

Gairnshiel Jubilee Bridge

PROJECT TEAM

Architect: Moxon Architects Ltd

Structural Engineer: Arcadis

Steelwork Contractor: J&D Pierce Contracts Ltd

Main Contractor: Wills Bros Civil Engineering Ltd

Client: Aberdeenshire Council



Gairnshiel Jubilee Bridge provides a new crossing of the River Gairn on the important north-south route between Deeside and Speyside. Located immediately downstream of the Category A-listed bridge built in 1749, the new structure carries two lanes of traffic and accommodates large goods vehicles, protecting the historic crossing from further vehicle strikes and allowing it to be retained for pedestrians, cyclists and equestrians.

The project called for a modern, resilient bridge that would improve access without overwhelming its sensitive Highland setting. Six possible alignments were explored, balancing road length, land boundaries, topography, flood risk and the relationship with the existing bridge. The selected route runs parallel to its historic neighbour and connects with the road network at a low point in the landscape.

River flood levels required a single clear span, while the low highway alignment demanded a shallow structural depth. Structural steelwork provided the strength and efficiency needed to span 35m while maintaining a slender profile and carrying full highway loading. Working compositely with the concrete deck, the steel structure delivers the required capacity without creating an unduly deep or visually dominant crossing.

The primary structure comprises bespoke fabricated box girders that evolved from an earlier plate-girder proposal. Although unconventional for a bridge of this span, the closed-box solution brought significant benefits for erection, durability and maintenance. The girders support permanent formwork soffit panels and the wet concrete load during construction, while their enclosed form removes external ledges and reduces areas where water and debris can collect.

Careful shaping allows the substantial steel structure to appear deceptively slender. The girders are inset from the parapets and their inclined webs taper towards the underside, causing the structure to recede into shadow when viewed from the surrounding landscape. The weathering steel will develop a muted russet tone over time, complementing the colours of the glen and contrasting with the lighter granite above.

Weathering steel was selected for its appearance and contribution to a low-maintenance structure. Its evolving finish supports the intended landscape integration, while integral abutments increase structural efficiency and eliminate bearing maintenance. Together, these decisions create a robust bridge with reduced ongoing maintenance needs throughout its service life in this remote Highland location.

The slender steelwork is paired with precast concrete parapets faced in locally reclaimed granite. Stone sourced from dismantled agricultural buildings around Aberdeen was already weathered and retained evidence of its former uses, while the coping stones were reclaimed from Aberdeen Harbour. The granite-faced parapets and wing walls taper into the landscape, echoing the form of the historic crossing without attempting to imitate it.

The use of reclaimed granite alongside a durable, fully recyclable steel structure also supports the project's material-efficiency objectives, combining long-term performance with reduced demand for newly quarried stone for the parapets.

The remote site, reached by single-track roads, imposed strict limits on deliveries, storage and on-site fabrication. Offsite manufacture was therefore central to the construction strategy. The primary steelwork was fabricated and trial-assembled before delivery, ensuring the components fitted correctly and reducing work beside the river.

The completed steel structure was too large to be transported in one piece. It was delivered in two

sections, precisely aligned and welded together on site to create the finished span. This required careful control of geometry and workmanship to maintain the structural integrity and clean appearance of the bespoke box girders.

Erection was undertaken using a 600t crane within a single 10-hour working window. Transport movements, site operations and crane positioning had to be closely coordinated around the limited access. Freezing temperatures, changing weather and the seasonal flood risk of the River Gairn added further constraints, making advance planning and offsite preparation essential.

Ground conditions, the water table and flood risk also informed the foundation and abutment design. Sheet piling was adopted, together with flood-resilient integral abutments and wing walls. The clear-span arrangement avoids placing supports within the river, while the robust steel and concrete structure establishes a dependable crossing capable of serving modern traffic.

Beyond its immediate function, the bridge supports a more resilient regional road network. The former crossing's restricted geometry and vulnerability to vehicle strikes had caused road closures and detours of up to 58km. Diverting modern traffic onto the new bridge safeguards the listed structure while maintaining an important connection between communities.

Gairnshiel Jubilee Bridge demonstrates how structural steelwork can provide the strength and efficiency required for modern infrastructure while responding sensitively to a historic landscape. Its fabricated box girders provide the capacity required for modern highway traffic, yet their tapered geometry, recessed position and weathering finish allow the bridge to sit quietly within the landscape. Precision fabrication, trial assembly and carefully planned erection overcame the challenges of the remote site, while the low-maintenance design responds to its long-term operational needs. The result is an elegant contemporary companion to the historic bridge: technically assured, economical and deeply connected to its distinctive Highland setting.

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JUDGES' COMMENT

This new bridge is located close to the 18th-century listed stone structure it replaces, and the design thoughtfully responds to its context. The slender, 35m-long weathering steel structure with its 'recycled' stone parapets integrates effortlessly into the Highland landscape. Carefully detailed, this bespoke structure is elegant, efficient and designed for minimal ongoing maintenance.



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