

CASE STUDY

WILLMOTT DIXON CONSTRUCTION - CARDIFF



WILLMOTT DIXON

Newport City Campus



in association with

**University
of Wales,
Newport**

**Prifysgol
Cymru,
Casnewydd**



**Since completion
the campus has
received a 12.7%
rise in UCAS
applications
against a national
average of a
5.37% rise**

“The building will be a hub for the development and exchange of knowledge, partnership and collaboration and social change and inclusion.”

Graham Rogers,
Deputy Vice Chancellor, University of Wales Newport.

The aim was to provide the highest quality student experience and to increase student numbers. This coincided with the aspirations of Newport City Council, which envisaged the University as a key part of the planned cultural, arts and learning quarter along the riverside in its effort to encourage economic growth in the region.

The new City Campus brings together the schools of Business, Art, Design and Media under one roof to encourage interdisciplinary research and learning. The building has been designed to be transparent in order to showcase the work of the University and foster 'out-reach'.

At the heart of the new building is the Academics' and Researchers' 'Hot House'. This innovative space promotes interdisciplinary collaboration between Academics, Researchers and students, with the aim of creating new commercial ideas to help drive entrepreneurship and creativity in the regeneration of the city. The organic shape of the Hot House creates a sense of territory and offers fantastic views across the River Usk, and provides a high level of daylight for occupants.

The ground level podium houses a preview theatre, lecture theatres, performance studio, opening out onto a riverside piazza, and a large double storey height exhibition space. The ground floor also houses the specialist recording studios, control rooms and film studios.

The first floor contains a three storey height library and café, together with large external terrace. The spaces within the library range from living room type arrangements, open platforms for communal working, and within the floor's deepest areas individual work spaces. Storage shelving is dispersed to provide screening between work spaces.

These areas allow the opportunity for students to remain in the building for longer periods and provide the catalyst for cross-sector collaboration further enhancing the University's objective of promoting the creation of 'start-up' companies that combine the skills of both arts and business students.

At the top of the building is the 'Willmott Dixon' boardroom (named after the main contractor) and outdoor terrace providing widespread views over the city and surrounding countryside. This area has been designed to function as a conference and corporate entertainment suite.

This suite was collaboratively designed - with discussions taking place between the end-users, Willmott Dixon and designers - as the proposed usage of the facility was a fundamental factor in the final outcome/selection of furniture design. The room has been sponsored by Willmott Dixon as a legacy to the building and the team that built and designed it.

Despite the need for the initial design to be Value Engineered, to meet the available budget, the completed building has met all the requirements of the original design brief.

The beginning

“This is what I see as 21st Century higher education... for inspiring, innovative and imaginative building. Its everything we could have hoped for and aspired for.”

Jane Hutt

Minister for Education and Lifelong Learning, The Welsh Assembly Government.

Willmott Dixon took over the project after the client and originally appointed contractor could not reach a Guaranteed Maximum Price (GMP) agreement. With the GMP approximately £5million above the client's budget Willmott Dixon stepped in and had to recoup the overspend and construct the building without reducing the quality and design - all in time for the stakeholders' target of completion prior to the Ryder Cup.

This two-stage tender was awarded to another contractor in July 2007. Willmott Dixon were in second place following submission of the first stage tender, due to the cost scoring matrix. The client's designers had developed the design to RIBA Stage E, however, the client could not reach a Guaranteed Maximum Price (GMP) agreement with the contractor as it was approximately £5million above the client's budget. The only option the original contractor gave to the client was to reduce the floor area and drastically change the external façade of the building. Both these options were not acceptable as it would have required a new planning application and the client's/stakeholders' target was to have the building substantially completed prior to the Ryder Cup.

Willmott Dixon were approached in July 2008 by the client via project managers Mott Macdonald, to help them to deliver this scheme by meeting some critical path criteria - namely: 1. to achieve a GMP that matched the client's budget; 2. agree a GMP by October 2008 for main board approval and 3. to commence on site by the 1st December 2008.

Willmott Dixon achieved the client's budget by a combination of agreed Value Engineering (VE) and re-tendering all the works packages to their preferred supply chain. The competitor's supply chain were also given the opportunity to re-tender for the packages. The whole process was open book with four quotations obtained per discipline; interviews with the best value supply chain chaired by Willmott Dixon with the presence of the client, PM and PQS.

Willmott Dixon achieved all this within the set timescales, without the need to reduce the floor area or downgrade the external façade of the building.





The numbers

£10 Million

Thanks to Willmott Dixon achieving a BREEAM 'Excellent' for the project, Newport Campus received £10 million of extra funding

£5 Million

Willmott Dixon was able to achieve the client's target of creating £5,000,000 worth of savings without compromising quality



8,500

The scaffolding on the contract constituted the largest amount of free standing scaffold that had been erected on any Willmott Dixon site. At the height to the scaffolding works a stock take revealed that there were 8,500 scaffold boards employed

99 weeks

Through rescheduling the contract programme and regular meetings the project was completed in 99 weeks - well before the 101 weeks originally contracted

754 hours

Willmott Dixon Staff dedicated 754 hours of their time to community engagement and charity activities during the project



87% diverted

87% of waste generated from the Newport site was diverted from landfill

£1.020 Million

Willmott Dixon saved the client £1.020 million by Value Engineering the curtain walling, windows and doors throughout the Newport City Campus



£293,000

Willmott Dixon saved the client £293,000 through Value Engineering the hard landscaping

4.89

Newport City Campus has achieved an excellent air tightness of 4.89m³/(h.m²) at 50 Pa to minimise heat loss

90% local

It boosted the local economy with 90% of the subcontractors being sourced from Newport, Torfaen, Monmouthshire, Blaenau Gwent or Caerphilly

25.10.2010

Newport City Campus was completed and handed over to the University of Wales on 25th October 2010

£510,000

By Value Engineering the M&E works Willmott Dixon saved a further £510,000



The innovation

125 metres

The Kalzip standing seam roof on the project is the largest in Wales, and the second largest in the UK. The roof sheets were all individually rolled on site to continuous lengths of 125m.

Efficient

The original drainage scheme was to connect to the foul sewer on the opposite side of Usk Way. However during the works it was impossible to complete these works due to the presence of a canal wall under the road. Willmott Dixon put forward the solution of a foul pumping station, which proved the most cost effective method of dealing with the foul drainage solution.

With a significant cost saving to achieve Willmott Dixon combined 'real' collaborative working with the supply chain as well as an innovative approach to provide a truly Value Engineered, iconic building.

The contract was awarded to Willmott Dixon in October 2008 just as the government announced that the UK was officially in a recession.

Willmott Dixon's aim was to select a financially stable supply chain and to ensure that there prices were not reduced by sacrificing their overheads/profits. As the material prices started to fall Willmott Dixon approached their 2nd and 3rd tier suppliers to ensure that they passed any commodity cost savings to Willmott Dixon's supply chain.

To cut down on waste and to ensure that Willmott Dixon's supply chain became more efficient Willmott Dixon placed all subcontract orders on a GMP basis, with a percentage contingency incorporated into the lump sum. The subcontractor was then tasked to ensure the contract sum was not exceeded yet their profit was ring fenced. They were asked to use their expertise in trying to achieve an end product but with the set criteria of the specification and lump sum price. This contingency was derived from Willmott Dixon's historical data. The contingency was for the supply chain to either use for any unforeseen event or for them to retain if they carried out their works in an efficient way by interfacing with other trades and cutting down on waste.



The project was a design and build contract with a guaranteed maximum price. Willmott Dixon realised that the budget was under pressure and any unforeseen items would have a financial impact on the client. Every opportunity to review design at the construction stage was taken - potential changes were identified that could offer both economic and sustainable benefits, as well as enhancing the quality and visual aspects. The savings were shared with the client, enabling them to offset any unforeseen costs during the contract. This is an example of 'real' collaborative working with the client, project managers Mott Macdonald and designers.

Despite being a 'design and build JCT contract' an 'open book' partnering approach was taken from the outset by Willmott Dixon. This is unusual under a JCT contract and also in the construction industry.

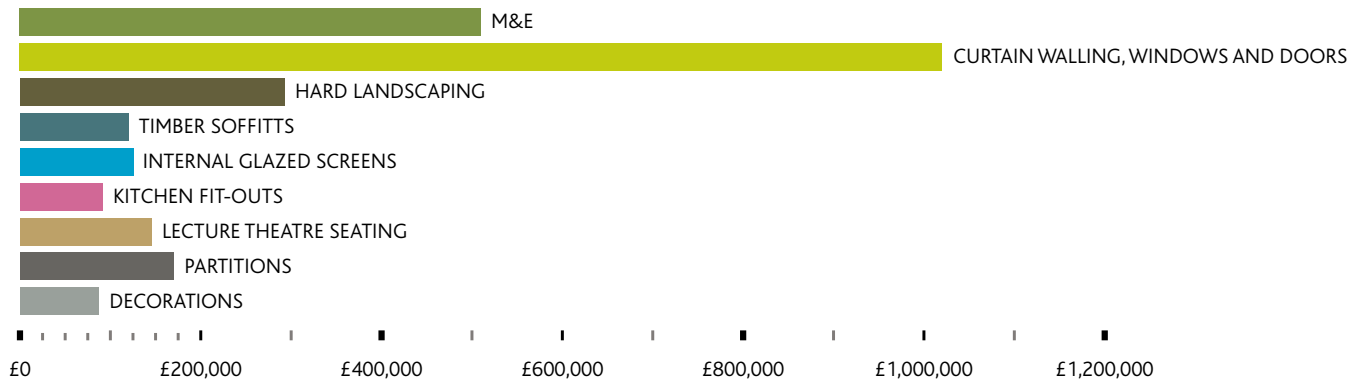
Willmott Dixon were frequently asked to prepare and deliver presentations to the senior staff to enable them to follow the design process and construction phases.

Our commercial team spent many hours with the Deans of the University helping to drive cost down and yet manage their expectations for the £1.2m worth of additional works, i.e. sound studio fit out, fixed furniture, lighting specifications, film studio fit out to name but a few.

Involvement of the end users was of vital importance in order to meet their expectations and aspirations. Weekly site visits for staff, students and support services were also organised to share visioning ideas during the construction stage.

The opportunities

Value Engineering Savings



As their budget was stretched, it would be to the benefit of the client, Willmott Dixon and the supply chain to explore savings without compromising the quality of the end product.

Value Engineering (VE) can be defined as; 'reducing cost without affecting a building's form or function, or enhancing quality without increasing cost'. With this in mind Willmott Dixon began a VE exercise in July 2008 with the aim of reducing the cost of the building by approximately £5million. All aspects of the design were addressed and, in collaboration with the University and Design Team, a list of over 200 potential VE items was compiled. Each item was reviewed to consider the affect on the building's:

- Aesthetics
- Functionality
- Longevity
- Operational cost
- Cost
- Predicted BREEAM rating

Items which had an adverse affect on any of the above were disregarded and savings for those deemed acceptable were incorporated within the Contract Lump Sum.

The majority of savings were generated from use of:

- Products by alternative manufacturers
- Standard products in preference to bespoke (where feasible)
- Standardisation and simplification of detailing
- Expertise provided by Willmott Dixon's supply chain
- Collaboration with supply chain to maximise efficiencies and minimise waste

It is testament that strong adherence to the definition of VE, i.e. that a completed building should not lose any of the form or function of the original design, has been achieved with considerable cost savings.

The following items show a cross section of some of the items where VE helped achieve savings without a compromise in quality or function.

Chiller Compound	£10,000.00
Curtain Changes	£1,900.00
WC change	£4,000.00
Omit insulations CMB	£2,000.00
Leak detection	£2,500.00
Access control	£7,000.00
Suspended ceilings	£5,206.00

The VE process did not stop when the project progressed to the construction phase and the promotion of further VE ideas was encouraged at all stages.

“It was a design led approach, a little risky, but actually was all about engaging with our students... and respecting them.”

Derek Lawther,
Dean, University of Wales, Newport

It was recognised at an early stage of the contract that it was to the benefit of the client, Willmott Dixon and supply chain to explore savings without compromising the quality of the end product. It was essential to ensure that BREEAM credits were not compromised and all savings shared with the three parties.

This message was communicated at all meetings to encourage supply chain partners to raise any innovative ideas that could result in a shared saving. A substantial number of ideas were harnessed which included the following:

756.3kg of CO₂

Energy consumption at Newport City Campus was kept to a minimum and the project fell well under its estimated target of 999kg of CO₂

Less is more

The first major design change was the omission of the purlin steel supports at roof level and the reduction of the column thicknesses and introduction of a metal deck. This allowed the roof to be erected early and offered the water tightness of the building to be achieved much earlier than originally planned. This also facilitated the safer and easier application of the roof covering.

More suitable, more sustainable

The home grown Larch is not as stable as the Canadian Cedar due to the Cedar being grown within managed and certified forests, Cedar also has a lower environmental impact throughout its life cycle although it does travel a long distance. The home grown Larch is only grown in Devon and the quantities required for this project, some 4200m² made it less sustainable than the long travelled Canadian Cedar. Sample areas were completed and approved by the board of Governors in time for a short lead-in time.

Creative solutions

This two fold change generated a cost saving for the client of approximately £62,000. Willmott Dixon proposed a change from home grown Larch to Canadian Cedar combined with a change from prefabricated panelling system to a metal frame grid and continuous slatted system for the high level internal and external ceilings and soffits. The client at tender stage could not afford to specify Canadian Cedar and had to opt for a Home grown Larch as it was more economical at the time with the panelling system. This system has been used on the National Assembly building in Cardiff. Willmott Dixon deliberated for many hours the design of the soffit as the initial design was to use prefabricated units but this would look very plain and featureless. Through creative thinking and utilising Willmott Dixon's supply chains' and designers' knowledge Willmott Dixon came up with a proposal for the use of Canadian Cedar combined with a metal frame grid system, which generated a significant cost saving. It also avoided the lengthy lead-in period of off-site fabrication.

A lighter side

The specification had included a large selection of 'designer' light fittings from various manufacturers. This would have meant the client would have to hold a lot of stock of light fittings and filaments as spares and these were also mostly manufactured abroad. Willmott Dixon tasked their supply chain to propose: 1. a maximum of two manufacturers and – 2. to propose a light fitting which closely resembled the architect and client's vision. This process had to be recognised at a very early stage as there is long delivery lead in for light fittings, and the approval process by the architect and client had to be given consideration. The majority of the light fittings and accessories were finally procured from one UK manufacturer and a small amount from a European manufacturer as an equivalent could not be sourced from the UK. This small measure saved the client approximately £25,000.

Health and Safety



Willmott Dixon has always strived for a high standard of Health & Safety throughout all aspects of a project's build. This project was no exception.

During construction, health and safety was the biggest driving factor, as demonstrated through the Accident Frequency Rate (AFR) results for the site of 1.17. The site was also awarded two internal H&S awards for the high standards of management on site.

The construction of the concrete frame was undertaken using the latest innovations in fall arrest systems. This construction method won plaudits from the Health & Safety Executive (HSE), who visited site to film the works for a 'best practice' video.

Health and safety was built into the design to ensure that the maintenance of the building could be undertaken under controlled conditions whilst the building was occupied. This was demonstrated by installation of an abseiling rail, installed above all the glazed section in the atrium spaces. This rail allowed a safe means of access for any window cleaning activities.

A Designer Safety Awareness Day was held at the Campus in March 2011 that saw the industry come together to ensure Health and Safety is paramount at every stage of a project.

10 minutes

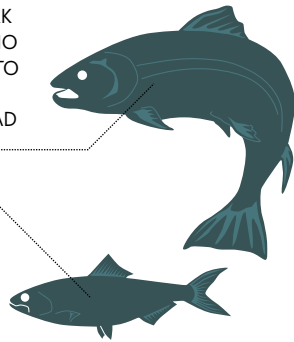
Every morning, a 10 minute stand up meeting was held which all subcontractors' supervisors attended. The meetings discussed the activities that were underway that day and any associated hazards.



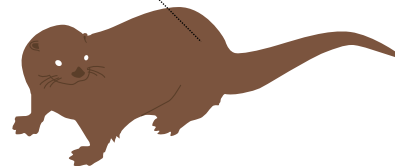
Consideration for local wildlife

ALL TEMPORARY SITE AND CAR PARK LIGHTING DESIGNED TO ENSURE NO MORE THAN 1 LUX OVERSPILL ONTO THE RIVER USK TO MINIMISE DISRUPTION TO SALMON AND SHAD

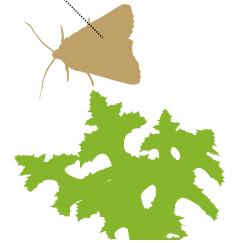
PILING OPERATIONS CARRIED OUT IN DECEMBER AND JANUARY OUTSIDE THE SHAD'S MIGRATING SEASON



NO WORK WITHIN 20 METRES OF THE RIVER 1 HOUR BEFORE SUNRISE & 1 HOUR AFTER SUNSET ENSURING LOCAL OTTERS ARE NOT DISTURBED



PRICKLY LETTUCE PLANTED AS FOODSTUFF FOR ENDANGERED SMALL RANUNCULUS MOTH



Willmott Dixon's commitment to sustainability means that every project site has to adhere to a set of self-imposed environmental goals. From water usage and energy use to the impact on the local environment, every project must exceed Willmott Dixon's Environmental Key Performance indicators.

The project achieved a Building Research Establishment Environmental Assessment Method (BREEAM) rating of 'Excellent' and an 8.71% improvement on Building Regulations Part L CO₂ emissions requirements, without heavy investment in low or zero carbon technologies. It delivered well against its Environmental Key Performance Indicators (EKPI) targets. For 'impact on the environment', the site scored 8.0 against 7.5 the EKPI target set. Energy and water consumption were kept to a minimum with only 756.3kg CO₂ used against the 900 kg CO₂ target. Waste production was reduced with only 5889m³ of waste created and 87% was diverted from landfill.

The River Usk is a designated site of Special Scientific Interest Area of Conservation so measures were put in place to protect the local wildlife, including otters, shad and salmon. Willmott Dixon ensured that no work was undertaken within 20 metres from the river Usk shore during an hour before sunrise and an hour after sunset to ensure that the local otter population was not disturbed during their prime times of recreational activity.

As part of the landscaping scheme and to boost the local environment post-construction, Prickly Lettuce was planted as foodstuff for the Small Ranunculus Moth, an endangered indigenous species in South East Wales.

Very high standards of insulation and air tightness: 4.89, were achieved to minimise heat loss, a low-temperature hot water system ensured boilers operated to maximum efficiency and dynamic energy modelling was used to incorporate a high proportion of façade glazing to maximise daylight and minimise energy use.

Solar control glazing, a carefully designed overhanging roof and brise soleil shading devices were used to take advantage of the angles of the sun to heat and cool the building.

A variable air volume demand controlled ventilation system ensured that air volume introduced to each room varied according to the temperature and CO₂ levels in the room. Sparsely populated or empty rooms receive less ventilation reducing energy consumption. 'Smart Valves' on the heating system also ensure that heating and cooling are not in conflict with each other.

Willmott Dixon was recognised for its contribution to this landmark building with the Gold Award from the Considerate Constructor's Scheme. This highlighted the energy saving measures undertaken, such as timed power shutdowns for evenings and weekends, water saving eco cubes in operatives' washrooms and the exceptional care taken to preserve the local wildlife.

Zero Waste

Willmott Dixon has committed to sending zero waste from its sites to landfill by 2012

Carbon Neutral

Willmott Dixon aims to be carbon neutral by 2012

The community



In building something for the whole community, it was vital to involve them so everyone had a sense of ownership of the finished scheme. In terms of community engagement, 754 hours of staff time was given to work with the community or to raise money for charity.

Guest Lectures

During the construction process, the Willmott Dixon site team undertook guest lectures at the University to students of the construction technology courses. These lectures took place at regular intervals during the academic year. Willmott Dixon personnel also offered site tours for the construction students in order to offer vocational learning experiences.

The community needed to be kept up to date on the build and the vision of the campus. A monthly newsletter was sent to local residents and other stakeholders with a progress report from site. The University's website was also a source of up to date information for the residents.

Special community and educational events were also held on site in partnership with organisations such as Construction Skills, Careers Wales Gwent and CITB. They included a one-day industry event to encourage more females into the construction industry.

Representatives of WAG also got involved. Jane Hutt, then Minister for Education, attended the topping-out ceremony and said: "...this is what I see as 21st Century higher education... for inspiring, innovative and imaginative building. Its everything we could have hoped for and aspired for."

Keeping site staff involved in the scheme's vision was crucial, especially when it came to sustainability. 'Playing Cards for the Future' is an innovative competition to encourage staff to think about what can be done to make projects more sustainable.

Staff collect playing cards for actions including choosing green products, finding sustainable solutions to waste and ideas for reducing energy.

In order to engage the University during the construction process, members of the site team delivered guest lectures to the University students. This involved site tours to give some practical experience of a construction project.

Willmott Dixon also signed up to the Newport Construction Employment Charter, a voluntary code of practice that states that, wherever possible, locally skilled and trained workers will be used. It boosted the local economy with 90% of the subcontractors being sourced from Newport, Torfaen, Monmouthshire, Blaenau Gwent or Caerphilly. 50 members of the workforce came from Newport itself.

During the construction process, a web cam was placed on the roof of an over looking building. The images of the construction process were then fed back in real time to the University of Wales, Newport for the public to view the construction process.

Localism

Throughout the construction of Newport City Campus Willmott Dixon employed 344 staff who lived within 20miles of the site.



www.tyhafan.org

Donations can be made on-line, using the Charity's online form. Alternatively, donations can be made through a bank, by post or via company payroll systems. To find out more log-on to tyhafan.org

www.querico.org.uk

To learn more, make a donation or to get involved go to www.querico.org.uk

As a responsible business, Willmott Dixon's core values include generating a positive influence beyond the immediate scope of Willmott Dixon's projects. At Newport, Willmott Dixon staff and contractors raised money to make a difference both locally and globally.

To comply with planning conditions stating: 'all parking of cars during construction is to be provided on site, and that parking of cars in nearby streets is to be discouraged' an area of 20m x 70m was created on site for a contractor's car park along the river Usk shore to act as a buffer barrier for construction activities.

As parking was at a premium, an idea generated by the site team was to sell the car parking spaces to the supply chain for the duration of their time on site. The funds raised by these sales were donated to charity. One charity, Ty Hafan - a local children's hospice - was supported for two years by the site car parking fund. For two

years site staff took part in the Welsh three peaks challenge which is an annual event organised by Ty Hafan and approximately £2800 was donated to this charity during this challenge.

The second charity which benefited from the car park site funds was 'Que Rico'. This is a British Charity which helps build houses for the poorest nations in Cambodia. The Project Director was involved in building homes and lives of these poor people for two consecutive years. He gave up four weeks of his annual leave to work for this worthy charity. 90% of the funds donated to 'Que Rico' are used to purchase materials for the houses.



The awards

“Another pleasurable visit to this well organised, motivated and considerate site - a fine example of CCS at its best.”

Considerate Constructor's Scheme report for Newport City Centre Campus



GOLD AWARD

Willmott Dixon's outstanding community engagement on the City Campus project lead to the Considerate Constructor's Scheme giving the project a Gold Award

HONORARY FELLOWSHIP

The University of Wales was so delighted with the finished City Campus that Project Director, Kanji Kerai has been asked to receive an Honorary Fellowship for his significant contribution to the development of the City Centre Campus



WINNER 2011

The Project was recently announced as the winner of the Public Sector Interior of the Year - Mix Interiors Awards 2011

RIBA AWARD

The design of the University of Wales, new City centre campus has been recognised in the prestigious RIBA architectural awards



AWARD

Richard David has been nominated by the client for the Construction Manager of the Year - CIOB award for his work and contribution to the success of the City Centre campus and has been short-listed and are awaiting the final results



The project has been short listed in the category of 'Project of the Year' in the Constructing Excellence Wales Awards 2011





CASE STUDY

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