CIBSE BUILDING PERFORMANCE AWARDS 2016

# Entry Form

## Project of the Year – Commercial/ Industrial

This Award recognises the new build or refurbishment of a Commercial or Industrial building that most effectively demonstrates high levels of user satisfaction and comfort whilst delivers outstanding measured building performance, energy efficiency and reduced carbon emissions. Examples of buildings suitable for this category include, but are not limited to, office buildings, warehouses and data centres.

Entries in this category must be from within the United Kingdom (see International Project for projects outside the UK), and projects must have completed during the period **1 September 2012 - 31 August 2014**. Entries may be submitted by any or all members (together) of the project team and should be accompanied by a full year of operational data.

Please complete the entry form below. The headings reflect the judging criteria and the judges will be looking for you to provide the relevant information under each heading.

| **Submission instructions** |
|---|
| 1. Complete and save this document<br>2. Click here to submit your entry online<br>3. Complete the required fields and follow the instructions on the online entry system<br>4. Upload your entry form and supporting documents.<br>5. Click finish to submit your entry<br><br>If you have any questions then please contact us on 020 7880 7625 or by email to lois.hunt@redactive.co.uk. |

| **Entrant details** | |
|---|---|
| **Full name** | **Job title** |
| Simon Smith | Chief Engineer |
| **Organisation** | |
| Nottingham Trent University | |

| **Project Details** | |
|---|---|
| **Project name**<br>*As you wish the project to be referred to throughout the competition.* | |
| 50 Shakespeare Street Refurbishment | |
| **Project Address** | |
| 50 Shakespeare Street, Nottingham, NG1 4FQ | |
| **Project completion date** | |
| September 2014 | |
| **Date the building was first fully in use after the project completed** | |
| September 2014 | |
| **Start of the 12 month period for which performance data is provided** | |
| August 2014 | |
| **Organisations**<br>*Please provide the names of all organisations that you would like to be credited in your entry. Please ensure that the company names you list are accurate as we may reproduce these on screen and in print. It is essential that you have the consent of all those named below to include them.* | |
| Building Services Engineer: | Mark Godfrey/Ashley Allsop |
| Building Owner: | Nottingham Trent University |
| Building Occupier: | Nottingham Trent University |
| Project Manager: | John Greasley |
| Quantity Surveyor: | Nottingham Trent University - Jon Allen |
| Brief Consultant: | N/A |

| | |
|---|---|
| Architect: | Nottingham Trent Univeristy – Hamel Tailor |
| Interior Designer: | Nottingham Trent Univeristy – Lori Hession |
| Mechanical / Electrical Engineer: | Nottingham Trent University - Mark Godfrey/Ashley Allsop |
| Contractor: | Mellor Bromley & Nottingham Trent University |
| Investment / Property Company: | Nottingham Trent Unviersity |
| Developer: | Nottingham Trent Unviersity |
| Facilities Manager: | Steve Swift |
| Other: | Rolton & Gleeds |


**Summary**

*Please provide a synopsis of the project and its building performance, low carbon and energy efficiency objectives.*

In 2012, Nottingham Trent University (NTU) acquired a building in disrepair: 50 Shakespeare Street. Built in 1887, the former Council registry office had endured years of foot traffic, unsympathetic refurbishments and World War II damage. NTU relished the challenge of rescuing this Grade II listed building to build upon the University Quarter concept in the City Centre.

Providing ample additional office space and a positive impact on the identity of NTU, the building is the perfect acquisition to assist in the completion of a long-term plan to accommodate our central administration into one location.

NTU set itself the challenging goal to carry out a full refurbishment of the Grade II listed property that met the future needs of the University whilst minimizing energy use and carbon emissions in line with the University's goal to reduce overall carbon emissions by 48% by 2020.

Despite providing scope for the future, the build posed significant challenges: with the primary challenge being our aim to significantly improve on the existing Energy Performance Certificate of an F whilst working within the constraints that the building presented

To achieve the goals set required a mix of traditional skills and forward thinking to ensure the building would meet the University's low carbon aspirations whilst ensuring a sympathetic restoration.

To ensure that the building met the needs of the users whilst significantly reducing carbon emissions, the NTU Engineering Department undertook a full review of the building and its existing services; identified potential improvements to the building fabric, assessed the heating, lighting and ventilation requirements for the future use of the building, assessed various low and zero carbon technologies to meet the requirements identified, assessed the potential energy use and carbon emissions of the building, carried out a full design for the proposed works and ultimately managed the installation.

In addition, the Engineering Department carried out full thermal and CFD modelling to confirm the design would work as intended, and to ensure that the design led to a significant reduction in the energy and carbon emissions of the building; whilst also providing a significantly improved environment.

The measures ultimately adopted within the building were to improve the thermal performance of the glazing and roof, to retain the natural ventilation strategy for the building, meeting the heating needs of the building through a mix of biomass and connection to the low carbon Nottingham District Heat Network, maximising the use of daylight throughout the building by reinstating roof lights and fitting internal glass partitions rather than solid walls, the installation of low energy lighting in a mix of high frequency T5 and LED fittings, taking controls back to basics and giving the user an influence on their local environment.

As a result of the works carried out, the Energy Performance Certificate level was significantly improved from a level F when acquired, to a high level B on completion of the works. In addition the results of the first year's energy use of the building whilst in operation also delivered a Display Energy Certificate of level B.

This distinct, largely self-refurbished project provided an opportunity for University-wide staff to combine skills and abilities, and also offers the opportunity to showcase our services from a building rich in local history and value: an asset we consider to be the 'Crown Jewels' of our estate!


**Entry criteria**

**Please outline how your entry meets each of the entry criteria – judges will be looking for information in each of the sections when assessing the entries.**

*Documents, charts or photos should be referenced and included in your supporting documents.*

## One year's evidence of measured building performance and energy use data. (Ideally including a DEC or ESOS report and an entry on the CarbonBuzz website)

The extent to which the energy and carbon performance of the building has been improved can be observed in the 65% reduction in the building emissions rate from the initial EPC to the EPC produced on completion of the works.

When acquired, 50 Shakespeare Street had an Energy Performance Certificate of F, a score of 129 and a building emission rate of 63.93kgCO2/m2 (certificate number 9812-3095-0095-0200-7991).

Due to the subsequent works undertaken this was significantly improved to an EPC level B, with a score of 34 and an overall emissions rate of 21.83kgCO2/m2 (certificate number 9836-3087-0956-0400-8091).

As the building has now been occupied for over a year we also have the first Display Energy Certificate to show how the building has actually performed.

Although acknowledged that the EPC and DEC do not show the same information, and as such cannot be used as a direct comparison, it is our belief that the overall rating of the DEC should approximately reflect the rating of the EPC if the building were to operate as designed. Where this is not a case and a performance gap occurs between the EPC and DEC, then this would be deemed to be either as a result of the building not operating as intended or that the EPC was not potentially modelled accurately in the first place.

In the case of 50 Shakespeare Street, the first year DEC was calculated to be a strong level B with a score of 39, a heating use of 128kWh/m2/year and an electricity use of 53kWh/m2/year, giving an overall energy use of 178kWh/m2/year. It could therefore be argued that the building is currently being operated as intended, and that the assumptions used in the EPC were accurate and reflected the proposed use.

Furthermore, the total first year DEC energy use figure of 178kWh/m2/year was 30% lower than the figure calculated by the Engineering Department at the design stage. As such NTU managed to deliver a building which exceeded the challenging targets it set itself to significantly improve the energy and carbon performance of the building. The fact that actual performance of the building was even better than that expected at design stage is believed to be a reflection of the accurate and realistic modelling that NTU undertook.

## Special challenges, objectives or constraints and the design solutions adopted.

Given the age of the building, this refurbishment presented a number of unique challenges and constraints.

One of the key challenges faced was the limited space and access to the sub-basement which was to become the main plant room for the building. Despite the low roof height, confined space and single access via existing staircase, the new plant room was intended to house the biomass boiler and associated fuel stores, the low loss plate heat exchanger for connection to the Nottingham District Heat Scheme; the buffer vessels, the ceramic filter for the biomass boiler and the associated control panels and electrical panels.

To ensure that it was possible to fit all of the plant and equipment into the plant room it was necessary to phase the installation of the works and to alter local floor heights.

Due to space and access restricting the use of lifting gear, it was necessary to break down the boiler and associated plant so that it could be man-handled down the single stair access and into the location the required. Despite the difficulties this process posed, the carbon savings were deemed to far out way the issues encountered.

The age and complexity of the building also presented a challenge when calculating heat loses, the potential for overheating and when assessing the performance of the natural ventilation strategy. In order to ensure that the design for the building services would perform as intended a series of thermal and CFD modelling was undertaken in house by the Engineering Department using the Design Builder Version 4 modelling software.

The key issues addressed through the modelling include the risk of overheating to a number of the offices, how the proposed radiator locations would perform in terms of heat distribution and the uniformity of heat, the performance of the heat pumps used in Courtroom and Board Room throughout the year, the impact of installing solid partitions in the basement level offices on cross flow natural ventilation and the control strategy to be employed for the light well roof vents.

Carrying out this modelling was deemed to be an extremely useful exercise as the process highlighted the overheating risk associated with the installation of full height partitions in the basement offices which would have occurred as a result of a reduction in cross flow ventilation. The modelling also confirmed that the services proposed and designed by the Engineering Department would work as intended and should therefore meet the requirements of the user.

In addition to the challenges faced with the installation of the electrical and mechanical services, the property

was fully refurbished within a demanding nine month programme and reopened in September 2014. The success of the restoration lay largely with the unique and vast range of specialist expertise dedicated to achieve the intricate project scope, which, whilst underpinned by the application of a sustainable procurement and an aim to install renewable energy solutions, had to include the retention and restoration of a building boasting original 1880s Gothic architecture.

The Court Room's domed ceiling, once described as "the prettiest public hall in town", was lost above a suspended ceiling installed circa 1990. As the ceiling was removed, decorative plasterwork was revealed which had suffered extensive damage and deterioration. The restoration included the repair of 234 holes where the steel suspended ceiling hangers had penetrated the plasterwork, replacement of the missing north-west corner piece of the ceiling, and the fitting of two new ceiling roses. These were reproduced by taking a mold of the one remaining rose. Plaster pilasters and oak paneling in the court room had been spoiled by the installation of temporary stud walls and required reconstruction using traditional joinery techniques.

The original roof light, which had previously been removed and replaced with a bitumen felt covered flat roof, was reinstated to reduce the requirement for artificial lighting and improve ventilation.

63 of the impressive 68 sash windows were fully refurbished, restored and fitted with low profile inert gas filled double glazed units. In addition 5 new replacement windows were authentically designed and fitted to match the original windows.

Other architectural 'treasures' restored to their former glory include: pink granite columns in the main entrance lobby, an original wall-mounted safe and ornate fireplace, both on the ground floor, and glazed brickwork and partitions in the lower ground floor.

## Specific elements of excellence and innovation in terms of design, equipment or application including lighting, heating, and cooling, façade or public health services.

The unique project scope included retention and restoration of original features, along-side the installation of renewable energy-solutions using sustainable procurement practices.

In order to take advantage of the tall ceilings and large sash windows in the building, a natural ventilation strategy was adopted throughout the building. This not only eliminated the need for ventilation plant and duct work for the majority if the building but also meant that along with the local heating controls, the users could take full control of their own environment.

The sash windows were also used to maximise the use of daylight in the building. In addition to further maximise the potential of using daylight in the building a light well at the top of the main circulation staircase which had been covered up by the previous owners of the building was reinstated to reduce the requirement for artificial lighting during the day. In addition ventilation opening were also added to the light well in order to create a stack effect and subsequently aid natural ventilation in the building.

Modern offices and meeting rooms were carved out from an existing warren of rooms, with glass walls installed for natural daylight optimisation. The project team surpassed standard requirements to reinstate the building as habitable; fully utilising its potential and future-proofing its longevity.

High-grade roof repairs and installation were not essential; however to reduce the risk of short-term roof damage, improve efficiency and exhibit diligence, a retrofit insulation solution was installed.
Two lifts were installed with consideration to improving mobility for passengers between floor levels, and a new category L2 Fire alarm system was installed by the DDA entrance. Room features were re-crafted by hand; 5000 linear metres of purpose-made floorboards sourced from FSC Certified wood were procured locally and materials salvaged from site were reused where possible.

The smallest of details were considered to cement the building's energy-efficient future, remaining sympathetic and honourable to its valued past.

The University's hands-on, in-house approach to maintenance and design services in undertaking this complex refurbishment demonstrates the accomplishments of a talented and dynamic workforce, united in respect to our heritage: We take pride in our success, having generated creative solutions and professional development opportunities. The restored building is better suited to embrace its architectural purpose than ever before; and lies at the heart of our 'Professional Services' hub.

## Specific energy efficiency aspects of the project, such as energy metering, monitoring and targeting, use of recycled/recyclable materials and other low carbon features.

NTU is committed to our Sustainable Procurement policy, adhered to when delivering all University purchases, helping to form the backbone of NTU's ISO14001 certified Environmental Management System.

The NTU Engineering Department developed designs to improve the building fabric performance, fit low energy lighting and to heat the building through a combination of a pellet biomass boiler and connection to the Nottingham District Heat Scheme.

The design was developed to install a wet heating system utilising radiators throughout the majority of the building. The heating system is zoned to a floor level and is controlled through the University's centralised Trend Building Management System. Occupants were also given local control through the installation of Thermostatic Radiator Valves on all of the radiators to ensure that they could manage their own environments.

In order to minimise carbon emissions, the heat to the wet system is supplied through the installation of a 150kW Hargassner biomass pellet boiler and connection to the Nottingham District Heating Scheme.

Although the majority of the heating requirements in the building have been met through the installation of the wet heating system, the heating to the Courtroom and Board Room have been met through the installation of reverse cycle heat pumps. The heat pumps were selected for the Courtroom and Board Room as, in addition to their day to day use, these rooms are also to be used for formal functions and events. As such when the heat gains were assessed for such events it was identified that there was the potential for significant overheating. In these instances given the limited cooling potential of a natural ventilation strategy it was identified that mechanical cooling would be necessary. The installation of the reverse cycle heat pumps therefore gave the option to cool the space on the small number of occasions when necessary without having to fit plant and equipment that would have remained unused for the majority of the time.

The artificial lighting installed in the building is a mix of high frequency T5 and LED fittings. Given the use of the building, and our previous experience with supposedly intelligent lighting system, it was deemed that the most suitable form of lighting control for the building was to install local switches with absence detection in the room. This option gave the users the full control of their lighting, whilst also ensuring that the lighting was not left on when not in use. The only exception to this strategy is in the Courtroom where the LED lighting is controlled through a local lighting control system to allow scenes to be set for the various events taking place in the room.

Further measures to minimise the energy used for lighting in the building include the use of glass partitions between rooms to allow light to spill from room to room.

A touch screen intuitive Building Management System is located within the sub-basement plant room; providing enabling and fault signals, and features programmable time clocks to all mechanical plant equipment. This ensures that systems only operate when necessary, reducing energy wastage and saving money. All utilities are individually metered and read at building level, allowing us to closely monitor consumption. We have automatic meter reading and radio equipment affixed to each meter and the Building Management System offers the opportunity to closely observe and record energy use and activity from remote locations at all times.

## Evidence of costs and expected savings associated with these measures and anticipated payback periods.

In order to gauge the extent to which any proposed works to the existing services and building fabric would have it was necessary to assess both the existing and future energy performance.

Prior to the refurbishment works taking place, an initial assessment of the existing building was carried out which involved reviewing the current Energy Performance Certificate for the building, calculating the steady state heat losses of the existing building and considering benchmarking data to determine the existing annual energy requirements and carbon emissions and as such the scope for reduction.

This survey highlighted a number of potential issues with the existing building, as well as significant scope for improvement.

Given the age of the property it was deemed that it would not be suitable to simply use standard published benchmark energy and carbon figures for the building. As such in order to determine the annual energy and carbon emissions as accurately as possible the results of the steady state heat losses were normalised with degree day analysis using the Bentley Hevacomp modelling package. The calculated annual heating load was then substituted into the relevant benchmarks for the building within CIBSE Guide TM46 for type 18 University buildings and the ECG 016 Guide: Energy Use in Offices. The results of the assessment can be found in table 1 and show that were the existing building to remain unchanged then the annual energy use and carbon emissions would be:

Baseline energy and carbon:

- Annual energy use: 354kWh/$m^2$
- Annual carbon emissions: 87kg$CO_2$/$m^2$

**Table 1:** Existing Performance

| Area | Usage | Floor Area | Energy Usage (kWh/annum) | Emissions (kgCO2/annum) | Notes: |
|---|---|---|---|---|---|
| Ground/First Floor | Offices / Meeting Rooms | 893.0 m² | 316,122.00 | 77,798.16 | Relevant Benchmark Data multiplied by Floor Area |
| Second Floor | Residential Flat | 139.0 m² | 49,206.00 | 12,109.68 | |
| Basement | Storage | 323.0 m² | 114,342.00 | 28,139.76 | |
| **Whole Building** | **Mixed** | **1355.0 m²** | **479,670.00** | **118,047.60** | |

With an energy baseline established, the next phase of our project was to assess the impact of the potential improvement measures on the performance of the building.

The findings of the initial assessment carried out indicated that the windows, predominately single glazed, were poor fitting and in most cases were subject to deterioration. In addition the external walls of the property were identified as being of solid brick construction and the roof had minimal levels of insulation present. The first set of measures considered therefore were to repair the windows, replace the glazing with high performance inert gas filled thin double glazing units and to add insulation to the roof space. It was identified that the repair of the windows would also have the added benefit of improving the air tightness of the building. The heat losses were again calculated using the U values associated with the improved building fabric, as found in table 2.

**Table 2:** thermal elements

| Element | Existing U Value ($W/m^2K$) | Proposed U Value ($W/m^2K$) |
|---|---|---|
| Walls | 1.23 | 1.23 |
| Internal walls | 2.1 | 2.1 |
| Roof | 3.1 | 0.18 |
| Floor | 1 | 1 |
| Windows | 4.7 | 1.6 |
| Roof light | 4.7 | 1.6 |
| Ceiling | 1.6 | 1.6 |

With the improvements in the building fabric applied the calculated energy usage reduced by 106,000 kWh/annum. This subsequently resulted in a 22% reduction in energy use and corresponding reduction in carbon emissions of almost 18% from the base model. The calculated annual energy consumption and carbon emissions with the fabric improvements was:

Improved fabric energy and carbon:

- Annual energy use: 276kWh/$m^2$
- Annual carbon emissions: 72kgCO2/$m^2$

Following the fabric improvements consideration was given to the lighting and small power to be used in the building. The typical energy usage due to lighting, small power and mechanical services in an office is 54 kWh/m²/annum (source – ECG019), the use of high efficiency T5/LED luminaires, low energy office equipment and variable speed drives etc. would improve this to good practice levels of circa 33 kWh/m²/annum (source – ECG019).

Through the improved efficiency of the building fabric and through the replacement of the existing T8/T12 lighting with T5/LED then the annual energy use and carbon emissions of the building were calculated to be:

Improved fabric + lighting energy and carbon:

- Annual energy use: 255kWh/$m^2$
- Annual carbon emissions: 61kgCO2/$m^2$

By improving the building fabric and lighting within the building it was calculated that it would be possible to reduce the annual energy use of the building by 28% and the associated carbon emissions by 30%. Although these were significant savings it was believed that further savings could be achieved through the appropriate use of low and zero carbon technologies in the building.

An assessment was therefore carried out on a number of low and zero carbon technologies and their suitability for the project. The options for assessed for heating the building included:

- Option A - Gas Fired Heating (100% Load 100% Contribution)

- Option B - Nottingham District Heating (100% Load 100% Contribution)
- Option C - Air Source Heat Pumps
- Option D - Lead Biomass Boiler (50% Load 75% Contribution) with Gas Fired Condensing Boiler
- Option E - Lead Biomass Boiler (50% Load 75% Contribution) with Nottingham District Heating

Calculations were carried out for each option to determine the associated energy use, carbon emissions and costs. From the assessment carried out the most suitable option to maximise energy and carbon savings, whilst also considering the impact on cost and suitability for installation in the building was deeded to be option E of having a lead biomass boiler to be supported by the Nottingham District Heat Scheme. This option, coupled with the improvements to the building fabric and lighting, was calculated to result in an annual reduction in energy use of 28% and a reduction of carbon emissions of over 83% against the original building and would result in the following annual energy and carbon figures:

Improved fabric + lighting + biomass boiler and connection to the Nottingham District Heat Scheme energy and carbon:

- Annual energy use: 260kWh/$m^2$
- Annual carbon emissions: 15kgCO2/$m^2$

With the design agreed, £900K capital was invested in replacing the Mechanical and Electrical services in the building, including a 150kW biomass boiler. In addition to the carbon savings associated with the biomass boiler the University also stands to gain an annual return on investment from the Government backed Renewable Heat Incentive.

On completion of the project the first year DEC energy confirmed that the energy use of the building was 178kWh/m2/year. This use was 30% lower than that predicted by Engineering Department during the design process and 50% lower than the calculated baseline energy use of the building if the refurbishment and upgrade works had not been carried out.

At present the first full year energy costs for the building is approximately £20k. Given that the energy use of the building has been calculated to be 50% lower than if no works were carried out then it is estimated that the works have saved approximately £10k per annum in reduced energy costs. In addition NTU will also benefit from an additional income of between £15k-20k per annum from the Renewable Heat Incentive associated with the biomass boiler.

Considering the reduced running costs and income from the Renewable Heat Incentive then the building has the potential to cost virtually nothing in annual energy costs.

## Description of commissioning, handover and soft landings processes, and how they contributed to achieving the designer's intended building performance.

As the project was managed and desiged by 'in house' NTU staff a formal soft landings process was not adopted on this project. The staff involved in the refurbishment and works are now also responsible for the maintenance and operation of the building and as such had a significant vested interest in ensuring that the building was commissioned fully to minimize any potential future issues.

In addition, prior to occupation the building occupants were given presentations by the Engineering Department on how the building mechanical and electrical services operate and the extent of control that they will have. This process was positively received and ensured that the occupants were aware of the building, the limitations of the services and the process for reporting any issues or request for further information well in advance of occupation.

A number of meetings have also been held between the Project Manager and the Directorate staff after handover to ensure all requirements were met.

Since its completion, the predicted comfort requirements and low consumption use has equally matched our predictions.

## Evidence of collaboration between members of the project team that has contributed to improved performance.

It was deemed necessary that to ensure the project could deliver the greatest possible impact for the budget available then it would need to be designed and managed in house by NTU's Estates & Resources Department.

High levels of collaboration were evident throughout all stages of this refurbishment, including specialised tradesmen, contractors and NTU staff to ensure that the refurbishment met the needs of the users, reduced carbon emissions and was carried out with respect to the listed status and heritage of the building.

Whilst the project required involvement from a number of members within the Estates & Resources Department, the task of assessing the heating, lighting, ventilation and cooling requirements; identifying the potential for overheating; the design of all the mechanical and electrical services to be installed and the assessment of how the fabric of the building could also be in improved fell to the Engineering Department.

Inclusion of hands-on Maintenance and in-house Design Services, combined with challenging timescales, demonstrated the expertise of a collaborative, dynamic workforce, and a diverse range of talent united in respect of our heritage; made possible whilst providing opportunities for creative solutions and professional development.

Commitment to our customers, staff, partners, communities and the environment is an integral part of the way we work. Operating with integrity and transparency, a number of small teams' contributed to every stage of the project process – from feasibility to final occupation, integrating decision making with corporate strategy and risk management.

This exclusive project enabled the NTU Estates & Resources team to act as principal contractors, with the success of this project overcoming restrictions associated with rescuing a Grade II listed building, giving our team the confidence, scope and knowledge to apply the same principles to future refurbishment projects.

In doing so, the team has acquired the knowledge and confidence to apply these same skills and principles to future refurbishment opportunities. The accomplishment created a range of benchmarked capabilities and exceeded expectations for delivery. Within the University the revitalised building itself represents a flagship statement to other universities and establishments who may otherwise have considered bespoke restoration as impractical or unachievable.

Rising above and beyond the minimal requirement of rendering the property as habitable, the teams involved in this venture maximised the building's existing potential to guarantee its future performance and endurance for years to come. The abilities and relationships built through communication on this renovation, not only inter-staff, but also between NTU and external contractors, is a shining example of how, even under critical architectural restrictions, professionalism, respect and collaboration are possible, and can thrive in support of a shared ambition.

The building illustrates real possibilities and group tours are welcomed to exhibit this working example of old-meets-new. It is our aim to inspire other institutions to take on similar challenges for the many benefits on offer in doing so.

## Evidence of any environmental or energy assessment, or other third party evaluations.

The refurbishment was not assessed under BREEAM. This was a conscious decision as NTU has undertaken a number of BREEAM projects in the past and it was deemed that on this occasion given that the project was to be managed and designed in house, the focus should be on delivering a low carbon building which met the needs of the occupants.

It is believed that this was a justified decision given the significant improvement in the buildings Energy Performance Certificate and corresponding Display Energy Certificate, along with the positive feedback from the building occupants.

## Evidence of user feedback on the building and satisfaction with the measures adopted.

*It's a good space that meets our needs; it means we can collaborate and work more effectively in an open plan area. There is a good amount of natural daylight for a basement, and it has a modern feel.* – **Diane Swift: Schools, Colleges & Community Outreach Office Manager**

*The new office space is great, re. the below, environmentally friendly lighting – lighting is ideal (especially considering we are in a basement!) and the sensors work perfectly to avoid any unneeded usage.* – **Nasser Latif: Partnership Co-ordinator**

*The project team consulted with us throughout the planning and building process. Their support and follow up once we had moved in was excellent to enable us to quickly become operational in our new surroundings.* –

**Alison Kitchen: PA to the Vice-Chancellor**

*We laid on a tour for the past occupiers of the building (The Registry Office, Nottingham City Council) who were amazed to see how NTU had transformed the building. They were very impressed with the level of detail.* – **Laura Taylor: PA to the Directorate**

*It's an absolute delight to come to work in this building each day.* - **Sue Sipple: Executive Assistant to the Directorate**

*We are fortunate to have been part of such a prestigious restoration project, bringing life back to a beautiful piece of architecture that will form part of the University's City Centre campus for years to come*. - **John Greasley: NTU Project Manager**

## Further information

*Please provide any further information, evidence or references that you would like to include in your entry.*

Nottingham Trent University is a modern, higher education institution of over 25,000 students and 3000 staff, based across three campus sites, all of which have seen major redevelopment works since 2003. These improvements have helped to support and strengthen the University's strategy to provide an inspiring and memorable learning environment: one which also drives a culture of sustainability, and develops graduates who are fully equipped to make far-reaching contributions to society. 50 Shakespeare Street was purchased in 2012 due to its strategic location in the heart of Nottingham City, already sited beside the University's Directorate. Providing ample additional office space and a positive impact on the identity of NTU, the building was the perfect acquisition to assist in the completion of a long-term plan to accommodate our central administration into one location.

Designed and built in 1887 by local architect, Mr AH Goodall, as The Poor Law Offices, 50 Shakespeare Street emits impressive scale and character. Its prominent position and ornate brick and stone Gothic architecture mirrors the University's Arkwright building. The unique project scope included retention and restoration of original features, along-side the installation of renewable energy-solutions using sustainable procurement practices.

50 Shakespeare Street has proven to be an extremely valuable addition of strategic importance to the University's property portfolio, providing far more than a housing for our central administration hub. NTU's Schools and Community Outreach Office are sited in the building's basement, and Directorate are located on the ground floor.

Also situated on the ground floor is a board room for use to University staff and visitors, and the impressive Court Room provides a magnificent function room for internal or external events. The lower ground floor (basement) has thirty two desks, both the ground and first floors have six, and the second floor is set up as a breakout-cum-meeting space area as required. The building accommodates approximately fifty people at any one time.

Befitting NTU's reputation as one of the country's 'greenest' universities, all campus developments meet rigorous sustainability standards. This encourages behaviour changes beyond just building fabric, benefitting the wellbeing of students, staff and visitors. The building's location compliments NTU's pedestrianisation scheme along the street, in conjunction with the newly-constructed Students' Union building.

## Supporting documents check list

*Entries should include supporting documents or evidence to supplement this written part of the submission. All supporting documents should be collated into one PDF document for upload.*

☒ DEC
☐ ESOS Report
☐ BREEAM Certificate
☐ LEED Certificate
☐ CarbonBuzz entry (please supply a link): Click here to enter text.
☒ Other (please specify): EPC Certificates (2011 & 2015)
Project Brief
Estates & Resources - Annual Report 2014 (extract)
Energy & Low Carbon Stratergy
Thermal Comfort Report
Design Builder – 50 Shakespeare Street CFD Analysis

CIBSE BUILDING PERFORMANCE AWARDS 2016

Mechanical & Electrical Handover Presentation
Photographs
NTU Logo