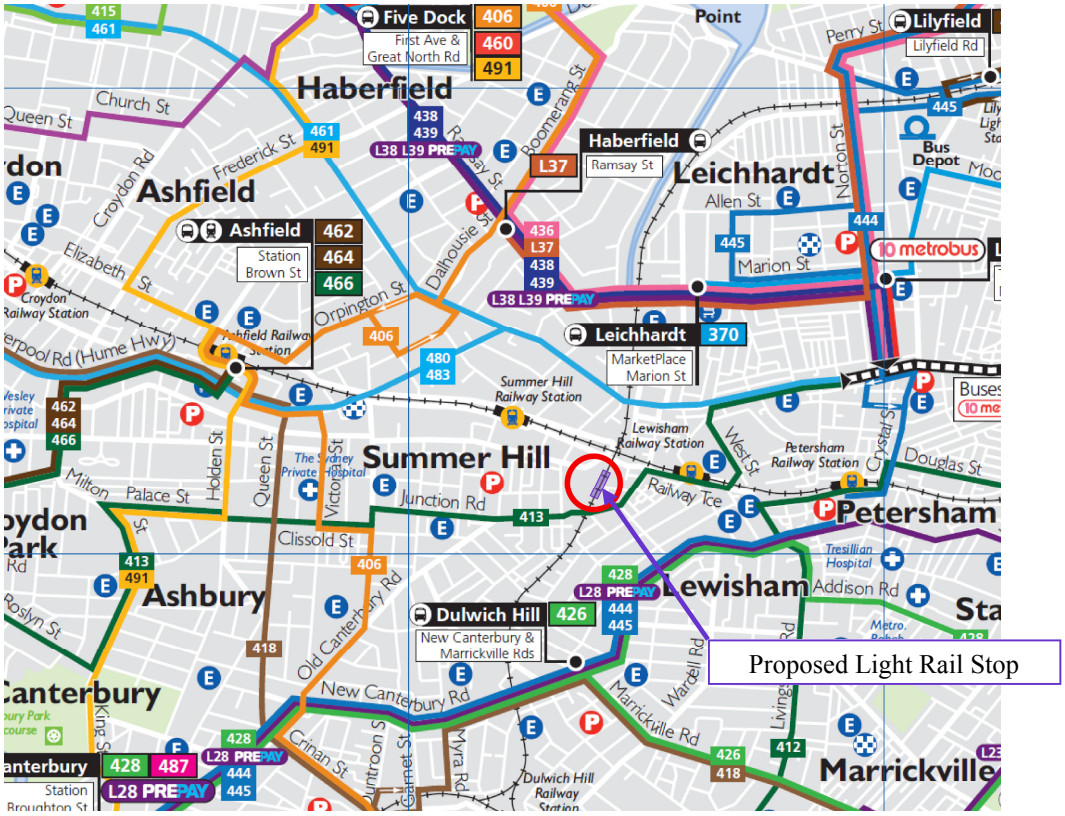
3.3 SUSTAINABLE TRANSPORT

Sustainable transportation is more than providing a means for residents and visitors to arrive at the site every day. It aims to reduce greenhouse gas emissions from individual trips and reduce travel time, which leads to healthier and happier commuters. **The site already has the advantage of a relative proximity to Sydney's CBD, with bus and train routes on the site's doorstep, as shown in the image below.** However, the site's connection to established transportation routes can be strengthened with improved facilities. This section presents some of the initiatives to be considered by the design team to maximise the site's potential for sustainable transport alternatives.

EXISTING PUBLIC TRANSPORT ROUTES



Source: Sydney Buses 2011 (www.sydneybuses.info)

The site is fully accessible with existing transport. Sydney Buses service routes 480 and 483 stop within 15 minutes walking distance of the site, whilst route 413 stops adjacent to the site. Frequent heavy rail services the Summer Hill and Lewisham Railway Stations, both of which can be reached from site on foot within 10 minutes. The proposed Light Rail station to be located alongside the site will enhance the accessibility by giving direct access to pedestrians and cyclists.

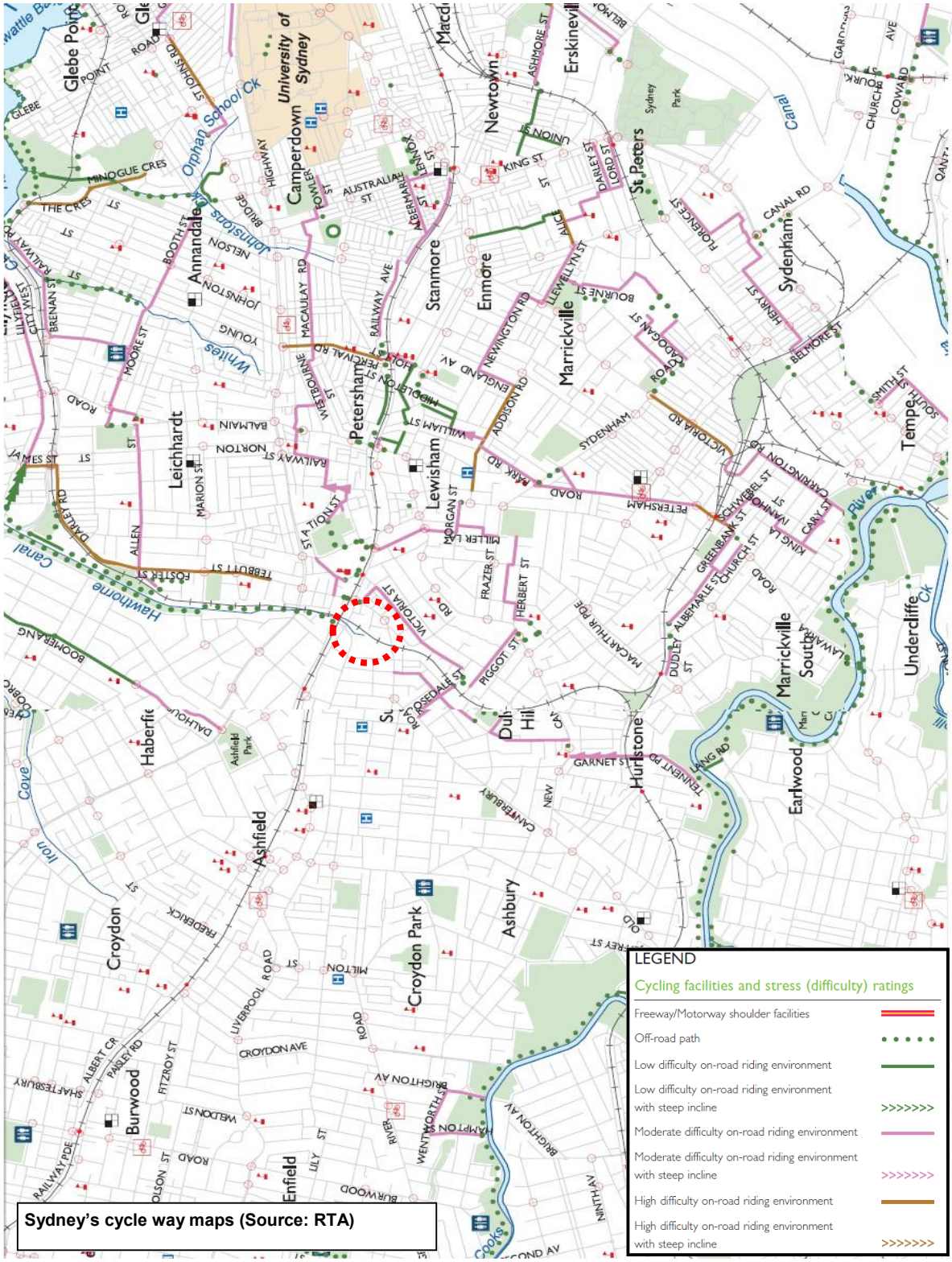
3.3.1 Base Strategies

CYCLIST FACILITIES

The NSW Government has been improving bike facilities, planning to deliver an average of 200 km of cycling facilities a year over a period of ten years.
The site is located close to major cycleways suggested by the RTA, as shown on the next page. Off- road paths connect the site to adjacent suburbs such as Petersham and Leichhardt. The off– road South Marrickville cycle way connects the site to the west and south, including the international Airport and surrounding suburbs. An on road cycleway with moderate difficulty suggested by the RTA connects the site with Newtown and the University of Sydney and further to the CBD. The future cyclepath associated with the site's Greenway will provide access directly through the Summer Hill redevelopment and links to the existing RTA's cycleways.

The existing and future bicycle infrastructure at close proximity to the proposed site enables residents and visitors to chose bicycle as an emission-free alternative method of transportation, provided appropriate facilities are available on site. The following cyclist facilities are therefore considered for the new development:

- Secure bicycle racks throughout the site, and where practical those could be weather protected with connection with major building structures;
- Office and retail spaces to be provided with shower and locker facilities. The feasibility of that shall be evaluated on an individual basis under financial and environmental considerations;
- Signage and visual display of major and safer cycle ways to stimulate and facilitate bicycle usage.



Sydney's cycle way maps (Source: RTA)

CAR SHARE PODS

There are approximately 3,000 members of car share companies in Sydney, including 500 small businesses with 120 dedicated on-street car share spaces. Car share membership has risen from around 50,000 users in 1997 to 550,000 in 2009 worldwide.
The developers will seek to team up with car share companies to provide car share locations on site, contributing to reducing GHG emissions associated with individual car use, manufacturing and disposal of parts.

ELECTRIC CAR SPACES AND CHARGING STATION

The project will consider providing parking spaces for the sole use of electric cars and installing a charging station within the site. The suburb of Glebe in the city's inner west has had Australia's first public charging station recently installed. Although Sydney's electric car fleet is still not substantial, the charging stations could provide the city planners with usage data for the installation of future public stations.

ABOVE Electric charging station at Glebe

3.4 MATERIALS AND WASTE MANAGEMENT

The approach to materials and waste will encompasses the philosophy to:

- **Reuse and recycle existing** building structures and construction materials as much as possible on site, reducing waste to landfill and embodied energy;
- **Promote and facilitate recycling practices** amongst residents and visitors;
- **Minimise** construction waste;
- Promote the selection of **low environmental impact materials**

3.4.1 Base Strategies

WHOLE OF SITE WASTE MANAGEMENT

The following strategies will be investigated by the design team to form part of the whole of site waste management:

- Communal space to be considered for the collection of over-sized personal goods or furniture that can be publicised for reuse by other occupants;
- Waste management plan to be developed for use during the construction of the proposed Concept Plan, which also incorporates an erosion and sedimentation plan for ensuring runoff from the entire project site during construction does not pollute surrounding areas;
- Construction will target to reuse or recycle surplus material on site. A waste management program will be considered for construction works to effectively collect, sort and reuse waste where appropriate to avoid land fill. This is also a part of the Green Star program and is quickly becoming common practice in Australia;
- Construction will target the recycling or reuse of demolition waste, including reuse on the site as aggregate for footpaths and other similar landscape features;
- Provide site-wide exterior waste and recycling bins at each building entrance or group of buildings;
- Target to provide space for dedicated food and yard waste composting areas as part of the site landscape design that shall be accessible to all residents and landscape personnel to provide organic material for use in on-site gardens and landscaping; design of the composting area should meet best practice guidelines and ensure leaching does not infiltrate adjacent stormwater or other such systems; as an alternative, dedicated compost collection areas can be nominated to allow for the off-site composting of the development's organic materials according to the requirements of AS4454 (2003) for Composts, Soil Conditioners and Mulches.

SUSTAINABLE MATERIALS

- Construction of public spaces will target the use of, as much as possible, timber and formwork that is either a combination of local, certified sustainable products or post-consumer re-used timber. Existing steel and timber from the silo buildings will be considered for reuse across the site;

- Target to specify reused products for public areas, pavement and urban furniture within the boundaries of the site (such as benches, signage and others)

- The construction of public areas will target the use of industrial waste product as a replacement of a percentage of cement as a way of reducing embodied energy associated with concrete and reducing waste to landfill.

Active Strategies

The feasibility of these strategies shall be evaluated on an individual basis.

WASTE MANAGEMENT

- A waste management plan to be developed for use during the construction of individual buildings, which also incorporates an erosion and sedimentation plan for ensuring runoff from the entire project site during construction does not pollute surrounding areas;
- Construction of individual buildings will target the reuse or recycling of surplus material on site. A waste management program will be considered for construction works to effectively collect, sort and reuse waste where appropriate to avoid land fill.

SUSTAINABLE MATERIALS

- Construction of individual buildings will target the use of, as much as possible, timber and formwork that is either a combination of local, certified sustainable products or post-consumer re-used timber;

- The construction of individual buildings will target the use of industrial waste product as a replacement of a percentage of cement as a way of reducing embodied energy associated with concrete and reducing waste to landfill;

- Alternative materials to PVC for pipe work, electrical cables and conduits will be considered where appropriate;

- The use of low-emission materials is proposed to minimise impacts to individual building occupant's health. This can be accomplished by using low-VOC (Volatile Organic Compounds from carpets, adhesives and sealants) and non-formaldehyde (from composite timber) materials. Low ODP (Ozone Depleting Potential) insulants will also be considered to reduce climatic impacts.

CLOCKWISE FROM TOP LEFT An example of the reuse of existing building structures is the Wooloomoooo Wharf in Sydney, a historic timber wharf converted into residential flats, hotel and restaurants. The intention of the design team is also to pursue the use of low-impact materials, including FSC certified timber, recycled steel, and recycled aggregate in certain types of concrete.

3.5 SOCIAL SUSTAINABILITY

Social sustainability involves the most complex and subjective issues when compared to economic and environmental sustainability. Moreover, economic sustainable growth and environmental preservation can be objectively measured. Social capital cannot. It is often related to issues such as health, education, housing, employment, family and community, crime and justice and environmental awareness.

It is possible to contribute towards social sustainability through design and urban form. This section discusses some of the characteristics of the proposed development and its relationship with the building of social capital.

DIVERSITY AND MIXED USE

Diversity is considered one of the most enabling aspects in terms of creating sustainable communities. All kinds of diversities: economic, social, gender, age, professions, business, types of households, cultural backgrounds, etc, living and interacting with each others and contributing with each other to create sustainable ways of living. Mixed use developments attract a variety of cultures, ages and professions. This contributes for keeping the area alive in the long term, since attracting the diversity of people is so important for the sustainable development of a region.

Mixed use developments also contribute to walkability by reducing car usage for short trips.

REACTIVATION OF DEGRADED OR UNDER USED URBAN AREAS

Evidence suggests that increasing housing density can help in the redevelopment of a degraded or under used area. The city of Pasadena in California has suffered this transformation and can be used as an example.

“Like many U.S cities by the mid- 1950s, the city center had been largely abandoned by residents, but what had been abandoned was once a jewel of a Classic beautiful plan (…) The creation of more housing at urban densities were among our highest priorities (…) They [citizens] expected, as had we when we began, that the solution to revitalizing the area would be a grand civic gesture in the tradition of the City beautiful plan. They did not expect so mundane an action as housing (…) Because no one lived there, there were no advocates for the area (…) Building new housing on every available site was the only meaningful strategy” (Hester, 2006, pp 210).

For local residents, a symbolic ownership of the place was created, and together with mixed used, walkability, places for social interaction such as parks and local businesses were reborn. Adding housing density was in this case, the solution needed to re-establish life to the area.

MAXIMISING THE POTENTIAL OF EXISTING INFRASTRUCTURE

The development is proposed where urban infrastructure is already abundant, contributing to the reduction of urban sprawl. Sprawl is part of what has undermined social and environmental capital as well as investments in many cities.

Sprawl makes travels and commuting longer, which means less time to be spent in social activities, family and friends.

"Each ten additional minutes in daily commuting time cuts involvement in community affairs by 10% - fewer public meetings attended, fewer committees chaired, fewer petitions signed, fewer church services attended and so on" (Frumkin, 2004, pp. 172)

With increasing population, Australian cities must find a way of maximising the potential of already existing infrastructure before sprawling and building on the outskirts of the cities.

Sprawl makes automobiles part of the community's daily lives. Longer distances to be traveled and less business diversity has imposed a high dependence on private cars on isolated homogeneous residential communities. Walkability is eliminated from neighborhoods, reducing (in some cases) to almost zero social interactions. Sense of community is undermined and local identity and "symbolic ownership" of the place disappears.

Commonly, the outcome of increasing urban densities in areas of existing strong infrastructure is crowded sites with skyscrapers and small apartments with no open spaces, which creates a sense of claustrophobia. In the case of this Concept Plan, special attention was taken in the design of public spaces to increase greenery within the site, allowing good solar access to public and private spaces and allowing appropriate distance between constructions. This justifies public investment in the development and encourages future investment to ensure the continual improvement of the area.

ADAPTIVE REUSE OF BUILDINGS WITH HERITAGE IMPORTANCE

The design team sought to enhance the heritage importance of existing buildings whilst maintaining their valuable contribution to the quality of the site and surroundings.

The Concept Plan creates opportunities to retrofit some of the existing industrial buildings, keeping the urban landscape familiar to the community, which will help in the revitalisation of the site, whist maintaining the "symbolic ownership" of the place.

4.0 ENVIRONMENTAL STANDARDS AND CODES

4.1 ENVIRONMENTAL STANDARDS AND CODES

The design team is committed to achieving mandatory codes and standards applicable to the Concept Plan and in the future, establishing the basis for the achievement of those for individual buildings and dwellings.

It is also an aspirational objective of the project to investigate and consider the application of voluntary environmental rating systems available in Australia as a way of demonstrating leadership and commitment to environmental aspirations stated in this report.

The following voluntary benchmarking tools are considered as **Base Strategies** concerning the environmental benchmarking of the Concept Plan:

GREEN STAR COMMUNITIES

Green Star is a comprehensive rating program developed in a similar vein to programs already in use throughout the world. It is a voluntary system that can be successfully used to implement green building principles in an effective and measurable way in the development of a new building, group of buildings or communities. Green Star rating covers several key environmental criteria and then assigns a star rating, from 4 to 6 Stars. The sustainability strategies presented in this report embrace the key aspects of the framework developed by the Green Building Council of Australia for a new rating tool *Green Star Communities,* to be released in the coming future. When released, Green Star Communities will contain best practice criteria and benchmarks for sustainable communities and provide information on the assessment and certification process
The design team will consider the evaluation of the still to be launched Green Star Communities rating tools as a way of demonstrating leadership and commitment to environmental aspirations stated in this report.

The following measures are considered as **Active Strategies** concerning environmental benchmarking of individual buildings and structures open for refinement during the design:

GREEN STAR MULTI– UNIT RESIDENTIAL

Aimed for the design and construction of green residential developments, it is applicable to new multi unit residential facilities, and extensions to and major refurbishments of existing multi unit residential facilities of two units or more. Certification will be considered for buildings and dwellings on an individual basis.

GREEN STAR OFFICE DESIGN

Aimed for the design and construction of green commercial office buildings, it is applicable to new buildings or major refurbishments. Certification will be considered for office spaces within the site on an individual basis.

NABERS ENERGY

The NABERS Energy (National Australian Built Environment Rating System) program is a widely recognised energy emissions rating scheme that rates a building's Green House Gas (GHG) emissions.

Currently NABERS provides rating schemes for commercial and retail buildings for the energy performance in operation after the building has been occupied for one year. The pursuit of a NABERS ratings will be considered for office and retail spaces within the site on an individual basis.

NABERS WATER

A post-occupancy performance evaluation for water will be considered for individual buildings through the National Australian Built Environment Rating System for water, or NABERS Water, to facilitate ongoing management of water in operation and benchmark the project's performance against industry best practice. The pursuit of a NABERS ratings will be considered for office and retail spaces within the site on an individual basis.

NABERS WASTE

A post-occupancy performance evaluation for waste will be considered for individual buildings through the National Australian Built Environment Rating System, or NABERS Waste, to facilitate ongoing management of waste in operation and benchmark performance against industry best practice. The pursuit of a NABERS ratings will be considered for office and retail spaces within the site on an individual basis.

The Concept Plan and individual building structures will comply with the following mandatory codes:

BASIX CERTIFICATE FOR RESIDENTIAL DWELLINGS AND BUILDINGS

A BASIX Certificate is required to form part of any new development application for a residential building in NSW.

BASIX is the NSW State Government's regulatory device through which all new residential dwellings and additions in NSW must achieve specified levels of water and energy savings. It is divided into 3 areas of assessment: Energy, Thermal Comfort, and Water. Each of these three categories often influences each other.

The scheme uses state average per capita consumption rates from information on existing dwellings as benchmarks for residential energy and water consumption. Predicted water and energy consumption are compared against a database of water and energy consumption figures collected from over 2 million households state-wide. This analysis allows state-wide averages of energy and water consumption to be calculated against which predicted performance is compared.

These state average per capita figures are adjusted according to the geographical location of the project being assessed. Adjustments take into consideration environmental factors

such as evaporation, rainfall, insulation, and heating and cooling loads. Individual dwellings and residential buildings shall comply with the location-specific targets.

BUILDING CODE OF AUSTRALIA (BCA) SECTION J

Section J of the Building Code of Australia is concerned with the energy efficiency of buildings. Minimum performance requirements have been set in regards to building fabric heat gains, external glazing, building sealing, air movement, HVAC systems, lighting and power, hot water supply and access for maintenance. Individual buildings shall comply with all relevant BCA Section J requirements.

LOCAL COUNCIL DCP

The project will incorporate sustainability principles referred to in the relevant Development Control Plans.

5.0 CONCLUSION

This report addresses the Director Generals Requirement (DGR) number 9 (Ecologically Sustainable Development– ESD) which reads:

"The EA shall detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development"

In response to the Director-General's Requirements, the *Summer Hill Flour Mill Site Redevelopment*considers the implementation of good environmental practice guidelines formulated by the Green Building Council of Australia .
Sustainability initiatives to be considered for the project include the following areas of environmental concern: Water; Energy and Environmental Comfort; Transport; Materials and Waste; and Social Sustainability.
The feasibility of key sustainability strategies will be considered on an individual basis. This means that to be deemed feasible the strategy must be justified based on specific financial considerations and sound environmental benefits.

In summary, the following initiatives will be considered for the project addressing the Director Generals Requirements regarding ESD, covering design, construction and ongoing operation of the site:

- **Attenuate peak flows** throughout the site by identifying and maximising available storage across the site and maximising **infiltration to ground**, reducing flood risks during operation;
- **Reuse, recycle and reduce** the amount of water being utilised according to each individual building's and the site's capabilities;
- Optimise the design of building's orientation to facilitate **solar access and natural ventilation** after construction ;
- Investigate the potential for sustainable technologies such as **photovoltaic energy to reduce carbon emissions in operation;**
- Reactivate a degraded urban area, by promoting the **adaptive reuse** of buildings with heritage importance and **maximising the potential of existing infra-structure**;
- Facilitate the use of **low carbon transport** such as bicycle and shared or electric cars;
- **Reuse and recycle existing** building structures and construction materials as much as possible on site, reducing waste to landfill and embodied energy;
- **Promote and facilitate recycling practices** amongst residents and visitors as well as during construction works;
- Promote the selection of **low environmental impact materials.**