

# BRILLIANT BUILDINGS

HOLLYCROFT PRIMARY SCHOOL

## Hollycroft Primary School

Creating Leicestershire's  
first net-zero school



**WILLMOTT DIXON**

SINCE 1852



## PUSHING THE BOUNDARIES FOR THE DESIGN AND BUILD OF SCHOOLS

Willmott Dixon has a long-standing history of delivering schools, continually operating at the leading edge of new and innovative approaches to create brilliant buildings that meet the changing needs of communities and local authorities alike. Our expertise in delivering projects that will meet each local authority's unique vision for education buildings often makes us the partner of choice for delivering pioneering projects.

From supporting Lincolnshire County Council's £100m investment to become the first region to adopt an 'all-through, all-needs' approach to SEND schools, to building the UK's first Passivhaus Plus primary school, the trust that local authorities have in us enables us to work together to push the boundaries for the design and build of new schools.

This was the case with Hollycroft Primary School in Leicestershire, which is the county's first net-zero in operation school. Having built numerous schools in Leicestershire over the last two decades, we have worked closely with Leicestershire County Council to design and build a facility that not only delivers great energy performance, but also provides a template for future net-zero schools.

With the council pledging to make Leicestershire a net-zero carbon county by 2045, this is a significant milestone that could only have been achieved through close collaboration between the council and our team.

This Brilliant Buildings explores the innovative approach taken to create a budget-friendly net-zero in operation school, what a net-zero school means for the council and the academy trust, and how Willmott Dixon worked with the council to set the standard for education facilities across the county and beyond.



Nick Heath, director, Willmott Dixon

Click the image below to watch a video about this project



## AT A GLANCE – WHAT'S INSIDE

**A 381m<sup>2</sup> solar panel array powers the school**

**The school's total emissions are 29.6kg of CO<sub>2</sub> per metre squared less than a typical building of its size and function**

**Advanced modelling has enabled the best value net-zero in operation school to be designed**

**Mechanical and electrical (M&E) elements have been left exposed internally and externally so students can see how the building operates**

**Achieved BREEAM Excellent**

**EPC A+ – the building is generating more renewable energy than it is using**

**Air source heat pumps heat and cool instead of traditional gas-based systems**

**Prefabricated timber frame reduces embodied carbon**

**Fabric-first approach, using materials with a low U-value to enhance the building's thermal efficiency**

**"WHEN COMPLETE, THE SCHOOL WAS UNIQUE IN BEING THE ONLY NET-ZERO CARBON PRIMARY EDUCATION FACILITY IN LEICESTERSHIRE – SOMETHING WE'VE BEEN TRYING TO ACHIEVE FOR A WHILE. HOWEVER, IT IS NOW THE TEMPLATE FOR OTHER PRIMARY SCHOOLS GOING FORWARD AS WE LOOK TO MEET OUR AMBITIOUS CLIMATE TARGETS AS A LOCAL AUTHORITY."**

TIM HALE, PROJECT TEAM MANAGER, LEICESTERSHIRE COUNTY COUNCIL





## Tackling the technical terminology

**Hollycroft Primary School is net-zero in operation for regulated and unregulated sources of energy.**

### What is embodied carbon?

The amount of carbon generated to produce a building - including processes related to the construction of the building and their end-of-life processes.

### What is operational carbon?

The carbon emitted in the day-to-day running of a building e.g. heating, cooling, lighting, lifts, electrical equipment, etc.

### What does net-zero in operation mean?

The school is net-zero in operation because all of the energy needed to power the day-to-day running of the school is produced by renewable energy sources – these are located on site.

### What are regulated sources of energy?

These are things that keep a building running such as heating and cooling systems, hot water and lighting.

### What are unregulated sources of energy?

These are harder to quantify as it depends on the use of a building. In a school it would include things like appliances, IT equipment, and catering facilities.

## THE VISION

From the very beginning, the plans for Hollycroft Primary School had two key aims – reaching net-zero in operation and providing a fantastic learning facility that inspires future generations. The combination of these has set a benchmark for primary schools not just in the local area, but across Leicestershire.

The catalyst for the school was the need to provide school places for a new, 850-house development that was being built just a stone's throw away.

Creating this new school also presented an opportunity to OWLs Academy Trust to create their first-ever STEM primary school, helping to address the growing importance of STEM skills in the curriculum and society more widely.

STEM specialist education has become increasingly important as academy trusts look at ways to help their pupils prepare for the workplace of the future. The OWLs Academy Trust was keen to utilise the opportunity of adding a new school to its ranks to encapsulate the core principles of science, technology, engineering and maths in a net-zero environment – arguably, the perfect case study for STEM skills in action!

To achieve the vision of creating a net-zero in operation school, true collaboration and early engagement was required. This was a new undertaking for the council, so guiding and supporting them to understand how to reach net-zero within budget was critical.

Being involved from RIBA Stage 0 – the earliest possible juncture for a contractor – Willmott Dixon was able to understand the vision of

both the academy trust and the local authority. Not only did this ensure that the proposed designs met the needs of the prospective pupils and staff, but the early discussions around the building's fabric and form helped the customer make informed decisions around design features that impacted carbon and cost.

By having these discussions at the earliest possible stage, the established vision was agreed before plans were drawn up, leading to a design that not only worked for OWLs Academy Trust and its pupils and staff, but also Leicestershire County Council's desire for a school that could act as an example across the region.

**"THE COUNCIL WANTED THE SCHOOL TO BE NET-ZERO IN OPERATION BUT DIDN'T QUITE KNOW HOW TO GET THERE. TO HELP, WE CREATED AN ENHANCED ENERGY MODEL ABOVE AND BEYOND WHAT IS REQUIRED, WHICH ALLOWED US TO MAKE INFORMED DESIGN CHANGES THROUGHOUT THE PROCESS ON ELEMENTS SUCH AS THE AMOUNT OF INSULATION IN THE WALLS, AND THE CONFIGURATION OF THE ROOFTOP SOLAR PANELS."**

FRANCESCA WILKINSON, SUSTAINABILITY MANAGER, WILLMOTT DIXON



## THE DESIGN AND DELIVERY

Having both Willmott Dixon as contractor and the OWLs Academy Trust as the end user involved from early doors proved hugely beneficial in giving the council insights from both perspectives.

An interesting design feature in the school is that the M&E throughout the building is left exposed and visually accessible for students. As a specialist STEM school, providing students with the opportunity to see how the mechanical and electrical elements of the building work is a huge benefit, helping create a STEM-rich learning environment.

Early engagement with the council also meant that concepts such as lifecycle costing, viewing carbon as a currency, and using buildings and equipment more sustainably could be incorporated in both the design and delivery of the school.

The new building took a fabric-first approach, using materials with a low U-value to enhance thermal efficiency, including enhanced fabric walls, floors and roofs as well as enhanced performance windows. This approach maximises air tightness, helping to reduce the impact of external temperatures and keep the building at an ambient temperature. Once the

building is heated or cooled, this warm or cool air will be retained inside the building for longer, reducing the need to turn on heating or air conditioning units.

A key factor in the overall design was the use of a cross-laminated, prefabricated timber frame, which has helped to reduce embodied carbon emissions when compared to a traditional steel frame. By manufacturing the frame offsite, the programme for the timber frame erection was also halved when compared to more traditional methods, saving time on-site and the costs associated with that.

The school is powered by 381m<sup>2</sup> of rooftop solar panels, and air source heat pumps provide heating and warm water. Electric vehicle charging points can be found in the car park.

Achieving net-zero in operation across both regulated and unregulated energy sources was a critical part of this project, and the Willmott Dixon team used advanced modelling through its [Energy Synergy™](#) process to help inform the design.

Using this modelling enabled the team to interrogate how changes to the design would positively or negatively impact the sustainability of the building. In turn, this allowed key

stakeholders at the council to make informed decisions about the project to get the best building for their aspirations and needs.

This modelling played a key part in establishing the size of the PV array required to power the building for both regulated and unregulated energy sources.

**"IT'S VITAL THAT WE HELP CUSTOMERS TO MAKE EDUCATED DECISIONS BY AIDING THEIR UNDERSTANDING OF THE DIFFERENT DESIGN OPTIONS AVAILABLE. THIS INCLUDES EXPLORING HOW DECISIONS WILL IMPACT BOTH CARBON AND COST. NOT ONLY HAS THIS MADE THE DECISION-MAKING PROCESS EASIER FOR THIS PROJECT, BUT IT WILL HELP ON FUTURE PROJECTS TOO."**

RYAN WILKES, CONSTRUCTION MANAGER, WILLMOTT DIXON



## STRIKING THE BALANCE: CAPITAL EXPENDITURE VERSUS OPERATIONAL EXPENDITURE

Any new school is a significant investment for an academy trust or local authority, and – at a time when education budgets are stretched thin – the balance between the upfront cost and the ongoing operational expenditure on the building is a tough one to strike.

In the case of Hollycroft Primary School, the council's desire for a school that was net-zero in operation meant that the initial capital expenditure on the building was always likely to be higher than a less sustainable school build.

Through advanced modelling, we were able to design the best-value net-zero school possible. This provides the benefit of operational cost savings, whilst also minimising capital expenditure costs.

Being net-zero in operation, the operating costs of the school are significantly lower than a traditional build, meaning that the investment more than pays for itself over the lifetime of the building – particularly when gas and electricity prices remain high.

With budgets squeezed, these savings on running costs can be injected back into the school's budgets for direct education delivery, resulting in better opportunities for the students to receive a high-quality level of teaching.



**"WE'RE KEEN TO SEE HOW MUCH MONEY HAS BEEN SAVED BY THIS APPROACH IN COMPARISON TO OTHER SCHOOLS IN THE ACADEMY TRUST. EVERY PENNY SAVED ON OPERATIONAL COSTS CAN BE PUMPED BACK INTO OUR PUPILS' EDUCATION, SO INVESTING MORE UPFRONT WILL PAY DIVIDENDS LATER DOWN THE LINE."**

PETER MERRY, CEO, OWLS ACADEMY TRUST

## Inspiring the next generation to go green

In parallel to the build, Willmott Dixon delivered a one-of-a-kind 'Green Village enrichment programme' for almost 600 students at Redmoor Academy in Hinckley. The three-day event provided an overview of the construction industry as well as introductions to the Willmott Dixon team and their career pathways.

Following a Q&A session, the students were split into groups of four and created 60 mini-construction companies, where they were tasked with different roles to plan, cost, and build a green village – ensuring that the principles of net-zero are embedded in the students' practical education.

As well as allowing students to use some of their STEM skills, the programme also put their soft skills to the test including communication, presentation skills and teamwork. Every student who took part walked away with an Industrial Cadets accreditation, which is the equivalent of a Bronze Duke of Edinburgh certificate.

**"THE SESSIONS WERE ORGANISED, METHODOICAL AND ABSOLUTELY INVALUABLE FOR THE STUDENTS. IT WAS A REAL PLEASURE TO SEE OUR STUDENTS INSPIRED, COLLABORATING AND ENJOYING BRINGING THEIR CREATIVE VISION TO LIFE – WHICH RESULTED IN SOME EXCELLENT AND WELL THOUGHT OUT PRESENTATIONS. IT WAS A TRULY POSITIVE DAY TOPPED OFF BY THE FACT THAT THEY ALL RECEIVED A BRONZE INDUSTRIAL CADET AWARD."**

MARISA WESTAWAY, CAREER LEAD AND ASSISTANT VICE PRINCIPAL AT REDMOOR ACADEMY



## THE LEGACY

The journey of this project through early contractor engagement, continued collaboration, advanced modelling and using data to drive decisions has resulted in a best-in-class school that has achieved and exceeded the aims set out at the beginning of the process.

The overarching sustainability goal of being net-zero carbon in operation for both regulated and unregulated energy has been achieved, with the building's EPC design rating being A+.

The school's total emissions are a massive 29.6kg of CO<sub>2</sub> per metre squared less than a typical building of its size and function, and the amount of energy used per square foot annually is significantly better than the Department for Education primary school benchmark levels. Meanwhile, the rooftop solar panels generate more energy than the school uses over a year.

However, the school has left a legacy beyond the mere numbers. As well as providing 210 extra places of vital primary education provision for a growing community, the design has proved to be such a success that Leicestershire County Council is now using it as the template for its schools going forward. An example of this in action is at Airfield Farm Primary School in Market Harborough, which Willmott Dixon is creating.

Above all, the OWLs Academy Trust and the children and staff of Hollycroft Primary School have been left with a building that inspires, educates and provides a window into the future of sustainable buildings.

**"WE BELIEVE THAT WILLMOTT DIXON HAS DELIVERED A BRILLIANT BUILDING, WHICH WILL TRANSFORM LIVES, STRENGTHEN COMMUNITIES AND ENHANCE THE ENVIRONMENT SO OUR WORLD IS FIT FOR FUTURE GENERATIONS."**

PETER MERRY, CEO, OWLS ACADEMY TRUST





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**SINCE 1852**

# BRILLIANT BUILDINGS

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Willmott Dixon is a privately-owned contracting and interior fit-out group. Founded in 1852, we are family-run and dedicated to leaving a positive legacy in our communities and environment. Being a large company means we can create a huge and lasting positive impact on our society. This is not only done through what we build and maintain; it's achieved through the fantastic efforts of our people who make a major contribution to enhancing their local communities.

**[willmott Dixon.co.uk](http://willmott Dixon.co.uk)**  
**@WillmottDixon**

**If you'd like to find out how we can help you to deliver pioneering projects that push the boundaries for the design and build of schools, get in touch with:**



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