Canal & River Trust
Making life better by water

Pontcysyllte Aqueduct
Bridge Owners Forum

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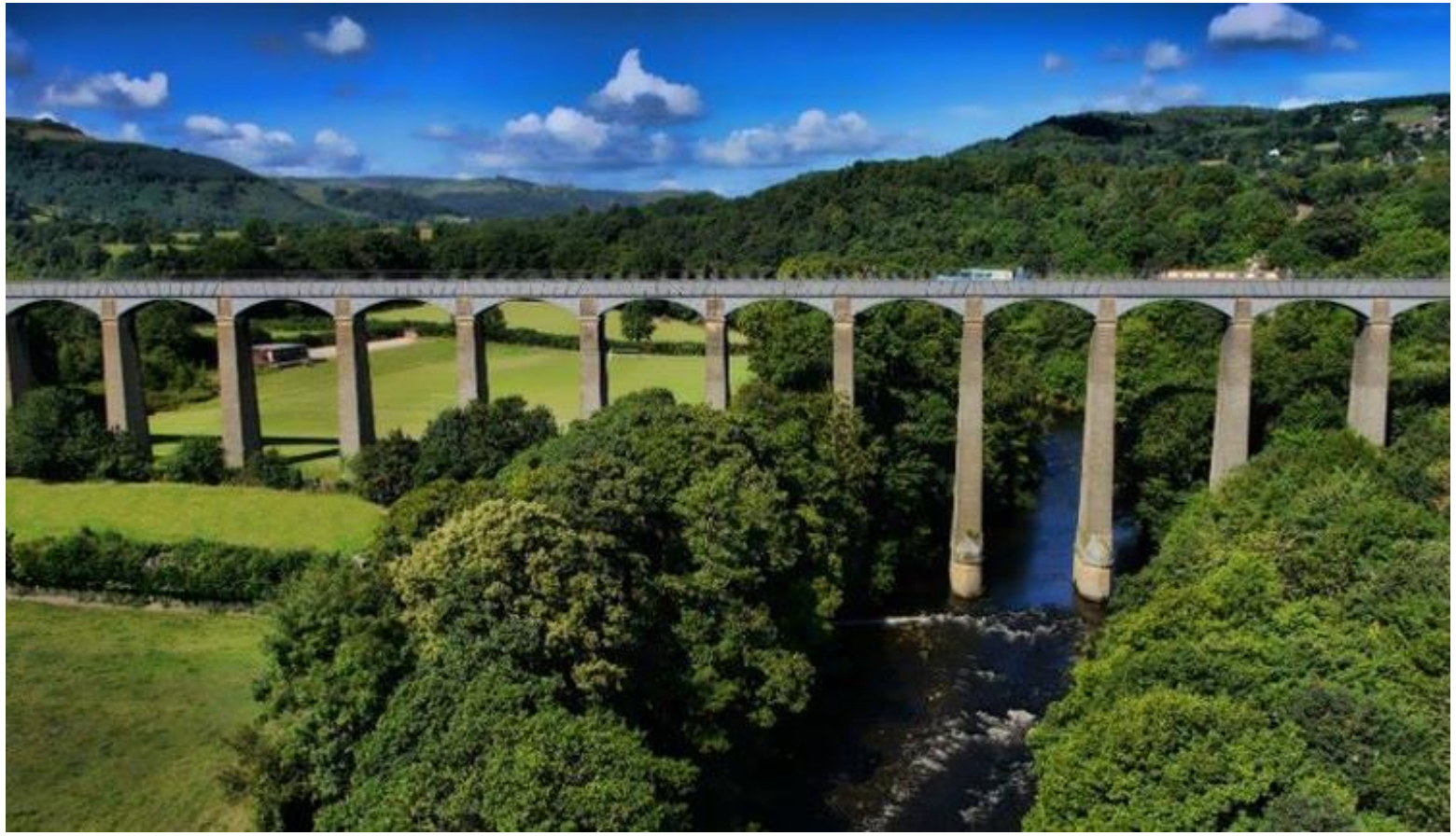
Pontcysyllte (Pont-Cuss-Ull-Tee) Aqueduct



The aqueduct is a Grade 1 listed structure and forms part of the 11 mile long, UNESCO World Heritage site.

Designed by Thomas Telford.

The aqueduct carries the Llangollen Canal, 38m above the River Dee between Trevor and Froncysyllte to the north and south respectively.

19No. spans (4No. cast iron, arched ribs per span) support the 307m long x 3.7m wide cast iron trough between slender masonry piers.

Cast iron panels sealed using Welsh flannel and white lead.

The upper sections of the piers are hollow to reduce the dead load.

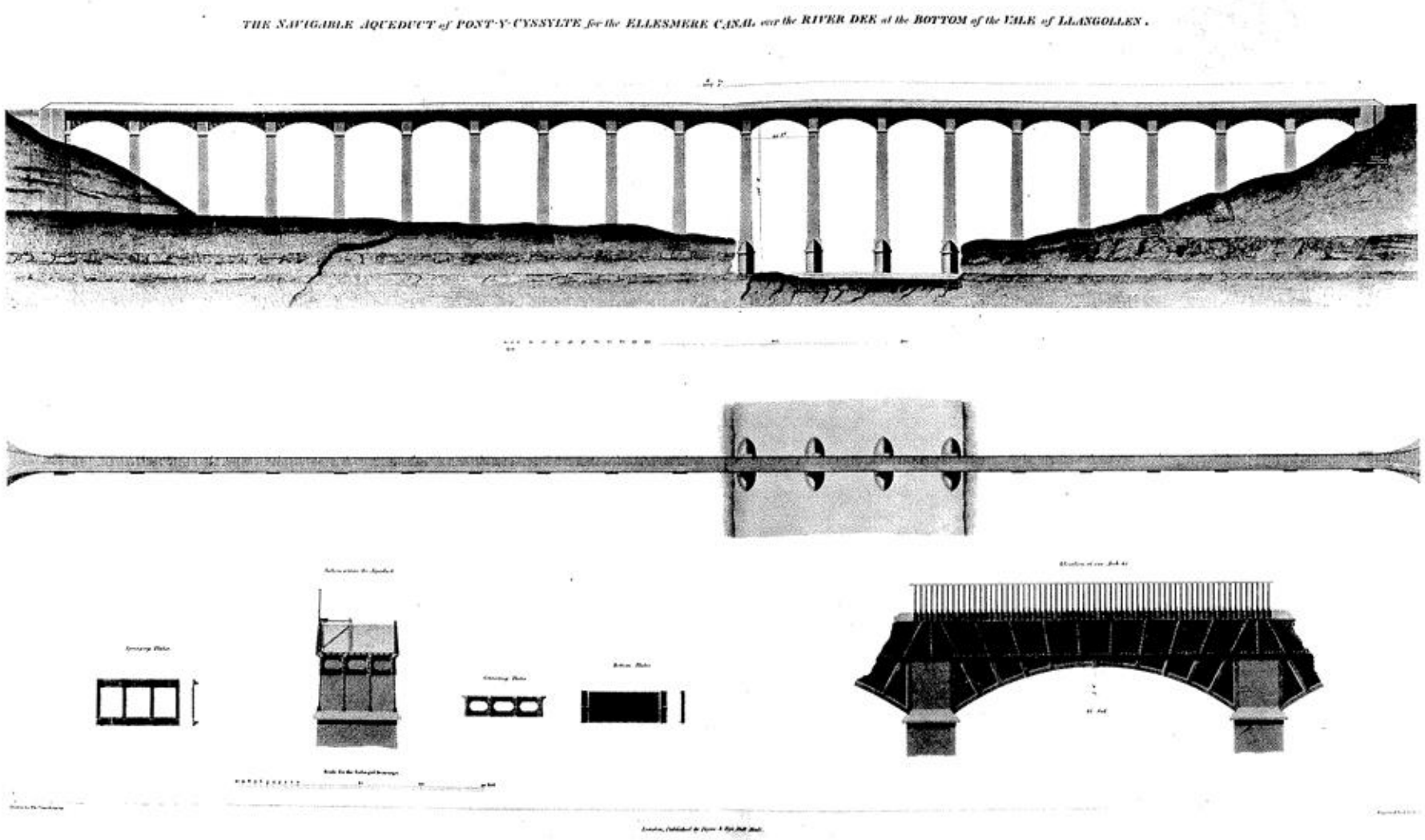
Brief History / Timeline

Timing	Event
1793	Act of Parliament for the construction of (Llangollen) canal was passed.
1805	Aqueduct completed. 10 year construction period.
1818	Letter written Thomas Telford regarding the construction and condition of the aqueduct.
1866	Report to London North Western Railway refers to movement of the aqueduct abutment and breaks in “the iron ribs” in several places due to ongoing leakage issues. Report suggests fish plate repairs to ribs and monitoring of movement to pier 18. Oxidation of the ironwork also noted and painted recommended.
1914 & 1918	Landslips to the north west of the aqueduct.
1950 - 1965	Extensive remedial works to the towpath including replacement of some original cast buckle plates. New steel angle bolted to top of eastern trough wall.
1965	External elevation of trough wall plates and outer ribs painted using “ Wailes Dove Bitumastic Super Service Black Solution”.

Brief History / Timeline

Timing	Event
1975	Replacement of the southern arched girders to span 19, adjacent to south abutment.
1976	Fish plates and tie-bars installed at springing at north abutment to contain cracks to vertical members.
1988 - 1989	Relining works undertaken by British Waterways at each end of the aqueduct.
1989	Engineering Assessment carried out by Ove Arup & Partners.
2000	Masonry repair trials to corbelled stonework on the bay between piers 9 and 10
2003	Refurbishment works based on recommendations from dewatered inspection in late 1990's.
2009	Dewatered Inspection.
2020	Principal Inspection.
2023 - 2024	Parapet maintenance works.
2024	Trough dewatered. Full tactile survey of the trough invert connections and towpath elements to identify extent of any works required.

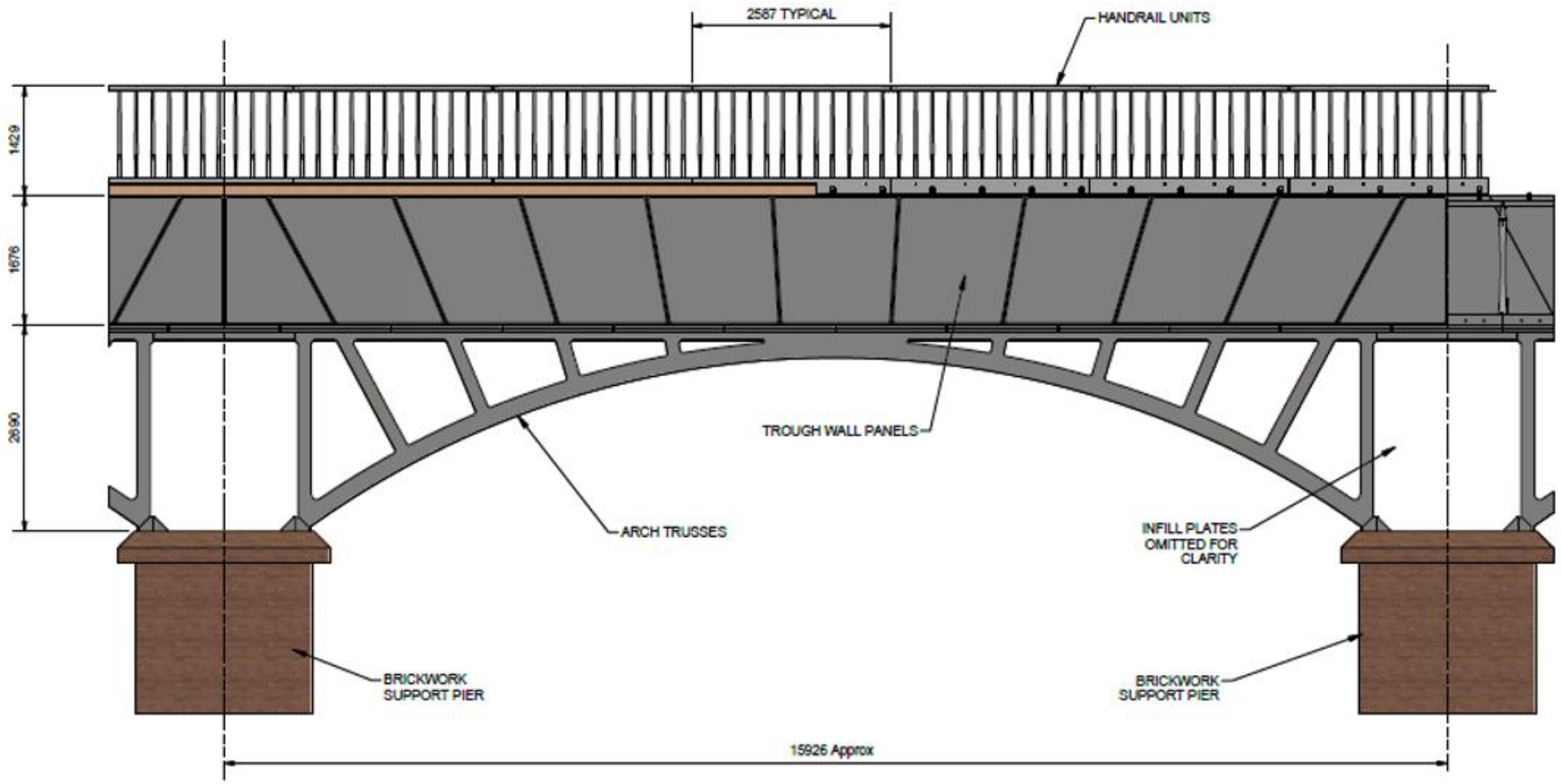
Historic Drawing



Masonry piers and abutments

Masonry cutwaters

Typical span arrangement



Typical span arrangement

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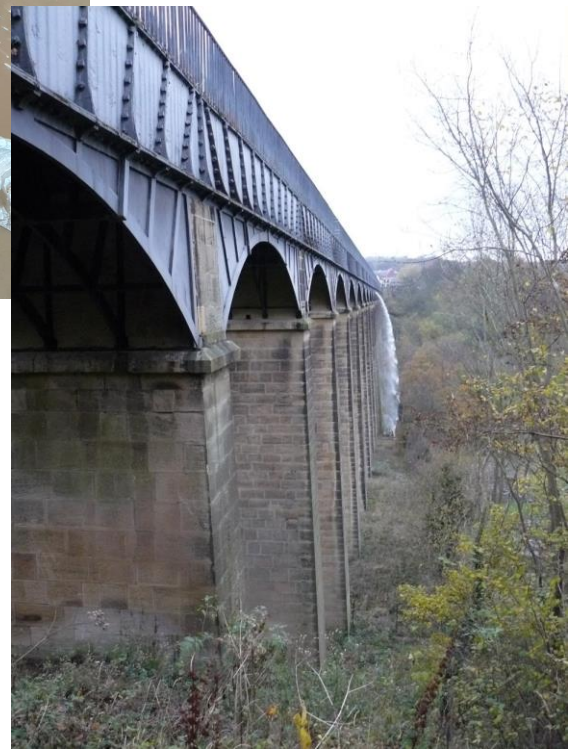
Cast iron arched ribs

Dewatering the trough

Normal dewatering process:

- Installation of timber stop planks in grooves to concrete approach walls at either end of the aqueduct.
- Pull the cast iron plug located in the trough over the river from towpath level.
- The water cascades down to the River Dee below.
- Pumping is required to maintain the navigation and water supply to 70,000 homes and businesses.
- Excess water from the upstream discharges into the river via an overflow weir and outfall channel.



2003-4 Refurbishment – Ironwork

- There are approximately 4180 wrought iron nut and bolt connections to the trough invert plates alone.
- 750No. nut and bolt connections were found to be in poor condition and were replaced.
- The following replacement works were also undertaken:
  - 1000No. nuts;
  - 36No. bolts to rib fascia panels;
  - 11No. 40mm dia. horizontal tie-bars in 12 locations to arch rib springing plates;
  - 5No. cast iron towpath supports &
  - 22No. cast iron towpath cross members.

2003-4 Refurbishment – Other Works

- Other works included:
  - New towpath buckle plates;
  - Towpath resurfacing;
  - Timber fender replacement;
  - Masonry corbel repairs to piers &
  - Painting of exterior elevations
- The remaining original trough invert bolts require close inspection at next available opportunity.

2024 Inspection Programme

The dewatered inspection of the trough required a planned stoppage of the navigation, water management and other temporary works.

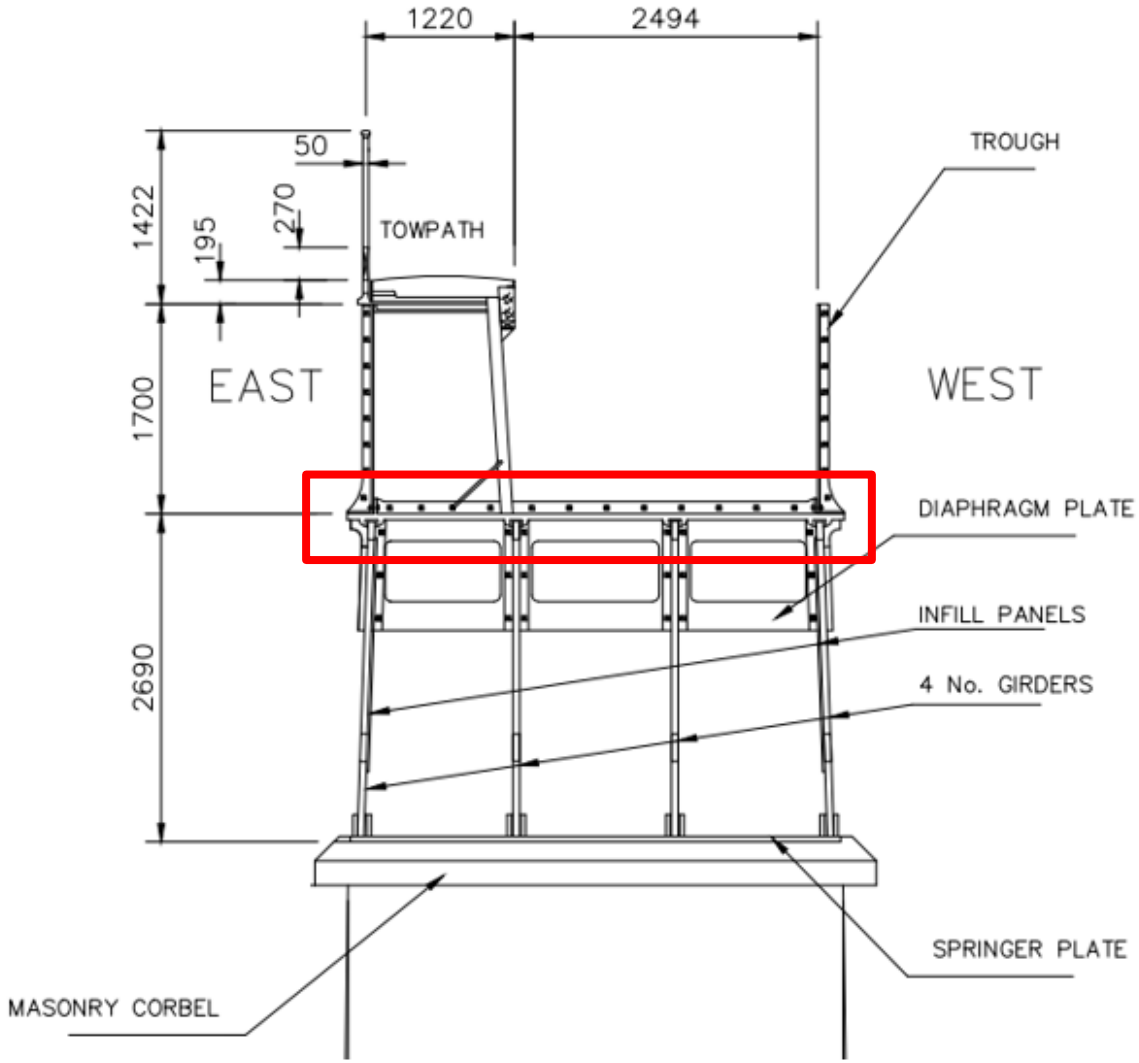
Planned Dates:	Activities:
Feb 12th	United Utilities commence pumping from the River Dee to maintain water supply to 70,000 homes and businesses in Cheshire and water levels in the Llangollen Canal.
Feb 13 - 14th	Installation of timber stop planks and fish rescue.
Feb 15th	Inspection of the weir outfall channel.
Feb 13 – 14th	Dewater the aqueduct trough.
Feb 19th – Mar 1st	Inspection Works (min. 6No. inspectors/day)

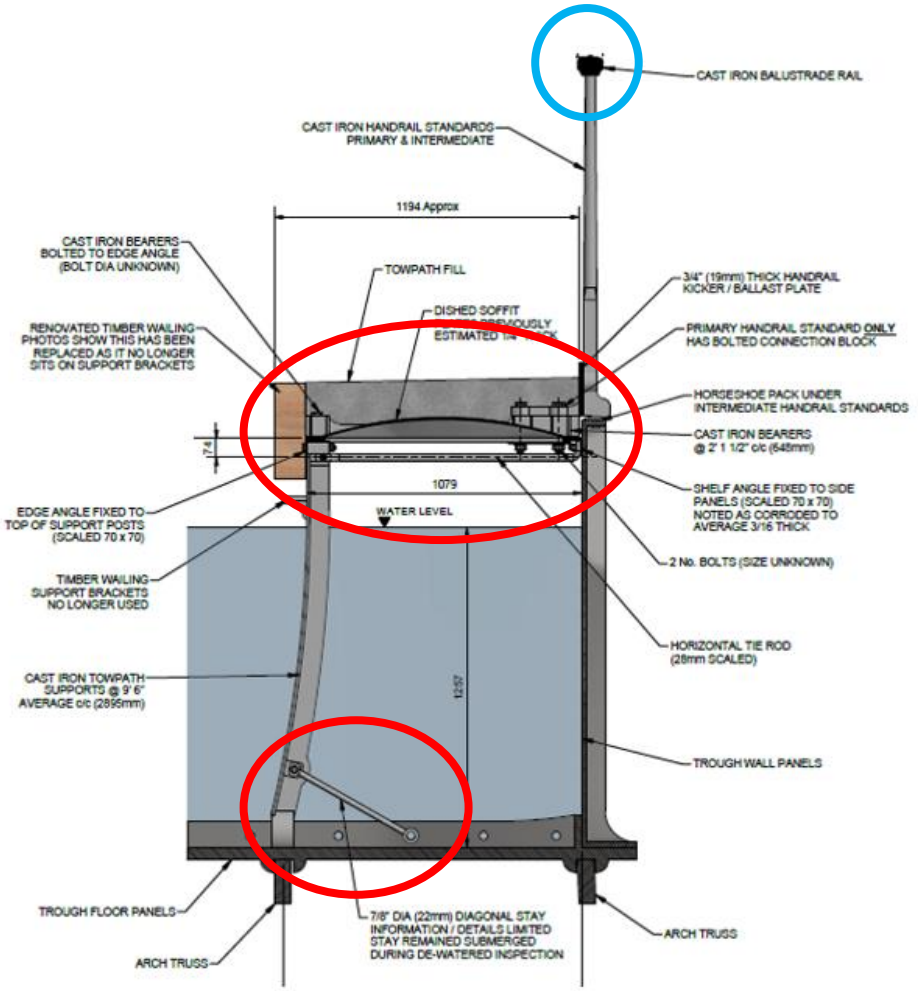
General photographs

General photographs (cont'd)

General photographs (cont'd)

2024 Inspection Focus





Towpath soffit & parapet fixings

Trough clearance & bolt inspection

Parapet repair works

- Specialist blacksmiths were undertaking routine maintenance repairs to the parapets during the 2024 inspection.

Proposed Works Summary

Summary of the proposed works identified during the dewatered inspection of the trough:

- 20No. diagonal stays replacement (temporary works solution installed)
- 1No. horizontal tie-bar replacement
- 5No. Nuts and bolts replacement to trough floor panels*

Potential timescale for the works is B26/B27, however this is subject to implementation of an improved temporary works pumping regime and the appropriate heritage consents being in place.

* Adjacent bolted connections remain in good condition.