

**NORTH LINCOLNSHIRE COUNCIL**

**HIGHWAYS AND NEIGHBOURHOODS  
CABINET MEMBER**

**A18 MELTON ROSS RAILWAY BRIDGE**

**1. OBJECT AND KEY POINTS IN THIS REPORT**

- 1.1 To provide an overview of the current condition of the Bridge.
- 1.2 To determine measures to deal with the current condition and to agree future strengthening proposals.

**2. BACKGROUND INFORMATION**

- 2.1 The A18 Melton Ross Railway Bridge is a skewed, simply supported two span highway structure. The spans comprise different forms of construction. The bridge spans the existing live railway line which runs between Brocklesby to Barnetby Stations.
- 2.2 The east span, constructed in 1970, comprises 18 closely spaced, transversely tied prestressed concrete inverted T beams with a reinforced concrete deck slab. The areas between the beams are infilled with in-situ concrete and the beams are topped with a concrete slab.
- 2.3 The west span, originally constructed in 1918 comprises seven riveted longitudinal mild steel girders with a more recent reinforced concrete deck slab supported off masonry jack arches with backfill and tie bars sprung off the bottom flanges of the six northern girders.
- 2.4 The age of construction of the west span deck slab is unknown. However, it is more recent than the original steel bridge and therefore likely to have been constructed circa 1970 when the parapets and the east span on the structure were reconstructed.
- 2.5 The substructures comprise brick abutments and an intermediate pier, with wingwalls adjoining the abutments. Network Rail S&T cables are attached to the east abutment at low level.
- 2.6 Following a recent bridge inspection, at which deterioration was noted, a quantitative structural assessment of the West Span and both Parapets was undertaken in accordance with HA standard BD 21/01 – The Assessment of Highway Bridges and Structures. The capacities of the west span and parapets have been determined to be not in accordance with current requirements.

2.7 The 2013 Structural Assessment found the following :-

### **West Span**

- *Internal Girders:* The assessed capacity of the most heavily loaded internal girder is 7.5 Tonnes governed by mid-span bending of the girder. The internal girders are also capable of carrying Group 1 Fire Engines.
- *North Edge Girder:* The assessed capacity of the North Edge Girder is 7.5 Tonnes governed by mid-span bending of the girder.
- *South Edge Girder:* The assessed capacity of the south Edge Girder is 0 Tonnes governed by mid-span bending of the girder.
- *South Parapet:* The concrete core in the south parapet was found to fail the assessment in bending for normal containment.
- *North Parapet:* The brickwork to the north parapet was found to fail the assessment in accordance with BS 6779 Part 4 for normal containment.

### **East Span**

- The 1970s prestressed concrete east span on the bridge was assessed in 1990 as having 40 Tonnes capacity. There was no observed deterioration of the east span beams to suggest that the capacity had been compromised.

2.8 The following recommendations were made in the assessment report:

- **West Span:** Both the long and short term future of the structure were to be evaluated via an options feasibility study, and remedial actions implemented with a view to improving its load carrying capacity to the current requirements, as well as investigate possible remedial repairs particularly to the girder bottom flanges.
- **Parapets:** All of the parapets on the bridge were assessed as sub-standard for normal N2 containment in flexure. As the bridge crosses over railway lines, the required containment would be H4a. Their failures even to satisfy N2 containment leaves them severely substandard and their protection or upgrade both in the short term and permanently were to be investigated via the feasibility options study recommended above, particularly as the west span girders that support the parapets are also substandard in strength.

2.9 The 2013 assessment recommended that interim measures be implemented within three to six months of the report being finalised which included the imposition a speed reduction over the structure from the current 60mph to 30mph, with single lane running using signalised traffic control.

2.10 We have applied for a Traffic Management Notice for an earliest implementation date of Monday, 29 July 2013, to action the points in 2.11. The maximum duration for a temporary speed restriction is a period of 18 months.

### 3. OPTIONS FOR CONSIDERATION

3.1 The following options are presented for consideration to deal with the issues described above:

3.1.1 **Option 1** - Introducing triangulated bracing to the bridge steel girders from underneath (west span only) with no additional work to be undertaken on the topside of the bridge;

3.1.2 **Option 2** – as option 1, but additionally replacing existing sub-standard parapet with type H4a (west span and east span) and replacing the existing deck slab on the west span over the edge pair of steel beams making only these edge beams composite;

3.1.3 **Option 3** - Replacing existing sub-standard parapet with type H4a (west span and east span) and replacing the existing deck slab on the west span with new to provide compositeness between steel beams and new R.C. Slab;

3.1.4 **Option 4** - Widening the existing carriageway and verges to an agreed design standard and replacing existing sub-standard parapets with type H4a (west span and east span);

3.2 All four options provide an adequate engineering solution to deliver the required 40T load carrying capacity required such that the road can be reopened and traffic flows return to normal.

### 4. ANALYSIS OF OPTIONS

4.1. **Option 1** - The estimated scheme cost excluding preliminaries, but including design fees is approximately £121,968 at 2013 prices;

4.2. **Option 2** - The estimated scheme cost excluding preliminaries, but including design fees is approximately £631,904 at 2013 prices;

4.3. **Option 3** - The estimated scheme cost excluding preliminaries, but including design fees is approximately £770,896 at 2013 prices;

4.4. **Option 4** - The estimated scheme cost excluding preliminaries, but including design fees is approximately £870,576 at 2013 prices;

4.5. Each of the options have both advantages and disadvantages as set out in the Feasibility Report compiled following the bridge inspection. However, Option 2 and 4 are highlighted in the report as providing the most advantageous asset management solutions.

4.6. Officers believe Option 4 is the preferred option due to the increased carriageway and verge widths, the new R.C. Deck slab will cantilever out from the edge beams of both spans, and be integral with new parapet plinths compatible for the installation of new high containment parapet (H4a).

**5. RESOURCE IMPLICATIONS (FINANCIAL, STAFFING, PROPERTY, IT)**

5.1 Financial

Each year a programme of works budget is agreed and monitored by the Cabinet Member. If these works are agreed, the programme will need to be re-prioritised to include the cost of the selected option. Only Option 1 allows all costs to be met in the 2013/14 programme.

5.2 Staffing

We would look to Pell Frischmann to continue and work up the final design proposals and for the Highway Alliance Partnership (or its replacement) to carry out the necessary construction works

**6. OUTCOMES OF INTEGRATED IMPACT ASSESSMENT (IF APPLICABLE)**

6.1 Not applicable.

**7. OUTCOMES OF CONSULTATION AND CONFLICTS OF INTERESTS DECLARED**

7.1 The Traffic Management Notice will be advertised for the signage of the temporary measures including the reduction in speed limit.

**8. RECOMMENDATIONS**

8.1 That the Cabinet Member notes the current condition of the Bridge and the progress made to date on the feasibility report and ongoing design works.

8.2 That the Cabinet Member considers the Options available and the funding implications including the option to re-prioritise the council's programme of works.

DIRECTOR OF PLACES

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**Background Papers used in the preparation of this report:**

May 2013 - A18 Melton Ross Railway Bridge - Structure Ref: 01/81/31  
Feasibility Options for A18 Melton Ross Railway Bridge Strengthening – West Span,  
East Span and Parapets. W50358/VAA/T180/R01 Rev 0