

## Executive Summary

### Key Facts

**Structure Type:** Single span overbridge

**Superstructure Form:** Longitudinal cased girders, pre-cast concrete jack arches.

**Substructure Form:** Concrete block and brick abutments and wingwalls.

**Span:** Clear square span 8.23m (27' – 0").

**Assessment Code:** BD21/01

**Live load capacity (carriageway):** 40T ALL (subject to acceptance of minor deficiency in jack arches)

**Critical Element:** Jack arches

**Overall Bridge Restriction:** 7.5T AVL

**Critical Load Effect:** Edge girder bending quarter span / Substructure

**Condition:** Fair

**Local Authority:** Norfolk

**OS Reference:** TF 703 238

This report presents the load carrying capacity for the bridge and identifies the data used to derive the assessment. It has been prepared by Jacobs for the exclusive use by HRE and should not be relied on by third parties. It has been based on site measurements and investigation by Jacobs or historical information provided by HRE, as appropriate.

The description of condition does not represent a principal inspection; nor should it be relied on for the development of maintenance works. Close inspection of members was limited by the constraints of safe access possible within a single site visit.

Identification of defects is principally based on ground level observation of visible members. The structural arrangement of the bridge meant that the following elements were not examined as part of the inspection for assessment:

- Concrete Encased Steel Beams - Only the exposed beam bottom flange plates in areas of spalling concrete and top flange plates within trial pit were visible for inspection. The webs and angles are considered as built-in parts not amenable for inspection.

### 3. Structure Condition

#### 3.1 General

The survey and inspection for BD21/01 assessment were undertaken on Wednesday 15<sup>th</sup> August 2018. Weather conditions were sunny with a temperature of 19°C.

Parking was available within an adjacent field accessed via a track to the north west of the structure.

Access to the formation was gained via a slope at the north face down to the old formation level.

#### 3.2 Structure Condition

##### 3.2.1 Edge beams

The north edge beam (Beam No.1) is in fair condition with the following visible defects noted during the deck soffit inspection:

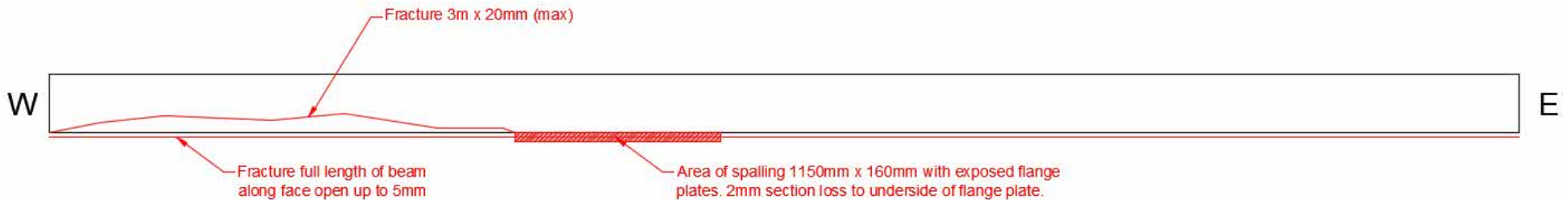


Figure 3. Plan View of Beam No.1 Defects (Photograph 7)

The south edge beam (Beam No.7) is in fair condition with the following visible defects noted during the deck soffit inspection:

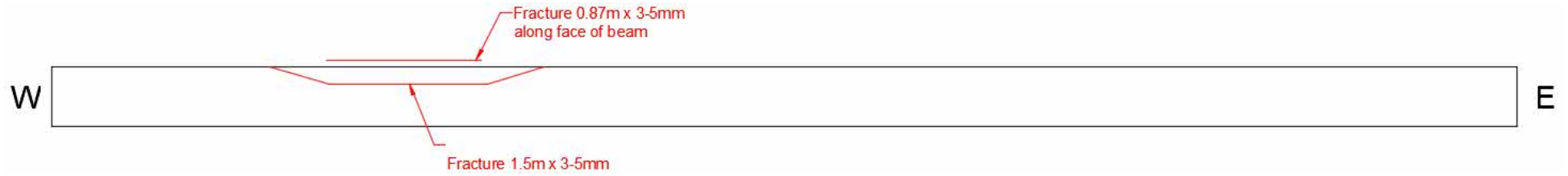


Figure 4. Plan View of Beam No.7 Defects (Photograph 13)

### 3.2.2 Internal beams

The internal beams are in fair condition with the following visible defects noted during the deck soffit inspection:

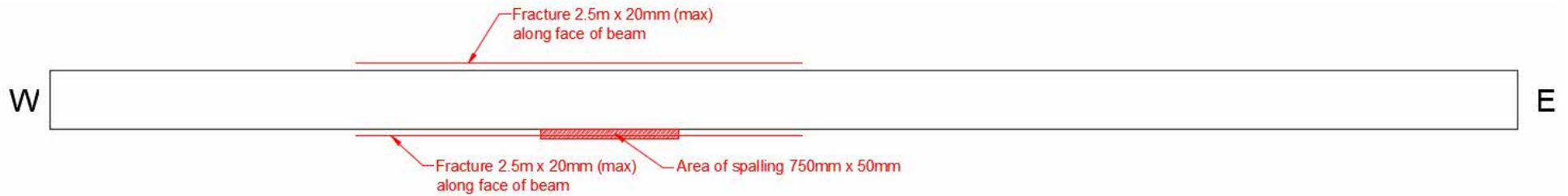


Figure 5. Plan View of Beam No.2 Defects (Photograph 8)

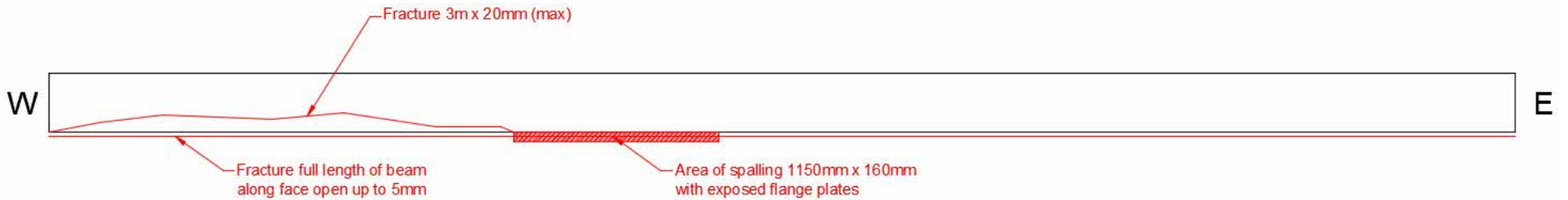


Figure 6. Plan View of Beam No.3 Defects (Photograph 9)

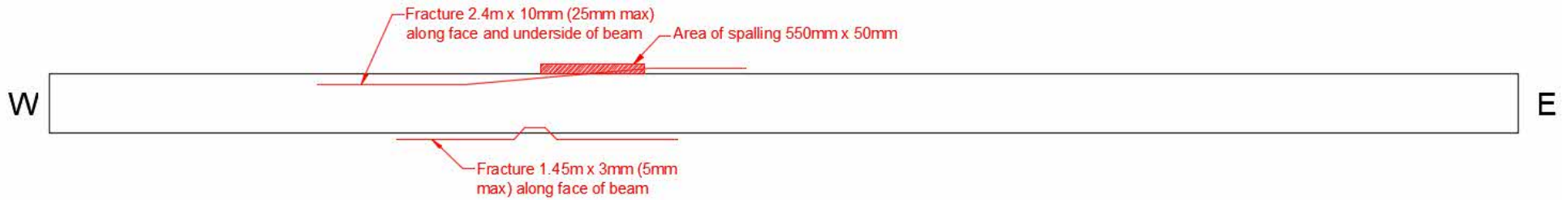


Figure 7. Plan View of Beam No.4 Defects (Photograph 10)

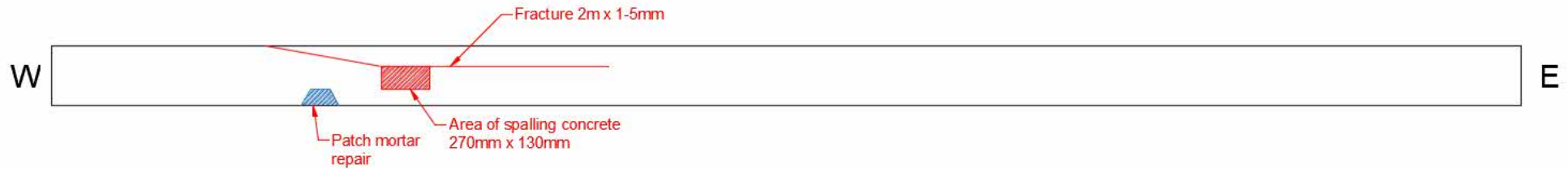


Figure 8. Plan View of Beam No.5 Defects (Photograph 11)

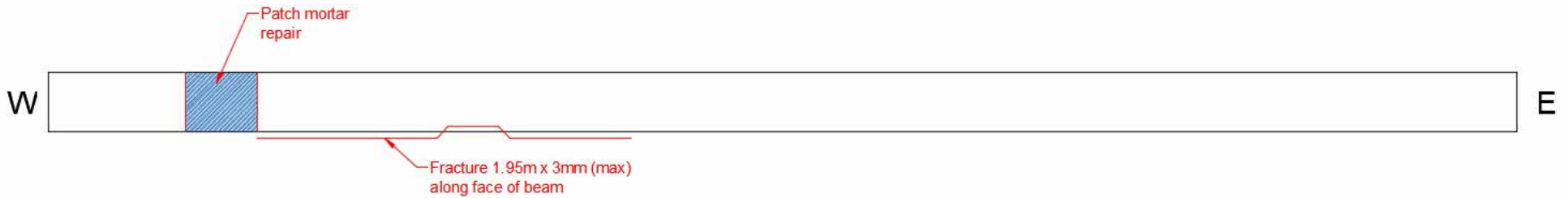


Figure 9. Plan View of Beam No.6 Defects (Photograph 12)

All areas of exposed flange plates exhibit up to 2mm section loss due to corrosion to the underside of the bottom plate. These areas are situated within areas of damp visible across the underside of the concrete encasement. Cracking through the concrete encasement is evident along each beam with spalling to the surrounding concrete occurring when tapped with a hammer.

### 3.2.3 Concrete Jack Arches

The concrete jack arches are in fair condition with widespread algal staining and isolated damp patches around the western third of the span (Photograph 6).

### 3.2.4 Abutments

The west abutment is in fair condition with graffiti across the bottom half of the face (Photograph 15). A vertical fracture through brick and mortar is visible below the corbelling blocks on the southern face, 1.0m in length and open up to 2mm.

The east abutment is in poor condition. Sections of concrete corbelling have been replaced in the outer thirds with concrete brick (Photograph 14). Both areas sound hollow when tapped with a hammer with significant cracking and movement visible below each edge beam. De-bonding of brickwork repairs is suspected. The following defects were noted on site:

- A section of brickwork beneath the north east edge beam is exhibiting outward movement up to 25mm from the face of the wall with fracturing visible at the northern face of the abutment.
- An area of spalled brickwork, 465mm x 330mm, is visible beneath the moving section of brick typically to a depth of 25mm with a maximum depth of 65mm.
- Heavy spalling is evident to the existing brickwork underneath the north east jack arch to a depth of 50mm.
- A section of brickwork beneath the south east edge beam is exhibiting outward movement up to 20mm from the face of the wall with fracturing visible at the southern face of the abutment.

It is possible that the defects to the east abutment brick cladding are caused by thermal movement of the edge beams. No allowance for thermal expansion between the beams and cladding appears to have been incorporated into the recent repairs. The point of bearing for the beams is not apparent. It is assumed to be behind the cladding on the concrete abutment core. If any live load is transferred directly onto the cladding it could be another contributory cause of the fracturing.

No signs of settlement to the east abutment were evident during the inspection.

### 3.2.5 Wingwalls

The north east wingwall is in fair condition with algal staining and weathering visible across the face. Graffiti partially covers the face of the wall and sapling growth is visible at the base of the wall (Photograph 21).

The north west wingwall is in fair condition with tree growth at the base of the wall and graffiti across the face. Isolated fractured blocks, vegetation growth within the mortar bed and leachate staining are visible across the face (Photograph 20).

The south east wingwall is in fair condition with graffiti and minor vegetation growth across the face. A horizontal fracture is visible through the mortar in the top third of the wall (Photograph 22).

The south west wingwall is in fair condition with algal staining and graffiti across the face. The bottom third of coping blocks have collapsed and fallen to the base of the wall (Photograph 23). Tree growth is evident adjacent to the end of the wall.

### **3.2.6 Parapets**

Both parapets are in fair condition with weathering across all faces (Photographs 24 & 25).

### **3.2.7 Formation**

The formation to the south is incorporated into agricultural land used for crops (Photograph 29). The formation to the north is an overgrown access track to other fields surrounding the structure (Photograph 30).

### **3.2.8 Road Surface**

The road surface shows signs of superficial cracking; therefore, due to the rural nature and unlikely regular road maintenance, a 'poor' road surface category (BD21/01 Clause 5.22) is considered appropriate (Photographs 3-5).