

# Bridge Replacement

## Northern Road Bridge, Portsmouth

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**Collaborative Scheme Enhances Local Town**  
The Northern Road Bridge carries a major transport route to the surrounding area including access to the hospital and had deteriorated to a point where replacement was required. Key concerns for our customer when considering reconstruction included the interface with the operational railway along with the period the road would be closed to the highway users.

Our innovative design and construct solution overcame the potential constraints to provide a scheme that would leave one lane running at all times and a shorter period of interruption to the highway; along with using innovative demolition techniques for removal of the road-over-rail bridge without the need for abnormal possessions.



**Collaborative Design Development keeps Traffic Flowing**

A thorough understanding of the technical constraints and needs and concerns of our customer were required in order to develop a modern, sustainable bridge that could be built with the minimum of disruption, whilst keeping the traffic flowing and providing best value.

Working with Portsmouth County Council and their designer WSP, we developed a semi-integral bridge structure based on maximising the use of precast elements to minimise programme duration and reduce impact on the local road network.

Early consultation with our specialist supply partners identified innovative working methods using low height piling rigs to construct the new bridge foundations directly adjacent to the railway line and beneath the roadway above. This permitted daytime working within the restricted height, allowing a faster build.



**TOP:** Northern Road Bridge at night

**MIDDLE:** Mural artwork on the new bridge

**BOTTOM:** Northern Road Bridge passing over the operational rail line

Through developing the design to allow the bridge rebuilding to be carried out in two halves, we provided a phasing solution that kept the road open at all times, with a one-way single lane system. The bridge deck was cut and lifted in sections using a unique wire sawing “de-construction” technique which eliminated the need for abnormal possessions, providing savings

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**TOP:** Baroness Kramer officially opening the Northern Road Bridge

**BOTTOM:** Works being undertaken alongside the rail line

and removing the potential disruption to train services. The pre-cast abutments were lowered into position in front of the existing abutments. Essentially, all of the work was completed during a series of overnight non-disruptive rail closures.

### Minimising Future Maintenance

Sustainability was central to our design solution:

- A precast sway wall design eliminated the need for future maintenance and provided a cost effective solution for managing thermal movement with the elimination of high maintenance bearings.
- Pre-cast concrete was specified to reduce wastage and future maintenance.
- Extra duct capacity under the carriageway was provided for future services expansion.

### Safety by Design and Industry Best Practice

The Health and Safety of ours' and future workforces, along with the local community, were of paramount importance in dictating the design and high quality of the new bridge:

- The removal of bearings significantly reduced the need for access to the railway for future inspections and maintenance.
- The use of pre-cast concrete mitigated risk and improved quality control through fabrication in factory conditions.
- Pre-casting also increased surety of durability, hence reducing the likelihood of future maintenance requirements.

Three dimensional computer modelling was used to gain a thorough understanding of the bridge reconstruction and was used to demonstrate the demolition sequence to operatives. This visualisation permitted a better understanding of the task, helping to achieve no accidents or incidents during demolition.

### Community Considerations

The impact of noise and light pollution on adjacent residential properties from the bridge replacement was a key consideration

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**A local resident was so impressed with the behaviours of the site team that she phoned the City Help Desk to ask that the workers be complimented:**

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***They have been doing really well and have kept residents informed of works at all times. The workers have been doing a fantastic job and I think that they all deserve a congratulations.***  
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**IMAGE:** Maintaining heritage at Northern Road Bridge

in the finalising of our plans and proposed methods. Noise events were minimised in duration through trial runs away from site to maximise the use of rail possession allowances and identify high risk activities requiring specific mitigations.

A noise assessment was undertaken to determine the likely impact of enforced night-time demolition works and the properties that would be most affected. The local community praised our advance notifications of potential high noise activities and our offers of alternative overnight accommodation.

Through regular public meetings, written communications and press releases, the local residents and businesses were informed of changes to the work site and traffic phasing. Community engagement tools included a dedicated webpage with live webcam, community meetings, drop-in sessions, one to one meetings with residents, twitter feeds and local radio and press.

### **A Lasting Legacy**

The Northern Road Bridge now provides the community with a modern transport link with a dedicated bus lane, wirelessly linked motion sensor crossings to improve traffic flow, and safe, well lit, pedestrian and cycle routes.

Several groups of local school children came to visit our project, and were given tours to explain how their bridge was being replaced “bit-by-bit” with the trains and cars still running. They were invited to produce artwork to enhance the appearance of the bridge parapets and we were inundated with great ideas from the enthused children. This community-led mural is now engraved on the parapets and provides a legacy, inspiring future generations.

The scheme's aesthetic ties in excellently with neighbouring town centre improvements in Cosham. The temporary one way system proved to be a great success and working with our customer and the local community it was decided that the final road layout would stay as one way rather than re-instating the previous system.

Accompanying traffic calming measures and enhancement of the high street shopping area have brought new life and economic benefits to the area.