



## Eastham Bridge Replacement

### CASE STUDY

#### THE PROJECT

An innovative piled abutment solution for a replacement road bridge.

#### REMEDY'S RESPONSIBILITIES

Fast track design and securing Technical Approval for 1050mm & 900mm diameter bridge abutment piles.

#### GEOLOGY

Extremely weak to weak mudstone of the Raglan Formation.

#### INNOVATION

Innovative design of 'spring' piles designed to accommodate bridge deck movements.

## Bridge Abutment Spring Piles

When the 18th century Eastham Bridge crossing the River Teme in Worcestershire collapsed without warning it was a race against time to build a new bridge to restore access to cut-off communities. Remedy Geotechnics was taken on to produce a technically challenging and innovative 'spring pile' abutment pile design and secure its Technical Approval. To achieve a high degree of durability and low maintenance costs the highway authority required an integral bridge design. To accommodate in-service thermal and creep movement of the 30m long, 4.4m wide steel bridge deck, the south abutment was supported on four 1050mm diameter 'spring piles' designed to flex under variable bridge loads. The north abutment was considered 'fixed' and was supported on eight 18m long 900mm diameter bored piles. Remedy Geotechnics developed the innovative design of the 'spring piles' cre-

ating a 7.5m flexural length within an open annulus between a 1200mm diameter outer steel casing and inner 1050mm diameter cased pile shaft. The applied lateral and vertical loads were then dissipated by a 9m long socket extending into the underlying Raglan Mudstone below the flexural section of the piles. Because of the open annulus, the 'spring piles' can flex in response to the variable bridge loading. To validate the pile design a 3,600kN sacrificial pile test was undertaken on a 21m long pile which had the top section of pile de-bonded from the ground to reflect the situation in the permanent 'spring piles'. The piles were successfully installed in early 2017 after only a 3 month design, testing and Technical Approval period driven by Remedy Geotechnics.

#### CONTACT US

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