DBFL
CONSULTING ENGINEERS

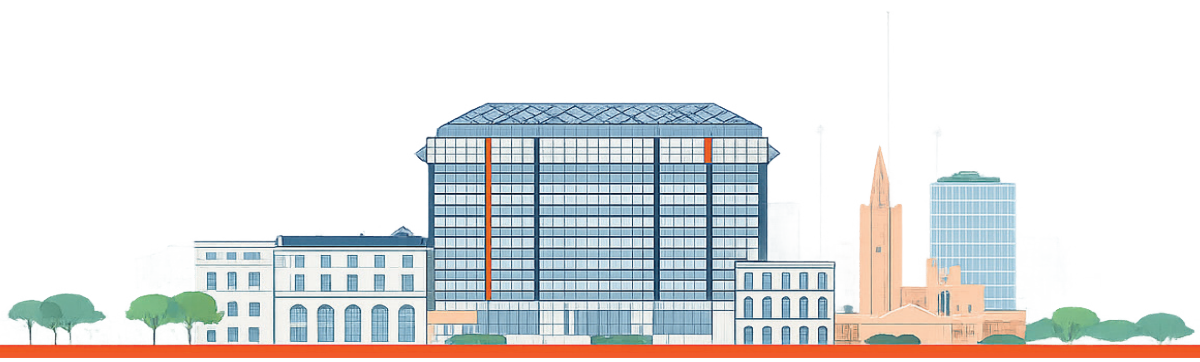
Engineering
Sustainable
Futures

Retain, Renew, Reimagine

Adaptive Re-Use in the Built Environment

Pledge to Net Zero
Thought Leadership 2026

Contents



Introduction

In 2021, DBFL became signatories of the Association of Consulting Engineers of Ireland's Pledge to Net Zero, a partner to the United Nations' Race to Zero Campaign. In doing so, DBFL joined a group of leaders in the civil, structural and transportation engineering sectors taking strong, tangible actions to mitigate the most significant impacts of climate change.

Since committing to the ACEI Pledge to NetZero, and in response to the climate crisis and our commitment to sustainable engineering solutions, DBFL has made significant progress in reducing our emissions across Scopes 1, 2 and 3 each year through a broad range of initiatives and a dedicated effort by all staff across the company.

In addition, we have implemented multiple sustainability measures across our offices, ranging from achieving the Gold Smarter Travel Mark for supporting sustainable and active commuting, to actively engaging with third-level institutes to promote sustainable engineering practices.

Building on previous thought leadership pieces highlighting DBFL's expertise in nature based drainage solutions and promoting sustainable workplace travel, in this our fourth thought leadership piece, we turn the spotlight on adaptive re-use of buildings, by focusing on three showcase projects DBFL have been centrally involved in.

The projects presented within this thought leadership piece demonstrate how engineering innovation can unlock the long term value of existing assets. Whether through the renewal of historic residential buildings, the transformation of recognised commercial landmarks, or the upgrading of protected structures to support future infrastructure, adaptive re-use enables development that is both environmentally responsible and economically sustainable.

Adaptive re-use plays a critical role in development by extending the life of existing buildings and reducing the environmental impact associated with demolition and new construction. By repurposing structures – whether institutional buildings such as the old Central Bank, historic residential buildings, or a 1960s office block – as designers and engineers we can significantly cut down on waste, conserve raw materials, and lower embodied carbon.

This approach aligns closely with DBFL's mission of **Engineering Sustainable Futures**.

Reimagining existing buildings also revitalises urban areas. It supports community regeneration by bringing new life to vacant or obsolete spaces, encourages new business activity and increases awareness of circular economy principles, where value is preserved and environmental impact is minimised.

For cities, adaptive re-use can also help protect architectural heritage, maintaining a sense of identity while meeting contemporary needs. For stakeholders, from clients to local authorities, adaptive re-use represents a practical and forward thinking strategy that blends stewardship of the built environment with innovation and long term value creation.

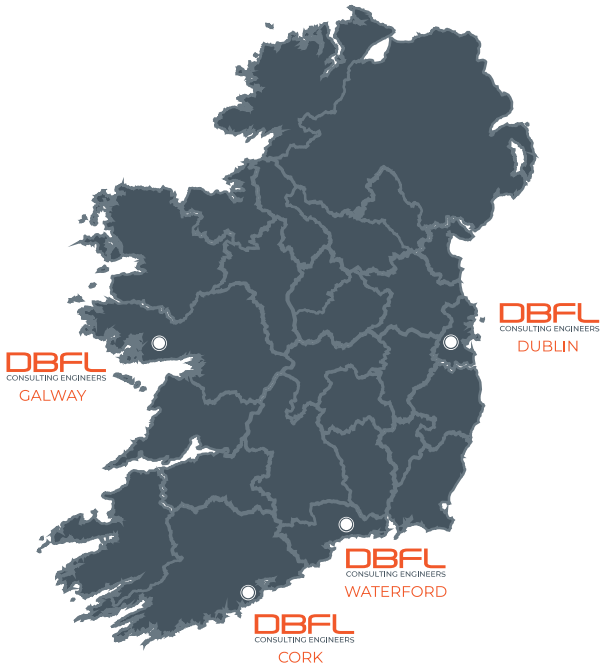
As Ireland continues its transition toward a low carbon built environment, adaptive re-use will play an increasingly important role in delivering sustainable growth. DBFL remains committed to applying innovative engineering solutions that reduce environmental impact while supporting the evolving needs of our cities and communities.

About DBFL

DBFL Consulting Engineers is a fully Irish-owned firm specializing in the planning, engineering design and delivery within the property, infrastructure, environmental & energy sectors for almost 40 years.

We are dedicated to delivering innovative, resilient and sustainable engineering solutions. Our core values of Sustainability, Integrity, Adaptability, Excellence, Innovation, and Inclusivity are the foundation of everything we do, guiding our approach to each project and helping us stay true to our mission of Engineering Sustainable Futures.

DBFL provide a high level of personal service to both public and private clients across Ireland, UK, and Europe. DBFL have a workforce of approximately 200 staff across offices in Dublin, Waterford, Cork and Galway.



Project Case Study 01:

Townsend Street Housing Renewal

Adaptive Re-Use and Structural Refurbishment

Introduction

This important city-centre renewal project transforms a long-vacant residential block into a modern, accessible and socially impactful housing development. The project encompassed the repair and renewal of a four-story historic residential building, situated at 180 - 187 Townsend Street in Dublin 2. Prior to this, the structure was uninhabited since 2011 and in a state of severe disrepair. The development now provides 20 one-bedroom units that the Peter McVerry Trust utilise to help address homelessness in Dublin. It is particularly relevant to Dublin City Council's Adaptive Reuse Unit in the Housing and Community Services Department for creating new social housing by adapting and refurbishing vacant office and commercial buildings in Dublin City.

Historic Context

The building was built in c1909 as one of Dublin Corporations first social housing complexes under the direction of the Improvements Committee. The aim was to provide three blocks, each four storeys high and include state of the art facilitates such as flushing toilets and fire-resistent floor structures. At the time, most of the city's poor were housed in single-family Georgian houses that were converted for multi-family occupancy, known as tenements. The building was primarily of masonry construction, clinker concrete floors with infill steel joists and timber roof. The building was in a state of severe disrepair prior to the commencement of works on site in January 2023.

Review and Approach

As Structural and Civil consulting engineers for the refurbishment and renewal of this building, DBFL carried out a full condition survey to identify areas that required structural repair and intervention. The works included repair or replacement of failed lintels, rotten roof timbers, rusted steel floor joists and damage to masonry walls, ensuring that all intervention was sympathetic to the original building fabric throughout.
DBFL adhered to the principle of minimal intervention and maximum retention of existing structure from inception to completion. An example of this is when limited opening-up works were permitted prior to tender coupled with evidence of long-term water ingress in the roof, DBFL allowed for a 30% replacement of roof timbers to alleviate risk. Upon full opening-up of the roof during construction, DBFL undertook detailed examination of all roof timbers. In combination with a specialist's report, DBFL was able to limit timber replacement to below 5% by using appropriate repair methods.

Project Works

An established principle of sustainable construction is that the most sustainable and environmentally responsible structure is the one that has already been built. Thus, it is imperative that existing structures are utilised wherever possible in urban development. When dealing with existing buildings rather than new, in particular historic structures such as on Townsend Street, there are elevated unknowns and risks that require increased attention to detail in order to alleviate them. While DBFL

undertook an initial full condition survey, as further opening-up was carried out during construction, there was an ongoing requirement for detailed inspections and adaptions to the. At multiple points during the course of the works creative problem solving was required to successfully keep the project progressing while being sympathetic to the existing structure. The tight nature of the city centre site and extensive depths of made ground encountered posed significant challenges for the foundations of the new structure. Therefore, a pile and ground beam scheme was utilized, with hand driven piles being used for any new internal masonry walls.

The original internal stairwells were removed and infilled to create a larger floor area to the new apartments to meet current building standards. Access to the upper floors is now provided by a new external circulation area comprising a steel framed walkway built over a new rear extension to the ground floor units in the southern courtyard at the rear of the building. A new reinforced concrete core containing a lift and stairs has also been installed linking these walkways.

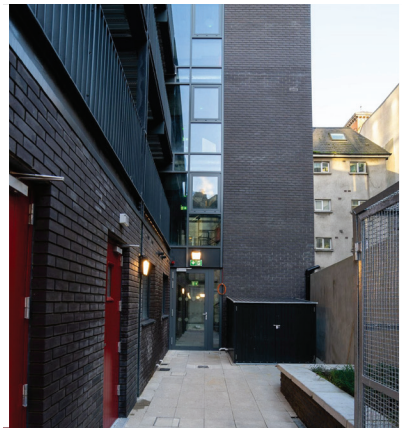
To facilitate the increased floor area and modern layout for the apartments, internal stairwells were replaced with composite concrete floor slabs. Access to the apartments was achieved via a new external steel frame terrace and balcony structure, with a RC core containing a lift and precast stairs. Furthermore, to enable expansion of the building at ground level, steel portalised “box frames” were used to maintain load paths and ensure lateral stability. There were large areas of the brick façade which required repairs. These were generally clear from inspection to be a symptom of the age of the building and lack of maintenance over the years, rather than attributed to any ongoing fundamental structural issue. A combination of crack stitching, brick replacement with recovered like-for-like bricks and re-pointing was utilized to re-instate the facade to its original quality. There were some instances of cracking uncovered during opening-up works which required ongoing monitoring to ensure that they were not caused by any recent or ongoing building movement. Telltales were installed and regularly monitored over the course of a year to confirm building stability.

As the works progressed it became apparent that the floor levels were highly irregular between different areas of the building. The solution initially proposed was a standard screed to equalize levels, however the loading from many areas would likely exceed the existing slab capacity. There was a significant risk at this point of a large amount of additional structure being required to facilitate this unexpected increase in load. However, DBFL undertook research which identified the possibility of using a proprietary lightweight screed, not yet used extensively in Ireland, which was half the weight of a standard sand-cement screed. The screed was deemed to be cost effective and by floating this screed on top of insulation, no additional structure was required.

For civil works, all storm and surface water is stored in attenuation tanks in the rear courtyard. Foul and surface water has been separated on the site before being discharged to the public sewer on Townsend Street.

Results

The direct result of DBFL’s contributions to this project are 20 new high-quality and modern apartments in a building that has already housed Dubliners for over 100 years. The dedication to conservation is such that when the building is viewed from the street, the façade looks almost identical to when it was first constructed back in 1909.



Project Case Study 02:

Central Plaza

Transforming a 1970s Landmark Through Adaptive Re-Use

Adaptive Re-Use of a City Icon

At DBFL we frequently work on conservation and heritage projects, so it was a privilege to be given the opportunity by our Client Hines, to work on the refurbishment, re-purposing, and re-use of one of Dublin's most recognised landmark buildings, One Central Plaza.

Design Brief

One Central Plaza is a dramatic building. The 1970's structure is eight storeys high, uniquely suspended from an innovative roof structure using twelve sets of Macalloy tension bars. The building has a double basement over the entire site. The project involved the complete repurposing and structural refurbishment of all building levels, including the repurposing of the roof area to deliver a glass-topped space affording panoramic views over the city.

Sustainability

At DBFL we want to reduce our environmental impact. Embracing adaptive re-use and refurbishment offers a sustainable approach to construction. In line with Hines' vision for minimising environmental impact and preserving the architectural heritage of the city, DBFL have had a unique opportunity to breathe a new life into an iconic building in the heart of the city.

Circular economy principles were implemented throughout our investigation, assessment, refurbishment, and protecting of the critical hanging tension rods and nodes at each level. Plant risers, lift shafts, stairs and staff facilities housed within the cores were completely modified to deliver the needs of a modern office. To preserve the character of the building and to maintain office floor space, the existing cores were retained with interventions kept to a minimum. The result is a saving of approximately 10,000 tonnes of embodied carbon.

The re-design of the public plaza, along with new retail, leisure and dining spaces engages the public and re-establishes the building in its urban context. The positive impact of the new design at street level is profound.

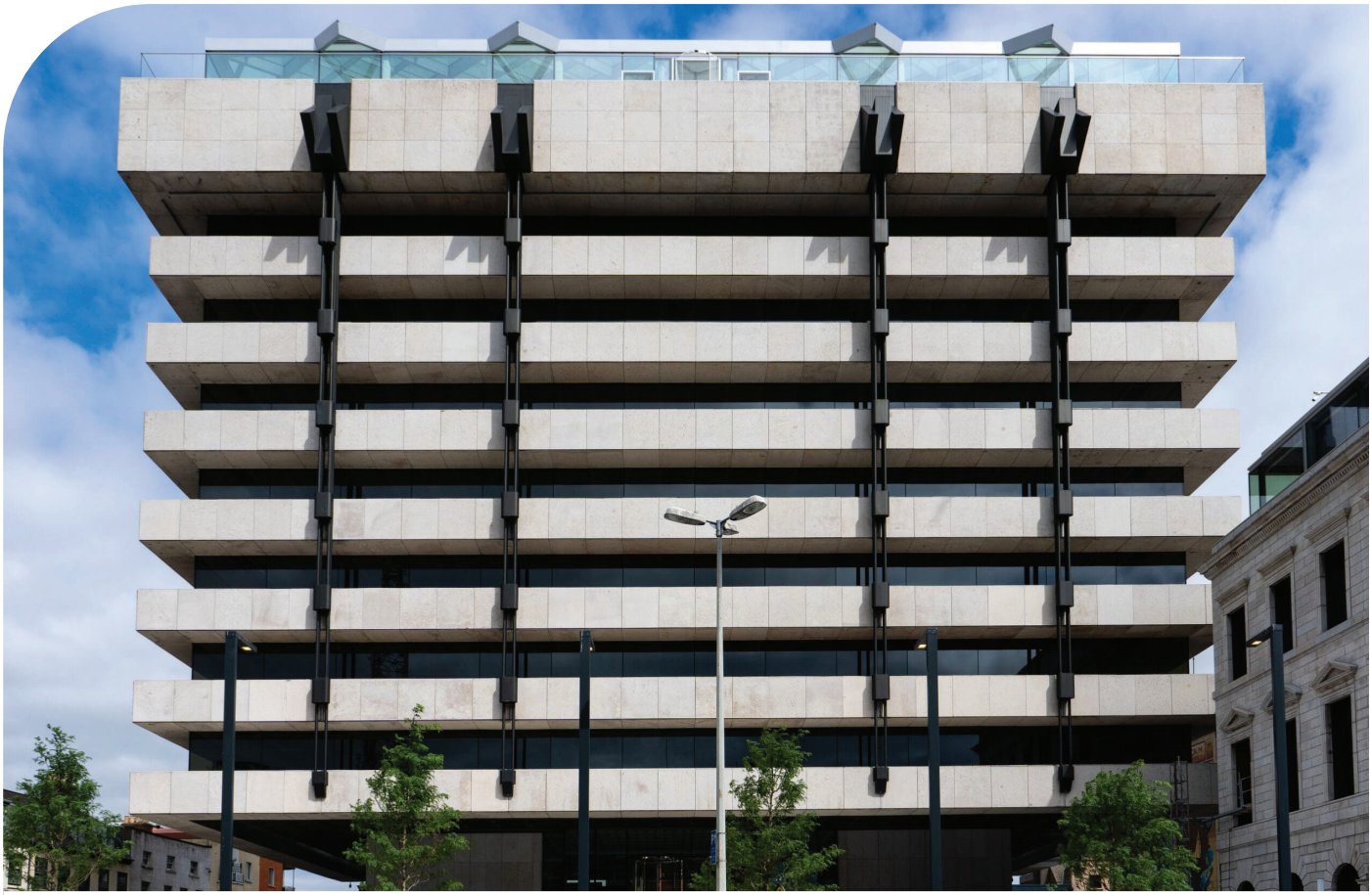
Conservation

Retaining the existing building fabric to reduce time, cost and environmental impact was central to DBFL's design philosophy. A full assessment and refurbishment of the building's hanging truss and bars system was performed to extend their design life. The two-storey basement car park was partly repurposed

to house building plant previously located in the roof space. Car parking now accessed by car-lift was redesigned at the lower basement.

Modern Use

Collaboration between the Design Team, Contractors and Specialist Service providers has successfully resulted in a modern Grade A building, proudly achieving LEED Gold status. At DBFL, innovative thinking and a detailed understanding of the challenges and complexities of the project allowed us to contribute to reducing the environmental impact of One Central Plaza and expand our experience in forward-thinking adaptive re-use and refurbishment of the built environment.



Project Case Study 03:

Two Grand Parade

Extending Building Life Through Adaptive Re-Use

DBFL was pleased to be given the opportunity by Hines to work on the Two Grand Parade Project which involved the upgrade and refurbishment of an existing protected structure along with the construction a new 6-storey building.

Two Grand Parade is a 9,600 m2 commercial development which included six storeys of new prime office space over a single level basement. The new steel framed building is linked via a glass atrium to the iconic 8-storey former headquarters of PJ Carrolls which overlooks the Charlemont Luas Stop and the Grand Canal in Dublin.

The existing structure, constructed in 1962, had exceeded its original design life. Hines sought to extend the life of the structure rather than demolish and re-build, and thus saved thousands of tonnes of embodied carbon emissions. The structure was assessed, analysed, restored and upgraded to meet all the standards of a modern office building with LEED Platinum status and BER A3 targeted for the scheme.

Various investigations were conducted during the assessment of the existing structure to determine what restoration measures were required. This included a visual inspection of the main structural elements, cover meter surveys and the cutting of several concrete cores which underwent chemical tests to detect signs of degradation.

Following the assessment, selected structural elements were then restored and upgraded. Stiffening elements were added to the steel beams to facilitate new openings and allow the efficient integration of services. The steel beams were sandblasted to remove any damage and defects to the steelwork along with receiving a coat of intumescent paint. The soffit of the concrete floor slabs were sandblasted and treated with an anti-carbonation coating. Additional structural elements were introduced in localized areas to accommodate service requirements for a modern office building. The existing stairs were strengthened to allow both the flights and balustrade to be retained and reinforced concrete walls were constructed for two new lifts.

The site is ideally situated for integration with various forms of sustainable transport including Luas, Dublin Bus, and bike share schemes. In addition, the Two Grand Parade site is intended to serve as the location for the final stop of the proposed metro line. With this in mind, part of the project involved the design of structure to allow the future construction of a metro station beneath the footprint of the Two Grand Parade site. This structure would serve to reduce the potential disruption and need for future demolition during the construction of the metro station. DBFL and the wider project team were part of discussions

with Transport for Ireland to allow for a station based on the proposed route and assist with aspects of the public consultation process. Recycled GGBS material was utilised in the concrete mix design for the large concrete pours during the construction of these elements. The new six storey steel frame structure utilised Westok castellated steel beams. The economical design methodology and castellated nature of these beams enables savings in steel tonnages when compared to other methods of steel design.

The castellated nature also allows for efficient integration with various building services and a reduced structural floor depth being required for each floor. Green roofs were utilised as a SUDS measure to control rainwater flows into the public system in the event of storms.

DBFL
CONSULTING ENGINEERS

EngineeringSustainableFutures

Dublin Office
+353 1 400 4000

Ormond House
Upper Ormond
Quay
Dublin 7
D07 W704

Cork Office
+353 21 202 4538

14 South Mall
Cork
T12 CT91

Galway Office
+353 91 33 55 99

Odeon House
7 Eyre Square
Galway
H91 YNC8

Waterford Office
+353 51 30 95 00

Suite 8b The
Atrium
Maritana Gate,
Canada St
Waterford
X91 W028

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