HILL & SMITH INFRASTRUCTURE

Case study

M18 J5-6 Central Reserve Renewal

The central reserve on the M18 was renewed to provide reliable protection for people using and maintaining this corridor. The project replaced the vehicle restraint system (VRS) through constrained sections and around existing gantry assets, with the delivery shaped to reduce disruption on the live carriageway, keep traffic moving and maintain assured performance in a high traffic environment.

Delivered as part of a wider Strategic Delivery framework (SDF) upgrade programme, the works required a permanent solution that could respond to the physical constraints of the site while supporting efficient installation and long-term maintainability.

Early collaboration between AGC (AmcoGiffen Carnell JV), National Highways and Hill & Smith Infrastructure helped refine the original concept and develop a solution suited to the realities of the route.

The scheme used low-carbon REBLOC RB80XA_3A H2 W2 VI2 system, engineered and tested to EN 1317 for permanent highway use, within a solution developed to meet the project's performance requirements while supporting a practical installation approach in a constrained central reserve.

The Challenge

The scheme centred on protecting historic steel gantries with centre piers located within the central reserve. These structures introduced significant design and installation constraints, requiring the team to work within the available width of the reserve while also dealing with a substantial existing concrete base that made conventional drilling and fixing difficult.





A standard approach based on large, embedded footings was not suitable in these conditions. The solution needed to work with the existing asset, remain practical to install and avoid unnecessary complexity. At the same time, the design had to account for future maintenance requirements, including continued access to chambers within the reserve.

Further challenges emerged through site visits and technical review. Height differences between carriageways and the presence of cross falls affected how the barrier could be installed through certain areas. Because the project formed part of a wider upgrade programme, the chosen solution also needed to integrate with adjacent works and

accommodate changes in programme without compromising delivery or increasing disruption for road users.

As well as flexibility and integration, carbon reduction was also an important consideration, with the team exploring whether a lower-carbon concrete option could be adopted and how its benefit should be assessed in comparison to both standard concrete solutions and more traditional steel solutions, not just in manufacturing and installation, but across the whole life of the asset.

The Solution

Early Contractor Involvement (ECI) was central to the final approach, helping the team develop a practical and efficient solution before installation began. Collaborative discussions between all parties allowed the original specification to be tested against actual site conditions and refined before installation. This helped identify the most practical way forward while ensuring that decisions around future access and carbon performance were considered from the outset.

To respond to the constrained width of the central reserve and the limitations posed by the existing concrete base, the team selected a surface-mounted system. This avoided the need for large, embedded footings, simplifying the approach and reducing the extent of intrusive construction works required on site.

The design was then adapted further in response to the geometry of the route. While the original concept included a concrete bifurcation, site visits and technical review led to the transition from concrete to steel barriers in areas affected by more significant cross falls and carriageway height differences. Freestanding steel removable units were also incorporated to allow future access, ensuring that maintenance requirements were addressed within the final design.

Discussions during ECI focused not only on the material itself, but on how carbon benefit should be assessed, including the distinction between comparison with standard concrete and comparison with steel systems that carry different whole-life maintenance implications. The low-carbon option was discussed with National Highways during ECI and received positive feedback, with Hill & Smith Infrastructure supporting the design process closely with the client team.

The carbon consideration went beyond material choice alone; AGC and National Highways considered both upfront and whole-life carbon performance. Using RB80XA_3A, it was estimated to provide a whole-life saving of approximately 6,501 kg CO2e compared to steel barriers as well as being around 33% less carbon intensive to produce than the standard concrete alternative.



The Outcome

The completed scheme delivered a permanent central reserve barrier solution tailored to the constraints of the M18. By adopting a surface-mounted approach and avoiding large, embedded footings, the team was able to develop a solution that worked within the available footprint and around the gantry structures that defined the scheme.

Detailed planning and ECI supported efficient installation, reducing disruption on-site and limiting impact on road users. Installation and offloading areas were identified in advance to avoid interference with other works, while traffic management requirements were limited to single-lane closures on each side rather than full closures. A hardstanding area was also established early to support welfare and movement, helping simplify logistics within the wider programme.

The scheme also benefited from a flexible delivery approach; the barrier installation formed part of a larger programme, therefore dates needed to remain adaptable, and the agreed solution allowed changes in sequencing to be accommodated without undermining the practicality of the design. The project also connected into wider steel barrier works delivered as part of the same broader upgrade project.

The scheme combined the permanence and tested performance of precast concrete VRS with a design approach tailored to the conditions on site. The RB80XA_3A helped align the project with National Highways' sustainability objectives while maintaining the required performance framework and supporting a practical, efficient installation methodology for the route.

Conclusion

The M18 central reserve renewal proves the value of early technical collaboration and site-led design development on constrained infrastructure projects. By refining the original specification to respond to site-specific challenges as well as National Highways' sustainability objectives, the project team developed a solution that was practical to install, appropriate to the site and aligned with long-term sustainability targets.

This project demonstrates how ECI discussions with the right partners can help bring carbon considerations into the design process early, while still keeping constructability, long-term performance and future maintenance at the centre of the final solution.

Find out more

For more information on Vehicle Restraint Systems (VRS) Solutions, contact **info@hillandsmithinfrastructure.com**

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