



## Awards for Planning Excellence Case Study

The Catalyst, Newcastle Helix - entered by Newcastle City Council and Newcastle University

Kindly sponsored by



## Awards for Planning Excellence 2020

### Summary

The Catalyst is home to Newcastle University's National Innovation Centres for Aging and Data and provides a UK hub for scientific research and innovation.

The Catalyst is a flagship building dedicated to global research and innovation and is home to Newcastle University's National Innovation Centres for Aging and Data as well as the National Institute for Health Research Innovation Observatory. The building brings together businesses, academics and the public to support the research and development of new aging, data and health related products and services. Situated on Newcastle Helix, once the site of a colliery and later the Scottish and Newcastle Brewery, it is transforming the post-industrial area into a thriving quarter for digitally enabled research, business and innovation.

## 1. Background

### The background to the project:

The building forms part of Newcastle Helix, a 24 acre key development site on the western edge of the city. The site is allocated for science and research-led mixed use and is an exemplar of sustainable development. Following outline planning consent in 2012 the Council responded to the changing context of the site with a review of the original masterplan and adopted the Science Central West Development Framework in November 2016.

The collaborative approach to the management of the site (an LLP joint venture of Newcastle University, Newcastle City Council and Legal & General) has already been recognised as an exemplar of best practice receiving the Estates Gazette Collaborators Award.

The Catalyst is the third University building to be completed on the site a complex facility bringing together the diverse needs of the National Innovation Centre for Ageing and the National Innovation Centre for Data. The establishment of the two centres are joint funded national government initiatives supported by the Department for Business, Energy and Industrial Strategy and Newcastle University.

The framework design team worked closely with the diverse stakeholder group to support the development of the project brief, accommodation schedule and a range of initial concept designs that addressed the needs of the building users.

Collaborative work between the design team, stakeholders and NCC planners (in particular the urban design team) completed the detailed design which the framework construction partners completed with the quality and finish that completes the final stunning package.

The building was opened in November 2019 following a three year design and build programme and has received excellent feedback from building users, visitors and the construction industry.

The principles of the Helix site have been incorporated into the building design and have enhanced the sustainability credentials of the site. The building is linked to the Helix site CHP, rooftop photovoltaics provide renewable energy and SUDS features including a green roof, and terraced rain gardens support the site wide flood management plan.

This BREEAM Outstanding building was delivered on programme within budget and exceeded the requirements and expectations of the stakeholders and has enhanced the urban landscape of this rapidly developing site.

## 2. Outcomes

### What positive impacts the project has provided

The declaration of a Climate Emergency by Newcastle University during the project delivery focused all project partners to improve upon designed targets to deliver a building with improved performance across a range of criteria, ultimately delivering a building that has a smaller construction and operational environmental footprint; assisting targets to achieve zero carbon well ahead of the government's target of 2050.

For this reason, a focus was placed on having local staff and supply chain members, helping to support initiatives to reduce transport related CO<sub>2</sub> emissions, as well as retaining project value, knowledge, expertise, and lessons learnt within the region.

In total there were 53 Subcontractors / Suppliers assigned to this Project, 28 (52%) of which were based within a 25-mile radius of the site, and a further 9 (17%) from within 25~50 miles. With 37 sub-contractors (70% by number) appointed to this project being based within 50 miles of the building, a total of £11.5m was retained within local businesses in Newcastle and North East. From these 37 Subcontractors, 33 (90%) were classified as SME's. Throughout the course of the works, excluding visitors 1,501 people were inducted to work on site, 1,255 (83%) of which lived within 50 miles of the site postcode.

The Catalyst is the first commercial office building in the North East to be awarded a BREEAM Outstanding certification, a rating reserved for only the top one per cent of new UK non-domestic buildings. The awarding of BREEAM Outstanding communicates not only a strong message about the outstanding design and construction elements of the building, but also acts as a flagship to the University's and City's commitment to the Climate Emergency and the zero carbon targets.

Collaboratively BREEAM Outstanding was achieved at no additional cost to the client or stakeholder group. In part, this has been achieved with improved performance from the CHP district energy centre comparative to design assumptions, coupled with high-standards of construction quality and design detailing, which greatly reduced the expected thermal losses (89.9% improvement) and air permeability rates (48% improvement – 2.61m<sup>3</sup>/hr/m<sup>2</sup>). With a high-capacity PV system mounted within the green-roof, the CO<sub>2</sub> emission rate of the final constructed building shows a betterment of 27% compared to the original tender-design targets.

Discussions on topics such as BREEAM, sustainability and specifically embodied carbon, Life-Cycle Analysis or Low-Carbon Assessments are generating consultations around material choice, promoting local manufacturers, low-carbon materials and performance metrics. All of which are now influencing current designs, workshops and frameworks.

### 3. Planning contribution

How the project has benefitted from the involvement of a planner or planners:

Although an outline masterplan existed for Newcastle Helix, significant work was required to address the challenges of the proposed 'triangular shaped' building footprint, the building's position on the plot and massing whilst keeping the central tenets of the development framework secure. The building needed to sit well in context with the existing buildings on the site, such as the University's USB and Frederick Douglass Centre, in key views into the site and integrate seamlessly with 'Science Square', which it overhangs and fronts onto. As the Innovation Centre for Aging would be accessible to the public, some accessibility measures needed to be retrofitted to the existing public realm, such as accessible parking spaces and accessible routes. Officers worked closely with the architects and landscape architects to ensure that the public realm surrounding the building was not only functional but also provided a cohesive, high-quality and distinctive finish to tie in with the existing public realm. Sustainable drainage systems were incorporated into the design with significant LPA involvement at an early stage in the process to ensure the public realm incorporated climate change measures, was high quality and provided a unique landscape with which to push the urban drainage agenda both on a city and nationwide scale. The developer was encouraged to create a highly sustainable building which would support the proposed district energy centre on the site (which has now been constructed) and incorporate measures such as a green roof and PV /solar panels at roof level. Integral public art was also requested by the LPA in accordance with the Public Art Strategy for the site. This secured the continuation of the existing 'Big Bang' concept in Science Square (at the interface with the building) into the public realm around the building in the form of linear paving and below the soffit in the form of a lighting installation. These elements helped to reinforce the cohesiveness of the public realm.

Effective discussions were held in a 'workshop format' led by the planning officer which allowed for productive debate/discussion, development of the scheme and a better understanding of issues from both sides. The Local Planning Authority (LPA) worked proactively with developer/architect/stakeholder to address the challenges to the Masterplan fixed parameters when the application was submitted. The LPA have continued to work closely and proactively with the developer/architect/contractor to develop solutions to any issues during construction works such as those in relation to the retrofitting of the public realm within/adjacent to the adopted highway.

## 4. Sustainable development

### How the project has supported:

From initial concept, through to completion, core values surrounding innovation and sustainability were maintained by collective agreement in the delivery of the Catalyst. Careful planning and consideration with regards to building efficiency and sustainability was crucial during the design stage, contributing to The Catalyst successfully achieving the highest level of BREEAM rating, 'Outstanding'. The brief and contractual requirement was to achieve BREEAM Excellent, however as a result of the team's rigorous approach to specification, detailing and quality management, we were able to secure the highest rating available for sustainability.

Working collaboratively to promote core virtues, such as, district energy, fabric first, reducing air leakage and thermal bridging, lead to a design that looked seamless whilst maximising performance. The use of lightweight, sustainable structural steel for the frame was agreed due to its durability, strength and ability to be reused and recycled, whilst allowing a more efficient internal layout. The low e glass is tinted to all facades other than the North elevation undercut, where it is clear to maximise connectivity into the building.

The building achieved an EPC B rating, in part due to the CHP district energy scheme it is connected to, and the high-capacity photovoltaic system. The CO<sub>2</sub> emission rate is 16.6kgCO<sub>2</sub>/m<sup>2</sup>/ year, a betterment of 27% compared to the original targets set.

The heat loss from heat transfer thermal bridging was also significantly improved from theoretical design percentages due to the frame and façade design and inclusion of distinct thermal breaks. This meant a betterment of 89.9% over estimated parameters.

The roof was designed and constructed taking into consideration the buildings irregular shape, with a structural composite metal roof deck and supporting steelwork laid flat to receive the proprietary insulated warm roofing system consisting of SBS modified bitumen membranes bonded over PIR aluminium foil faced insulation boards and vapour control layers. The roof coverings include a highly efficient Photovoltaic array mounted within an extensive green roof, wildflower meadow. The green-roof system contains several different species of mainly low growing, drought tolerant plants and grasses.

In direct response to future climate change, a Siphonic drainage system feeds into the 'rain garden' providing water storage whilst demonstrating SuDS to the wider public. Further attenuation measures via extensive green roof also provides biodiversity. The System is designed to cope with 1 in 100 year event plus 40%.

M&E provision ensures regulated heating and chilling whilst providing a controlled environment. Power is supplemented by a 30kW PV array mounted upon the green roof. The building connects to a district energy centre, managed and monitored heating, cooling and domestic hot water generation for the building. A promotion of sustainable design and use for future buildings.

98.6% of all construction waste generated was diverted from landfill, this was either reused, recycled, or sent for energy recovery. Project emissions from energy usage (electricity and diesel, water consumption, material deliveries and waste collections equated to 260.49 tonnes CO<sub>2</sub> (0.74 tonnes CO<sub>2</sub> /£100k project value).

## 5. Community benefit

Construction of The Catalyst created a number of exciting opportunities for new roles, whilst the connection to Newcastle University offered a great opportunity to provide training and other opportunities to local students.

3 new jobs were created, 1 of which was given to a person who was Not in Employment Education or Training (NEETS). The Subcontractors and supply chain partners were also encouraged to generate employment opportunities and collectively create a further 8 jobs, creating a total of 11 new roles overall.

In addition to the above, 3 Graduate Apprentices were also employed in a Management, Quantity Surveying and Engineering capacity. Work experience placements were provided for 2 young persons under the age of 18 and our supply chain partners employed a further 7 trade apprentices in a variety of vocations. In total, 10 apprentices, 5 trainees and 2 summer placements were appointed and supported as a direct result of this development.

Over 40 site visits and tours were arranged and conducted, including several VIP visits. Over 66 students visited the site, including a group of 10 summer school students in preparation of starting their architectural degrees with the University. We were also actively involved with local schools and colleges, conducting a series of engagement events including Career Ready Mentoring Scheme.

Two of the project team members were part of the Career ready scheme and mentored 3 x A level students, helping with their studies and career aspirations. Whilst another team member is an active Committee member of the Constructing Excellence Generation4Change (G4C) scheme and works alongside young professionals within the industry to tackle current issues surrounding stereotypes, the environment and best practice.

A number of the female staff at Bowmer & Kirkland are part of the National Association of Women in Construction (NAWIC) and tutor students studying construction related degrees, helping them with their studies and routes into the industry. They are also leading the development of a Video to promote the construction industry to young female students.

Throughout the course of construction, there were many initiatives to raise money for charity, including donations, collections and events. Several members of the Bowmer & Kirkland project team completed the Marie Curie Bubble Rush 5K run, as well as the annual Great North Run raising over £5,000. A client Golf Day was also held, where a further £900 was collected also for Marie Curie. In total over £6,000 was raised for local charities and Marie Curie throughout the construction period.

## 6. Leading practice

As one of the main key drivers for the project, innovation was discussed and explored extensively throughout the design stage. The design needed to address the notion of a National signature building, the home to both Innovation centres on the global stage, whilst promoting sustainability and efficiency. The brief was to inspire and welcome businesses, academies, third sector & public sector organisations, staff and public, developing a local sense of public ownership.

Newcastle University, NICA and NICD wanted to encourage different ways of working within the building, moving away from both cellular and large open plan offices. The innovative structural layout was generated by the need to design large column free spaces which would allow for flexible, collaborative spaces within the building, an attractive selling point to potential tenants.

The complex design relied on a coordinated approach to the architectural, mechanical, and electrical and structural strategies. Viewpoint for Projects was used as the Common Data Environment allowing



full collaboration; this cloud-based platform housed all project information digitally throughout the life of the project. All stakeholders from client team to subcontractors had access.

During early stages of design, the building footprint was in much need of extensive design development, in order to provide suitable floor-plate areas to offer publicly accessible lower floors and private upper floors to host both Innovation Centres as well as rentable, commercial space to ensure the long-term financial sustainability of the development. In order to provide the necessary floor areas and extensive public realm spaces, an adverse 8° incline to the building was introduced resulting in the floor plates increase in size as you climb the building.

The project was delivered to BIM Level 2, which allowed the team to explore various innovative design options and features at the planning stage. This provided significant benefits to the fabric first approach adopted by the Team. The project utilised the BIM model during construction to actively engage the stakeholder team through VR whilst working with the construction team to reduce wastage and maximise efficiency on site. The use of rapid prototyping and imaging enabled the stakeholder teams to make decisions quickly and efficiently, enabling a larger stakeholder group to envisage the options and what was being constructed.

The use of clash detection in the fortnightly design team meetings brought the relevant people together at the right time. We held fortnightly Design Monitoring Group's whereby the client team and end users were kept abreast of the design and in some case became actively involved in the coordination, such as coordinating the FF&E using 3D Renders. With 3D real time presentations allowing the client and end users the opportunity to view the live model which led to the development of the FF&E brief relating to layouts and spatial planning.

The project and wider Helix District Energy Scheme is supporting city-wide ambitions and planning for a network of district energy systems. Challenges regarding temperature differentials, return rates, advanced planning and designing for future loading are already being reviewed to advance new schemes.

## Regional Significance

### Importance of the project for the North East of England

The regional significance of this project takes many forms.

The design team and main contractor were appointed from the newly created regional university frameworks comprising wholly of locally based suppliers. This enables the development of excellent working relationships and maximises the benefit to the local economy, local community and employment opportunities within the region.

The locally based consultants and contractors have well established working relationships with the local planning authority thereby enhancing the design, planning and construction process. Any issues were quickly and easily resolved and the collaborative approach undoubtedly enhanced the design.

The development of the Newcastle Helix site, the former derelict Scottish and Newcastle Brewery site, plays a key role in the regeneration of this area of the city and has attracted significant inward investment, not only to the site, but also to the surrounding area – transforming the urban landscape and significantly enhancing the local economy. The recently complete Lumen building on the site will also accommodate the offices of the newly established North of Tyne Combined Authority further adding to the regional significance of the site.

The two national innovation centres will add significant benefit to the local community and regional economy by addressing two of the key issues of the current time. Ageing in particular has been identified



as one of the governments Grand Challenges. Throughout the project VOICE North East were a key stakeholder and integral part of the design development. As a result VOICE has now spread more widely and the North East tag has been dropped. The work undertaken by the centre in collaboration with VOICE attracted Nic Palmarini to take up the post of Director of NICA. Nic is an internationally renowned expert in the field of Ageing formally based in Boston. All of this is enhancing Newcastle's reputation as a centre of excellence in Ageing.

The world data analytics economy is estimated to be worth almost \$200billion and is growing exponentially year on year. The Government 2013 report 'Seizing the Data Opportunity' noted that a shortage of skilled workers was one of the key barriers preventing business from exploiting the huge opportunities afforded by data analytics, both globally and in the UK. NICD takes up the of this skills gap through its stated objectives. It will provide significant additional investment and leadership in big data skills, work with employers to develop and exploit these skills, fully involve universities and their students, and address the needs of regional government and agencies. This approach will provide the opportunity to create highly skilled jobs retaining talent in and attracting talent to the region boosting the regional economy. NICD's approach is to work with business to develop their data analytics skills rather than providing a service to analyse the data – teaching them to fish not giving them a fish.

### **This year's Chair's Award: Best response to climate emergency**

Newcastle City Council, Newcastle University and Newcastle upon Tyne Hospitals Trust have all declared a climate emergency and are working collaboratively to address the challenges and are working towards Net-Zero Carbon targets ahead of national government's target of 2050.

As mentioned in the submission above numerous initiative have been included in this project to minimise the impact of the development on the environment and enhance the contribution to sustainable development. This work was recognised by the awarding of the BREEAM Outstanding certification, the first commercial office building in the North East to achieve this rating.

Some of the additional work not mentioned above was the careful review of the design and choice of materials. A review of the structural design for example dramatically lightened the steel frame of the building, reduced the quantity of piling required and improved the construction methodology which improved the project programme.

But the work hasn't stopped there, research at Newcastle University is supporting the development of improved technologies in heat networks, mapping of pedestrian, cycle and vehicle flows, monitoring of air quality, flood management and much more. All of which is helping to improve our environment and support future initiatives.

The lessons learnt from the design and construction of the building have support the introduction of a bespoke University Sustainable Construction Specification to be used on all subsequent construction projects over £1m. It focusses on outcomes rather than compliance and now forms part of the wider suite of briefing documents which define the University's requirements across all aspects of construction in the drive to achieve net-zero carbon by 2040.

This project is so much more than a BREEAM Outstanding building.