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HC1245 Sluice Gate Report

Poole Park

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Description

The sluice channel was created in 1885, when the railway line was built and is one of the most important historic features in Poole Park. It created the large saline lake in the park and controls the level of the water.

The brick channel was built with two decorative brick piers with terracotta capstones on the park lake side of the channel. The railway line runs adjacent on the other side of the channel.

A later addition to the sluice gate was a concrete deck as a replacement bridge which has now been condemned and a temporary structure has now been put in place above.

Condition

The piers were surveyed by Brian Hall and Jessica Crow on 15th March 2018. Access was limited and the piers viewed from the footpath barriers, due to the body of water. Weather was dry and bright.

It was not possible to record dimensions at this time due to limited access.

Organic growth and weather has impacted on the mortar resulting in large areas of loss to joints, there are also a number of cracks and missing bricks. The steel/iron I beam running into the bases of the piers, these beams have been cut back flush with piers and are now heavily corroded and likely to be putting pressure onto the internal brickwork. They are likely to be part of the original sluice gate mechanism.

The terracotta caps have numerous chips and marks from impact and/or frost. There are also areas of old repairs which show poor brick replacement/repair and mortar repairs applied over the brickwork.

The surfaces of both the brickwork and terracotta are soiled with dirt, old repairs residues and organic growth.

It has been confirmed to us that the brickwork of the brick channel below the water level is in a relatively good condition however the piers show signs of extensive structural degradation due to mortar loss and there seems to be on both piers a fracture between the base of the plinth and the main base sections of the brick channel making them likely to be unstable.

Conservation Methodology

To carry out the works it will require a scaffold access/platform constructed around the base of the piers above the water line. The works will need to be carried out while the water line is held at a low level. The scaffold and working platform will be required to remain on site for the duration of the removal, restoration and re-installation of both the Eastern and Western piers.

A full condition and photographic survey of all surfaces carried out prior to any works and mortar samples removed for analysis.

The large cracks in both piers should be investigated and made good by lifting the pier and re-bedding. The upper section of the piers should be lifted out at the point of fracture and packed using plastazote foam and plywood box for transporting back to the workshop.

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This lifting should be carried out with soft slings and a Hi-Ab which can be positioned on the pathway above. Both the Eastern and Western pier would be removed and returned/replaced to original location as fully built structures. Cleaning and repairs of the upper sections of the piers will be carried out at the workshop.

Decorative Piers

The thermatech steam cleaning system will be used to clean the stone gate piers. A discreet area will be used for a trial clean to determine appropriate pressure and temperature. Any plant growth or vegetation will be removed and after cleaning a biocide/systematic weed killer will be used to prevent any re-growth.

Areas requiring repointing will be located and marked on a drawing. The failed pointing will be removed manually using specialist hand tools; the size of the tools will vary depending on the area of loose mortar.

The piers will be repaired with an NHL 3.5 to match consistency and appearance of original, mortar analysis will be carried out from samples removed to determine the exact original mortar mix. The new mortar will be applied manually using hand tools; small point spatulas, pointing keys and trowels, to match the existing/original technique and finish.

Both the Eastern and the Western piers require repairs to the terracotta capstone, these should be carried out using the approved Lime mortar and a terracotta compound mix that is to be manually applied using hand tools to build up the missing sections/detail to match the original. Any cracks will be consolidated and filled using specified mortar and will be finished to match the original area.

If the terracotta sections of capstone are badly damaged or missing they will require replacing. If a matching stone cannot be acquired, sections of carved out Bath stone can be used as a suitable replacement as it is similar in colour and appearance. Other options to be considered for replacing missing or badly damaged capstone is to first make a mould of the capstone, then fill with a terracotta clay which is then fired in a kiln to finish, alternatively if the terracotta cannot be sourced use a lime, aggregate and concrete mix instead.

Removal of any defective or damaged bricks, capstones or sill sections, will be carried out by hand, removing the mortar manually using specialist hand tools. Labelling, separating and deconstructing sections of the pier will allow the damaged sections to be removed and the new stone to be installed in place using the approved lime mortar. The piers should be braced and supported as required during this process.

See images below for repair reference.

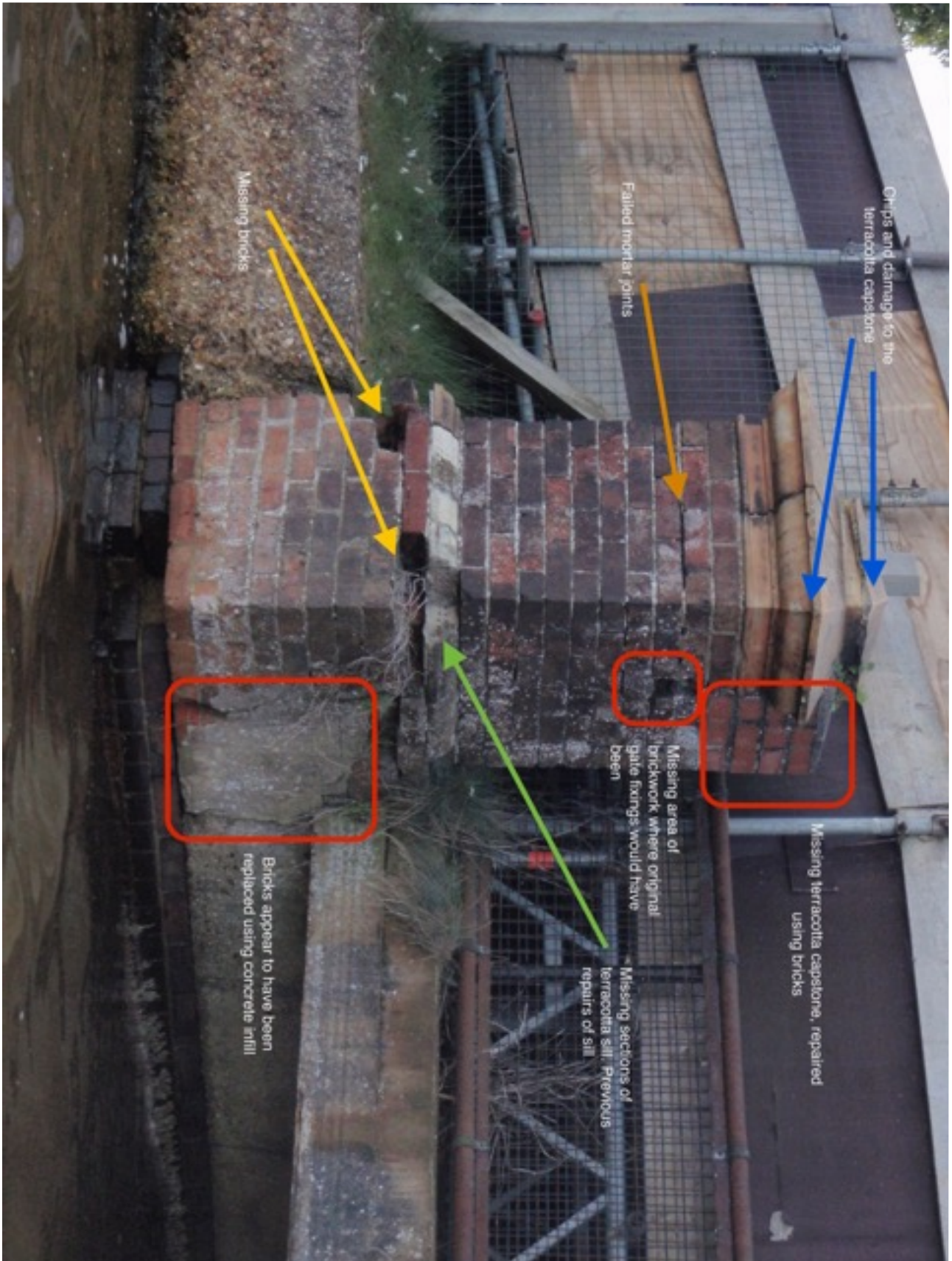


Image 1 - Eastern Pier

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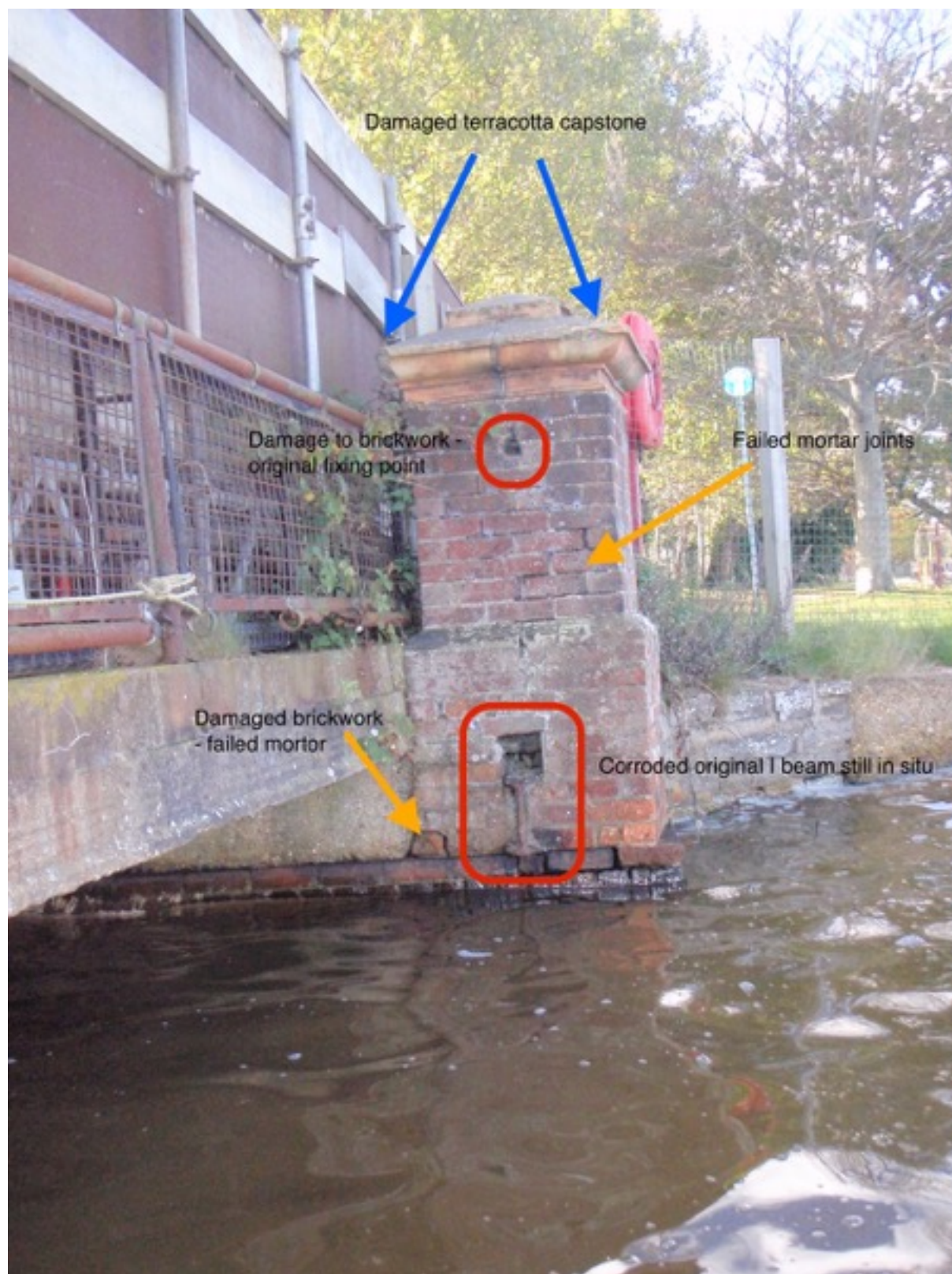


Image 2 - Western Pier



Image 3 - Pier Sections

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Lower Sections of Sluice Channel Piers

The lower part of the piers within the brick channel will be left in situ, cleaning and repairs to be carried out on site.

A thermatech steam cleaning system will be used to clean the lower brick sections of the both piers, discreet area will be used for a trial clean to determine appropriate pressure and temperature prior to this, this process should remove any dirt and natural growth. A manual clean with soft bristle brushes should also be carried out. Biocide or detergent should not be used in the cleaning process due to the environment and location.

All old repairs and failed mortar should be removed and raked out. It is recommended that the mortar be replaced with an NHL 5 mortar, this is a much harder setting mixture which would be more suited to the marine environment and exposure to water. The new mortar will be applied manually using hand tools; small point spatulas, pointing keys and trowels, to match the existing/ original technique and finish. The new pointing will need to be protected from the elements until it has sufficiently hardened, this will be achieved by wrapping the area in hessian and plastic sheeting. The hessian will be dampened down as appropriate.

The iron/steel I beams are to be removed to prevent further corrosion, causing possibly further structural problems to the brick piers. The upper section of the brick pier will be lifted at the point where the I beam is embedded. The surrounding bricks and mortar are to be carefully removed, allowing the I beam to be lifted out.

Lifting, Packing and Transportation

Prior to lifting the piers should be protected with a plastazote foam along the corners and arisses, they will then be secured with a tight fighting plywood crate. Soft slings will be attached and the piers will be lifted using a Hi-Ab crane on our vehicle.

Surface tracking should be used along the pathways to allow access for the vehicle along each side of the bridge/channel. The piers will be lifted and secured one side at a time. It would be necessary to reverse the vehicle out from one side of the bridge/channel and drive around the lake/park to access the other pier from the next side.

A lifting plan will need to be provided for this process and all equipment will require up to date certification and testing.

The piers will be secured onto the vehicle for transportation. During all manoeuvring, banksman and barriers should be provided to protect the public in addition to the closure of the pathway and bridge.

The same process will be undertaken for the return and re-installation of the piers.

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Risk Assessments Required

The following risks have been identified. During the preliminary works all method statements and risk assessments should be undertaken, allowing safe procedures of work to be implemented.

- Working above water
- Working at height
- Manual Handling
- Security and Public protection
- Environmental factors (water contamination, wildlife)
- Lifting - all lifting procedures to be carried out under LOLER regulations.
- The close working vicinity to the railway line which will require input from Network Rail
- Use of Thermatec steam cleaning system
- Working with mortar