

Our Ref: 12444/CH/B

11th January 2025

Devizes Castle – Ladies Arch

The area of concern is the arch leading from the terrace to the garden. This is highly decorative with carved columns and arch and was originally inspected in April 2022 and has subsequently been propped.



The structure is leaning to west (into the garden) and by a simple plumbob survey this is measured at 365mm over a height of 4.45m . As the width of the main stonework is approximately 615mm then it is considered that it is theoretically becoming unstable as the centre of gravity of the arch is outside the base (acceptable limit $615/2 = 307.5\text{mm}$). Due to a potential slight inaccuracy in respect of taking measurements where the stone is quite decorative then a check dimension was taken to the lower stonework and this showed a lean of 100mm over 1.5m. This is of a similar magnitude and indicates the complete structure has rotated and not just the top section.

The degree of movement is clearly evident as the columns on the eastern face (nearest the house) are now detached.

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As the total load is now being taken on the eastern columns, this is causing a compression failure with the stone splitting and cracking.



The movement has allowed the arch to spread and there is a distinct opening of the centre of the arch as the springing positions have released slightly.



In the upper section the smaller decorative columns are also slightly loose.

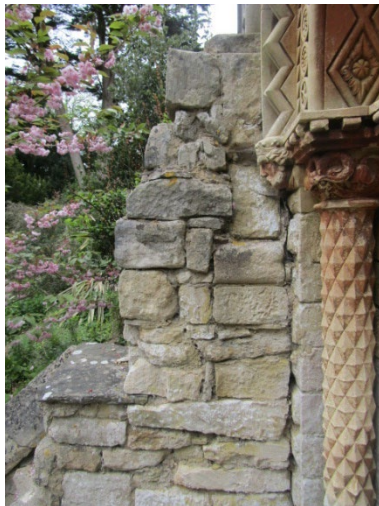
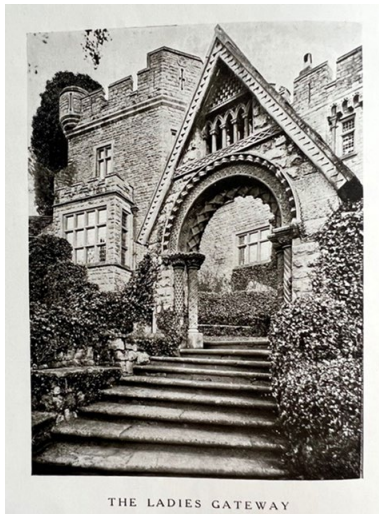


The western third of the arch is built off the steps, as exposed by the trial hole excavations and highlighted below and this is the reason why the arch has moved.



Column supported off riser of steps

Historically an attempt to support the structure has been made with the introduction of a crude form of buttressing with stonework built off the side walls of the steps but this covers the rustication of the original stonework. This can be appreciated by comparing a photograph in the 1914 sales particulars (supplied by Justin Ayton) and the current view with the buttresses.



The long term structural stability of the arch is of concern and has clearly been an issue for a period of time and hence the construction of the buttress and the potential options are set out below:

Option 1 – Do Nothing

The arch is currently propped by the buttresses and therefore this will aid the current stability. However, the amount the arch is leaning and the fact the trial holes have revealed that the western third of the arch is only supported off the steps gives concern to the long term integrity and stability. It is not considered prudent to leave the arch as found as the western third is inadequately supported and there is a high probability that this will continue to move.

Option 2 – Repair Existing

Consideration was given to repairing the existing structure insitu where the stonework could be repaired and potentially the arch underpinned. However, the current lean is such that this is not considered a practical option as even after repairs the structure would still be on the point of being unstable. There would also be concern with underpinning the arch as there is limited space to excavate the pits and ensure that the arch remains stable.

Option 3 – Jacking

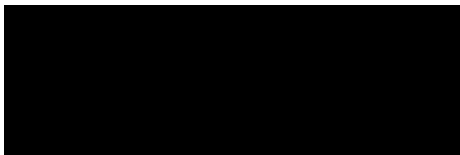
This option would be to jack the arch back to upright and then improve the foundations so the complete arch is off the same footing. The process of jacking a historic structure is not straightforward as a jacking platform below ground would have to be introduced which would likely be piled. This process has its own difficulties as the steps are in a poor condition and therefore locating the piling rig or in fact excavating a pit without disturbing or undermining the arch is high risk. If a platform can be installed the arch is quite decorative and the plinths have fractured requiring repairs, therefore it is unlikely that the jacking process would be successful without damaging the decorative elements of the arch. This operation is also considered high risk as the arch requires to be moved by 300mm.

Overall the risk element is considered to be exceptionally high in attempting to jack the arch back to upright insitu.

Option 4 – Take Down and Rebuild.

Although a very invasive option this is the lowest risk in protecting the historic feature. Conservation stone masons would take down the masonry and this would provide the best opportunity to keep all the decorative elements intact. Once taken down, new foundations would be cast and then the arch reconstructed with the failed plinth stone replaced. The main risk with this option is the potential damage to the decorative elements however by the selection of the correct conservators, then this is reduced.

Overall this option is considered the lowest risk of protecting the historic structure and also would allow the removal of the slightly crude later buttresses.



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