Nick Wood
Nick.wood@bakerhicks.com

BakerHicks.

Tyn-y-bryn Active Travel Bridge

NCE Bridges – Active Travel Bridge Award 2024

BAKERHICKS.

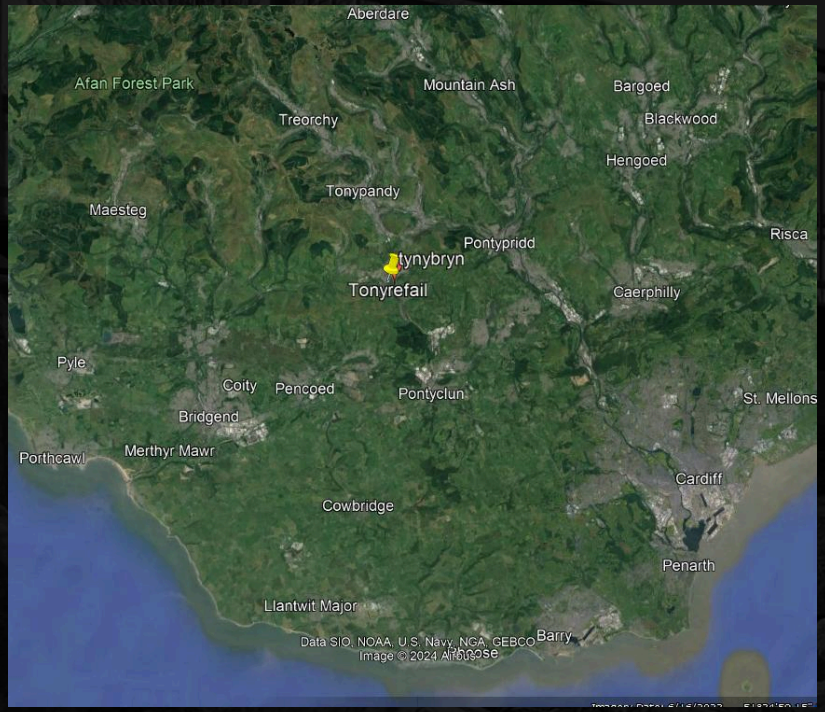
DELIVERING CONNECTED COMMUNITIES THROUGH EFFECTIVE HIGHWAY DESIGN AND ENGINEERING.

RHONDDA CYNON TAF

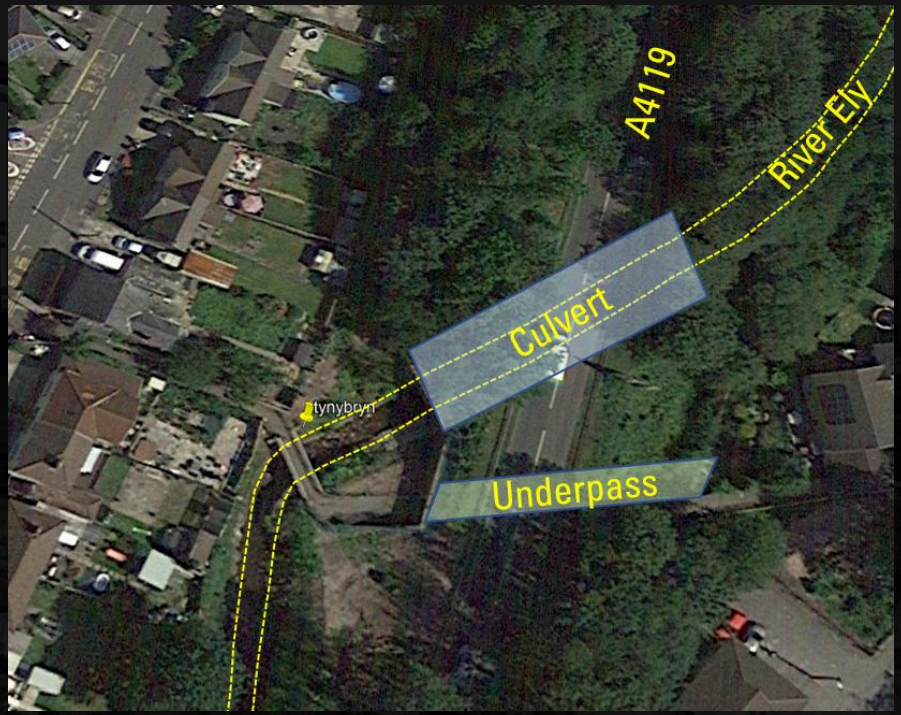
Balfour Beatty

Project Location

BakerHicks.



Site location 13 miles North West of Cardiff along the River Ely



Bridge is a key link between the communities – River very close to residential properties

We took it from this !

Evidence of bank erosion near properties/under-scour at Gabions

Narrow bridge crossing, lack of width

Undefined stream entry creating local erosion

To this !

New Active Travel Bridge (11.5m span by 3.5m wide) designed with innovation in mind

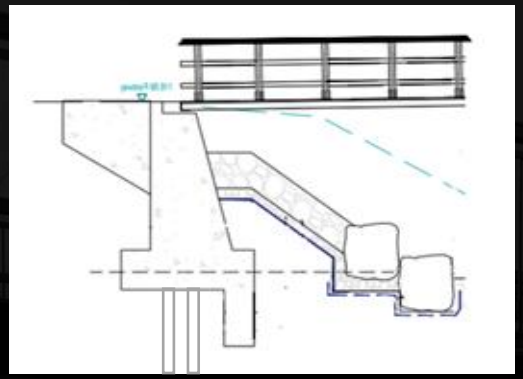
Sustainable blockstone bank stepped back to create habitat potential, designed to stabilise A4119 and extreme storm events

Tumbling mountain stream cascade to create interest, control velocities

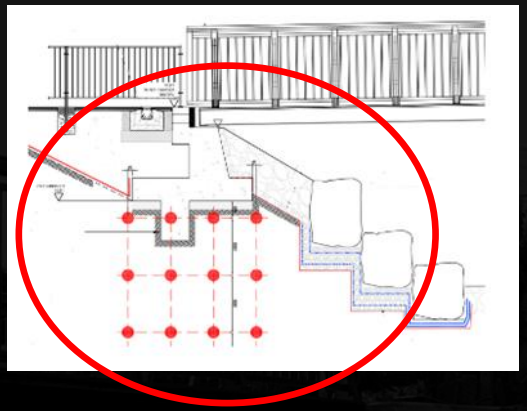
Innovation in mind– The Bridge & Foundations

- We reduced the foundation size and bridge weight
- Used geopolymer ground injection to improve the bearing.
- Introduced a prefab Fibre Reinforced Polymer bridge in lieu of steel.
- Benefits - very durable, low maintenance, good longevity, light weight.
- Used as a preconstruction activity rather than a post remedial solution.

Initial Design



Final Design



Before

After

In a nutshell

BakerHicks.

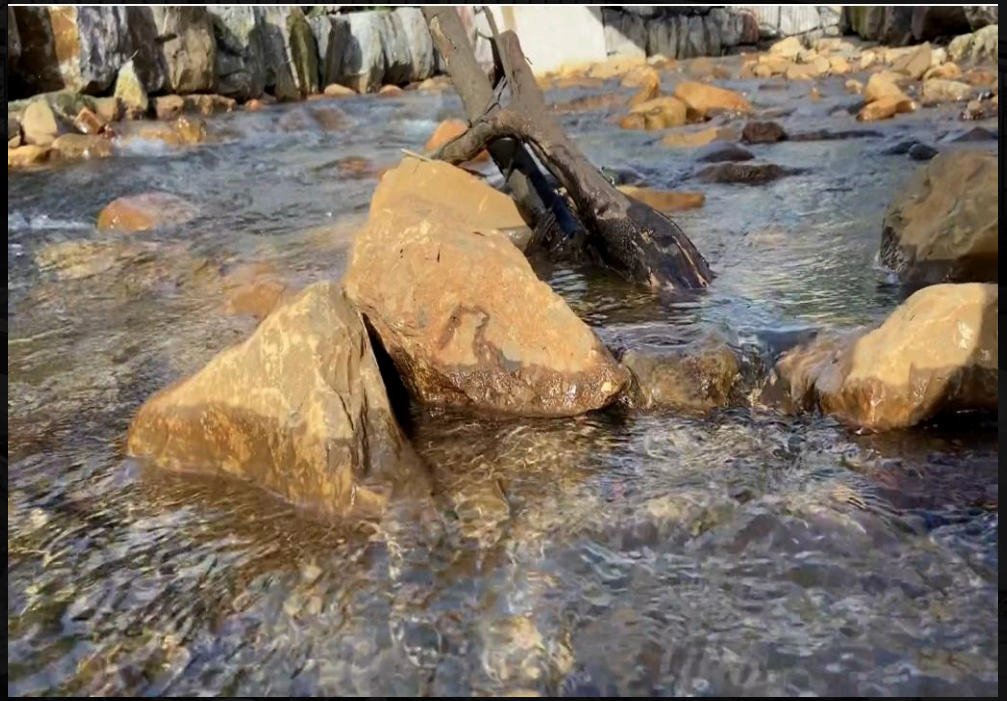
Inputs

- Delivered the Design and provided ongoing technical support during construction
- We procured the key surveys (GI, CCTV, extra topo, GPR, Tree & Ecology Surveys, and dilapidation surveys)
- Introduced ecological and environmental enhancements: fish baffles, hibernacula, tree planting (600 new trees)
- Led on obtaining the permits and approvals (FRAPs, OWCs, impoundment licence)
- Developed the Construction Environmental Management Plan – Japanese knotweed

Successes

- We saved £110k in construction cost by changing the design
- We saved 15% in embodied carbon – demonstrated using our inhouse assessment tool
- Up to 8 weeks saving in programme
- Reconnected the community while providing a place to stop and stare and appreciate nature

Fab Video



Thankyou for listening

Civils/Project Manager – Nick Wood
nick.wood@bakerhicks.com
07971 391776

SPENCER Bridge Engineering

UNION CHAIN BRIDGE

THE REPAIR AND REFURBISHMENT OF THE UNION CHAIN BRIDGE

TEMPORARY WORKS AND ACCESS SYSTEM

Scope of Work

Project Scope:

- Repair and refurbishment of UCB
- Fully dismantle the bridge leaving only the masonry towers
- Remove the timber deck & handrails
- Remove the hanger rods & suspension chains
- Replace the anchorages
- Masonry tower refurbishment
- Refurnish the chain components
- Rebuild the bridge maintaining its original form

The Challenge

Key Constraints:

- Restrictions on working within the river due to salmon spawning
- Limitations on works from the river due to climatic and environmental conditions
- Requirement to minimising stresses on existing bridge components during dismantling
- Restrictive access to all bridge locations
- Load restrictions on the bridge deck

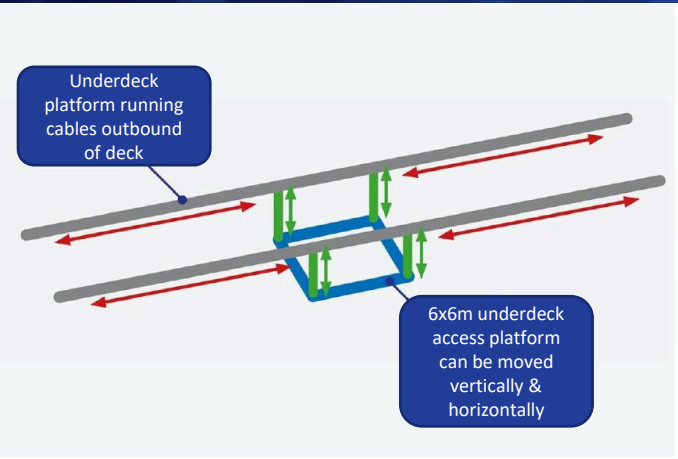
Laser scan bridge surveys allowed a 3D model of the bridge to be produced. This assisted with our development of our temporary works designs and construction sequencing.

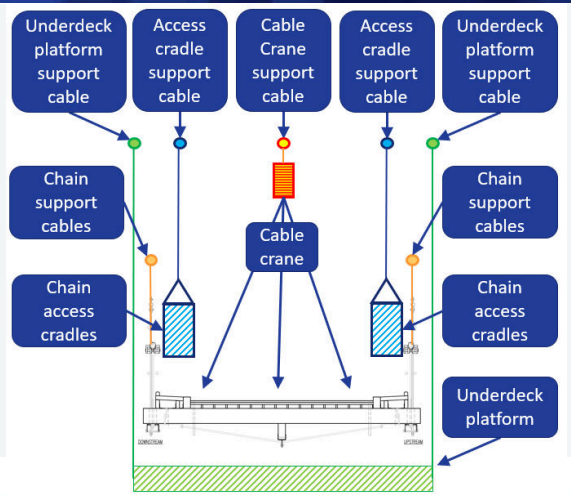
The Solution

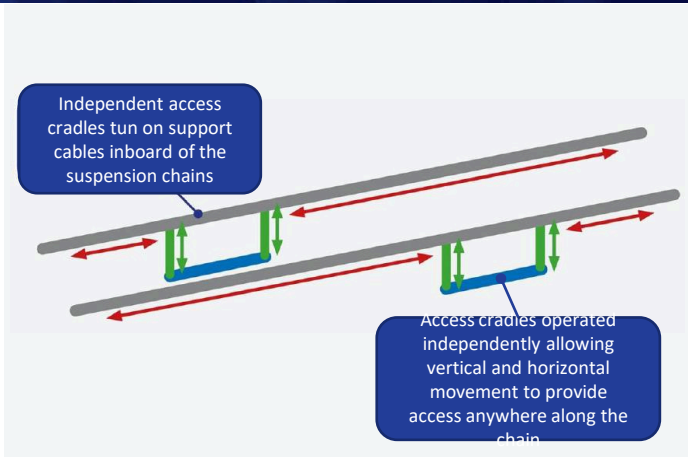
Overhead Cable Crane & Access System:

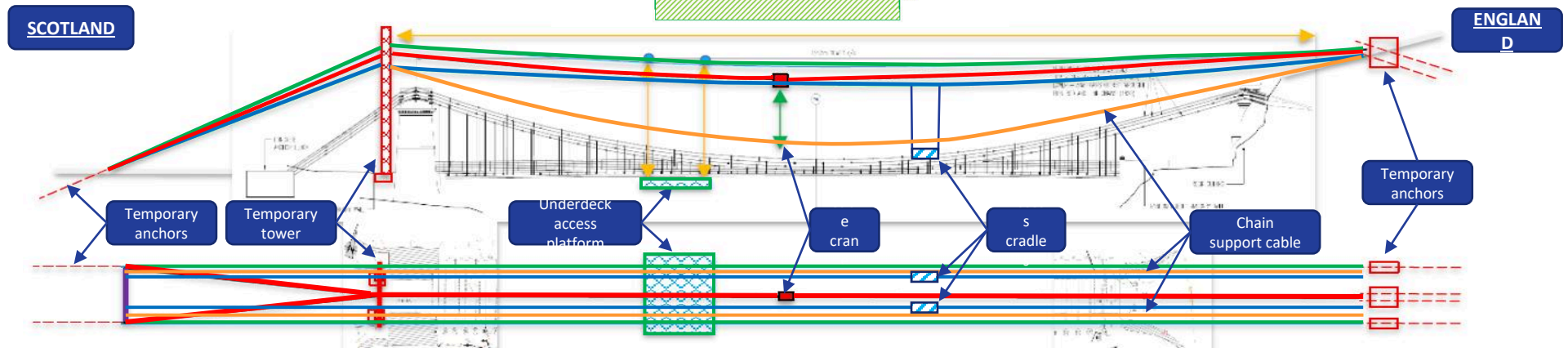
- Cable crane that runs the length of the bridge (2.2t capacity)
- Access and containment with the underdeck access platform
- High level access along the full length of the chains with the two access cradles
- Catenary suspension cables to allow load transfer of the main suspension chains

Overhead Cable Crane & Access System





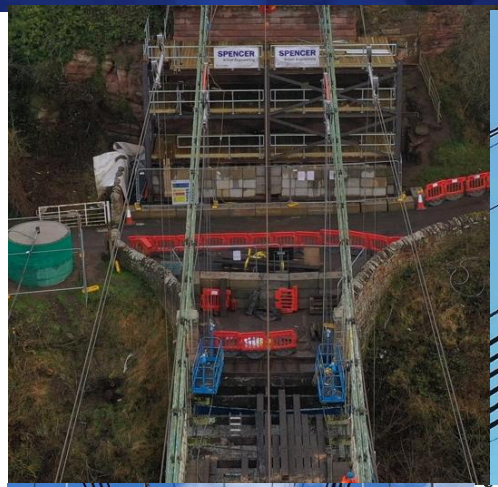




Access

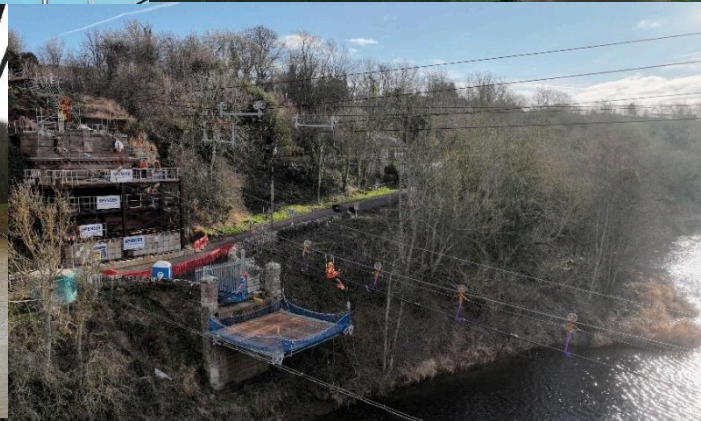
Chain Access Cradles:

- Independent access cradles capable of accessing the chain / hanger connection nodes



Underdeck Platforms:

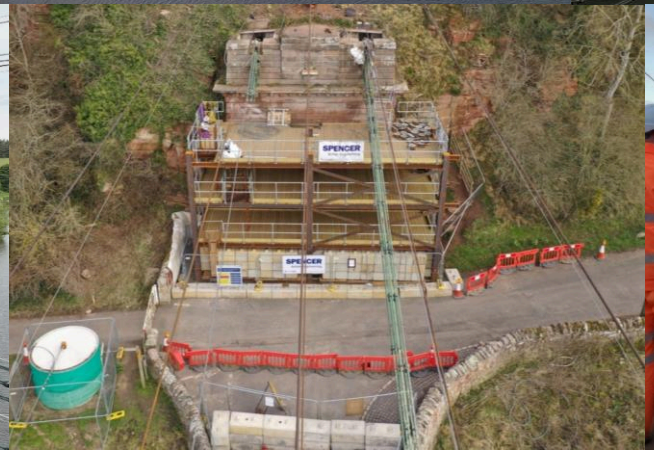
- Safe Access
- Dropped object protection



Permanent Works Dismantle & Erection

Chain Removal & Install:

- Catenary trolly system supporting every chain link during dismantling & erection
- Ability to tension / detention the suspension chain

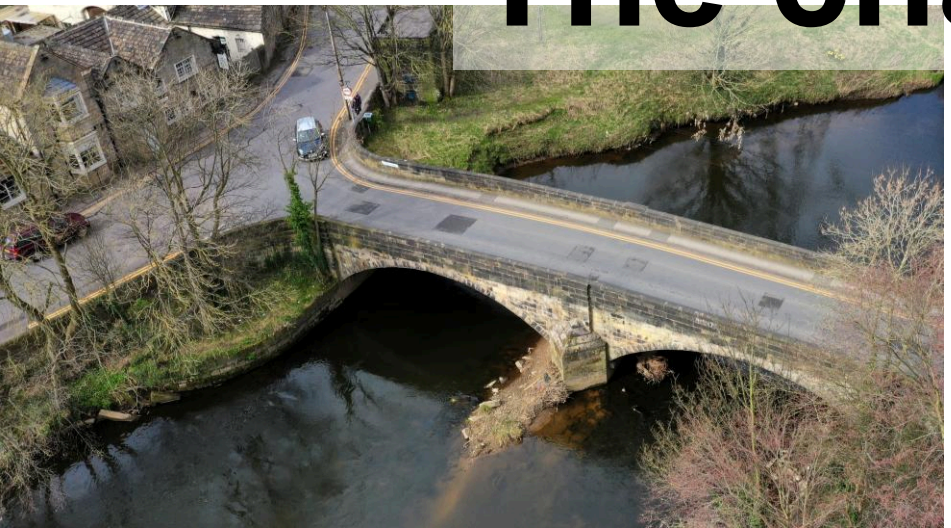


MOTT MACDONALD

APPERLEY LANE BRIDGE STRENGTHENING

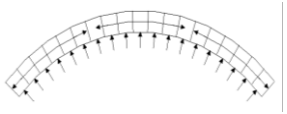
ROBERT LEATHER – SENIOR PRINCIPAL ENGINEER
MOTT MACDONALD

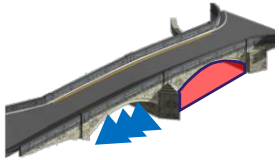
The challenge

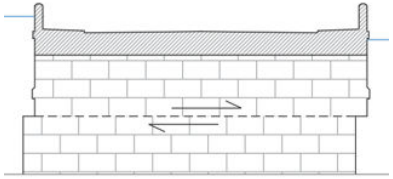


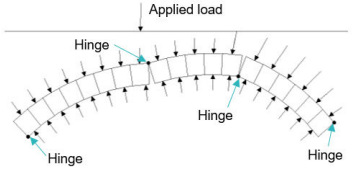
Assessing the existing structure to target interventions

1 Situations and actions



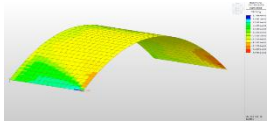






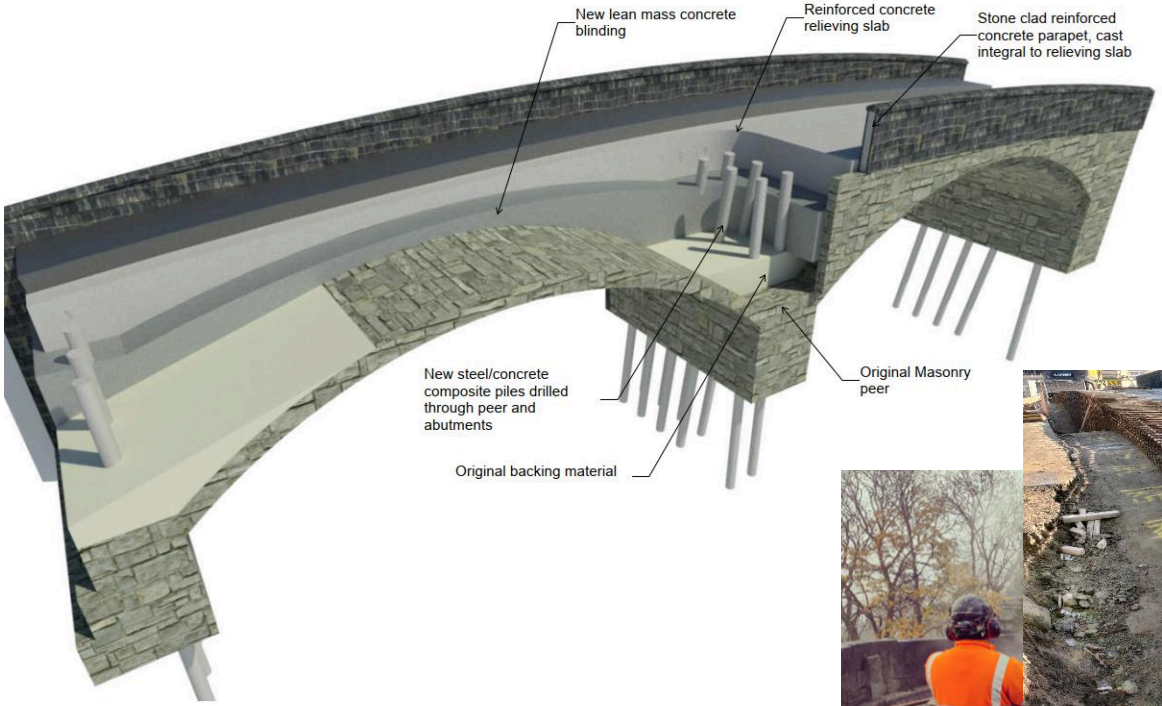
2 Failure modes

3 Analysis



4 Risk profile

Innovative strengthening solutions



Apperley Lane Bridge was one of the most complex elements of the Leeds flood alleviation scheme, requiring design collaboration from bridge engineers, heritage specialists, hydraulic modellers, scour specialists, and various other environmental and engineering specialists from BAM Mott MacDonald JV, AECOM, LCC and CBMDC. The final solution is a heritage structure, robust against future flood events which the whole project team can be proud of

Mark Garford
Principal Engineer, Leeds City Council

Engineers from CBMDC, LCC, AECOM and BAM Mott MacDonald JV worked together to develop an efficient solution which will keep the bridge open to traffic in extreme flood events. The design team drew on their collective experience from previous masonry arch assessment and strengthening projects. Building on this previous experience, the designers were able to enhance structural efficiency and minimise impact on the historic fabric.

Aaron Okorie
Highways Structures Manager – City of Bradford Metropolitan District Council.

Balvac
Balfour Beatty

Bridge Maintenance Contractor of the Year

2024

Richard Bailey - Director

Balvac
Balfour Beatty

As a trusted expert, we provide solutions to sustainably manage and care for existing assets, extending the life of our nation's infrastructure

- Survey, Inspection, Testing & Structural Health Monitoring
- Structural Repair, Strengthening & Protection solutions

Balvac
Balfour Beatty

Bridge Maintenance Contractor of the Year 2024

- 37 Bridge Projects undertaken
- Diversity of asset repair and protection projects
- Continuous development of our people
  - Recognised experts
  - Recruitment & succession
  - Development & professional qualification programme
- Early Contractor Involvement
  - Understanding asset condition
  - Developing solutions
  - Design Management & Technical Approval process

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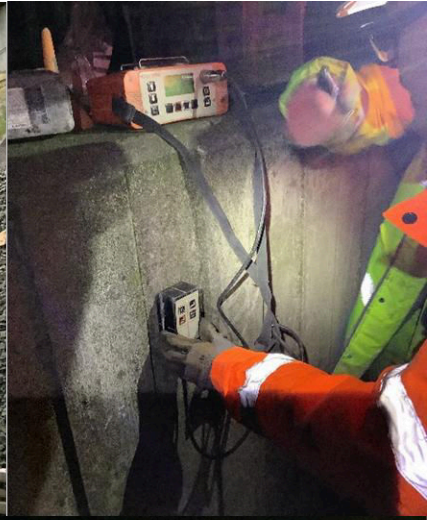

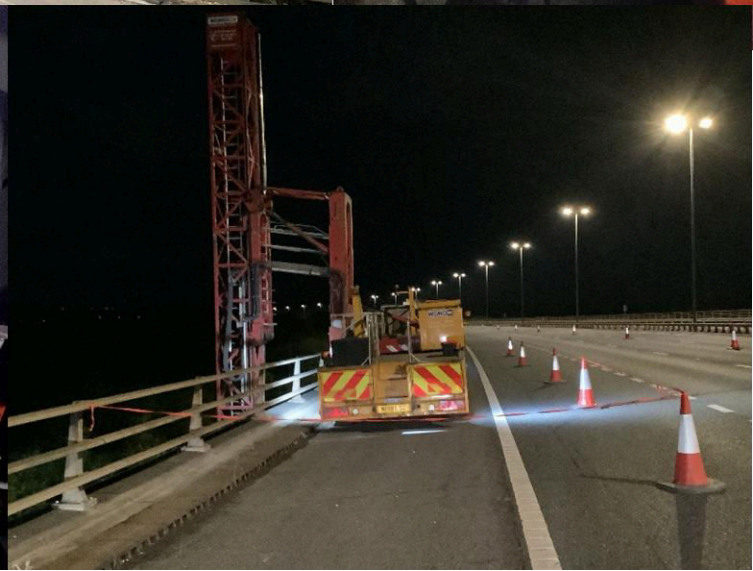

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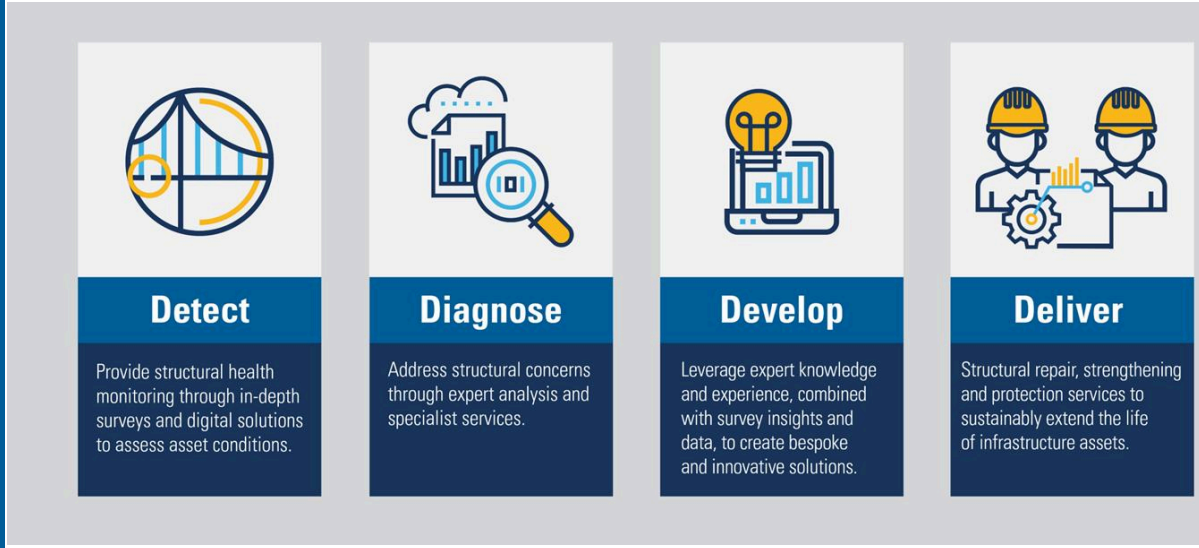

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Summary

- Asset care & maintenance of existing bridges & civil assets
- End to end professional service
- Collaboration with all stakeholders throughout the stages of a project
  - Efficiency
  - Innovation
  - Technical Assurance & Standards Compliance
- In house expertise and development of a growing engineering community
- Zero Reportable Injuries since 2018
- Zero Lost Time Injuries since 2021

ZERO HARM
MAKE SAFETY PERSONAL