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Brent Civic Centre, UK

Case Study 115 The Brent Civic Center is a newly constructed community building in northwest London that was the first public building to achieve BREEAM Outstanding.

Aspects of Sustainability

This project highlights the following:

Green Aspects

Energy
Carbon
Materials
Water
Local Impacts

Social Aspects

Human Resources
Corporate Community Involvement
Business Ethics
Health and Safety



“As well as having the highest sustainability and environmental standards, which will save the council money in the long-term, the building’s state-of-the-art community facilities will set the standard for public sector buildings.”

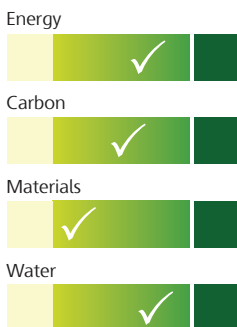
Councilor George Crane

Brent Borough Council lead member for regeneration and major projects.

meeting and exhibition spaces. It also offers a variety of public services and amenities under one roof, including a Council Services Centre, a new flagship central library and learning center, a large capacity assembly hall, registrars and wedding services and training facilities. The Civic Centre was completed in March 2013 and will be fully functional by July 2013.

Skanska was the general contractor of the US\$ 134 million project. The building includes a large glazed winter garden and community hall, which can be used for various events. The Civic assembly hall has a cylindrical shape and is visible from the front of the building through the winter garden. There is a café/restaurant with indoor and outdoor seating and retail spaces on the ground floor. The Civic Centre has concrete external walls with an aluminum frame and insulated cladding paneling. A public garden landscaped area with trees, lawns and water features was also created adjacent to the Centre. The building has basement parking with the capacity for 158 vehicles.

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Project Information

Brent Civic Centre is a newly built community building situated opposite Wembley Stadium and Wembley Arena, in the London Borough of Brent, northwest London. With around 2,000 workspaces, the 9-story 21,744 m² Civic Centre is the headquarters of Brent Borough Council and some of its partners. Council employees relocated to the Center as part of a modernization and centralization initiative. Brent Civic Centre is also a community hub with half its space dedicated to public uses, including retail, café/restaurant,



The Brent Civic Centre was the greenest public building of its type in the UK on completion and the first public building to achieve BREEAM Outstanding, which is the highest possible rating. BREEAM is a green building measurement rating that was established by the Building Research Establishment in the UK. The project is expected to achieve a BREEAM score of 94.8 percent, which far exceeds the 85 percent required to achieve BREEAM Outstanding. Skanska and Brent Borough Council won the Local Government Chronicle Award in the innovation category in 2012, which recognized the project's community engagement and legacy efforts.

Contributing Toward Sustainable Development

The Brent Civic Centre is a resource efficient building that uses 65 percent less energy and 45 percent less water than a conventional building. Efficient features include a biofuel boiler and a rainwater harvesting system that provides water for toilet flushing. The Centre is also a functional and flexible building that promotes healthy indoor environments, has a green roof, and contributes toward sustainable urban development. During construction, the project team implemented extensive community engagement activities, incorporated environmentally responsible materials and sought to divert construction waste from landfill. The project worked to maximize local economic benefit by prioritizing local workers, contractors and suppliers.

Green Aspects

Energy

Energy efficiency

The A-rated Energy Performance Certificate building is designed to annually use 93.5 kWh/m², which is around 65 percent less energy than the current Building Regulations. The passive design makes extensive use of natural/mixed mode ventilation, which involves using natural ventilation instead of mechanical ventilation when possible, and natural daylighting. 28 Air Source Heat Pump Air Handling Units (AHUs) decrease heating and cooling loads by around 23 percent compared with conventional systems.

The building is equipped with two 300 kW Combined Cooling, Heat and Power (CCHP) liquid biofuel engine, which can run on 11 different waste fuels. The system includes two 120 kW absorption chillers and two 30 m³ thermal storage vessels. The CCHP system is designed to meet between 11 and 13 percent of the building's total heating requirements. The system will primarily run on fish oil residue, which is recognized by the UK Department of Energy and Climate Change and the Office of Gas and Electricity Markets as having the lowest carbon footprint of all biofuels and as being a sustainably sourced second generation end-of-line waste. The fish oil residue is sourced by an external supplier, which also maintains the system.

The atrium roof is made from Ethylene tetrafluoroethylene (ETFE), which is a semi-opaque material that allows natural daylight into the atrium whilst avoiding excessive solar heat

gain. Light Emitting Diode (LED) lighting has been extensively used throughout the building, which uses around 50 percent less energy and has a lifespan of up to 7 times longer than conventional lighting. Energy efficient elevators were installed that each uses around 4,000 kWh/year, or 60 percent less energy than conventional models. The elevators are each equipped with a regenerative drive that converts the potential energy from downward movements back into electricity. The elevators also have a standby mode, LED lighting and energy efficient displays. In addition, the escalators are energy efficient, with a sensor activated standby mode and a load-sensing device that synchronizes motor output with passenger demand through variable speed drives.

Energy monitoring and management

The Centre is equipped with a Building Management System (BMS), which manages and optimizes the overall building performance through continuous commissioning. The BMS controls and monitors the CCHP plant, the air-handling and chiller plant, electricity use and the indoor environment, and allows sub-metering.

Carbon

Carbon footprint

The team conducted a carbon footprint that calculated a 26 percent reduction in the project's embodied carbon emissions. Carbon savings resulted primarily from the reduced thickness of the concrete floor slabs due to the post tensioning method used in the construction, and the substitution of carbon-intensive binder with 50

percent Ground Granulated Blast Furnace Slag (GGBS). GGBS is a by-product of the steel making process and reduces the need for carbon-intensive cement. 25 percent of the aggregate used on the project was Cornish Stent, which is a secondary aggregate derived from the China Clay mining process. The team's materials strategy focused on recycled content and efforts to reduce the volume of the frame to reduce the carbon footprint. Local materials were also sourced when possible to reduce transport-related carbon emissions. Other carbon savings were realized through the use of more energy efficient site cabins and a reduction in the amount of concrete required for the project.

Operational carbon savings

The New Brent Civic Centre has an estimated Building Emission Rate of 8.5 kgCO₂/m² per year with NO_x emissions of approximately 40 mg/kWh.

Materials

Environmentally responsible materials

Over 80 percent of the construction materials were environmentally certified in some way. For example, BES 6001 Responsible Sourcing of Construction Products included the concrete and steel frame and in situ concrete floor slabs. ISO 14001 certified products included the external walls, plasterboard and glass partitions. Material selection was based on a cost and environmental lifecycle perspective. For example, rigid tile/slabs with a relatively high initial cost were selected due to their lower life cycle cost over a 60-year period due to their low replacement rate. Materials with low or zero-VOC (Volatile Organic Compound)



content were selected, such as finishes, fittings and decorative coatings. Other environmentally responsible materials included the GGBS, and the concrete frame of the building, which has a fair-faced finish that does not require additional finishing materials such as plasterboard.

Waste management during construction

The project team diverted over 90 percent of construction waste from landfill through efficient waste management processes. All demolition waste from the existing car park was crushed on site and used as aggregate for the sub-base. Demolition aggregate made up around 34 percent of the total aggregate used on the project. Reusable packaging was used to deliver construction materials in order to reduce waste.

Operational waste management

The Civic Centre has comprehensive waste sorting facilities including provision for the composting of biodegradable waste. The Centre is connected to the ENVAC automated vacuum waste collection system in Wembley Park, which efficiently transports waste in underground pipes and avoids the need for waste collection vehicles.

Water

Water efficiency

Brent Civic Centre uses around 45 percent less water than conventional water management systems and techniques. All bathroom fixtures have sensor controls and taps have a limited flow rate of 0.17 l/s. The toilets are water efficient with a 4.5-liter flush and have a water saving delay valve. The Centre has a large rainwater harvesting system, which collects roof runoff in a 38 m³ storage tank in the basement. The system automatically manages and prioritizes the reuse of harvested rainwater for toilet flushing and landscape irrigation. Landscaped areas include drought tolerant species that require minimal irrigation. The BMS measures water consumption in different parts of the building and can detect leakages.

Water efficiency during construction

Skanska used an innovative water treatment and reuse system during construction to clean the chilled and heating pipe work, which reduced potable water use by 99 percent. Water used to clean out pipework can typically amount to almost half the total water used during the construction process. The solution similarly reduces the effluent discharge during treatment.

Other Green Aspects

Minimizing environmental impacts

Potential noise disturbance was managed through close liaison with the local authority and by stressing the importance of minimizing noise among the project team. During the summer, dust was monitored and site roads were dampened with harvested rainwater when necessary.

Green roofing

The administration building has a 313 m² sedum green roof. Green roofing provides additional thermal insulation and extends the roof's lifespan by protecting it from weathering and UV light. In addition, roof vegetation can provide habitats for birds and insects, filter airborne pollution and reduce stormwater runoff.

Biodiversity

The site was previously a carpark with no plant species. The addition of landscaped gardens, a green roof and various hanging boxes for bats and birds, and invertebrate boxes has enhanced biodiversity on the site. Specific species of bird that are being encouraged include the black redstart (*Phoenicurus ochruros*), which is a protected species that tends to favor urban habitats. 70 lime trees (*Tilia x europaea*) have also been planted on the site.

Minimizing light pollution

Exterior lighting luminaires emit less than 15 percent upward light and have a total site illuminance of 25 lux pre-curfew and 5 lux post-curfew. All external lighting is controlled by daylight sensing photocells, time switches and manual override switches.

Social Aspects

Project team cooperation

Cooperation of the entire project team was key to the project achieving BREEAM Outstanding. Skanska developed and issued a Building User Guide for the client and other building occupants to promote the correct use and management of the building and its various green solutions.

Community engagement

The project won the Considerate Constructors Scheme National Site Silver Award for its exceptional standards of consideration for the local community, its workforce and the wider

environment from a list of 8,500 sites around the country. The project team organized around 50 community engagement events primarily held off-site with schools, local organizations and local disadvantaged or unemployed people. Such events involved around 2,110 people and over 400 hours of Skanska and trade contractor staff time. Around US\$ 4,000 was raised through various Skanska and trade contractor activities.

There were 50 trainees working on site for Skanska and project trade contractors during the project, and over 1,000 weeks worth of training was provided free of charge in total. Various events were also held to provide information about construction careers and apprenticeships, and interview techniques.

Regular construction updates were posted on Brent Council's website to keep local stakeholders updated about the project. Prior to construction, local stakeholders were consulted and the project design and plans were amended accordingly to meet the concerns and issues raised.

Occupational health and safety

There were no serious incidents during construction and the Lost Time Accident Rate was 5.3 per million hours worked. Near Miss Incidents were recorded and shared internally with other Skanska Business Units.

Healthy indoor environments

The administration building is designed to promote healthy environments for staff and visitors. All administration workstations are within 7 meters of a window, which provides natural daylight and external views at seat-level. The building is also extensively glazed to allow natural daylight to penetrate the building, and various manual and electronic sunblinds avoid solar glare and excessive solar gain. All luminaries in the administration areas have high frequency ballasts to reduce light flicker. Zones of no more than four workstations are used to control temperature, windows and lighting on control panels or via a computer desktop control. The winter garden and public gardens offer spaces to relax. The winter garden has acoustic banners, soft furnishings and artwork to dampen loud noises.

Functional and flexible building

Brent Borough Council relocated from various inefficient, expensive to maintain and not fit-for-purpose premises to the Brent Civic Centre, which has modern, purpose-built facilities that enable staff to work more flexibly and efficiently



The centre itself is designed to be flexible in order to promote a long useful lifespan. The mixed-use development provides workers and the public with opportunities to work, shop and eat. The multi-functional winter garden and community hall has the capacity for up to 1,000 people for various events, such as weddings and art exhibitions. The library is open 24-hours and has enhanced learning resources and study areas. The Customer Service Centre has an interactive waiting area with self-service options. Disabled access features include disabled car parking, automatic doors, and large lifts to all floors.

Skanska, together with a project partner, developed a detailed maintenance strategy that includes how all the building's main equipment is to be removed and replaced within the building's design life.

Contributing toward sustainable urban development

The Brent Civic Centre is situated in the heart of the Wembley regeneration area. The site was previously brownfield land, and the project consequently did not directly impact upon natural habitats or greenfield land.

Promoting more sustainable modes of transport

The Centre has 250 cycling spaces, including 75 basement spaces reserved for staff, which is double the BREEAM requirement for the building. 16

showers and lockers are also provided to encourage staff to cycle to work. Bus stops are within an 8-minute walk, and London Underground lines and National Rail within a 12-minute walk. There is a dedicated travel information point in the foyer that displays public transport and taxi information. 47 of the basement vehicle parking spaces have electric charging stations, which are connected to the biofuel CCHP system to provide vehicles with low-carbon electricity.

Economic Aspects

Local contractors and workers

The project team established the Civic Centre Supply Chains Programme, which worked to maximize the involvement of the local economy and in particular opportunities for local small and medium sized enterprises (SMEs). Over 100 local companies attended the business event about the project and Skanska's procurement processes. Opportunity workshops were also held to highlight and advise on contract opportunities, and the necessary tender documents that were required for specific works. Over 28 local suppliers were used on the project, with a total spend of over US\$ 6.8 million. Around 500 workers were on site during the peak of construction, and on average, 24 percent of the workforce was from Brent, which exceed the client's 10 percent target.

Efficiency savings

Council employees relocated from 17 buildings as part of a modernization and centralization initiative, which will annually save around US\$ 4 million in operating costs due to the Centre's resource efficiency. The new Civic Centre also provides opportunities to generate around US\$ 15 million in annual income through its retail and events facilities, which will be spent on public services in the borough.

Learning From Good Practice

Brent Civic Centre's green ambitions were met through close cooperation between the entire project team, and by using the BREEAM Outstanding criteria to guide the project.

