

**NR/L2/CIV/003/F006: ROAD/HIGHWAY AUTHORITY AGREEMENT TO
BRIDGEWORKS,**

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Project title	SPC2/83 – Irthlingborough Road Bridge		
Project Number	143058		
CR-T Ref. Number	143058-INF-CRT-EMG-000009		CR-T Rev. 1.0
Location	Irthlingborough Road, Wellingborough, Northamptonshire		
ELR	SPC2	Mileage	64miles 814yds
OS grid reference	SP 909 674	Structure Number	83

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DOCUMENT CONTROL SHEET

STRUCTURE NAME		SPC2/83 – Irthlingborough Road Bridge		
DOCUMENT TITLE		Irthlingborough Road - Highway Authority Agreement to Bridgeworks		
DOCUMENT REF		V-R6390.02 – F006		
PROJECTWISE REF:		143058-JMS-F06-ECV-000008		
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A01.1	Issued for Client Comment	S.Hill 12/05/17	L.Johnson 12/05/17	R.Barton 12/05/17
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201 Rev A03	Proposed GA Elevations and Section
400 Rev A04	Proposed Highway Layout
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410 Rev A01	Proposed Forward Visibility
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PART 1: DETAILS

1.1 Brief description of existing conditions

Irthlingborough Road Bridge is a four square span arch overbridge, situated to the South East of Wellingborough Station. The bridge spans the Bedford to Kettering line. The bridge carries the B571 Irthlingborough Road, a single carriageway, traffic signal controlled single lane public road. The bridge consists of four wrought iron decks with cast iron edge beams.

The existing carriageway layout comprises a 0.90m wide verge on the North-Eastern side and a 1.00m wide verge on the Western side of the carriageway (with minor variation). The carriageway width is 4.10m over the bridge (with minor variations), with width between parapets of 6.1m.

The existing vertical alignment is subject to a vertical curve over the bridge deck. The crest of the compound vertical curve is positioned above the central pier. The gradient of the Northbound approach rises at approximately 6.9%, with an approximate $k = 2.4$ hog curve over the bridge. The Southbound approach falls at approximately 1.1% gradient from the crown.

The horizontal alignment to the South of the bridge is an approximate 15m radius curve which straightens out at the start of the bridge deck. The alignment then curves North-Eastward over a 55m radius curve before a short straight which turns north heading towards Mill Road.

The existing carriageway is subject to a varying crossfall. The carriageway drains in both directions from the crown, positive drainage does not appear to be present.

The existing surfacing appears to comprise hot rolled asphalt with splay kerbs denoting the extents of carriageway on the approach to the structure. No kerbs are evident over the bridge; however a chamfered concrete plinth is visible. The existing carriageway and footway surfacing is generally in serviceable condition over the structure.

An existing crash barrier is visible along the South Eastern approach, it is not clear if this is compliant to current design standards. No approach containment protection preventing vehicle incursion onto the railway is evident on other approaches. Palisade fencing provides trespass protection and defines the highway / rail boundary to the South of the bridge. Paladin fencing forms the highway / industrial property boundary to the North West, with a post and three rail fence forming the North East highway boundary.

To the North East an overgrown embankment falls from Irthlingborough Road down to track level. At the North West corner a level grassed area between the highway and adjacent industrial estate is evident, a masonry retaining wall, approximately 5m high retains the industrial land from the railway below. Along the Southern side of the bridge overgrown embankments fall from the highway to the rail line below.

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Traffic count data was not available during the preparation of this report. However, it appears there are width limitations, restricting HGV movements, when travelling eastbound from the B573 Embankment at an existing partially demolished bridge abutment and further restricted at a bridge over the River Ise.

1.2 Brief description of proposed works

The proposed works include the reconstruction of the bridge deck to provide adequate vehicle containment and highway loading in accordance with the European Standards, along with the aspiration for increased headroom to the track to achieve clearance for future electrification of the line, without having adverse effects upon the highway and adjoining Network Rail boundaries.

Based on initial discussions with Northamptonshire County Council the replacement of the Irthlingborough Road Bridge will include the provision of nominal verges either side of the single lane, traffic controlled carriageway. The carriageway will be positioned eccentrically to assist vehicle negotiate the South Eastern approach.

The current track layout at the bridge consists of three lines: - Up Fast and Down Fast and a bi-directional Up and Down Slow line. It is proposed the road and bridge deck soffit will be uplifted to improve vertical clearance and provide minimum standard electrification clearance of 5175mm for Overhead Line Electrification (OLE) apparatus installation, the proposed alignment will smooth the vertical curvature over and on the immediate approaches to the bridge.

The proposed highway alignment shall be as per drawings 143058-JMS-DRG-ECV-183400, 183401, 183410 and 183411. The horizontal alignment has been adjusted locally over the proposed bridge deck to increase the Eastern and Western verge widths to a minimum 0.6m wide maintaining the carriageway wide at 4.1m wide. The vertical alignment has been adjusted to accommodate the proposed replacement bridge construction by providing a smoothed alignment. Forward visibility will be adversely affected by the proposed design. However, the affected visibility splay will be within the signal controlled section of highway and visibility will meet Manual for Streets guidance.

The increase parapet height and road uplift will change the potential intervisibility for vehicles waiting at the Southern (Eastbound) signal controlled stop line. The installation of a mirror will assist drivers in seeing and delayed vehicles or cycles crossing the bridge.

The proposed carriageway will be bounded by splay kerbs and minimum 0.6m wide verges with new H4a parapets (as per design requirements of TD19/06, Chapter 4, Para 4.6). The bridge sub-structure will not be altered.

Safety barriers will be provided for 45m on the Northeast, Northwest and Southwest approaches to the bridge parapets. Due to the 90° bend in the road alignment providing a safety barrier to the south-eastern corner is not appropriate as a safety barrier is unlikely to work as intended. Therefore, a N2 parapet will be extended to

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prohibit road vehicle incursion. A safety barrier will be reinstated as it currently exists to the Southern approach embankment.

Earthworks will be required to the existing embankments to accommodate the uplift in the carriage way and the safety barrier working width requirements. Note the Southern approach safety barrier will be installed as existing without the compliant working width.

Fencing along the highway boundary will be reinstated to match existing with metal palisade fencing provided to ensure integrity of Network Rail's land boundary and restrict trespass onto the railway along the Southern approach. Paladin fencing will be provided alongside the industrial units and post and three rail fencing provided to the North East / adjacent Southern property boundary, if affected.

The existing carriageway is bound by splay kerbs; therefore, it is assumed a positive drainage systems exists. However, this is not evident on-site potentially due to the significant levels of debris along kerb lines. Although we are not increasing the bridge surface area Northamptonshire County Council surface water records are to be reviewed and / or CCTV surveys undertaken to determine if existing surface water (sw) drainage exists and has sufficient capacity. Checks are being undertaken to ensure the proposed works do not lead to flooding issues.

Although keeping the proposed services positioned outside the wheel track would be beneficial it however impractical as there are number of services present and they all need to be kept in within the top and bottom mat of the reinforcements. In addition all the services are encased in reinforced concrete and hence will not be affected if they are in the wheel track zone or outside of wheel tracks zone. See drawing 143058-JMS-ECV-DRG-183201 for further details.

The following relaxations/departures from current design standards to TD9/93 have been identified (assuming a 48kph (30mph)) design speed limit. For further expansion see Appendix C.

Horizontal Design

- Minimum radii curve 520m (50kph design speed)
 - Designed Southern radii curve is 16.0m (existing radii curve is 15m)

Vertical design

- Desired crest curve K=10 (for 50kph design speed)
- Minimum crest curve K= 6.5 (desirable minimum for 50kph design speed)
 - Designed Crest curve K= 4.5 (existing k= 2.4)

Due to the traffic flows undertaking a RRRAP assessment utilising the HA spreadsheet document is considered to be excessive due to the urban location, assumed moderately high traffic flow volumes and low (<50mph) assumed vehicle speeds. Therefore, a risk assessment using the Department for Transport (DfT)

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guidance: Managing the accidental obstruction of the railway by road vehicles has been undertaken. The most appropriate review, for the Northern side of the bridge (Southbound approach) is utilising the Form 1a – Single carriageway road vehicle incursion risk ranking. However, the Form 2 – Neighbouring road vehicle incursion risk ranking is more appropriate for the Southern side (Northbound approach), both sets of assessments are appended to this document.

Based on the Form 1, Southbound vehicle movement review addressing the Road Approach Containment (f1), Site Topography (f5), Parapet Resilience (f8) and Road Verges and Footpaths (f9) elements reduces the risk score to within an acceptable risk level. Based on Form 2, Northbound vehicle movement review addressing Interface Arrangements (f3) and Road Kerbs (f7) will assist to reduce the risk rating. However, further improvements may be required along the parallel section of Irthlingborough road to reduce risk to an acceptable level (i.e. below a value of 65). These works will be addressed as part of the bridge deck replacement works. The majority of other risks identified cannot be reduced by the proposed highway improvement works and / or local property boundary constraints.

A Stage 1 Road Safety Audit has been undertaken in accordance with HD19/15 requirements by an Independent Road Safety Audit Team based at Opus International Consultants (UK) Limited Birmingham office. The results of the audit will be submitted separately to this report under the reference 143058-JMS-REP-EHW-000009 – Stage 1 Road Safety Audit.

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PART 2: PROPOSED DESIGN CRITERIA

2.1 Design loading

~~For Structural Assessment based strengthening works~~

~~Full HA. units HB.~~

~~No provision made for abnormal loads.~~

Design of new components, use the Traffic Load Model as defined in the **UK NA to BS EN 1991-2.**

Traffic Loading to LM1, LM2 and LM4 to BS EN 1991-2:2003

Traffic Loading to LM3 including SV100 vehicle to UK National Annex of BS EN 1991-2:2003

2.2 Other criteria

Design speed of road traffic: 30mph

Standard of parapet containment: H4a

Road/footpath layout: as shown on Drawing No. 143058-JMS-DRG-ECV-183400

The proposed highway alignment shall be ostensibly as existing with regards to the k values and the stopping sight distances.

Road profile: as shown on Drawing No. 143058-JMS-DRG-ECV-183401

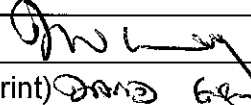
Specification for road surfacing: To be in accordance with Local Authority Design Standards (as existing HRA).

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PART 3: ACCEPTANCE ON BEHALF OF THE ROAD/HIGHWAY AUTHORITY

I confirm that the above proposals are acceptable to the Road/Highway Authority subject to the following amendments and comments.

I confirm that the Road/Highway Authority ~~does~~/does not (delete as applicable) wish to contribute towards widening or other improvements to the Bridge in association with the proposed Works.

Signed		Title	ASSET & TRAFFIC MANAGER
Name (print)	DAVID GENDALL	Date	15/6/18
For	NORTHANTS COUNTY COUNCIL		

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APPENDIX A: ROAD VEHICLE INCURSION RISK RANKING

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APPENDIX B: DRAWINGS

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APPENDIX C: HIGHWAYS GEOMETRY DESIGN STANDARDS AND DEPARTURES

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HIGHWAY GEOMETRY DESIGN STANDARDS USED

TD9/93 – Link Design

TD27/05 – Cross Sections and Headroom

TD19/06 – Requirement for Road Restraint Systems

The latest DMRB standards have been used to review the departures

DEPARTURE 01

STOPPING SITE DISTANCE		
EXISTING ALIGNMENT	PROPOSED ALIGNMENT	DESIREABLE MINIMUM STANDARD
NORTH BOUND = 70m SOUTH BOUND = 70m	NORTH BOUND = 70m SOUTH BOUND = 50m	TD9/93 TABLE 3 VISIBILITY DISNACE FOR 50kph SPEEDLIMIT AT ONE STEP BELOW DESIREABLE MINIMUM = 50m

COMMENTARY

There is a slight reduction in visibility in the proposed from 70m to 50m in the southbound direction. It has been considered that the extent of the highway lift required to smooth out the alignment and provide a compliant sighting distance is excessive.

DEPARTURE 02

HORIZONTAL ALIGNMENT		
EXISTING CURVE RADII	PROPOSED CURVE RADII	DESIREABLE MINIMUM STANDARD
15m	16m	TD9/93 TABLE 3 MINIMUM R WITHOUT ELIMINATION OF ADVERSE CAMBER AND TRANSITIONS FOR 50kph = 520m

COMMENTARY

The existing curve radii has been increased by 1m from the existing to the proposed schemes – therefore the departure is a slight betterment in the horizontal geometry. It has been considered that the extent of the highway lift required to smooth out the alignment and provide a compliant sighting distance is excessive.

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DEPARTURE 03

VERTICAL ALIGNMENT		
EXISTING ALIGNMENT	PROPOSED ALIGNMENT	DESIREABLE MINIMUM STANDARD
K =2.40 OVER = 25.00m DISTANCE	K =4.50 OVER = 63.00m DISTANCE	TD9/93 TABLE 3 AT ONE STEP BELOW DESIREABLE MINIMUM CREST K VALUE FOR SPEED LIMIT 50kph = 6.5

COMMENTARY

The K value for the minimum crest is improved, but there is a departure in the existing and proposed conditions. This does slightly improve visibility. It has been considered that the extent of the highway lift required to smooth out the alignment and provide a compliant sighting distance is excessive.