Addressing flood risk through city-University collaborations

Driven by significant disruption from flooding, Newcastle University implemented sustainable drainage systems and green infrastructure across its campus. Working with other city stakeholders to manage surface water, this produced benefits for the university and wider city community.

Newcastle University has been impacted several times by extreme weather over the last decade. Most significantly, the 'Toon Monsoon' in June 2012 resulted in over £1 million worth of damage to the campus. The event prompted a risk assessment of the University's buildings and business critical assets, and actions to mitigate against future flooding, including the installation of flood barriers to doors and flood alarms.

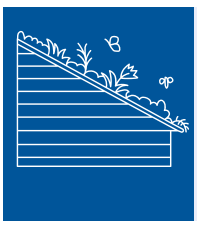
As a longer-term, strategic response, the Estate Support Service (ESS) funded an academic post, working with researchers to model flooding and design sustainable drainage systems (SuDS) across the campus. Total funding of over £4.5m was obtained from the University, the UK Collaboratorium for Research in Infrastructure and Cities (UKCRIC), and University/City Council Partnership funding. This included support for the National Green Infrastructure Facility (NGIF), a 'living laboratory', sited on a flood corridor connected to the city centre, underpinning research into Sustainable Drainage Systems and green infrastructure (GI).

Challenges to delivery proved to be working across functions in the University and competing with future development on high value land to make space for green infrastructure. Alignment with funding cycles also remains a barrier to the longevity of measures.

Collaborations between researchers led to modelling that identified vulnerable areas and buildings. The management of urban water for city stakeholders was a key motivation of a project to model flow paths within the University campus and beyond.

KEY MESSAGES

- **An adverse weather event led to significant positive benefits and learning** opportunities to understand climate change impacts and for the University to become more resilient through planning for the future.
- **Challenging traditional approaches** can demonstrate how new benefits and organisational culture change can be generated.
- **Removing institutional barriers and interests** when resolving problems and exploring solutions can facilitate collaborative working across functions, departments and organisations.



> "Making green infrastructure/sustainable drainage systems open and accessible allows stakeholders to see and understand climate adaptation in action, helping to change attitudes and perceptions of how resilient cities might look, and encourage action elsewhere."

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For example, modelling proposals for the redevelopment of a student village demonstrated that incorporating small retention basins within lawned areas alleviated flooding of the main access road to the local accident and emergency hospital and adjacent University buildings.

Community workshops upstream of campus also demonstrated the value of capturing stormwater using butts to reduce the impact on storm drains, reusing the water to grow vegetables locally. City-wide benefits included an increase in green space on the campus with potential positive effects on wellbeing, urban ecology and water quality.

The National Green Infrastructure Facility, whilst actively reducing flood risk, is also used for research and teaching, shaping the University's climate curriculum, and providing visual demonstration and advocacy of green infrastructure. Measures to mitigate flood risk also led directly to the University being able to renegotiate a reduced insurance premium.

Partnerships with students, Newcastle City Council, Northumbrian Water Limited, and other organisations as part of a Local Action Alliance promoted a sense of shared responsibility for surface water. One outcome was a city-wide pledge for joint working to achieve the highest standards of water management and to promote investment in Sustainable Drainage Systems. Collaboration with the city council led to Newcastle University co-chairing the city's Net Zero Task Force and publication of a citywide climate action plan in 2020.

The University set a target for Net Zero carbon dioxide emissions by 2030 in its own Climate Action Plan. Future developments of this plan will include extending its scope to address adaptation to climate risks. This will build on a collaboration between Estates and Facilities and the School of Engineering, which saw students reviewing the UK Green Building Council guidance for measuring and reporting climate-related risks. As these plans develop, they will be integrated within campus developments.

Key facts about the institution:	
Institution name:	Newcastle University
Location (city and nation):	Newcastle upon Tyne, UK
Number of students (total for institution):	28,383 (incl. international campuses)
Number of staff (total for institution):	6,474
Campus type and location:	City centre campus in Newcastle upon Tyne with various satellite sites

Key facts about the intervention (case study):	
University or department led:	Collaboration between Estates & Facilities and academic colleagues in the School of Engineering.
Number of staff engaged:	A team comprising the Blue-Green Cities steering group/ academics in School of Engineering/flood risk manager (Estates & Facilities).
Number of students engaged is:	~20 in latest phase
External partners:	Many stakeholders incl. including Newcastle City Council, the Environment Agency, Northumbrian Water Limited, the Freemen of Newcastle upon Tyne, Newcastle University students.
Climate risks the intervention addressed:	Surface water flood risk, and looking ahead, wider climate risk.

PROJECT TEAM:

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Image: Swale and other green infrastructure at the National Green Infrastructure Facility facility on the Helix campus, Newcastle University. Photo credit: John Donoghue.