

4.8 Celebrating natural heritage

The natural heritage of the Knowledge Quarter’s parks, gardens and streets will be protected, enhanced and valued as distinct assets.

The Knowledge Quarter and its context has a rich heritage of parks, gardens and streets dating back over two centuries that form an important starting point for the Green Infrastructure plan. Some are as important visitor attractors in their own right.

These assets include the parks and gardens of St James’s Gardens and Falkner and Abercromby Squares, and the surrounding Georgian streets, several of which have had street trees added to them during the 20th Century. The potential to enhance their value as assets within a wider Quarter has a key role to play

St James’s Gardens is the most significant GI asset of the quarter, with its rich historic environment including St James’ Mount – Liverpool’s first public park dating from 1767. Restoration of the Gardens under the supervision of the late Professor Tony Bradshaw and the Friends of St James’s Gardens enhanced its value as an oasis of native and exotic trees and habitats.

The Garden’s role is, however, currently undervalued by the poor quality of the access along Hope Street. This could be improved by setting back the boundary and creating three new entrances from the streets onto the sloped causeways. This would create elevated green promenade along the East side.

Georgian streets were often designed without trees in order to emphasise the role of pocket parks and squares. The street trees of the Knowledge Quarter’s distinct Georgian streets are therefore a later addition. Nonetheless their maturity and distinct contribution to the streetscape and habitat value is well recognised.

Dating from 1835 Falkner Square was one of the earliest formal open spaces in the city. Nearby was one of the early sites for William Roscoe and the Liverpool Botanic Society’s botanic garden – an urban ‘elysium’ that would help soothe any viewer. It later moved to Wavertree but the garden’s borders continue to be planted to be representative of the exhibits of ornamental grasses, herbaceous plants and shrubs.

As indicated by our site survey newer urban parks such as Everton whilst being less rich in heritage quality, do have potential to play a significant role in the Quarter’s Green Infrastructure. As discussed in Section 4.3 this could be achieved through remodelling to attract more use and application of different landscape management techniques to enhance biodiversity.

Key benefits from celebrating natural heritage

- **Land and property values:** Investment in major parks and gardens would enhance the value of adjacent sites.
- **Tourism:** By celebrating and investing in the Quarter’s heritage people will be attracted to visit and explore the area;
- **Health and wellbeing:** By investing in the Quarter’s parks and gardens the value of important tranquil spaces will be protected and enhanced;
- **Land and biodiversity:** Larger parks and gardens would play an enhanced role as significant stepping stones for biodiversity;
- **Climate change adaptation and mitigation:** Larger parks and gardens would continue to play a major role in moderating extremes in the Quarter’s urban microclimate;

Design principles

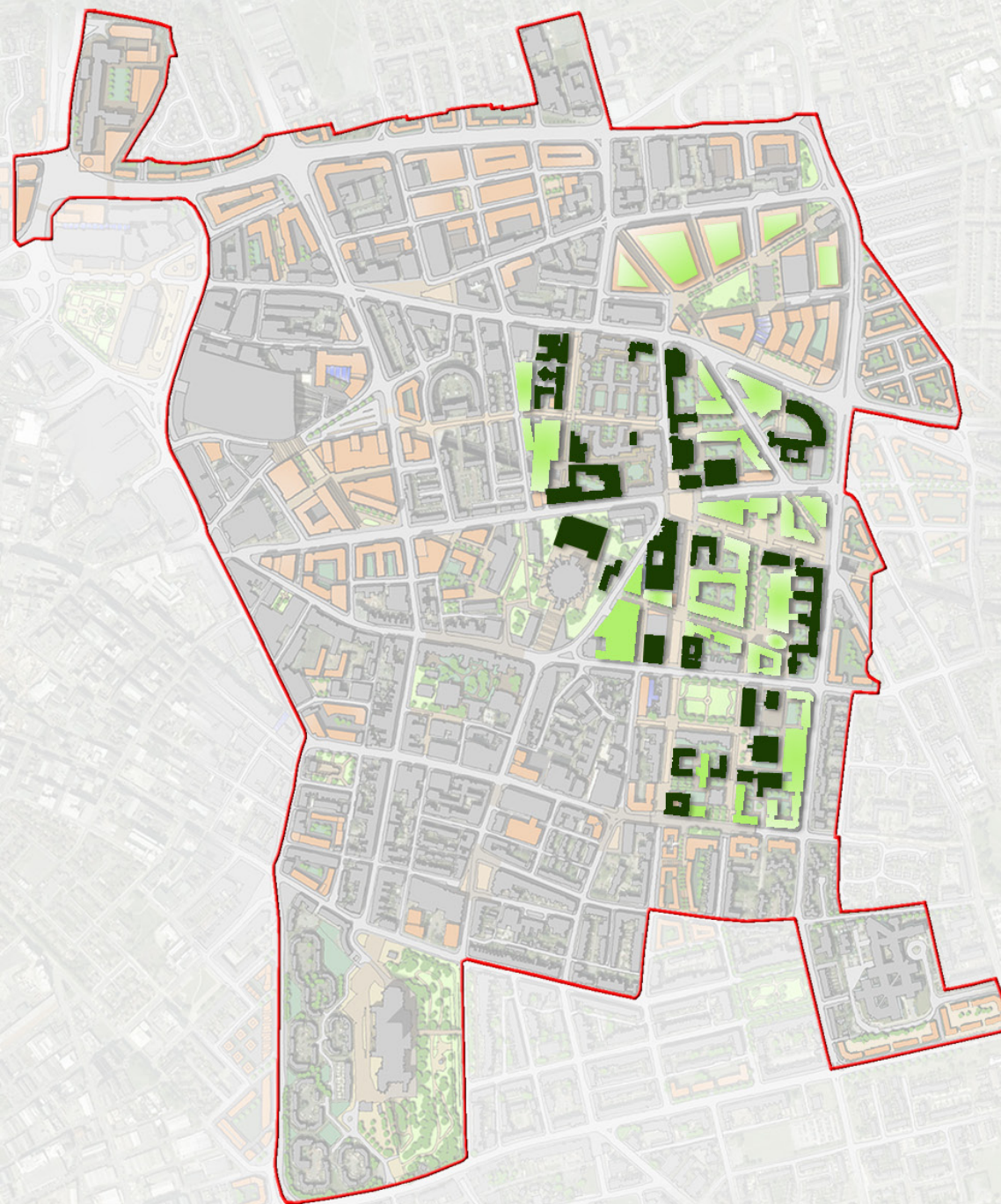
- Heritage assets should be protected, with access and related interpretation improved so that their value and history can be celebrated;
- The habitats and biodiversity of the Quarter’s natural heritage should be surveyed and documented, following the approach of William Roscoe;
- The species of trees and shrubs should be to used to inform a pattern book for planting in similar streetscapes and spaces across the quarter;

Implementation issues

- Joint working would be required between the Liverpool Botanic Society, the University’s Botany Department, Friends of St James’s Gardens and the Council’s parks and environment Department;



Green Roofs



Key	
	Commercial & public sector green roofs
	Retrofit green roofs

4.9 Building value ecologically

Buildings as well as streets and spaces will form part of the mosaic, with green roofs and facades enhancing the skyline and providing ecological services such as comfort cooling for occupiers.

There is increasing evidence of the benefit of integrating green roofs and facades into buildings. This represents an opportunity in the Knowledge Quarter to demonstrate the potential for ecological engineering solutions, with the benefits realised by estates managers and building occupants including:

- A cooling effect in summer, reducing the energy and costs associated with running electric chillers for comfort cooling;
- Greater retention time for rainfall run-off, so reducing the possibility for drains to be flooded;
- Reduced wind chill on facades in winter;
- Protection of roof membranes;

Extensive green roofs with a greater depth of soil (of at least 150mm) and a range of planting has been shown to deliver the greatest benefits.

The Knowledge Quarter contains a range of existing buildings with flat roofs which could be retrofitted with green roofs – as highlighted and reviewed by Mersey Forest, who estimated that 41% of the roof area was suitable, equating to 20.3 hectares. In particular larger floor plate, deep plan depth modern offices and University buildings with cooling loads to counter overheating are likely to benefit the greatest.

There are a number of notable recent examples of new green roofs in and around the quarter, including the Cathedral visitors centre, John Moore's Cherie Booth building and new Art and Design Academy, and the Environmental Academy. This creates an emerging body of local experience with green roofs.

The extensive proposed programme of new-build for both the Universities and the NHS Trust create the opportunity to integrate green roofs into design and procurement. As we explore in Section 4.9 these green roofs could be designed as spaces in their own right for people to use and benefit from.

Key benefits from green roofs and facades

- Economic growth and investment: The incorporation of Green Infrastructure into buildings will enable building owners and occupiers to control and reduce their energy costs and carbon emissions;
- Land and property values: A combination of reduced energy costs and carbon emissions with more attractive buildings will work to raise land values;
- Labour productivity: Enhancing views across the city's roofline and introducing a natural edge into the built environment would contribute to a more productive workforce;
- Flood alleviation and management: Green roofs would significantly attenuate run-off from rainfall;
- Climate change adaptation and mitigation: Integration of green infrastructure into buildings would reduce buildings' cooling demand;

Design principles

- A preference for extensive green roofs in order to maximise the overall benefits to occupiers and wider management;
- Where practical roofs should be designed to incorporate access for people to enjoy rooftop habitats and views;
- Green roofs should be planted with a diversity of hardy upland plant communities, potentially working with the National Wildflower Centre in Knowsley;

Implementation issues

- Knowledge and experience of green roofs should be shared across the Quarter in order to address practical concerns about their feasibility;
- The additional capital cost should be weighed up against a thorough and informed evaluation of the potential benefits;



Knowledge Quarter Hospitals



4.10 Naturally healthy spaces

Health facilities will realise the recuperative potential of greenspaces through the informed design of settings, spaces and views, adapted to the specific needs of patient groups.

The Knowledge Quarter is dominated by the presence of a number of major health facilities, including the Royal Liverpool University Hospital, the Women’s Hospital and related University Departments. The University Hospital in particular presents a bleak concrete image at odds with its recuperative function, and the setting and public realm around the Hospital do little to lift the spirit.

There is a strong body of medical research that has demonstrated the recuperative potential of Green Infrastructure. This specifically includes:

- Views of natural greenspace;
- Opportunities to sit within and obtain quiet enjoyment from natural greenspace;
- Contrasts in sensory experience, including visual appearance and soundscapes, between natural greenspaces and the urban environment;

Persuaded by this burgeoning evidence base the NHS has sought to encourage the incorporation of this thinking into the design of the new hospitals and health facilities – as demonstrated by the emerging plan for Alder Hey Children’s Health Park in west Derby, approximately 5 miles into the suburbs. The proposed rebuilding of the University Hospital therefore creates the potential to take a holistic approach to the design of the setting for the new hospital, the spaces and views available to patients, and the specific recuperative needs of different patients.

The Knowledge Quarter Climax plan also proposed the reconfiguration of the original boundary landscaping surrounding the Women’s Hospital. This creates the potential to green the internal car park space to provide views and recuperative space which would benefit the wards and any new-build development forming a building line onto Upper Parliament Street. A formal link could also be re-instated through to Falkner Square so that patients and their families could benefit from the historic Falkner Square Gardens.

In each case design elements such, edible landscaping, as mature trees, water features, green walls and roofs could all carry out multiple functions. So, for example, they would also form part of a low carbon energy strategy for the buildings, reducing loads such as cooling and the potential for overheating, which would in turn help meet NHS Estate targets for carbon emissions reductions.

Key benefits from designed health spaces

- Economic growth and investment: Integration of green roofs and integral greenspaces would reduce energy costs associated with cooling;
- Labour productivity: Integration of green infrastructure into the facilities would create a more attractive workplace, providing respite from high stress situations;
- Health and wellbeing: Carefully designed facilities would enhance comfort and contribute towards recuperation for patients, with the potential to adapt designs to specific needs;
- Recreation and leisure: Carefully designed facilities would provide opportunities for exercise in attractive settings to visitors and patients;
- Quality of place: The integration of green infrastructure into hospital grounds would enhance perceptions and pride in the NHS estate;

Design principles

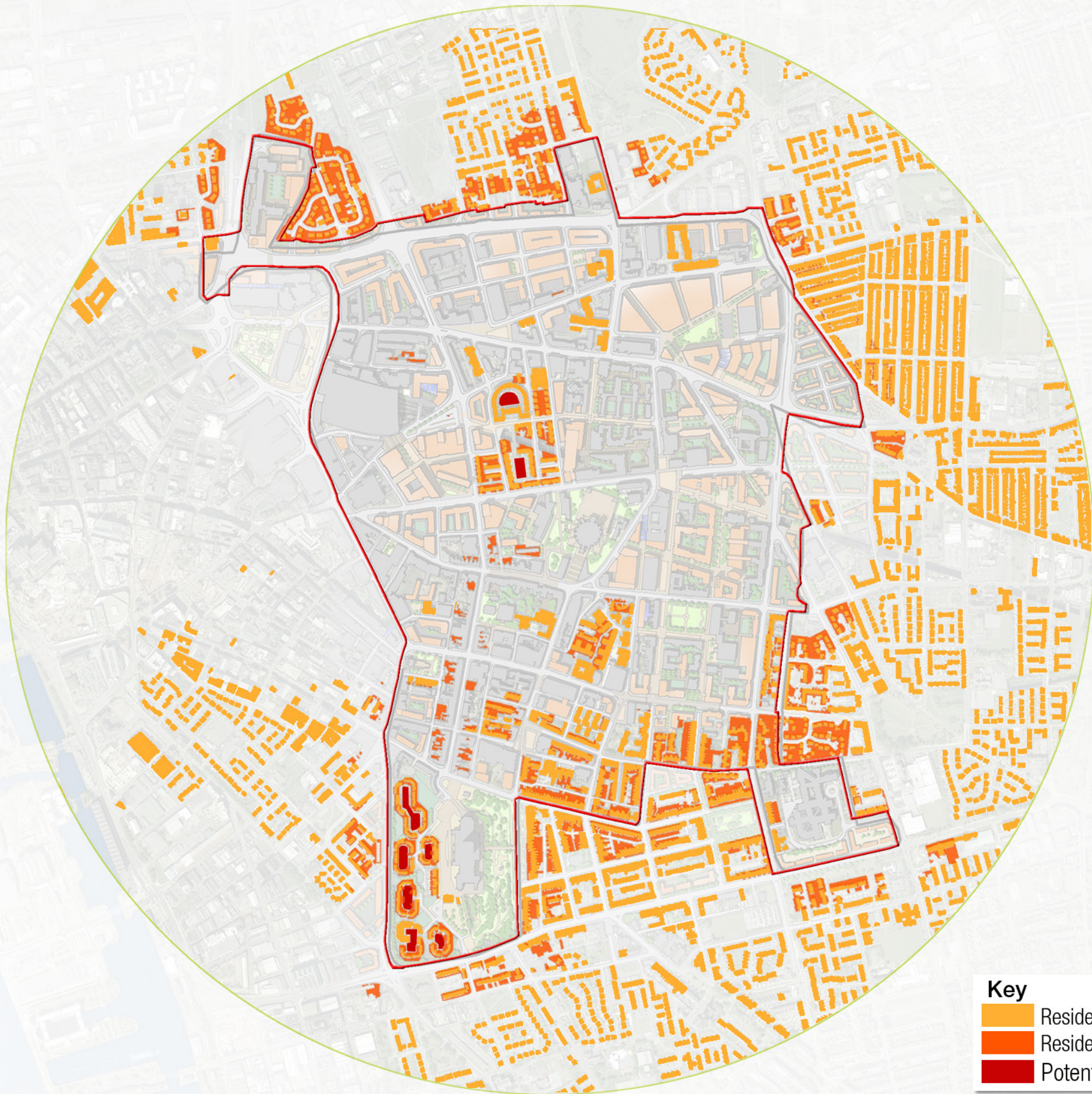
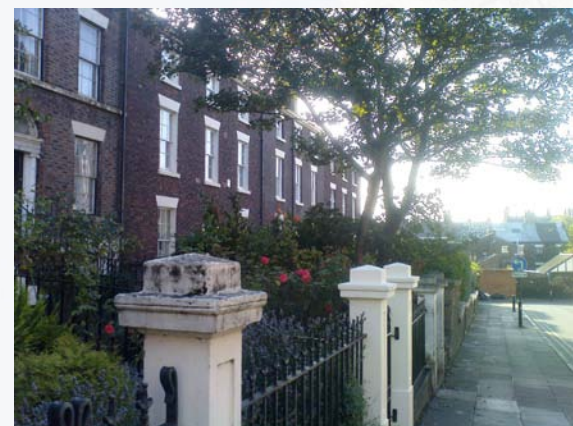
- Spaces in and around new and existing health facilities should reflect current thinking on the recuperative and therapeutic potential of greenspace;
- Spaces should create a clear setting to ensure that the experience of approaching and entering buildings and taking respite in spaces near each building reduces blood pressure;
- Patients should have access within close proximity to a tranquil space designed to provide a choice of sensory experiences and habitats settings for walking and sitting;
- Views from wards should be considered, and this could include locating specific wards that research shows would benefit most from views of green spaces;
- The roofs of buildings could be used to provide safe access to panoramic views across the Irish Sea and Welsh Mountains at specific times during the year.

Implementation issues

- Dialogue will be required with the NHS in order to ensure that the benefits of naturally healthy spaces are captured and realised, and that where required technical support is provided to develop design concepts.
- Design requirements for health providing Green Infrastructure should be incorporated into the PFI procurement process from the outset, responding to the specific mix of care facilities and the needs of patients;
- Reconfiguration of the landscaping surrounding the Women’s Hospital may require provision of accessible off-site car parking or multistorey spaces.



Residential Gardens



Key	
	Residential properties
	Residential gardens
	Potential gardens

4.11 Growing a garden city

Private and communal gardens will burst into life bringing colour and vibrancy to homes and streets, providing a chance for the existing community to benefit from the Green Infrastructure plan.

There are a significant number of homes in the quarter, characterised by gardens to the front and rear of properties, and communal gardens within courtyards. Functionality plans of the Knowledge Quarter highlight their significance role now and as potential future for Green Infrastructure.

Gardens therefore have an important role to play in strengthening Liverpool's network of Green Infrastructure, with the potential to deliver a range of benefits including:

- **Habitat creation:** A high density of gardens can create a mosaic of habitats for wildlife, as demonstrated by research for the London Plan;
- **Water management:** Increasing the infiltration of rainwater into the ground and slowing run-off, as demonstrated by Berlin's courtyard greening programme to reduce flood risk;
- **Healthy living:** Gardening promotes physical activity and exercise, and has also been demonstrated to have strong therapeutic potential. Views from homes onto green spaces also improve wellbeing;
- **Self-sufficiency:** Activities such as food growing contribute to self-reliance and promote connection with natural processes;
- **Pride:** Private and communal gardens can contribute to an increase in community pride and a sense of wellbeing.

Our survey showed that these potentially valuable spaces are currently underutilised as Green Infrastructure. For example, many have been paved over by occupiers and landlords, such as in the Canning area. In other instances such as the apartments adjacent to the Anglican Cathedral and many of the new student halls of residence courtyards are given over to car parking. There are, however, a number of positive examples, such as Hope Place where front gardens have been revitalised, making the street more vibrant and attractive.

The plan would seek to promote the greening of gardens and courtyards, working with landlords and residents across the area. Support could be provided to access grants and design spaces. A pattern book for garden and courtyard design could be created to inspire people, and to inform the selection of plants and the design of habitats and landscaping. Technical solutions that provide benefits but still accommodate uses - such as green car parking grids - could also be promoted.

Building up the mosaic

Key benefits from enhancing gardens

- **Economic growth and investment:** Improved gardens, especially where they are visible from the street, would enhance the image of the Quarter;
- **Land and property values:** This in turn would positively enhance property values, especially in more neglected areas;
- **Health and wellbeing:** More attractive gardens would positively influence tenants and residents health and encourage outdoor activity;
- **Land and biodiversity:** A higher density of gardens would contribute towards the mosaic of habitats across the Quarter;
- **Flood alleviation and management:** A reduction in paved surfaces would increase rainwater infiltration and attenuate run-off;

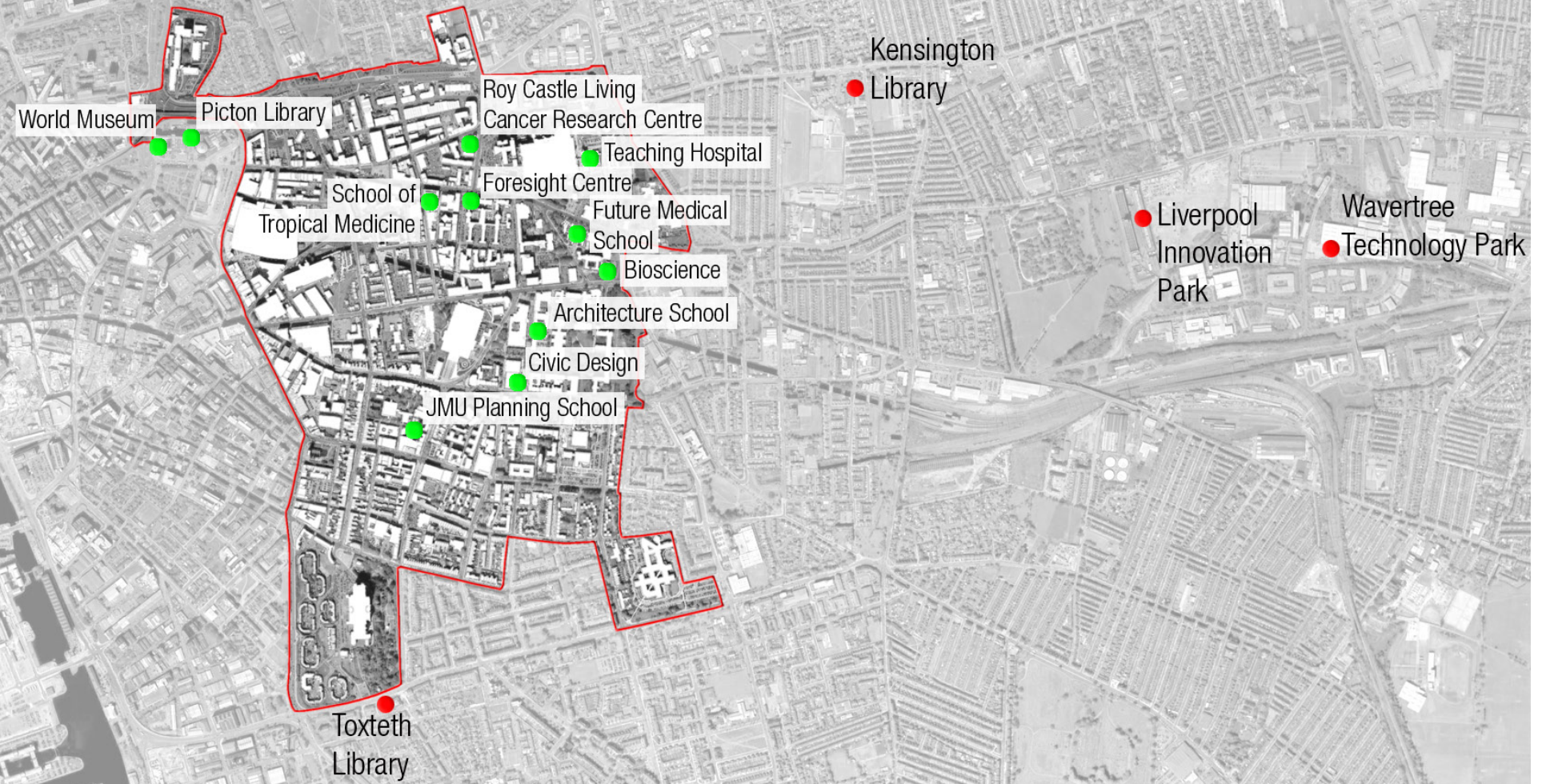
Design principles

- Gardens and courtyards should be greened in order to introduce habitats and greenspace, and improve the environment for residents;
- Engagement with residents is important in order to promote greening and to ensure that gardens are valued, used and maintained;
- Planting and habitat creation should be informed by a pattern book of species and mosaics in order to promote a more naturalistic aesthetic and maximise biodiversity value;
- Existing uses such as car parking should be creatively accommodated, such as through the use of green parking grids;

Implementation issues

- Collaboration would be required with residents and landlords in order to promote and support garden and courtyard greening;
- Access to small grants programmes may be required in order to incentivise and provide financial support;
- A pattern book would need to be designed in order to promote specific approaches and outcomes from a greening programme;





4.12 Creating a living laboratory

The Knowledge Quarter’s rich tradition of investigation and curiosity for the natural world will continue to evoke and inspire through its web of expertise in all facets of Green Infrastructure.

The Quarter has a rich tradition of the pursuit of knowledge about the natural world and the built environment.

From William Roscoe’s Botanical Society and the establishment of the first School for Tropical Medicine, to the pioneering work on environmental restoration by the late professor Tony Bradshaw and cross cutting expertise in biological and ecosystem science at the University of Liverpool. The Department of Civic Design is the world’s oldest planning school, established in 1909.

A key role of the Knowledge Quarter plan will be to harness the potential of the Universities to support the knowledge economy of Liverpool. The new Green Infrastructure of the quarter could become a living laboratory and focus for dynamic action research linked to all facets of the proposed plan. This could be akin to an urban equivalent of the existing research facility at Ness Botanic Gardens.

To support the knowledge economy objectives a ‘web of knowledge’ would be created related to Green Infrastructure. We have carried out a brief review in order to identify existing research centres and relevant expertise that could form the starting point for the ‘web’:

University of Liverpool

- Department of Biological Sciences: The department carries out a range of multi-disciplinary research and is rated in the top tier of UK Universities. Notable institutes within the department include:
 - o The SWIMMER Institute: An internationally renowned centre of expertise in water systems. It is carrying out research for the UN on the benefit and value of ecosystem ‘services’;
 - o Institute for biocomplexity: Research focussing on the complexity of natural systems and how they work at multiple levels;
- School of Architecture: The Environment and Process Group within the school focussed on acoustics and urban noise pollution and ‘building life modelling’ which has included collaboration with the NHS;
- Department of Civic Design: The department has internationally recognised expertise in Environmental Appraisal and sustainable development of the urban environment;
- Merseybio Incubator: Established as an incubator for spin-out R&D businesses from the Department of Biological Sciences it has recently received support from the Wellcome Trust.

John Moores University

- School of Natural Sciences and Psychology: A multi-disciplinary department with research spanning ecology and environmental science;
- Institute for Health Research: A multi-disciplinary institute with a specific focus on health promotion, quality of life and therapeutics. The institute collaborates with Alder Hey Hospital, which is incorporating green infrastructure into its new site;

Independent centres

- Roy Castle Lung Cancer Foundation: The foundation carries out research focussing on patient support;

The knowledge web would link together specialist research centres across the quarter, harnessing existing knowledge to design and monitor the performance of the quarters new Green Infrastructure. The web could also respond to the real-life research needs of key public and private sector stakeholders, helping to grow the evidence base for Green Infrastructure.

Key benefits from creating the ‘living laboratory’

- Economic growth and investment: Creation of a knowledge network would enhance the value and reputation of the University research base and create new opportunities;
- Labour productivity: Creation of a focussed knowledge network would serve to incentivise and drive new thinking united around a common purpose;
- Products from the land: The research base would seek to identify new products and services related to the design and management of green infrastructure;
- Climate change adaptation and mitigation: Strategies developed by the knowledge base would contribute towards national policy objectives;

Implementation issues

- A map of the Universities’ ‘web’ of knowledge and specialisms in the natural sciences would need to be brought together, building on the initial list;
- A co-ordinating structure would be required in order to enable the web to function as a coherent research network;
- Academic input into Green Infrastructure design would need to be action-orientated and managed through existing University mechanisms for engagement with public and private sector stakeholders;
- A monitoring specification and protocol would be needed for University involvement as each element of Green Infrastructure is completed;





4.13 Inspiring the next generation

The potential of the Knowledge Quarter's extended network of Green Infrastructure, and the combined facilities of the Universities, would be harnessed to inspire the next generation of young scientists.

The level of University attendance in Liverpool is lower than the national average, and in the adjacent wards of Everton, Kensington and Granby the level of attainment is amongst the lowest in the country. Furthermore, the level of uptake of A levels and degrees in traditional science subjects has fallen in recent years – particularly in biology and related natural sciences.

A key role of the Knowledge Quarter plan will be to harness the potential of the Universities to raise the aspirations of the City. Green Infrastructure could play a key role by providing a 'living laboratory' for applied science, linked to the competencies of University Departments, and by working with Further Education institutions including Liverpool Community College. The aim would be to:

- Reach out to young people across the local community;
- Inspire them with the potential of science and the natural world;
- Signpost future career paths available to them;
- Provide support with the necessary attainment.

There might be three strands to this approach, two of which would require further investigation as capital projects. There could also be potential to make links with the work of Tim Smit and the late Tony Bradshaw:

- The Living Laboratory: Development of a network of outreach in conjunction with local schools, including the Environmental Academy, which would bring young people into the living laboratory of the Knowledge Quarter in order to learn about ongoing research and to carry out their own projects;
- Tony Bradshaw young scientist library: Creation of an educational facility the aim of which would be to support young people who want to achieve the necessary attainments in GCSE, A level science and access courses in order to study natural sciences at University level;
- Eden Project in the North: Creation of an educational attraction and resource, either in the form of a single facility or a network of locations affiliated with the overall aims of the Eden Trust to 'use exhibits, events, workshops and educational programmes to remind people what nature gives to us and to help people to learn how to look after it in return'.

The combined effect of this approach would be to break down the barriers – both mental and physical – between the Knowledge Quarter and local communities, and to lift the aspirations and attainment of young people from these communities.

Key benefits from targeting the next generation

- Economic growth and investment: Creation of links between the knowledge network and schools and colleges would raise aspirations and attainment in science, and build the skills base to exploit opportunities in the environmental sector;
- Labour productivity: By bringing the subject to life and providing support there would be greater motivation amongst students to do better;
- Health and wellbeing: Young people would be encouraged from an early age to live active lives in the outdoors;
- Land and biodiversity: Young people would be encouraged from an early age to value nature;
- Climate change adaptation and mitigation: Young people would develop the skills and knowledge to tackle environmental issues

Implementation issues

- A map of the Universities' network of knowledge and specialisms in the natural sciences would need to be brought together;
- An outreach programme would need to be developed in conjunction with local schools in order to support GCSE and A level science syllabus's and course work;
- The potential for a shared library resource would require further investigation in order to evaluate how it could work, the extent to which/how it would be used and how it could be funded;
- The potential for a major offshoot of the Eden Project – either as a single facilities or a network of affiliated locations – would require further investigation in conjunction with the Eden Trust.



The Knowledge Quarter Green Infrastructure Framework

