British Land

DEVELOPMENT CASE STUDIES 2012

This booklet features some of the initiatives that took place across our development programme in 2012. For all our case studies, please visit: **www.britishland.com/casestudies**

One of our refurbishment team at 199 Bishopsgate, which was highly commended in the national Energy Awards 2012.

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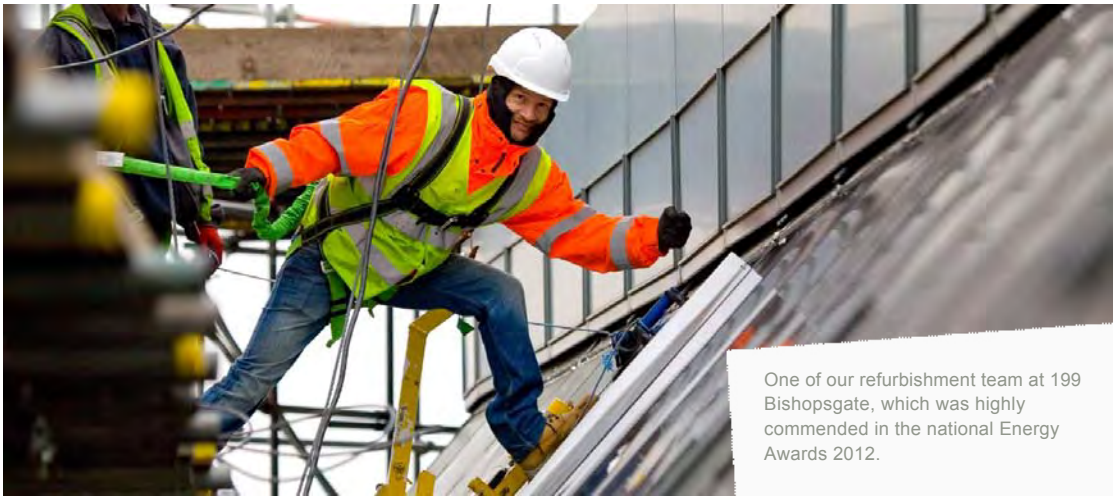
Case study : Developments

Dec 2012 – **Development supply chain scoops sustainability award**



One of our refurbishment team at 199 Bishopsgate, which was highly commended in the national Energy Awards 2012.

British Land thanks our supply chain partners for helping us win the Built Environment Award 2012, by embracing the high standards set out in our Sustainability Brief for Developments.

Sustainable Developments Executive at British Land, Sarah Cary, explains: “We have the largest committed development programme in central London, and we’re leveraging this to change procurement practices and influence behaviour in a significant part of the UK’s construction industry.”

British Land’s consistent approach to environmental and social issues on developments was recognised last month by ENDS Green Business Awards, winning the Built Environment category.

Sarah adds: “We’re delighted to win this national award and thank our supply chain partners, who have worked hard to reduce resource use, enhance biodiversity and create positive social outcomes in the design and construction of our buildings.”

British Land’s Sustainability Brief for Developments sets nine core targets that all major projects must meet, such as diverting 98% of demolition waste from landfill and 96% of construction waste. All timber must come from certified sustainable sources, all developments must contribute positively to local biodiversity and all new office buildings must achieve BREEAM Excellent sustainability ratings.

Projects also have to meet bespoke targets. For instance, at 5 Broadgate in the City of London, the team has to exceed our usual 25% recycled content target for certain materials, notably steelwork. At Marble Arch House in London’s West End, we’ve set embodied carbon targets for the new façades and at Whiteley Shopping in Fareham, procurement requirements include BES 6001 certified concrete, aggregates and blockwork.

Download

Over the past three years, we’ve reduced development waste sent to landfill from 15% to 2%. This has diverted over 383,000 tonnes from landfill – equivalent to the weight of over 26,000 double decker buses and saving £808,000 in landfill tax costs.

British Land develops buildings in partnership with teams of external specialists. These include architects, engineers, general contractors and trade contractors.

The Green Business Awards, supported by ENDS, the leading

Excellent

2.2 million sq ft of office and retail space certified BREEAM Excellent in 18 months.

British Land's sustainability initiatives add value to our business; they are hugely important to us. Their agenda is aligned with our own.

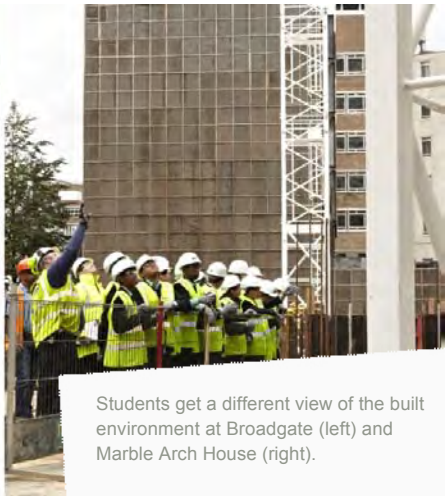
Office occupier feedback

our Sustainability Brief for Developments PDF (1.48 MB)

environmental publishing house, celebrate business excellence in environmental sustainability and innovation. They are the UK's most authoritative awards in this field, and are judged by an independent panel of 13 judges with a range of expertise.

Case study : Developments

Nov 2012 – **British Land fosters Budding Brunels**



Students get a different view of the built environment at Broadgate (left) and Marble Arch House (right).

Our volunteers and project teams helped students gain insights into career opportunities in the built environment, through Construction Youth Trust's Budding Brunels programme.

At 5 Broadgate in the City of London, a group of 22 students from the Bridge Academy and BSix College in nearby Hackney took part in an intensive three-day programme.

Feedback from the Year 12 (sixth form) students included: “life changing” “one of the best weeks of my life” “enabled me to discover the vast opportunities that civil engineering has to offer” “motivated me to keep aspiring to work in the construction industry” and “allowed me to meet and speak to professionals”.

Communities Executive at British Land, Anna Devlet, commented: “We were delighted to work with our project teams on Budding Brunels, giving young people insights into the range of careers in the built environment, at a key decision making point in their academic and personal development.”

She added: “As an industry, we’ve got a fantastic opportunity to build on the Olympic display of everything Britain’s construction sector can be proud of. We need to work together to pass on the flame to promising young people, who are the future. Many thanks to our project teams for making this programme such a success.”

From a classroom at Imperial College …

Day 1: Students visited Imperial College, a world leader in construction-related degrees. Here they interacted with professionals from British Land and a range of our partners - sustainability consultant Arup, engineering firm Buro Happold, planning consultant DP9, architectural practice Make, development managers M3 Consulting, construction managers Mace and property management firm Broadgate Estates.

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Students from Hackney and Westminster took part in Budding Brunel programmes at 5 Broadgate and Marble Arch House.

The students who attended have all come back to college much clearer about the opportunities open to them, more confident about what is really involved and really motivated to succeed. Three of them have even been able to secure work placements as a result of the project.

Careers and UCAS Coordinator at BSix College, Yvonne Brewster

… to the construction site for 5 Broadgate, where we are building a future office for financial firm UBS.

Day 2: Students went to Broadgate, the City of London's premier office estate, which we own in joint venture with Blackstone. Over breakfast in the employee canteen at 5 Broadgate, they got a taste of what it would be like working on the project. Volunteers from Broadgate Estates, M3 and Mace then led them on tours of the construction site for 5 Broadgate, as well as The Broadgate Tower and recently refurbished 199 Bishopsgate.

The new double-height reception area at 199 Bishopsgate.

Day 3: After a short tour of Regent's Place and the Royal Institute of British Architects (RIBA), students visited The Building Centre, where they took part in a workshop on apprenticeships led by Mace. They then went through competitive interviews for work experience placements. This led to seven students being selected for one-week work placements at 5 Broadgate and Marble Arch House, with British Land, Buro Happold, M3, Mace, Make and cost consultancy Sense.

Speaking about his placement with M3, 17-year-old Conor said: "I have had an amazing week; not only did I learn a huge amount, I was lucky enough to work with a group of talented and hardworking individuals… This is now an area I am very interested in and may even go into in the future."

Construction Youth Trust is also offering post-programme guidance and support to all participating students who wish to pursue a career in the built environment.

Students got a bird's eye view of the construction site for Marble Arch House from British Land's Head Office, York House.

At Marble Arch House, 16 students from nearby Westminster Academy took part in Budding Brunels Bitesize, a one-day programme that 15-year-old Kamal described as "changing our view on the built environment". This is part of our growing community programme in Westminster, where our Head Office, York House, is located.

Students completed a safety test, donned hard hats and high-visibility jackets and headed across to Marble

In an article about his experience, Kamal described why the project was so successful: "We met the engineers and architects behind some of the magnificent buildings we see each day. The professionals explained the maths and science that go into actually building and designing buildings. We learnt more thoroughly about the paths to take after secondary school.

Arch House.

Students followed in the footsteps of famous bridge builder Brunel – creating their structures from newspaper and sticky tape.

Volunteers sharing insights came from construction contractor McLaren, design consultancy Alan Baxter, architectural practice Bennetts Associates, project management consultancy Stace and British Land.

“The best part of this whole experience has to be going out on the site of construction and experiencing how a building comes about. We discussed the effect the construction has on the community and how they reacted to it.”

Afterwards, the students returned to York House for a bridge building exercise: “We were given a task to see if any of us were aspiring architects. Our group was given 20 minutes to build the bridge. The excitement and tension was truly shown as we reached the last couple of minutes.”

The benefits of Budding Brunels, according to Construction Youth Trust:

- Providing valuable insight into the wide range of opportunities available within the sector
- An opportunity for students to add further qualifications to their CVs through the Open College Network
- Introducing key industry figures to inform and inspire future career choices
- Enabling informed decision making for progression through Higher Education or alternative industry entry points
- Widening diversity in the industry by encouraging access to a wider pool of future talent, drawn from non-traditional areas and backgrounds.

Case study : Developments

Sep 2012 – **The Leadenhall Building boosts jobs in Bolton**

From the steelworks in Bolton - to The Leadenhall Building in the heart of London's insurance district.

As the five rings were being forged in the opening ceremony of the 2012 Games, the structural frame for The Leadenhall Building was taking shape at the same steelworks that helped build the Olympic stadium.

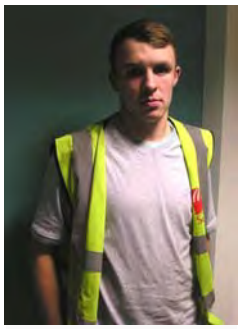
A computer-generated image of the 47-storey Leadenhall Building.

Steel is our biggest construction package. The steelwork for The Leadenhall Building is particularly interesting as it will be on view – with no central core, the structure will be stabilised by external megaframes of inclined steel columns.

Producing this steelwork is creating 400,000 hours of work at Watson Steel in Bolton, and 200,000 hours at Severfield-Rowen's plants in Northern Ireland, Scotland and Yorkshire. 13 young apprentices are working on the steelwork in Bolton and it was the catalyst for 20 more skilled steelworkers being recruited.

Jobs and training in London

At the construction site, 12 apprentices are learning while they earn and 25 operatives have signed up for NVQ courses. As a National Skills Academy for Construction, at least 40 apprentices, five graduates and 65 NVQ students will work on The Leadenhall Building.



Young apprentice

19-year-old electrical apprentice Bradley is proud to be working on The Leadenhall Building site: "I enjoy my work and look forward to every day. I have a dedicated training supervisor who works between Laing O'Rourke and my college, keeping track of my progress. Once I complete my training, I will be fully employed by Laing O'Rourke and would like to become supervisor in a few years."

The project is also supporting local jobs and businesses, with 70 local residents working on the site since September 2011, and £1.7 million of local procurement, for instance on waste management, electrical services and glazing.

9,800 jobs

According a new study by PriceWaterhouseCoopers (PwC), The Leadenhall Building will support an estimated 9,800 jobs (direct and indirect) during construction and 2,000 jobs once fully occupied.

Winning the contract for The Leadenhall Building provided a boost to our company. This was particularly important as our largest project, the Olympic stadium, had just come to an end and, at the same time, the UK fabricated steel market had shrunk from 1.2 million to 900,000 tonnes.

Peter Miller, Director of Watson Steel Structures, part of the Severfield-Rowen Group

Bradley Garnar-Inglis.

Sustainable development

Laing O'Rourke has won a Green Apple Award for environmental excellence at The Leadenhall Building.

Our main contractor, Laing O'Rourke, is performing well on most of our sustainable development targets, including:

- BREEAM Excellent sustainability rating
- 97% of construction waste diverted from landfill (95% target)
- 26% recycled content by value (25% target)
- 37 out of 40 Considerate Constructors Scheme score (32% target)
- 67 hours on community projects, including visiting primary schools in Hackney, participating in a Boss Day at a secondary school in Newham and hosting a site visit by carpentry students from Hackney.

Areas we are reviewing include:

- A slight increase in the embodied carbon footprint, largely due to switching from pouring concrete on site to preparing pre-cast concrete slabs in Derbyshire before delivering them to London. However, this has speeded up the process on site, is inherently safer, cuts wastage and is another example of construction in London supporting jobs around the UK
- BES6001 Good certification for steel reinforcement and block work, short of our Very Good/Excellent target.

Construction underway at The Leadenhall Building in September 2012.

A computer-generated image of The Leadenhall Building, designed by Rogers Stirk Harbour + Partners.

The Leadenhall Building is a joint venture between British Land and Oxford Properties. All data in this case study is correct as at 30 June 2012.

Case study : Developments

Sep 2012 – **Community focus at 199 Bishopsgate**

The project team from 199 Bishopsgate transformed a playground for local schoolchildren and raised £25,000 for the Indee Rose Trust, which helps children with brain or spinal tumours.

In June, our main contractor at 199 Bishopsgate, Como, took a team of volunteers to nearby William Davis Primary School in Tower Hamlets. In one day, they built a new bridge suitable for little feet, painted woodwork, replanted flowerbeds and installed sustainable planters made from carpet industry waste.

Teachers commented positively on how the volunteers involved several little helpers who wanted to dig, paint and plant during their playtimes.

£25,000

Fundraising for children's charity, the Indee Rose Trust, including £1,500 contributed by British Land.

Before the garden was drab and dreary and now the children's faces light up when they go out there - it's inviting, bright and cheerful. We can't thank Richard and the team enough!

Early Years Co-ordinator at William Davis Primary School, Christelle Gostling

The team of volunteers from Como and some of our subcontractors at 199 Bishopsgate, H&S Decorating, Taylor Made Joinery and Sky Gardens.

In July, the volunteers returned to the school, joining teachers, pupils and parents for the playground's official opening. Como Project Manager Richard Wash cut a red ribbon with a

giant pair of scissors and unveiled a plaque, before enjoying food, dancing and even a bit of hula hooping.

Sustainable Developments Executive at British Land, Sarah Cary, who attended the opening event, commented: “A different world from Broadgate, but one clearly visible from the top floors of 199 Bishopsgate.”

Project Executive Edward Beaver added: “Encouraging suppliers to actively support local projects is one of the commitments set out in our Community Charter. We’re delighted with the fantastic fundraising and volunteering efforts of Como and its subcontractors at 199 Bishopsgate.”

Over 130 people attended the charity dinner and auction organised by Como at 199 Bishopsgate. Canteen Projects put together the menu, whilst senior members of the Como team helped prepare and serve food.

The Indee Rose Trust was founded in 2009 to help children (and their families) diagnosed with brain or spinal tumours. It was started by the parents of three-year-old Indee Rose, who lost her battle with cancer. Indee’s parents and grandparents attended the 199 Bishopsgate event, which was one of their biggest ever fundraisers, raising £25,000.

Case study : Developments

Aug 2012 – **The Decarbonised City: A Vision for 2050**

A vision of the City of London in 2050 (sketches by Adriette Myburgh).

As part of a major public exhibition, John Robertson Architects teamed up with British Land, Land Securities and Arup to create a vision of a Decarbonised City.

The Developing City exhibition gave three teams of architects, supported by consultants and property professionals, the chance to present their visions for London in 2050.

Each team created a different response to a series of drivers for change, including governance, climate change and banking regulation.

Our vision for 2050:

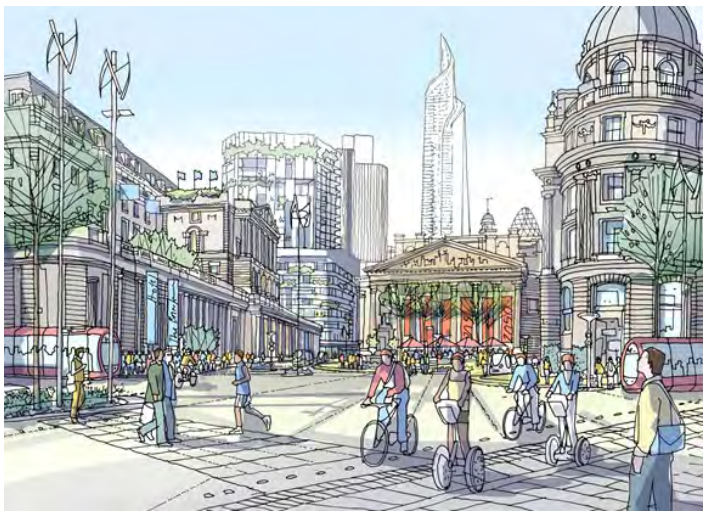
- A Decarbonised City Core, with pedestrianised streets, more green space and a mix of uses including retail and residential
- More intensively occupied real estate and a workforce less tied to offices and desks, with 50% more workers occupying 25% less space
- A new eco-park on the River Thames, with green islands and new pedestrian and cycle bridges linking the City to transport interchanges
- A new cultural quarter around Smithfield Market, combining excellent transport links and improved connections to the Barbican
- A new financial centre at Aldgate, set within a landscaped 'high park', with hybrid building types never seen before in the City, clustered to achieve synergies between offices and trading rooms, live/work units, residential apartments and technology
- An elevated park providing a biodiverse natural habitat and reducing the environmental impact of the new development.

9 million

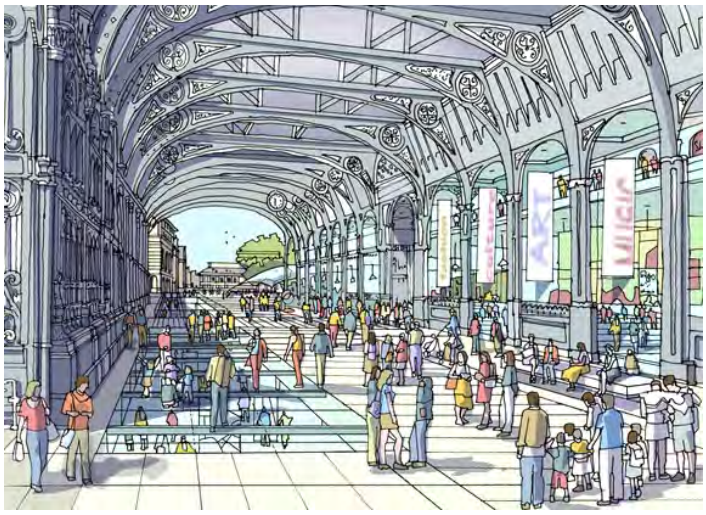
London's population is forecast to grow from 7.8 million to more than 9 million within eight years - how will it adapt?

The exhibition shows what the City could look like in 2050: a greener City, a taller City - in the right places - a quieter, cleaner City, a City that places quality of life at the top of the agenda as one of the key ingredients that attracts high level workers to the Square Mile.

Curator of the exhibition and Chairman of New London Architecture, Peter Murray



The Decarbonised City Core.



The new cultural quarter around Smithfield Market.

The new financial centre at Aldgate, which links Broadgate to The Tower of London.

Find out more about our vision

A series of seminars, talks and walks accompanied the exhibition. These included a tour of Broadgate, which is jointly owned by British Land and Blackstone.

Developing City was the headline event of the London Festival of Architecture 2012. It was organised by New London Architecture, the centre for London's built environment, with the support of the City of London Corporation.

The exhibition, which took place at The Walbrook Building, also featured 40 scale models of recent and proposed developments in the City. It showed the growth of the City since Roman times, the impact of the Great Fire and the Blitz, and how the current financial turmoil might affect the sort of buildings that get built.

Case study : Developments

May 2012 – **Construction supply chain**

Members of our construction team in action at Regent's Place

To improve our understanding and management of the environmental and social impacts of our developments, we've commissioned three studies over the past few years.

These studies have explored the impacts we have through our construction supply chain, looking at site activities, procurement of materials and embodied carbon.

At Whiteley Village in Fareham, where we demolished a shopping centre to create space for an exciting new retail scheme, we diverted 98% of waste from landfill.

In January 2012, Arup completed a review of energy, waste and water use on our construction sites over the last two years. This confirmed waste as a key issue and highlighted that we're outperforming industry good practice benchmarks for recycling and re-use of 70% to 90%. It also identified that most of the energy consumption on our construction sites comprises diesel use during structural works, when access to the national electricity grid is not available.

In 2012, we also commissioned Davis Langdon to update its 2010 embodied carbon review of our development programme. These two studies calculated the amount of greenhouse gas emitted in relation to the extraction, manufacture, transport and assembly of our developments. They highlighted the significance of energy and material use on our developments in relation to our other managed emissions.

In 2009, in partnership with site contractor, Lend Lease, we mapped the supply chain for 10 and 20 Triton Street at Regent's Place in London.

This study particularly explored our ability to influence materials and suppliers. To illustrate, one package supplier, Swift Horsman, supplied joinery and washroom Podwall systems. These included over 200 washroom pods, 1,000 doorsets and two bespoke reception desks. Our architects specified the packages, with Swift Horsman then sourcing the components from hundreds of suppliers. The Podwall system supply chain began in Essex and spread globally. The framing system was assembled in Scotland, using rolled steel sourced via EOS, a UK-based company supplied by UK-based Corus, which, in turn, probably obtained iron ore from Brazil and recycled steel (up to 80% in this case) from the UK.

97%

Thanks to the efforts of our contractors, 97% of the waste we sent off site was diverted from landfill (135,600 tonnes), with a further 81,100 tonnes re-used on site.

The scale of our construction activities, and their potential social, environmental and economic impacts, as well as the importance of the quality of build, make construction a particularly material issue for us. These are not simple issues to manage, particularly given that we contract out our construction activities, relying on teams of external specialists, and that our procurement approach varies between projects.

Sarah Cary, Sustainable Developments Executive at British Land

The supply chain for the washrooms at 10 and 20 Triton Street involved over 50 firms worldwide.

The package overall had low social risks because of Swift Horsman's effective health and safety processes, supplier training and product development. It also had low environmental risks, primarily because supply chain assimilation drove greater efficiencies on site, minimising waste and energy impacts during both construction and operations.

Find out more about how we manage our construction supply chain

Case study : Developments

Mar 2012 – **Sustainability in action at The Leadenhall Building**

Computer-generated image of The Leadenhall Building in London EC3.

The team at The Leadenhall Building in the heart of London's insurance district is putting our community commitments into action and exceeding several of our sustainability targets.

Two years from practical completion, the 47-storey building remains on track to achieve a BREEAM Excellent rating. By the end of 2011, performance against our sustainable development targets included:

- 97% of construction waste diverted from landfill (95% target)
- 26% recycled content (25% target)
- 29% local employment (10% target)
- 15 apprentices and other trainees (target of 10)
- £240,000 of local procurement
- All major suppliers with ISO 14001 certified environmental management systems.

Supporting local employment, training and procurement, as well as community projects, are amongst the ten commitments to local people set out in our Community Charter.

In February 2012, the project was granted National Skills Academy for Construction status. This will give local people the chance to receive training at all levels directly on site. At least 40 apprentices, five graduates and 65 NVQ students will work on the construction site of London's latest iconic building.

Marie Neen of the National Skills Academy for Construction said: "The Academy will provide much needed on-site training to help bring new blood into the industry and help ensure that this building project leaves a legacy of skills for the future."

In November 2011, our contractor Laing O'Rourke took 11 engineering students from Lambeth College on a tour of the construction site, as part of a London-wide event organised by Career Academies UK. In addition, five volunteers from the site have committed to visit Hackney Primary School every two weeks for a year to provide reading support to pupils.

29% local

In December 2011, 29% of workers on The Leadenhall Building were from the local area, outperforming our 10% target.

Our priority is to ensure The Leadenhall Building will create a positive and sustainable impact upon local communities. We want to encourage a transfer of skills to the local labour market.

Project Director at Laing O'Rourke South, Andy Butler

Lambeth College students visit The Leadenhall Building.

After the site visit, Chief Executive of Career Academies UK, James McCreary, commented: “Thank you for contributing so brilliantly to the success of our student conference, A Capital Experience… All the students had a fantastic experience of London… I know from the feedback we have already that the students enjoyed their time with you immensely.”

Other volunteering activities by the project team for The Leadenhall Building include giving a presentation at Haggerston School in Hackney and planting trees for waterways charity Thames 21. Four employees have also signed up to visit Hackney schools in March 2012. Fundraising on site includes £190 for Haven House Children's Hospice in east London and Jeans for Genes.

During the 2011 City of London Festival, people of all ages took part in wide range of creative activities with professional artists. This trio of young people in the Leadenhall Market appears to have been inspired by The Leadenhall building. Photo by Hilda Bramley.

In June 2012, for the second year running, British Land is part-funding a free programme of creative activities in the City of London led by Open City, near to The Leadenhall Building.

Last year’s successful programme 'Take a Closer Look' with The Big Draw was delivered by the City of London Corporation in partnership with British Land, Aviva, and Hiscox. British Land is delighted to announce that it will join other City businesses in supporting this exciting project over the next three years.

View an article on Take a Closer Look

The 736 ft Leadenhall Building, which will be one of the tallest and most iconic buildings in London, is tapered along one side to preserve views of St Paul’s. With no central core, the structure is stabilised by external megaframes of inclined steel columns. These are being constructed by UK steel contractor, Severfield-Rowen, providing employment in Lancashire, Yorkshire, Northern Ireland and beyond.

The Leadenhall Building is a 50:50 joint venture between British Land and Oxford Properties. Designed by Rogers Stirk Harbour and Partners, it was recognised in the inaugural New London Awards as one of the capital’s best projects, winning an award for the best example (unbuilt) of a place to work - meeting the needs of businesses, technology and individuals.

At ground level, a landscaped open space, which rises seven storeys high and covers nearly half an acre, will be on a scale unprecedented in London.

In May 2011, insurance company Aon pre-let ten floors (191,000 sq ft), with options to take a further five floors (85,000 sq ft).

Case study : Developments

Feb 2012 – **Commerce and community at NEQ**

As work progresses on the North East Quadrant (NEQ) of Regent's Place in London's West End, we have agreed a pre-let with Debenhams, achieved excellent sustainability ratings, and boosted local training and apprenticeships.

NEQ will create 500,000 sq ft of office, retail and residential space. Completion of this final phase of our masterplan for Regent's Place, scheduled for 2013, will bring the total floor area to some two million sq ft, providing accommodation for 14,000 workers and residents.

In September, Debenhams pre-let 145,000 sq ft at 10 Brock Street as its new headquarters. We also secured a BREEAM Excellent sustainability rating for this new office building and for the adjacent office building, 30 Brock Street. We consistently achieve high environmental certifications across our £1.1 billion committed office development programme, currently the largest in central London.

Building on our award winning community programme at Regent's Place and on the commitments set out in our Community Charter, our Communities Executive, Anna Devlet, established a local procurement and employment working group. This includes representatives from the London Borough of Camden, King's Cross Construction and Skills Centre and our main contractor at NEQ, Lend Lease.

NEQ, February 2012.

On local procurement, we are working closely with Camden Council and the London-based Supply Cross River project. In October, Lend Lease and project management contractor M3 Consulting attended a 'meet the buyers' event organised by Supply Cross River, where they were introduced to almost 20 local companies, several of which have provided services to the project. Two other local firms have also submitted tenders, which are being reviewed, and members of the Lend Lease team have visited a number of local businesses to discuss opportunities.

Trade contractors Argus, Gardner and Morrisroe have taken on a total of eight young apprentices at NEQ, giving them a chance to gain qualifications whilst working and earning. We are on track to achieve our target for the whole project of 15 apprentices, with a further six positions already advertised and more to follow.

In addition, we are supporting local employment opportunities, with 10 Camden residents

60

Students from University College London visited the NEQ site and met the project team.

currently employed.

In December and January, we arranged site tours for around 60 project and construction management students from University College London.

These tours tie in with the participation of our main contractor, Lend Lease, in the Considerate Constructors Scheme, of which we are a Client Partner.

Project Management Course Director at University College London, John Kelsey, commented: “The visit to the NEQ site and discussions with the project team allowed our students to glimpse the real complexities - technical, spatial and commercial - which property developers face both in optimising site use and in delivering quality developments. Additionally they saw the importance of having a well-coordinated project team representing both the client and the supply chain.”

Computer-generated image of the Regent's Place Plaza

In January, we began the first phase of the redevelopment of the Regent's Place Plaza, next to the new buildings. This included planting trees and installing new features for an events and community space. We set up a protective screen with a viewing window so the public can see what is going on.

In partnership with M3, we hold monthly meetings with local residents, businesses, community organisations and our occupiers. In addition, our monthly newsletter details progress on the development. This is available at www.regentsplace.com/neq

As with all our major developments, we manage environmental and social impacts at NEQ through our ISO 14001 certified Environmental Management System and our Sustainability Brief for Developments. These show that monthly waste diverted from landfill has been consistently above 94%, sometimes reaching over 99%.

In October 2012, Transport for London (TfL) will start works to improve Euston Circus, which is used by thousands of Regent’s Place occupiers each weekday, as well as local people and many others. British Land has worked closely with TfL, London Borough of Camden and other local stakeholders to develop designs to make this junction greener, safer and more user friendly. We also part funded the project, which will create better pedestrian crossings, safer routes for cyclists, simplified traffic movements, wider pavements, more trees and improved landscaping.

Works will start after the Olympics and will be contained to one area of the junction at a time, starting with the northeast corner. The construction is expected to last a year, with works undertaken outside of the busiest times. Euston Circus is the junction of Euston Road, Tottenham Court Road and Hampstead Road. The improvements are part of the Mayor's Great Outdoors Programme.

Visit the TfL website for more information

Case study : Developments

Feb 2012 – **On track for excellence at 199 Bishopsgate**

Computer-generated image of 199 Bishopsgate.

With work underway on the comprehensive refurbishment of 199 Bishopsgate at Broadgate, we are firmly on track to achieve another BREEAM Excellent rating.

Due for completion later this year, the innovative refurbishment design will provide 146,000 sq ft of high quality space, transforming the building's interior and upgrading its energy performance, reducing carbon emissions by 60%.

Compared to a new build, the environmental impacts of the refurbishment are also significantly lower, with less materials usage and a smaller embodied carbon footprint.

The entire project team is applying our Sustainability Brief for Development, which sets out processes for continually improving performance, promoting step changes in efficient design, responsible construction and ethical procurement.

Informed by our Brief and by dynamic energy simulation modeling, sustainability measures at 199 Bishopsgate include:

- Energy efficient chillers, particularly important as the building has a net cooling load (needs more cooling than heating)
- Replacing air handling units on each floor with centralised units which maximise heat recovery (75%)
- High performance glazing on the top two floors, which carefully balances heat loss and solar glare, taking into account impacts on lighting, cooling and heating demands
- Replacing fan coil units on each floor with high-efficiency, variable speed motors, which reduce flow when the demand is met, whilst increasing the overall fresh air rate, improving efficiency and comfort conditions
- Centralised rooftop plant and relocating chillers to roof level, which both improves efficiency and creates amenity space within the building
- Energy efficient, dimmable lighting with motion sensors and daylight linking
- Automated meter reading system for energy and water, with sophisticated sub-metering, following an award-winning pilot at our Head Office.

There will also be recycling facilities for occupiers, 50 cycle spaces, showers and lockers to support green travel, and brown roof space to encourage biodiversity.

Other improvements through the refurbishment include:

- Reconfiguring office floor plates and cores to improve the layout, efficiency and flexibility, for instance allowing sub-division

60%

Carbon emissions at the refurbished 199 Bishopsgate will be cut by 60% compared with the existing building.

... there are many more non-domestic buildings out there waiting for this type of intelligent overhaul.

A sustainability blog in The Architects' Journal

- Relocating the entrance away from the pedestrian crossing area, to improve pedestrian flow, and redesigning it to provide a double-height reception
- Enhancing retail space on the ground floor
- Improving disabled access and facilities
- Enclosing the centralised roof plant and introducing acoustic louvers, to avoid any impact on strategic views from King Henry VIII's Mound towards St Paul's.

To deliver our sustainability objectives during construction, a comprehensive environmental requirements contract was drawn up for both the strip-out and construction contractors. This covered procurement of materials and careful attention to the deconstruction process, as well as setting targets for local employment and training.

Once the building is occupied, we hope to launch a green building group with occupiers and the building management team. We will also provide regular building environmental statements providing detailed performance comparisons.

A sustainability blog in The Architects' Journal about the refurbishment of 199 Bishopsgate stated: "Overall this approach to delivering a low carbon refurbishment, focusing on building fabric and efficient systems, shows the immense savings - in the order of 60% - that can be achieved… this approach is highly replicable and there are many more non-domestic buildings out there waiting for this type of intelligent overhaul."

British Land and Blackstone gained planning consent for the refurbishment of 199 Bishopsgate in February 2011.

Case study : Developments

Jan 2012 – **Embodied carbon in our developments**

We're reducing the carbon emissions associated with the manufacture of materials and construction of our new buildings.

For the last few years, we've been working with our development supply chain to understand the scale and sources of emissions associated with the manufacture of construction materials, their transport to site and their erection on site. This year, we began making decisions which will reduce this element of our carbon footprint.

We estimate that our embodied carbon footprint for 2011/12 will be 190,800 tonnes of CO_2e. This is greater than the annual emissions from all the energy sources we measure across our property portfolio.

Ropemaker Place, London EC2

Our journey to understand the emissions associated with our developments began in 2009, when we commissioned two studies on Ropemaker Place. A study by Deloitte measured the building's carbon footprint, that is, the total emissions that have been or will be caused by Ropemaker Place from extraction of materials through to eventual demolition, using the Lifecycle Assessment Standard (BS EN ISO 14040). Sturgis reviewed the building's carbon profile, that is, the carbon impact of individual building components based on their expected lifespan. The total carbon footprint for construction, operation and demolition of Ropemaker Place, assuming a 60-year lifespan, is 340,000 tonnes of CO_2e, of which embodied carbon is 82,263 tonnes.

In 2010, we asked Davis Langdon to estimate the embodied carbon from our entire development pipeline, using several of our projects as benchmarks. Together with the studies on Ropemaker Place, this highlighted that the largest areas of embodied carbon in our new buildings are the structure and façade, that is, coming from the energy used to manufacture steel, concrete and aluminium from raw (or recycled) materials.

190,800

Our estimated embodied carbon footprint for 2011/12 is 190,800 tonnes.

Computer-generated image of 5 Broadgate, London EC2

Building on this knowledge, our design teams for 5 Broadgate and Marble Arch House conducted investigations into the embodied carbon of these building elements, seeking to design out material usage and to specify lower carbon sources of concrete and aluminium. Their efforts are beginning to pay off, as outlined below.

At 5 Broadgate, the design is on track to reduce the construction carbon footprint by 4% compared to the concept baseline, after a specific structural frame solution was chosen and the amount of steel used in the façade was cut. Although 4% may sound small, the absolute figures are significant: 3,300 tonnes CO_2e, equivalent to the annual external lighting demand of our entire retail park portfolio.

Computer-generated image of Marble Arch House, London W1

At Marble Arch House, the design team has set a façade carbon target, which the contractor must achieve.

The design teams on both projects have sought to incorporate energy information about individual material components into the intelligent modelling software they use to design the building. This makes it easier to understand the embodied carbon implications of design changes, alongside cost and appearance.

We are also asking contractors on all our major projects to measure and report the embodied carbon of substructures, foundations, frames and façades. This gives us a better indication of our actual footprint, as well as raising awareness about embodied carbon in our supply chain.

In October 2011, we hosted a seminar entitled 'The Growing Importance of Embodied Carbon in Construction' with speakers from British Land, construction consultants Davis Langdon and engineering consultants Buro Happold.

Looking forward, we will continue to raise awareness about embodied carbon and what construction teams can do to reduce it. We will also improve the measurement and reporting of our embodied carbon footprint; there are currently several measurement methodologies which the industry can use. In time, we hope to be able to set design benchmarks and targets for specific buildings, and work with manufacturers to find new, low-carbon ways of sourcing and producing the kinds of materials used in our buildings.

All information in this case study is as at 30 November 2011.