors.		Covered in Design Guidelines section 2.4
	Enhance levels of biodiversity and ecology	LEL 1.2a	Where existing features of importance have been removed, aim to replace with features of similar value on the new masterplan in addition to other improvements. Identify relevant experts within the University, including the Cambridge Conservation Initiative, and consult on the proposals with the aim to identify and to incorporate best practice and current research.		University to develop
	Enhance levels of biodiversity and ecology	LEL 1.2b	Design briefs for reserved matters applications to include the biodiversity and ecology improvements including both the phasing of the landscaping and buildings. This should include assessment of proposed construction works on each scheme and infrastructure, and the impact this may have on an existing assets. Ensure buy-in from contractors though contractual obligations.		University to develop
	Enhance levels of biodiversity and ecology	LEL 1.2c	Target for at least an average of 50% of useful, available roof area across the site to incorporate extensive green roofs. This target should be considered as complementary and working in conjunction with the 50% useful/available roof area PV target (in the energy strategy). The aim is to identify and introduce an overall 50% PV plus 50% green available/useful roof as available/applicable: it is unlikely that a roof achieving 50% of PV or 50% green roof target may have availability left for additional green roof space/PV respectively, but if it does, implementation of both features should be considered. Consider planting type where this needs to be compatible with other uses such as PV panels or water retention. Green walls should also be explored.		To be addressed at reserved matters stage

	Enhance levels of biodiversity and ecology	LEL 1.2d	The future detailed ecology design must take into account future climate change conditions: • Planting must be drought resistant to withstand warmer and drier summers • Planting must predominantly not require irrigation. Any irrigation proposed beyond establishment must be from recycled water or rain water collection, and be in addition to the recycled / collected water needs for buildings.		Covered in Design Guidelines, section 1.1
	Enhance levels of biodiversity and ecology	LEL 1.2e	Develop a long term biodiversity and ecology management plan for the site and assign responsibility for its implementation. Aim to review the plan every five years with an expert ecologist based on monitoring and site surveys, and at each revision, commit to increasing the ecological and biodiversity value of the site.		University to develop
	Encourage site users and others to enjoy and engage with the biodiversity and ecology of the site	LEL 1.3a	Identify and include facilities and measures which allow site occupants to engage with the site biodiversity and ecology. These could include: • Signage and displays • Educational measures and features • Community gardens managed by site occupants • Roof top gardens • Water features engaging with people • Butterfly gardens		To be addressed at reserved matters stage
Pollution and Local Environment	Identify and mitigate through design all potential sources of pollution and adverse local impact.	LEL 2.1a	Identify and review all possible sources of pollution and adverse local impact which may have an impact on the site and local environment. The sources should include: • Existing sources from the site • Potential sources from new site occupants activities • Other local sources which may impact on the site • Sources associated with construction activities The types of pollution and local impact reported on should include as a minimum: • Ground contamination • Water pollution • Air pollution • External noise impact on the site • Noise generation from the site • Night time light pollution • Light impact on neighbours • Impact of vibration • Construction impacts (e.g. dust, noise, air quality, etc). • Trade effluent		Covered in Environmental Statement
	Identify and mitigate through design all potential sources of pollution and adverse local impact.	LEL 2.1b	Provide mitigation measures for all identified sources of pollution and local environmental impact.		Covered in Environmental Statement
	Ensure contractors develop and implement procedures to limit local environmental impact.	LEL 2.2a	Develop a robust construction framework as part of the Construction and Environmental Management Plan (CEMP). Make use of an assessment scheme such as the Considerate Constructors Scheme. Consult regularly with site occupants, neighbours and local residents to assess and mitigate any local impact.		To be addressed at reserved matters stage
	Ensure contractors develop and implement procedures to limit local environmental impact.	LEL 2.2b	Ensure appropriate on-site monitoring, and that construction periods do not exceed permitted times. Put in place reporting procedures for occupants, and neighbours. Undertake monitoring of buildings (on-site and neighbouring) for structural movement during construction. Record adverse impacts experienced and near misses to inform future activities.		To be addressed at reserved matters stage

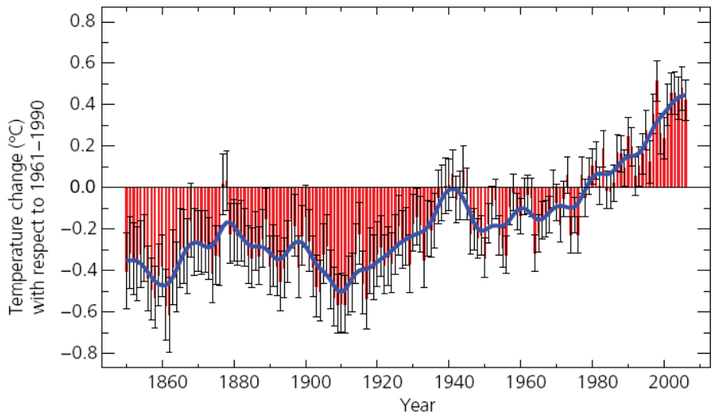
	Establish operational procedures to prevent future pollution and adverse local impacts.	LEL 2.3a	Establish a system of recording and reviewing near misses as well as actual incidents. Conduct regular reviews of potential local impacts, and develop mitigation plans. Consult regularly with specific receptors such as the Institute of Astronomy.		To be addressed at reserved matters stage
Reputation, Heritage and the City	Embed sustainability into the site through branding and commitment	LEL 3.1a	West Cambridge to develop sustainability branding under which the sustainability strategy and communications strategy is adopted, and which sets out the commitment of the University to making West Cambridge a sustainable site. Branding to be used as a common element under which sustainability activities can be coordinated. Ensure branding fits within the overall sustainability branding being used by the University, including North West Cambridge. Create a dedicated Sustainability Champion for the site to head the branding and ensure implementation.		
	Embed sustainability into the site through branding and commitment	LEL 3.1b	Core principles of the sustainability strategy to be incorporated into a constitution and estate management plan which is embedded in all activities on the site including commercial occupiers. This should allow flexibility, but aim to drive for best practice standards and prevent activities which are seen as detrimental to achieving the principles. This requires long term high level University commitment and be embedded in the site governance.		
	Commit to deliver several Signature Sustainable buildings as part of the redevelopment	LEL 3.2a	Incorporate at least two exemplar sustainable University buildings as part of the masterplan. These should be highly visible and used by a range of site occupants and visitors. They should contain elements which are visibly exemplar in terms of sustainability and which are considered innovative at a UK level. Aim to achieve BREEAM Outstanding or equivalent for each of the exemplar buildings in addition to meeting the requirements of this framework. All other buildings will have to demonstrate why Outstanding is not viable, and will have to achieve BREEAM Excellent as a minimum.		Covered in Design Access Statement
	Display and celebrate innovative measures and sustainable infrastructure for occupants and visitors to see and explore.	LEL 3.3a	Identify key opportunities for displaying sustainable site infrastructure and features to occupants and visitors, as part of the communications strategy. Develop designs in combination with signage and information on sustainability features of the site to inform and educate site occupants and visitors about the infrastructure.		To be addressed at reserved matters stage

Appendix 2: Climate Change Adaptation

A changing climate

There is international scientific agreement that the earth's climate is changing and will continue to change as a result of increased concentrations of greenhouse gases. The most prevalent of these is CO_2 and the overwhelming evidence base suggests that this is as a result of the burning of fossil fuels by humans.

The climate has always changed with fluctuations in global temperature resulting in historical warm and cold periods. The current rate of change though is significantly faster than any past change in history and this has important consequences on the way that buildings and infrastructure is designed and operated. Future development needs to reduce the effects which are causing climate change to minimise any future changes, and also prepare for the change which is likely to occur in the shorter term.



Change in annual-average global-mean near-surface temperature showing increases in temperature during the 20th century as a result of rising CO_2 emissions. (Source – UKCIP)

Mitigation or adaptation?

Climate change **mitigation** is something we need to do as a society. Mitigation is about changing the way we live and generate energy to reduce the emissions of greenhouse gases which are causing climate change. New development plays a role in this and much of the work on the Proposed Development, particularly in terms of energy and transport, aims to mitigate against further climate change, by reducing our reliance on fossil fuels and minimising CO_2 emissions.

The concept of climate change **adaptation** is more recent in the UK, although basic climate adaptation is a feature of buildings internationally to allow them to cope with local climatic conditions. Climate change adaptation is a broad topic which covers a number of aspects of site and building design. Adaptation is about designing buildings and sites to be fit for future climatic conditions as well as current conditions. It is widely recognised that there will be some degree of climate change in the next 50 years which is caused by anthropogenic CO_2 emissions, with the following potential impacts on the UK:

- Increased peak summer temperatures and milder winters
- Lower annual rainfall
- More intense storms including higher peal rainfall and winds.

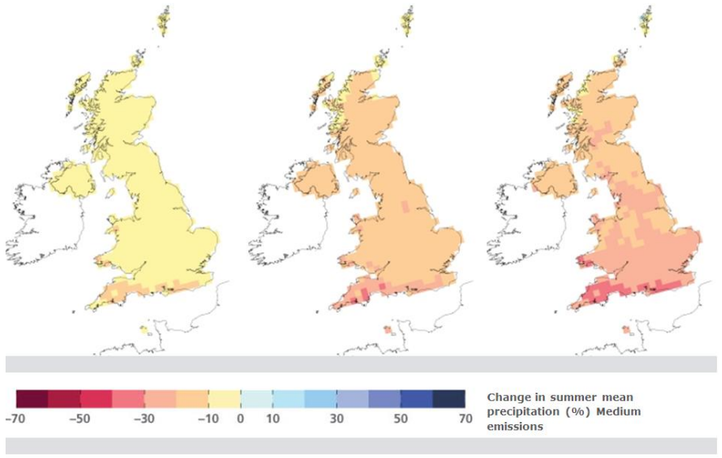
The impacts of these are fairly obvious – we need to design buildings which minimise overheating, which are able to withstand more adverse weather conditions, and which require less potable water.

Quantifying the potential climate change

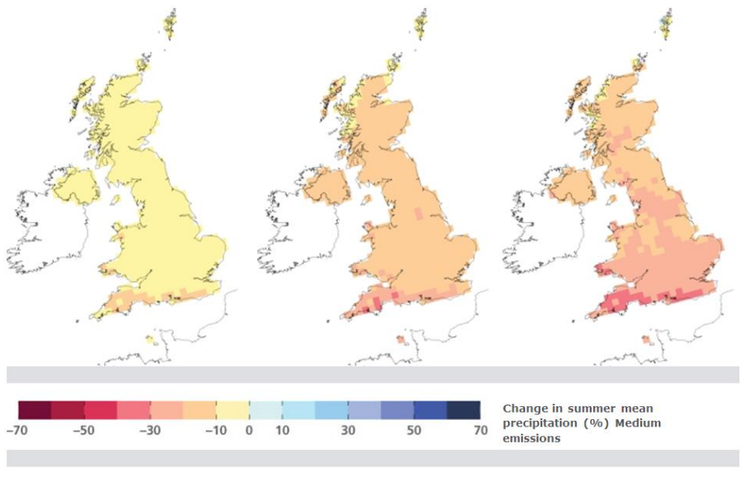
Detailed information about the major climatic changes expected in the UK is prepared by the UK Climate Impacts Programme (UKCIP) and is available as the UKCP09 (UK Climate Predictions 2009) climate change scenarios.

These climate projections, the fifth generation of climate information for the UK, have been developed to help understand the possible future climate; they are intended to inform practical decisions, helping society deal with the risks presented by climate change. The UKCP09 provides projections of climate change based on quantification of the known sources of uncertainty. UKCP09 does not provide a climate forecast, it provides a snapshot of the evidence for different potential climate scenarios which allows us to understand the likelihood of projected changes over three time slices (where 2020s is 2010-2039, 2050s is 2040-2069 and 2080s is 2070-2099) at particular locations and for given emissions scenarios.

The following maps show examples of central scenario projections for summer temperature and rainfall.



UKCIP projections for mean summer temperature in 2020s, 2050s, and 2080s. Data shown for the 50% probability level (central) for the medium emissions scenario. By the 2080s, average summer temperatures are predicted to be over 4℃ higher than now.



UKCIP projections for mean summer precipitation in 2020s, 2050s, and 2080s. Data shown for the 50% probability level (central) for the medium emissions scenario. By the 2080s, average summers will be up to 30% drier than now.

Higher summer temperatures

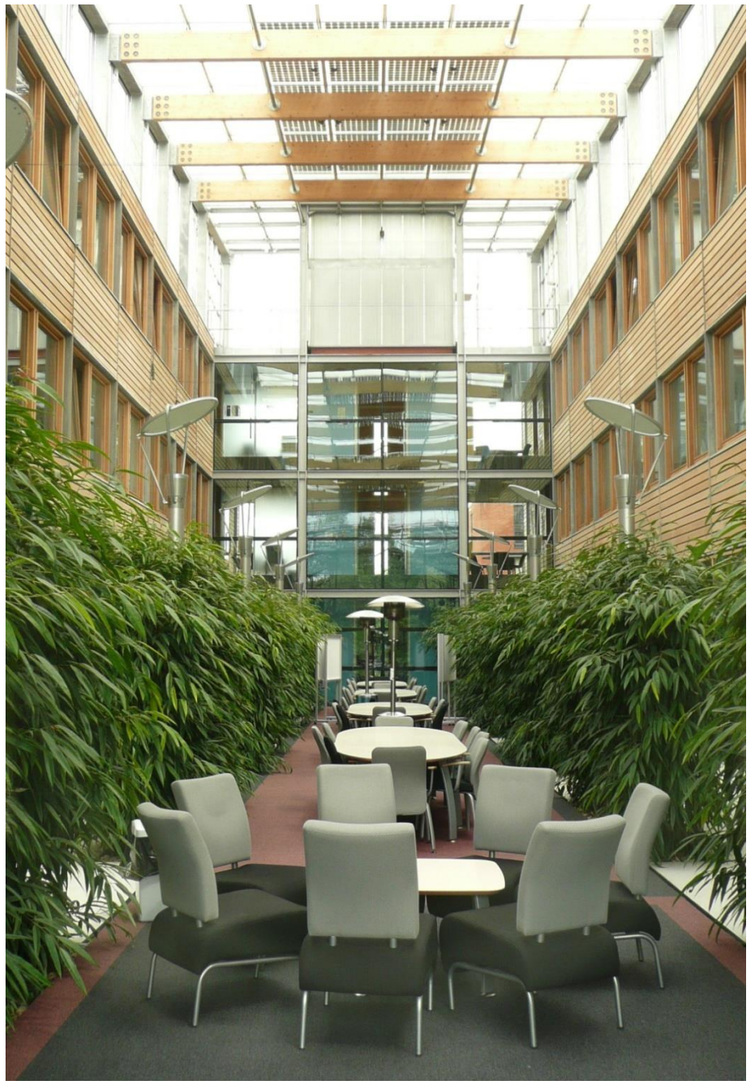
Higher summer temperatures could have two impacts on the built environment. Firstly higher peak temperatures may cause conditions which are uncomfortable for building residents with acceptable comfort criteria being exceeded on a regular basis. Secondly, higher temperatures (combined with lower annual rainfall) may affect ground conditions, and affect the structural stability of buildings and infrastructure. This second aspect is perhaps easier to cope with and requires foundations and infrastructure to be designed in such a way that they can cope with shifting ground conditions such as clay shrinkage. This will be assessed as part of the detailed design proposals for the Proposed Development.

Overheating presents more of a challenge and buildings need to be designed to provide natural ventilation and cooling to cope with higher summer temperatures for occupiers' comfort and investor confidence. Measures under consideration for the Proposed Development include:

- shallow plan and dual aspect buildings to allow cross ventilation. (This also means natural daylighting will be improved). Buildings will have sufficient areas of opening windows and secure shuttered ventilation to achieve this. Passive ventilation measures such as the inclusion of stack effect chimneys will be examined.
- Hard landscaping and building surface finishes with high albedo where beneficial to increase solar reflectivity. This means that less infrared radiation is absorbed. One simple way of doing this is to paint roofs white and use light coloured materials.
- The use of shading to reduce solar gains. Shading can be in a range of forms including external shutters, brise soleil, recessed windows, or natural vegetation (either growing up the building or neighbouring trees). Natural vegetation is particularly attractive because it can provide shading in the summer when required, but loss of leaves in the winter means better solar access. There is also the potential for evapo-transpiration to reduce external temperatures.
- High thermal mass buildings which provide a buffer to high daytime external temperatures.

To demonstrate that the design proposals function correctly at a detailed design stage, thermal modelling of buildings will use current climate data and also future weather data from the UK Climate Impacts Programme (UKCIP). The architect will be required to demonstrate that the designs are optimised for both and that the need for additional cooling has been minimised through passive design.

Brise soleil can be used to provide shading and minimise internal overheating. Natural stack ventilation is provided with vertical chimneys.



Internal shading and planting can be used to provide a cool pleasant environment for working.

Water supply

With lower annual levels of rainfall, water will become scarcer. In East Anglia, with already the lowest levels of rainfall in the UK, there will be a significant pressure on existing supplies.

The Proposed Development includes a number of features to reduce potable water demand:

- Water fittings and sanitary ware will be selected on the basis of low consumption, including dual flush toilets, aerated taps and showers, and intelligent water controls.
- Buildings will be designed to achieve high Code and BREEAM standards for water consumption resulting in design for 80 litres per person per day or less for all dwellings.
- Water will be metered for all buildings, via smart meters, allowing occupants to monitor and observe water consumption.
- Greywater and rainwater systems will be installed on a per building or communal basis to reduce the demand on mains water.
- Water for irrigation purposes will be sourced from rainwater or greywater systems.
- Any appliances provided will be designed for low water consumption. Green leases will require all users to use only low consumption devices.

Aerated shower heads reduce water consumption whilst maintaining pressure.

Greywater recycling means that less freshwater is needed for non-potable demands.

More intense weather

Climate change may mean that the UK experiences more intense weather events, for example more intense storms with higher winds and peak rainfall. Both buildings and the wider site infrastructure will need to be designed to cope with these.

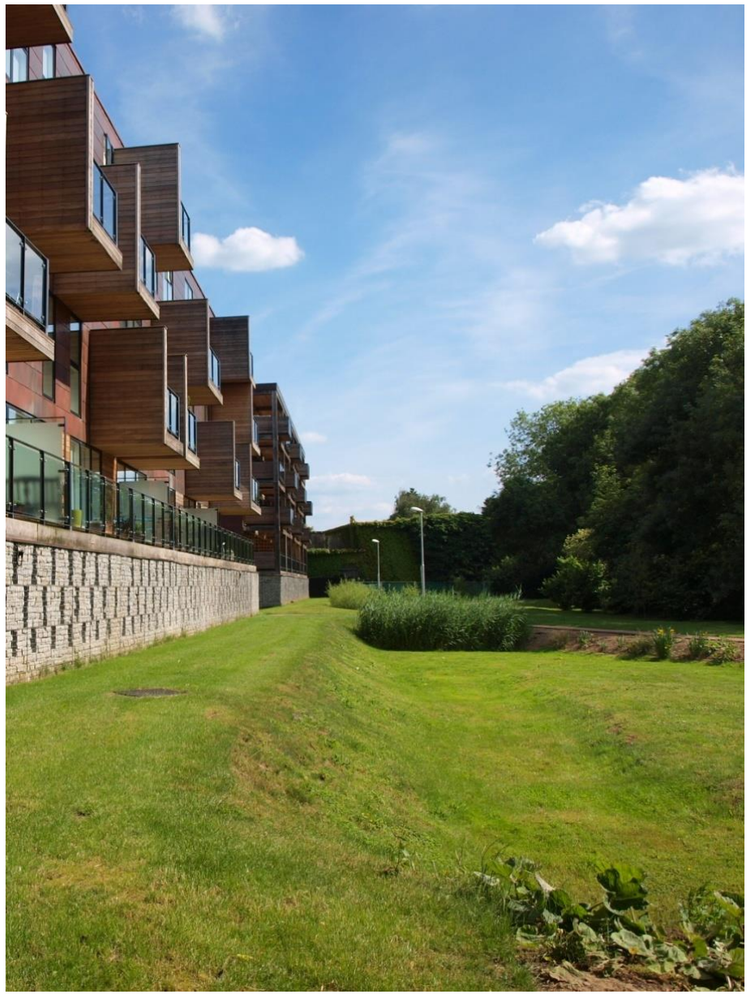
Buildings in the UK are currently designed with a large safety margin for wind loading and major structural failure is rare. However all the building designs will be required to demonstrate that they have considered increased wind loading on key components, for example shading devices, and that these are adequate for predicted future climatic conditions.

Predicted combinations of high wind and rainfall suggest that the building fabric will need to be impervious to driving rain. The use of roof overhangs and recessed windows would provide protection from driving rain and additional shading.

Predicted higher levels of winter rainfall suggest higher surface run-off and that flooding will result unless adaptation measures are incorporated. At a building scale, guttering and downpipes can be sized to allow for greater rainwater run-off to prevent damage to the structure. At the ground level, the use of Sustainable Urban Drainage Systems (SUDs) can provide a way of attenuating the run off.

The end result is that surface run-off will be no greater than for the existing greenfield site for a 1 in 100 year event modelled on 2050 rainfall scenarios from UKCIP.

Extended eaves provide shelter against intense rainfall.



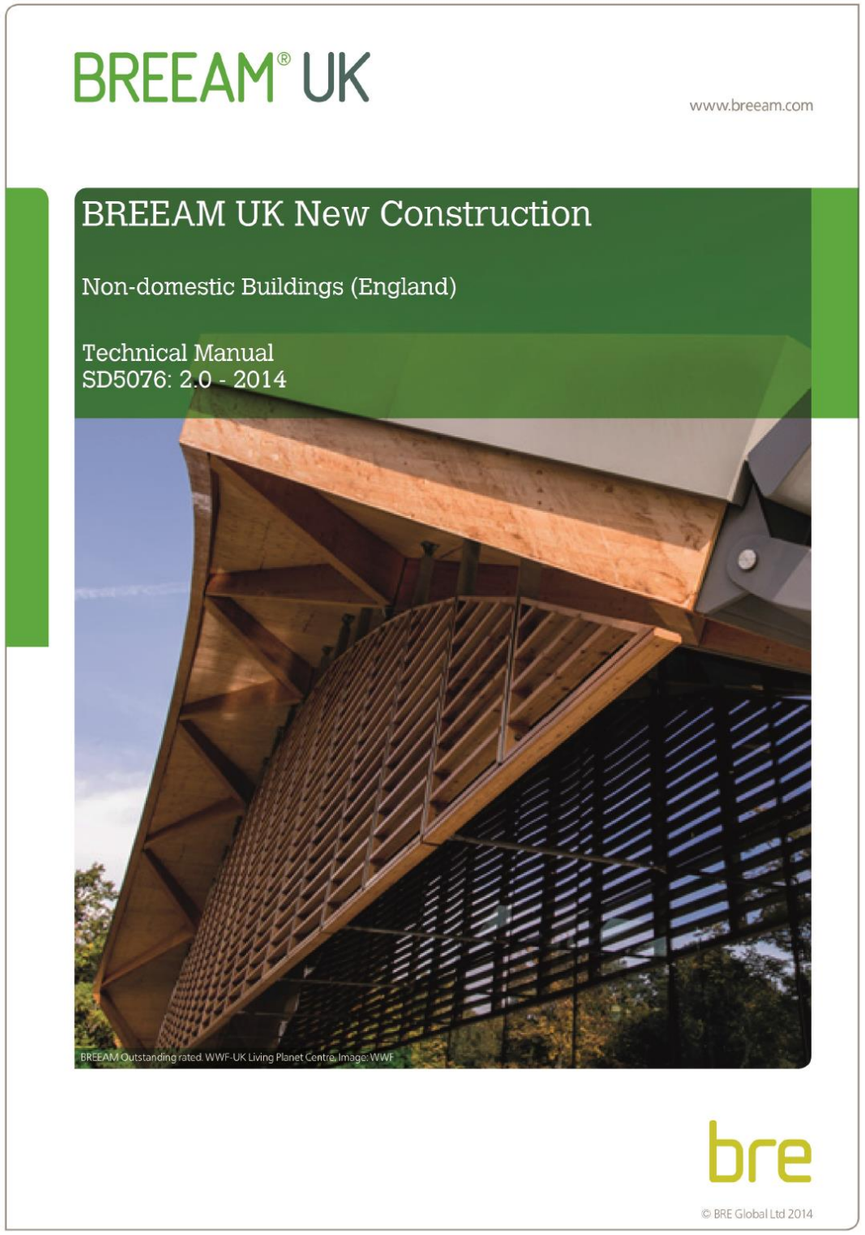
Swales can be used as part of a sustainable urban drainage strategy (SUDs) to attenuate run-off during intense rainfall.

Appendix 3: BREEAM

Introduction

The re-masterplanning of the University of Cambridge's West Cambridge site requires design and construction to a high sustainability standard in line with the University's policies and ambitions and with local planning guidance. The Sustainability Vision developed for the site states that there will be an expectation for new non-domestic buildings to be rated BREEAM Excellent or equivalent. A Sustainability Framework has been developed to drive the Masterplan and ensure that this level of sustainability is embedded in it from the earliest stages. Therefore, the Sustainability Vision indicates that new non-domestic buildings should be costed at BREEAM Excellent level.

This document highlights the mandatory credits and likely credits required in order to meet BREEAM Excellent rating under the BREEAM UK New Construction (NC) 2014 version of the standard. In particular it highlights credits that will have an effect on the development of the Masterplan and outline application proposals, and that need to be considered at this early stage of the design development so that they can be achieved.
Many of the environmental issues covered by BREEAM will only become relevant once the detailed design of individual buildings starts. For example, BREEAM gives credit for dedicated operational waste storage within units, and specifying water efficient sanitary ware. Whilst these issues impact on capital cost they are not relevant to the overall masterplanning of the site and can be incorporated at a later design stage.
The following tables therefore outline all of the BREEAM credits considered, and assumptions made, at the masterplanning stage.



BREEAM impact on masterplanning

BRE Environmental Assessment Method (BREEAM)

There are a number of BREEAM schemes for different types of non domestic buildings. The schemes are largely similar, but with changes to account for the specific building uses. In addition, the credit structure changes within schemes depending on the design and scope of the building.

The following table identifies where the BREEAM schemes impact on the development proposals at early stage masterplan design. These are highlighted in **blue** rows. Those credits which are mandatory (minimum requirements) are shown in **red**.

Due to the different credit requirements across schemes, and the required flexibility in meeting targets, individual credit ratings are not provided at the current stage.

ID	Issue (red = mandatory)	Notes
MANAGEMENT		
Man 1 (A)	Project brief and design - stakeholder consultation	Consultation at concept design stage and beyond.
Man 1 (B)	Project brief and design - sustainability champion	Required to be a BREEAM AP and to be in place at Stage 1 and through the design process.
Man 2	Life cycle cost and service life planning	An elemental life cycle cost (LCC) analysis to be carried out at Stage 2; a component level LCC plan at Stage 4; and a capital cost reporting on £/m2. To be addressed by developer and design team at detailed design.
Man 3 (A)	Responsible construction practices - minimum requirement	All timber and timber based products used on the project is 'Legally harvested and traded timber'. To be addressed by developer and design team at detailed design.
Man 3 (B)	Responsible construction practices - environmental management	Contractors to operate accepted EMS. To be addressed by developer and design team at detailed design.
Man 3 (C)	Responsible construction practices - construction sustainability champion	To be addressed by developer and design team at detailed design.
Man 3 (D)	Responsible construction practices - considerate construction	Contractors to operate accepted considerate construction scheme. To be addressed by developer and design team at detailed design.
Man 3 (E)	Responsible construction practices - monitoring of construction-site impacts	To be addressed by developer and design team at detailed design.
Man 4 (A)	Commissioning and handover - commissioning and testing schedule and responsibilities	To be addressed by developer and design team at detailed design.
Man 4 (B)	Commissioning and handover - commissioning building services	To be addressed by developer and design team at detailed design.
Man 4 (C)	Commissioning and handover - testing and inspecting building fabric	To be addressed by developer and design team at detailed design.
Man 4(D)	Commissioning and handover - handover	Building user guide is mandatory. To be addressed by developer and design team at detailed design.
Man 5 (A)	Aftercare - Aftercare support	To be addressed by developer and design team at detailed design
Man 5 (B)	Aftercare - seasonal commissioning	To be addressed by developer and design team at detailed design
Man 5 (C)	Aftercare - post occupancy evaluation)	To be addressed by developer and design team at detailed design
HEALTH AND WELLBEING		
Hea 1 (A)	Visual comfort - glare control	The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures. The glare control strategy avoids increasing lighting energy consumption.
Hea 1 (B)	Visual comfort - daylighting	Daylight analysis to identify potential issues with daylighting for input to application proposals. 2% daylighting will be targeted in all relevant areas.
Hea 1 (C)	Visual comfort - view out	95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥ 20% of the surrounding wall area. To be addressed by developer and design team at detailed design.
Hea 1 (D)	Visual comfort - internal and external lighting	To be addressed by developer and design team at detailed design.
Hea 2 (A)	Indoor air quality – minimising sources of air pollution: indoor air quality plan	To be addressed by developer and design team at detailed design.
Hea 2 (B)	Indoor air quality – minimising sources of air pollution: ventilation	Landscaping and site design to help provide buffer zones between buildings and car parks and roads. Where practicable air intakes will be located 20m from sources of external pollution.
Hea 2 (C)	Indoor air quality – minimising sources of air pollution: VOC emissions levels	To be addressed by developer and design team at detailed design.
Hea 2 (D)	Indoor air quality – adaptability: potential for natural ventilation	Buildings to make use of narrow floor plans where appropriate to allow natural ventilation through cross-flow and the stack effect.
Hea 3	Safe containment in laboratories	To be addressed by developer and design team at detailed design.
Hea 4	Thermal comfort	To be addressed by developer and design team at detailed design.
Hea 5	Acoustic performance	Suitably qualified acoustician to advise on influencing outline design solutions.

ID	Issue (red = mandatory)	Notes
Hea 6 (A)	Safety and security - safe access	Footpaths and cycleways will be designed using the best practice guidance, and in line with BREEAM access requirements.
Hea 6 (B)	Safety and security - security of site and building)	A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design.
ENERGY		
Ene 1	Reduction of energy use and carbon emissions	The number of credits will depend on the individual building design, but the proposed energy strategy should result in a large number of credits being achieved to meet the mandatory requirements.
Ene 2	Energy monitoring	To be addressed by developer and design team at detailed design.
Ene 3	External lighting	To be addressed by developer and design team at detailed design.
Ene 4 (A)	Low carbon design - passive design analysis	Identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services To be addressed by developer and design team at detailed design.
Ene 4 (B)	Low carbon design - free cooling	To be addressed by developer and design team at detailed design.
Ene 4 (C)	Low carbon design - LZC feasibility study	A feasibility study to be carried out by the completion of the by an energy specialist to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development.
Ene 5	Energy efficient cold storage	To be addressed by developer and design team at detailed design.
Ene 6 (A)	Energy efficient transportation systems – energy consumption	To be addressed by developer and design team at detailed design.
Ene 6 (B)	Energy efficient transportation systems – energy efficient features	To be addressed by developer and design team at detailed design.
Ene 7 (A)	Energy efficient laboratory systems – design specification	Client engagement is sought through consultation during the preparation of the initial project brief (RIBA Stage 1 or equivalent) to determine occupant requirements and define laboratory performance criteria.
Ene 7 (B)	Energy efficient laboratory systems – best practice energy efficiency measures	Best practice energy efficiency measures are specified to at least the minimum standards in BREEAM NC 2014. To be addressed by developers and design team at detailed design.
Ene 8	Energy efficient equipment	Reduction in building's unregulated energy consumption. To be addressed by developer and design team at detailed design.
Ene 9	Drying space	To be addressed by developer and design team at detailed design (only for dwellings).

ID	Issue (red = mandatory)	Notes
TRANSPORT		
Tra 1	Public transport accessibility – accessibility index	The number of credits will depend on the exact location of the building and relevant services. Planning with local service providers and the transport consultants is advisable. Addressed in Sustainable Transport strategy for the site.
Tra 2	Proximity to amenities	To be considered at masterplan stage.
Tra 3	Cyclist facilities	BREEAM compliant cycling facilities should be designed.
Tra 4	Maximum car parking capacity	A maximum car parking capacity should be decided upon with reference to the BREEAM credit thresholds.
Tra 5	Travel plan	Develop a BREEAM compliant travel plan to support the planning application - A site specific travel assessment/statement to be undertaken to ensure the travel plan is structured to meet the needs of the particular site
WATER		
Wat 1	Water consumption	Develop a site-wide water strategy if appropriate, considering rainwater and greywater recycling, as well as demand reduction measures.
Wat 2	Water monitoring -criterion 1 mandatory only	To be addressed by developer and design team at detailed design.
Wat 3	Water leak detection and prevention	To be addressed by developer and design team at detailed design.
Wat 4	Water efficient equipment	The design team identifies all unregulated water demands that could be realistically mitigated or reduced. External planting is drought resistant and/or relies solely on precipitation and/or uses reclaimed water for irrigation
MATERIALS		
Mat 1	Life cycle impacts	Masterplan to mandate building's quantified environmental life cycle impact through assessment of the main building elements using the BREEAM Mat 01 calculator for selection of materials with lower impacts. To be addressed by developer and design team at detailed design.
Mat 2	Hard landscaping and boundary protection	Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. To be considered at masterplan stage for consistency across the site, allowing individual developments to coordinate.
Mat 3 (A)	Responsible sourcing of materials - mandatory criterion	Legally harvested and traded timber to be addressed by developer and design team at detailed design.
Mat 3 (A)	Responsible sourcing of materials – sustainable procurement plan	To be addressed by developer and design team at detailed design.
Mat 3 (B)	Responsible sourcing of materials - RSM	To be addressed by developer and design team at detailed design.

ID	Issue (red = mandatory)	Notes
Mat 4	Insulation	To be addressed by developer and design team at detailed design.
Mat 5	Designing for durability and resilience	Buildings to incorporate suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements.
Mat 6	Material efficiency	Opportunities to be identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life.
WASTE		
Wst 1 (A)	Construction waste management - Construction resource efficiency	Targets set at masterplanning stage. To be further addressed by developer and design team at detailed design.
Wst 1 (B)	Construction waste management - diversion of resources from landfill	Targets set at masterplanning stage. To be further addressed by developer and design team at detailed design.
Wst 2	Recycled aggregates	To be addressed by developer and design team at detailed design.
Wst 3	Operational waste	To be addressed by developer and design team at detailed design.
Wst 4	Speculative floor And ceiling finishes	To be addressed by developer and design team at detailed design.
Wst 5 (A)	Adaptation to climate change – structural and fabric resilience	Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by Concept Design.
Wst 5 (B)	Adaptation to climate change – responding to adaptation to climate change	Holistic approach to climate change adaptation considered – actions on other criteria determine this criterion.
Wst 6	Functional adaptability	A building-specific functional adaptation strategy study to be undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation. Some consideration is needed at masterplan stage, but it is to be fully addressed by developer and design team at detailed design.
LAND USE AND ECOLOGY		
LE1 (A)	Site selection - previously developed land	Site already selected.
LE1 (B)	Site selection - contaminated land	Site already selected. Carry out land contamination study.
LE2	Ecological value of site and protection of ecological features	Ecologist to be appointed and consulted to advise if any of the credits for LE are achievable.
LE3	Minimising impact on existing site ecology	Ecologist to be appointed and consulted to advise if any of the credits for LE are achievable. Carry out ecology survey of the site.
LE4 (A)	Enhancing site ecology - ecologist's report and recommendations	Ecologist to be appointed and consulted to advise if any of the credits for LE are achievable. Carry out ecology survey of the site.
LE4 (B)	Enhancing site ecology – increase in ecological value	Ecologist to be appointed and consulted to advise if any of the credits for LE are achievable. Carry out ecology survey of the site.
LE5	Long term impact on biodiversity	Ecologist to be appointed and consulted to advise if any of the credits for LE are achievable. Carry out ecology survey of the site.
POLLUTION		
Pol 1 (A)	Impact of refrigerants	To be addressed by developer and design team at detailed design.
Pol 1 (B)	Refrigerant leak detection	To be addressed by developer and design team at detailed design.
Pol 2	NOx emissions	Energy centre design and connections to impact the NOx emission levels. Consider which buildings are to be served by the site-wide heat network.
Pol 3 (A)	Surface water run off - flood risk	Carry out site specific flood risk assessments
Pol 3 (B)	Surface water run-off - pre-requisite	An appropriate consultant to be appointed to carry out, demonstrate and confirm development's compliance with surface water run-off performance criteria.
Pol 3 (C)	Surface water run-off - minimise watercourse pollution	An appropriate consultant to be appointed to confirm rainfall discharge levels and pollution prevention as appropriate.
Pol 4	Reduction of night time light pollution	To be addressed by developer and design team at detailed design.
Pol 5	Reduction of noise pollution	Noise impact assessment must be carried out by a suitably qualified acoustic consultant

It should be noted that additional BREEAM credits could be obtained for Approved Innovation: this is defined as any new technology, design, construction, operation, maintenance or demolition method or process that can be shown to improve the sustainability performance of a building and is of demonstrable benefit to the wider industry in a manner that is not covered elsewhere in BREEAM. In addition the innovation has to be approved by BRE Global in accordance with its published BREEAM Innovation credit procedures.

Appendix 4: Policy review – setting a sustainability framework

Legal Drivers

The challenge of climate change and the need to stabilise CO_2 levels in the atmosphere whilst enabling sufficient growth to support the UK's growing population has intensified. There is now a comprehensive range of legislation and policy at various scales which support the design and implementation of measures and approaches to ensure new development is sustainable and 'low carbon' as a result of energy efficiency measures and appropriate selection of energy sources.

The **UK Climate Change Act (2008)** sets a legally binding target for reducing UK CO_2 emissions by at least 80% from 1990 levels by 2050. To achieve this, a number of carbon budgets have been developed which set out CO_2 reduction targets every 5 years from 2008. The second budget covers the current period to 2017, and the third and fourth budgets have been agreed to 2027.

Budget	Carbon budget level	% reduction below base year
1st Carbon budget (2008-12)	3,018 $MtCO_2e$	23%
2nd Carbon budget (2013-17)	2,782 $MtCO_2e$	29%
3rd Carbon budget (2018-22)	2,544 $MtCO_2e$	35% by 2020
4th Carbon budget (2023-27)	1,950 $MtCO_2e$	50% by 2025

The Act and carbon budgets are supported by the **Carbon Plan (2011**) which sets out how the budgets will be met.

The **Building Regulations Part L** set maximum limits for CO_2 emissions from buildings and provide minimum efficiency standards for fabric and building services. Part L is revised every few years to become more stringent. Initial phases at West Cambridge will have to attain at least the minimum standards required by Part L 2013, and other phases will need to meet future versions when announced.

Floods and Water Management Act 2010. The aim of the Act is to provide better, more comprehensive management of flood risk for people, homes and businesses.

The **National Planning Policy Framework** (NPPF) came into force in March **2012**. This document consolidates over two-dozen previously issued Planning Policy Statements (PPS) and Planning Policy Guidance Notes (PPG) for use in England. The NPPF has significant impact on local planning policy in respect of sustainability. It states that "Policies in Local Plans should follow the approach of the presumption in favour of sustainable development so that it is clear that development which is sustainable can be approved without delay". As part of plan-making and decision-taking, a set of 12 principles are established in the NPPF which are developed under the following themes:

- Building a strong, competitive economy, whereby significant weight should be placed on the need to support economic growth through the planning system.
- Ensuring the vitality of town centres, via the application of a sequential test to planning applications for main town centre uses that are not in an existing centre and are not in accordance with an up-to-date Local Plan.
- Supporting a prosperous rural economy, in order to create jobs and prosperity by taking a positive approach to sustainable new development.
- Promoting sustainable transport, with encouragement given to solutions which support reductions in greenhouse gas emissions and reduce congestion. Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised. Plans should also protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people. A key tool to facilitate this will be a Travel Plan.
- Supporting high quality communications infrastructure, recognising that advanced, high quality communications infrastructure is essential for sustainable economic growth.
- Delivering a wide choice of high quality homes, considering housing applications in the context of the presumption in favour of sustainable development.
- Requiring good design, as this is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people.
- Promoting healthy communities, by delivering the social, recreational and cultural facilities and services that each community needs.
- Protecting Green Belt land. Local planning authorities should plan positively to enhance the beneficial use of the Green Belt, such as looking for opportunities to provide access; to provide opportunities for outdoor sport and recreation; to retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land.
- Meeting the challenge of climate change, flooding and coastal change, by adopting proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.
- Conserving and enhancing the natural environment, where the aim should be to minimise pollution and other adverse effects on the local and natural environment.
- Conserving and enhancing the historic environment, by setting out in a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats.
- Facilitating the sustainable use of minerals, to make best use of them to secure their long-term conservation.

Floods and Water Management Act 2010

The aim of the Act is to provide better, more comprehensive management of flood risk for people, homes and businesses. The main responsibilities of the Act will lie with local authorities. A key feature of the Act is encouragement of the uptake of sustainable drainage systems by providing for unitary and county councils to adopt Sustainable Drainage Systems (SUDS) for new developments and redevelopments.

UK Waste Strategy for England 2007

Produced by Defra, this and other UK policy, legislation and regulations result in obligations on local authorities and on businesses to manage and handle waste more safely and sustainably. Key objectives of the waste strategy are to reduce the amount of waste going to landfill through promoting waste minimisation, reuse and recycling. Although not produced as national planning guidance, this strategy is a key driver in the development of local policies and targets for waste reduction.

Local Policy Drivers

An important document which can be used as additional guidance is the Cambridge City Council 'Sustainable Design and Construction' Supplementary Planning Document (SPD) adopted in June 2007.

This document lays down the principles of sustainable design in the context of Cambridge and provides design advice on how these can be met. The document is split into 'essential' considerations, and 'recommended' considerations, the latter being applicable for large sites.

In this sustainability statement, the relevant elements of the Sustainable Design and Construction SPD and sustainability checklist are referenced in each section to show how the relevant issues have been addressed.

Environmental assessment methodologies

BREEAM

The BRE Environmental Assessment Method (BREEAM) provides an overall rating for a building based on performance against different credits. Ratings are given from Pass to Outstanding. BREEAM is the most established assessment scheme for non-domestic buildings in the UK although there are other schemes available with a similar assessment and credit structure which are also used in the UK.

The University requires all non domestic buildings to achieve a BREEAM rating of Excellent. This introduces requirements on maximum CO_2 emissions and other constraints where the achievement of credits is either mandatory or a minimum standard must be attained.

For BREEAM, certificates are issued by independent accredited assessors. An outline assessment of the factors affected at the masterplan design stage has been conducted and is referenced in this statement. It is important to note that the assessment criteria will almost certainly change during the build out of the Proposed Development and the detailed proposals may need to respond to these changes.

Appendix 5: Cambridge City Council Sustainable Design and Construction SPD Checklist

This section provides a completed version of the Sustainability Checklist from the Cambridge City Council Sustainable Design and Construction SPD, 2007. The checklist has been completed for all Outline Planning considerations.

Theme	Checklist	Comment	Location within statement
Transport	Have you demonstrated that the development is in the most suitable location for access by public transport, walking and cycling?	As an existing site, there is no opportunity to change site location.	N/A
	Have you demonstrated how the design of the development helps reduce the need to travel, especially by private car?	TLC1.2 sets out the site targets/aims with respect to reducing the need to travel by private car. The strategy is covered in the Travel Plan	Principle 5: Transport & Mobility Travel Plan
	Do the development proposals for walking and cycling link with the surrounding walking and cycling network?	Yes	Travel Plan
	Are existing walking and cycling routes retained, and improved where possible?	Yes	Travel Plan
	Will the proposed walking and cycling provision be in place by first occupation of the development so that sustainable travel patterns can be established at an early stage?	The site is part developed already, so not applicable	-
	Do the development proposals provide cycle parking in accordance with the Local Plan Parking Standards (Local Plan Appendix D), in number, location and design?	TLC1.3a sets the standards that the proposed development is targeting	Principle 5: Transport & Mobility Travel Plan
	What is the car parking strategy?	TLC1.2b informs the targeted site strategy for car parking, which aims to minimise individual car use	Principle 5: Transport & Mobility Travel Plan
	Does the transport provision conform to established good practice, particularly in terms of wildlife and landscape factors, so that any adverse impact is minimised?	Detailed planning work has been done on transport and all issues have been discussed and developed in consultation with the Local Authorities.	Travel Plan and Transport Assessment
	Have any 'softer' measures been included, to encourage uptake of more sustainable modes of transport?	Yes, TLC1.2b outlines some of the strategies the proposed development is implementing to promote more sustainable transportation. Details of cycling facilities provided are included in the Travel Plan – sections 6.6.11, 6.6.16, 6.6.18	Principle 5: Transport & Mobility
	Does the development inhibit the expansion of high quality public transport routes?	No – the plans are supportive of additional public transport and depend upon them	Travel Plan

Theme	Checklist	Comment	Location within statement
	Are the development proposals accessible to those with impaired mobility?	Access for impaired will be catered for and considered in detail at detailed design.	Principle 5: Transport and mobility Principle 7: Collaboration and Inclusion
	For non-residential proposals likely to attract a large number of trips, has the sequential approach been followed? (i.e. preference is given to a more central location)	Yes	Travel Plan
	If appropriate, has proper consideration given to the potential for movement of goods and materials by rail or water?	Not applicable.	Not applicable
	If the development is within an urban extension area, is it served by a high quality public transport service (as defined by the Local Plan), within a 400 metre walk of all new housing?	Not applicable.	Not applicable
SUDS	Has adequate information been provided in response to questions 1-3 of the Design Accreditation Checklist? (See Appendix B)	Yes	Principle 2: Water Flood Risk Assessment & Drainage Strategy
	Has sufficient technical information from the Design Information Checklist been provided? (See Appendix B)	Yes Criteria 1.1 - Set out in FRA Section 8. Criteria 2.1 - Set out in FRA Section 8.7. Criteria 2.2 - Set out in Section 3.3 and 8.4 of FRA. Criteria 3.1 - Set out in section 8.7 and 8.15 of FRA. Criteria 3.2 - Set out in Section 8.14 and 8.15.4 of FRA. Criteria 3.3 - Set out in Section 8.16.1 Criteria 3.4 – although not specifically stated – a review of the drainage strategy plan shows that site Control is being implemented.	Principle 2: Water Flood Risk Assessment & Drainage Strategy
	Have sufficient soakage tests been carried out on site?	Not applicable. Brownfield site underlain by clay. Addressed in Section 8.4 of FRA	Principle 2: Water Flood Risk Assessment & Drainage Strategy
	Does the proposal meet the principles set out in the Design Principles section of Section 7 of the SPD?	Yes	Principle 2: Water Flood Risk Assessment & Drainage Strategy
Energy	Has the 10% CO_2 reduction required been established using the most appropriate benchmark(s)?	Yes	Energy Strategy
	Has all onsite energy been included, including process energy where applicable?	As far as is possible at outline planning stage	Energy Strategy
	Has the Energy Statement form provided been completed? (Appendix C1)?	Yes, this has been included in the Energy Strategy.	Energy Strategy
	Has initial feasibility work into renewable options for the development been provided?	Yes, this has been considered in the Energy Strategy.	ENERGY STRATEGY REFETRENCE Principle 1: Energy & Climate Change

Theme	Checklist	Comment	Location within statement
Recycling and Waste Facilities	Have the size and location of recycling and waste facilities, both for storage and collection, been provided?	Not at this stage – RCC4.3 outlines requirements for operational waste strategy to be outlined in the Design Briefs	Principle 4: Waste
Biodiversity	Has an appropriate survey been conducted, with sufficient detail given the nature and size of the site and the proposed development?	Arboricultural and ecology impact assessment has been carried out.	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
	If a protected or priority species has been identified, has a specialist been engaged to conduct a detailed survey?	Covered in the EIA Ecology section No specific issues required	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
	Has all the relevant information from these surveys been provided?	Not required	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
	Has it been demonstrated how existing habitats and species have been protected through the proposed ecological and landscape strategy?	Yes, strategy laid out in ecology document	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
	Has it been demonstrated how any potentially adverse effects have been mitigated?	Yes, strategy laid out in ecology document	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
	Has it been demonstrated that existing habitats have been enhanced and new ones have been created?	This is to be developed further in detailed design	Principle 10: Biodiversity & Ecology
	Has it been demonstrated that adequate compensation measures have been proposed where it is agreed that damage is unavoidable?	Not applicable.	Principle 10: Biodiversity & Ecology Covered in the Environmental Statement Ecology chapter
Pollution	Has an assessment of the need for lighting been carried out and the principles of an external lighting strategy that meets the requirements of the policy been set out?	Lighting is needed across the masterplan public areas and addressed In Design Guidance document	
	If the answer to any of the questions 1-9 below is yes, then an Air Quality Assessment is likely to be required and further guidance should be sought from the Environmental Services Scientific Team (see section 2.7 of SPD)	An air quality assessment has been carried out	Principle 11: Pollution
	1) Does the development provide more than 50 new parking spaces or more than 25 if it is within an existing AQMA?	Yes	Environmental Statement: Air quality chapter
	2) Is the development within an AQMA and a sensitive development (Residential, school, healthcare, childcare etc.)?	No	Environmental Statement: Air quality chapter
	3) Is the development a prescribed industrial process under the PPC regulations?	No	Environmental Statement: Air quality chapter
	4) Is the development a sensitive development close to an existing prescribed Process?	No	Environmental Statement: Air quality chapter

Theme	Checklist	Comment	Location within statement
	5) Will the development significantly alter flows or speeds on busy roads greater than 10,000 vehicles per day or any road within an AQMA? Where 'significantly' is defined as including any of the following: • Change in traffic volume of 2% AADT or 1% AADT within the AQMA • Change in average vehicle speed of 5kph or a significant increase in congestion • A change in the modal split to a greater percentage of Heavy Duty Vehicles(HDVs) including buses	Potentially, but addressed in air quality and transport assessments	Environmental Statement: Air quality chapter
	6) Is the development part of a major phased redevelopment?	This document is in support of the OPA for a major phased development.	Environmental Statement: Air quality chapter
	7) May the development create a street canyon or reduce dispersion of pollutants?	No, the buildings are not tall or close together	Environmental Statement: Air quality chapter
	8) Will the development significantly alter the road or rail network?	Not beyond the site boundary	Environmental Statement: Air quality chapter
	9) Will the proposals interfere with the Air Quality actions stated in the Local Transport Plan or Local Air Quality Action Plan?	Covered in the Air Quality assessment which forms part of the EIA	Environmental Statement: Air quality chapter
	Is there a previous potentially contaminative use?	No	Environmental Statement: Ground Conditions chapter
	If yes, has a desk top study been undertaken and included with the application?	N/A	Not required
	Has the potential impact of noise from the development or noise from adjoining sites which might affect the development been assessed?	Covered in the noise chapter of the EIA	Covered in the noise chapter of the Environmental Statement
	Has the impact of construction noise been assessed and mitigation proposed?	Covered in the noise chapter of the EIA	Covered in the noise chapter of the Environmental Statement
Climate Change	How have the layout, orientation and any landscaping proposals for the development taken into account predicted climate change impacts?	RCC1.2a and RCC1.6a show the aims guiding the development of the energy strategy and its principles for addressing climate change. These principles will be included in the Design Briefs.	Principle 1: Energy & Climate Change Energy Strategy
	What other measures have been incorporated into the development to enable it to adapt to cope with predicted climate change impacts, without increasing use of energy consuming ventilation and cooling?	RCC1.2a and RCC1.6a show the aims guiding the development of the energy strategy and its principles for addressing climate change. These principles will be included in the Design Briefs.	Principle 1: Energy & Climate Change Energy Strategy
Water	Has a target been set for the reduction of water consumption for the development?	RCC2 gives the proposed targets for water for the site	Principle 2: Water
Materials and Construction Waste	Has a target been set for improving the environmental impact of materials used in constructing the development?	RCC3 shows the proposed strategies and targets with respect to material use for the development.	Principle 3: Materials

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