



This Note has been prepared by Renaissance in support of an application to install a tower crane at the Viadux development site in Manchester City Centre. The note should be read in conjunction with the wider application documents and the structural drawings as follows;

- VIA-REN-0-ZZ-DR-S-90040 : Tower Crane Opening Indicative Methodology
- VIA-REN-0-ZZ-DR-S-90041 : Tower Crane Opening Design Forces
- VIA-REN-0-XX-SP-S-00060 : Movement and Vibration Monitoring Performance Specification
- Temporary Works Engineers (NK Engineering) Detailed Design Information Package

In order to install the tower crane onto its base within the undercroft of the arches, a temporary opening is needed within the top of the existing Viaduct masonry arch structure. Both the construction sequencing of the formation of this opening and the design of the temporary opening trimming structure have been carefully considered in order to maintain the existing integrity and stability of the Viaduct structure.

Thrust forces are present within the arch barrels of both the segmental arch and the pointed arch spans. The trimming structure proposed for the opening are to be designed by the temporary works engineer to safely accommodate these thrust forces and ensure that the stresses within the arch brickwork remains acceptable. The worst case thrust forces have been determined by renaissance using several analysis methods including;

- Simplified thrust line analysis
- A series of 2D analysis models using Limitstate Ring masonry arch analysis and design software
- A series of 3D finite element models

In addition to the localised structural design of the new trimming structures noted above, global structural analysis checks have been carried out on the multi-span arches using Limitstate Ring software to ensure that the load carrying capacity of the arches is not compromised by the removal of fill and brickwork proposed in the temporary state.

The construction methodology of the works is a key consideration of the design proposals to ensure that structural integrity of the arches are not compromised at any time during the works. The proposed methodology is described on drawing VIA-REN-0-ZZ-DR-S-90040 including propping requirements, works sequencing and providing limits on excavation works to protect the integrity of the arches. Vibration and movement monitoring works are to be installed and monitored at all stages of the works to further safeguard the existing structures.

renaissance

Carvers Warehouse, 77 Dale Street, Manchester M1 2HG
0161 393 6509
info@renaissance-ltd.com

A company incorporated in England and Wales as Renaissance Associates Limited
with Company Registration No. 08149019 and registered address as above.
VAT Registration No. 163 9988 47