

DEPARTMENT FOR TRANSPORT

3 January 2019

TRANSPORT AND WORKS ACT 1992

**TRANSPORT AND WORKS (APPLICATIONS AND OBJECTIONS PROCEDURE)
(ENGLAND AND WALES) RULES 2006**

**THE NETWORK RAIL (LONDON TO CORBY) (LAND ACQUISITION, LEVEL
CROSSINGS AND BRIDGE WORKS) ORDER**

**PROOF OF EVIDENCE
of
DAVE BUTTERWORTH**

DOCUMENT REFERENCE: NR73

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
*Proof of Evidence - Engineering***

INDEX

1. INTRODUCTION
2. EVIDENCE SUMMARY
3. EVIDENCE
 - 3.1. IRTHLINGBOROUGH ROAD BRIDGE
 - 3.2. BROMHAM ROAD BRIDGE
 - 3.3. BROMHAM ROAD BRIDGE – PROVISION OF CYCLE WAY
 - 3.4. BROHMAM ROAD BRIDGE – CONSTRUCTION IMPACTS
4. CONCLUSIONS
5. STATEMENT OF DECLARATION

Glossary and List of Abbreviations

BBC – Bedford Borough Council
BHL – Bovis Homes Limited
BPM - Best Practicable Means
DfT – Department for Transport
DPE – Designated Project Engineer
ELR –Engineers Line Reference
EPA – Environmental Protection Act
GRIP – Governance of Railway Investment Projects
KO1 – Key Output 1
L2C – London to Corby
NR – Network Rail Infrastructure Limited
OLE – Overhead Line Electrification
SPC – St Pancras to Chesterfield (Tapton Junction) ELR

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

1. INTRODUCTION

- 1.1. My name is Dave Butterworth. I am a Chartered Civil Engineer by profession with 21 years' experience. I have held a number of Engineering and Project Management/Project Development roles within the supply chain and within Network Rail. My role within Network Rail is that of Project Delivery Engineering Manager. I hold a Masters Degree in Civil and Structural Engineering (MEng) and am a Member of the Institution of Civil Engineers. I am also a Member of the Association of Project Management.
- 1.2. As the Project Delivery Engineering Manager I am responsible for the engineering aspects of the two bridges, authorisation for works to which is sought in the order, as these fall within the L2C Civils scope of works and are managed day to day by Engineers within my team. I have been in my current role since February 2018. The Engineers within my team are responsible for Engineering Assurance of design and construction submissions received from designers and contractors
- 1.3. I will provide evidence on the following topics:
- (a) Irthlingborough Road Bridge and the passive provision to accommodate the Route 2 Bridge to service the new Bovis Homes Limited (BHL) (OBJ/7) development in the future.
 - (b) Bromham Road Bridge and the reasons a cycleway has not been included within the design of the superstructure reconstruction.
 - (c) Bromham Road Bridge. Acquisition of land to enable the reconstruction and the concerns over invasion of privacy, light, noise, dust and other matters raised in objection 8.

2. EVIDENCE SUMMARY

- 2.1. Irthlingborough Road Bridge – In summary the reconstruction of the Irthlingborough Road Bridge as proposed by Network Rail, does not preclude the later construction of Route 2.
- 2.2. Bromham Road Bridge – The reconstruction of the superstructure of Bromham Road Bridge on its existing substructure does not facilitate inclusion of a cycleway. A superstructure of sufficient width to incorporate the 3m wide cycleway would not be able to sit on the existing substructure as is and would require reconstruction or significant extension and alteration of the substructure. This would go beyond what Network Rail is funded for, which is to provide a structure suitable for the electrification of the Midland Mainline Railway that passes beneath.

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

- 2.3.** The acquisition of land is required to facilitate reconstruction, including the erection of a temporary foot and services bridge. The design of this structure has taken privacy concerns into account and incorporates 1.8m high screening of the approach ramp. It also addresses concerns over antisocial behaviour and access will be prevented from areas beneath the bridge to address this. The greatest noise will be limited to a 54 hour period within the 400 day construction programme including the bridge demolition. At no point will the noise levels pose a risk to health and safety of workers or local residents. Noise and dust levels will be monitored throughout.

3. EVIDENCE

The primary components of the works authorised by the Order to which this evidence relates are the reconstruction of Irthlingborough Road Bridge and Bromham Road Bridge. These works form part of the rail infrastructure being delivered to enable electrification of the Midland Mainline between Bedford and Kettering, and Corby, known as Key Output 1 (Proof of Evidence of Mr Akers), section 1.3.6 (**NR 70**).

3.1. Irthlingborough Road Bridge

3.1.1 Existing Structure

Until its recent demolition, the structure was a 4 span overbridge carrying the B571 Irthlingborough Road single lane carriageway over the Midland Mainline railway near Wellingborough at 64 miles 814 yards from London. The southern spans of the bridge were over the following operational lines as shown in the diagram below.

2017

- Span 1 – Down Fast & Up Fast lines
- Span 2 – Bi-directional Up & Down Slow line

2018

- Span 1 – Down Fast & Up Fast lines
- Span 2 – Up Slow & Down Slow lines

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

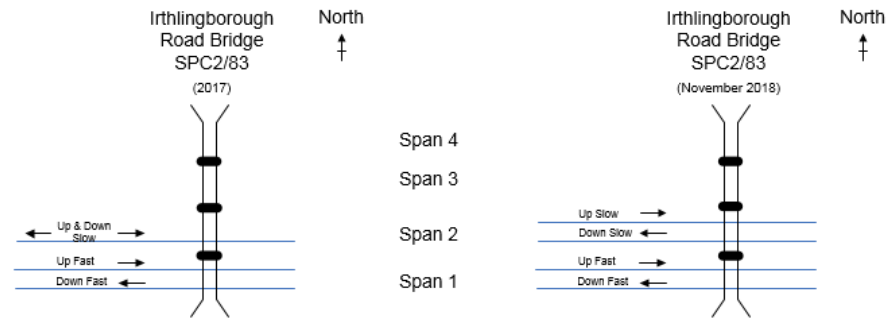


Figure 1 - Track layout at Irthlingborough Road Bridge

- 3.1.2** The superstructure comprised two cast iron edge girders supporting brick parapets and 3 No. wrought iron intermediate girders which supported curved cast iron plates with concrete backing to form an infill deck. The abutments and three intermediate piers were constructed from brickwork with concrete cill beams supporting the superstructure. The wing walls, parapets and pilasters were also constructed from brickwork with stone copings.



*Photograph 1 - Irthlingborough Road Bridge
Low Mileage Elevation looking North, 2017*



*Photograph 2 - Irthlingborough Road Bridge
High Mileage Elevation looking South, 2017*

- 3.1.3** To facilitate the installation of 25kV OLE on Midland Mainline the rail to bridge soffit dimension ('clearance') needs to be increased. In October 2014 when this project was at the feasibility stage the existing minimum vertical clearance was 4.102m as compared to a required clearance of 5.175m. This need to increase clearance comes from the fact that electric trains have pantographs on their roofs, above which there needs to be space for the wires plus an allowance for safe electrical clearance between these wires and the soffit of the bridge. Making electric trains lower such that the wires could be fitted within the existing clearance is not an option as the railway needs to cater for the existing, non-electric trains that would clash with wires in this scenario.
- 3.1.4** Three options for increasing clearance, each with different span arrangements, were considered during the feasibility stage and a single option ('Option 1') was selected as the most economic solution accepting the advantages and disadvantages given below. The options considered are summarised below:
- i. Option 1 – Four span reconstruction on existing substructure with precast concrete beams
This option does not involve any strengthening works to the central pier but the construction requires a greater number of lifts than options 2 and 3. With respect to inspection and maintenance it also results in a larger number of assets on completion – and therefore greater inspection and maintenance requirements – than options 2 and 3.
 - ii. Option 2 - Single span reconstruction
This option would require fewer crane lifts and therefore a potentially

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

reduction in possession requirements, and would also reduce inspection and maintenance requirements compared to option 1. However, this option would require strengthening of abutments and inclusion of a box culvert to retain vehicular access alongside the railway. The uncertainty over the future use of the cess (potential sidings) was also a reason for not selecting this option.

- iii. Option 3 – Two span filler beam deck retaining the existing abutments and central pier.

Although this option would reduce inspection and maintenance requirements as compared to option 1, it would require significant substructure strengthening and underpinning works. For this reason option 3 was not taken forward.

3.1.5 The selected option is a four span superstructure making use of the existing substructure with increased headroom above the railway to facilitate railway electrification and gauge clearance requirements standards such as GL/RT1210 Energy Sunsystem and Interfaces to Rolling Stock Subsystem **(NR 41)**. This option forms the basis of the Prior Approval granted October 2017 (Ref: WP/17/00564/STUN) **(NR 38)**.

3.1.6 The extract from the General Arrangement Drawing below shows the form of construction of the new structure. The full General Arrangement Drawing can be found in Appendix A.

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

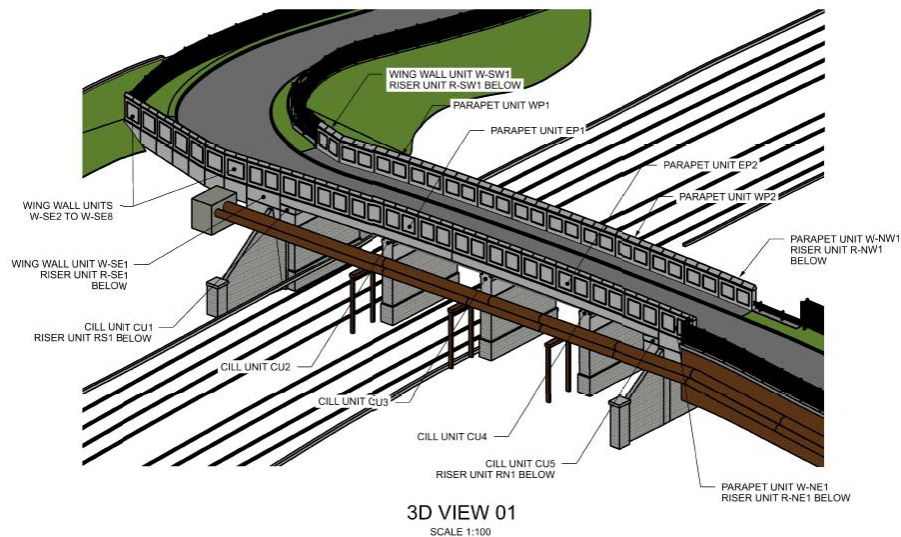


Figure 2 - Extract from the Proposed General Arrangement reconstruction drawing

3.1.7 The proposed reconstruction of the existing Irthlingborough Road Bridge structure has been devised to sit within the same footprint as the existing bridge. However, it will be necessary to alter the highway approaches including raising levels and provision of retention structures so as not to permanently encroach beyond the limits of the current adopted highway boundary nor into any adjacent third party owned land. There is however an area of approach verge, roadside safety barrier, and embankment slope regrading, that now falls outside current Network Rail ownership and the highway boundary. This can be seen on the area bounded red on the north approach shown on the Proposed General Arrangement Land Plan in Appendix A. This land (Plot 616) is contained within the Order for acquisition. The drawing in Appendix B also shows the land take required, both temporary and permanent, for the construction of Irthlingborough Road Bridge. As detailed in the Proof of Evidence of Mr Glynn, section 9, (**NR 71**) it should be noted that Plot 605 is currently in Network Rail ownership and is subject to potential transfer to Bovis Homes Limited should Route 2 be constructed to the satisfaction of Network Rail under an agreement dated 31st March 2017 between Network Rail Infrastructure Limited and Bovis Homes Limited and Bovis Homes Group PLC.

3.1.8 The Permanent Works reconstruction of the existing Irthlingborough Road Bridge has been devised to give a future highway operational functionality, and driveable geometry, and assessed highway safety risk mitigation to users that is no worse than that of the existing bridge, and this has been formally agreed with the local highway authority, Northamptonshire County Council, through the

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

Network Rail “F006” design consultation acceptance process. The Irthlingborough Road Bridge Form 006 (NR 80) is in accordance with the requirements of NR/L3/CIV/003, Engineering Assurance of Building and Civil Engineering Works (NR39).

3.1.9 As discussed above the Network Rail reconstruction of Irthlingborough Road Bridge requires only limited third party land as covered by the Order. The interaction between the Network Rail reconstruction of Irthlingborough Road Bridge and Route 2 is confined to the south west approach to Irthlingborough Road Bridge and does not impede or preclude the future construction of the Route 2. The reconstruction of Irthlingborough Road Bridge does not materially change the area of interaction between Irthlingborough Road Bridge and Route 2 and therefore the reconstruction does not introduce works that would prevent the later construction of Route 2. The footprint of the Irthlingborough Road Bridge and its associated earthworks on the South West side (Down Fast Line side) of the railway is smaller than and fits within the larger embankment of the future Route 2 scheme. Our understanding is that Irthlingborough Road will be downgraded to a bridleway upon the construction of Route 2 and therefore a compliant link between the two would be required. It is recognised that there will be works required to the approach embankment area as part of the construction of the Route 2 bridge works. This in itself does not prevent the construction of Route 2. The works necessary to prepare this area to receive the earthworks for Route 2 would be comparable with those required to construct Route 2 today if Irthlingborough Road Bridge was not being reconstructed. Below is a summary of the works likely to be required:

- Removal/modification of kerbs and barriers
- Breaking out highway to receive new earthworks and highway reinstatement
- Stopping off vehicular access over Irthlingborough Road Bridge and alterations to convert to cycle/pedestrian bridge
- Earthworks regrading
- Retaining wall modifications

3.1.10 Below is a drawing extract showing the area described above. Irthlingborough Road Bridge is shown to the left with the Route 2 Bridge approach earthworks shown in blue. The full drawing showing the extents of the Route 2 Bridge and its associated earthworks can be found in Appendix C.

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

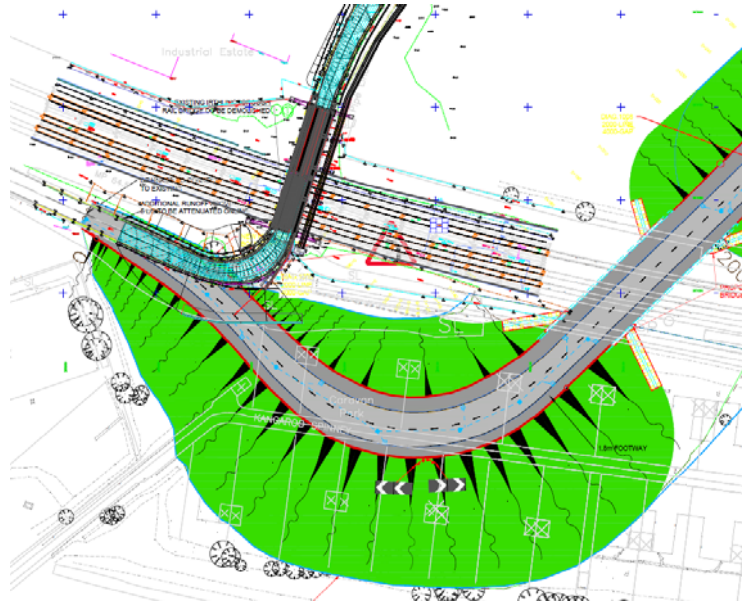


Figure 3 - Area of interaction between Route 2 and Irthlingborough Road Bridge

3.1.11 The Network Rail reconstructed Irthlingborough Road Bridge utilised in the way described above could then remain in place after the construction and commissioning of Route 2, and could serve long-term as a dedicated Public Footpath, Cycleway, and Utility Services carrying bridge over the electrified railway and could potentially be transferred by Network Rail into Local Highway Authority (Northamptonshire County Council) ownership with responsibility for maintenance as a Footpath/Cycleway/Utility Services bridge. It should however be noted that both parties, (Network Rail and Bovis Homes Limited) are in agreement that the preferred solution for access to the Stanton Cross development is via the new Route 2 Bridge thus allowing for the removal of Irthlingborough Road Bridge permanently.

3.2 Bromham Road Bridge

3.2.1 Bromham Road Bridge is a two span brick arch bridge that lies to the north of Bedford Midland Station and carries the two-lane single carriageway, Bromham Road, over the Midland Main Line at a mileage of 50 miles 220 yards from London. Both arches span two operational tracks as follows:

- Western span – Up and Down Fast lines
- Eastern Span – Up and Down Slow lines

The bridge carries the A4280 Bromham Road which crosses the railway in

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

an approximate east-west orientation. The crossing is skewed to the railway with an approximate skew angle of 16 degrees. Pedestrian footpaths are present adjacent to both roadside faces of the parapets across the structure. The road width is approximately 7.14m between the kerb lines and the width between the parapets is 10.7m.

- 3.2.2** The new superstructure has been designed to provide an additional 600mm of width between the parapet faces. This is the maximum increase in width that can be accommodated on the existing substructure. It enables the footpath widths to be increased from 1.96m and 1.579m respectively to 2m (**NR 10**), but it should be noted this increase in width is insufficient to accommodate the required 3m for each foot/cycle way. The Department for Transport Local Transport Note (LTN 02/08) (**NR 78**) advises a minimum 3m width for a shared, non-segregated route. However, it should be noted that where the route is bounded by a bridge parapet of greater than 1.2m, the 3m needs to be increased by 0.5m. Where physical segregation is required the overall minimum cycleway and footway width increases to 4.6m to include for the barrier and the associated edge distances (LTN 02/08). Similar guidance is also provided in the Sustrans Design Manual - Handbook for cycle-friendly design (**NR 79**).



Photograph 3 - Bromham Road Bridge – Low Mileage Elevation looking North 2017. Fast lines shown on the left of the picture and slow lines on the right

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**



*Photograph 4 - Bromham Road Bridge– High Mileage Elevation looking South
2017 Slow lines shown on the left of the picture and fast lines on the right*



Photograph 5 - Bromham Road Bridge aerial photograph

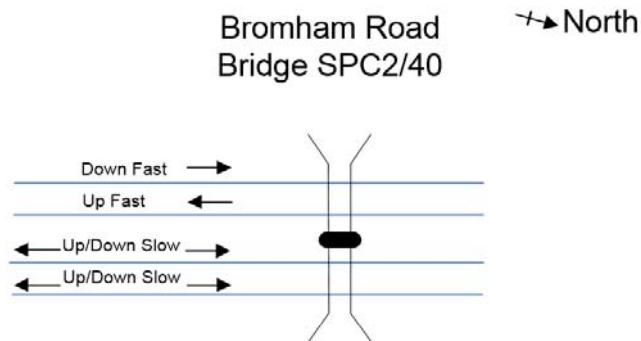


Figure 4 – Track layout at Bromham Road Bridge

- 3.2.3** To facilitate the installation of 25kV OLE on Midland Mainline the rail to bridge soffit dimension ('clearance') needed to be increased. During the option selection process it was confirmed that the existing twin brick arch overbridge did not have sufficient headroom clearance to permit the passage of railway electrification and the aspired future train gauging envelope; consequently three main options were evaluated to determine the most technically appropriate and cost efficient scheme to suit the physical confines of the site to take forward into design and delivery.
- 3.2.4** The first option (Option 1) considered was to retain the existing bridge in its current state, squeezing the required electrification wire arrangement and aspired train gauging envelope through the existing available bridge arch space. This option was ruled out as there was insufficient room available to satisfy electrical and passing vehicle gauge clearances demanded by GL/RT1210 (**NR 41**), and gauging standard GI/RT7073 (**NR 37**). Consequently, some form of physical alteration to the bridge site had to be explored.
- 3.2.5** The second option (Option 2) was to lower the track by up to 1m to give the required future clearances. As the bridge is approximately 250m north of the platform ends of Bedford Station there would be insufficient horizontal distance within which to provide a satisfactory vertical track gradient for the 125mph current line running speed. There would also be insufficient distance to provide an acceptable electrification wire vertical gradient which would in turn lead to the future risk of periodic train pantograph de-wirement incidents. Additionally, a track lower would impact on the switch and crossings of a large series of track cross-overs north of Bedford Station, forming what is known as Bedford North Ladder Junction. This would entail the lifting out and relaying the existing junction arrangements at a cost of several millions of pounds as a

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

scheme in its own right. This option would also necessitate works to the station platforms and station footbridge due to the change in track levels through the station. The amount of disruptive railway access required to implement this option would be several times that required to implement the bridge reconstruction under Option 3.

- 3.2.6** Track lowering under Option 2 would also require tangible alterations to the earthworks and track drainage system and gradients in the area and potentially impact on adjacent third party lands including potential land acquisition. There would also be adverse impact on the 'run-out' termination of the north end of the existing St Pancras – Bedford electrification in the adjacent sidings area which would require additional works and therefore costs that are not required for the bridge reconstruction. Finally, even if the existing Bedford Borough Council-owned Bromham Road bridge could be retained with a track lower, it would still be necessary to raise and modify the existing parapets over the bridge to satisfy GL/RT1210 (**NR41**) for electrical safety above an electrified railway.
- 3.2.7** Consequently, a third design solution (Option 3) was considered, which involved reconstruction of the bridge. As the bridge reconstruction does not require changes to the track the disadvantages detailed above for Option 2 were not applicable to Option 3.
- 3.2.8** The bridge reconstruction was therefore deemed to be the appropriate design solution, and the design was developed using a risk based approach to provide a twin span flat deck reconstruction of the existing twin brick arch bridge, maintaining the existing substructures and approach embankments. This was found to offer the most suitable, cost efficient, and buildable solution within the confines of the site as shown in Appendix D.
- 3.2.9** A twin span flat deck reconstruction solution (Option 3A) considering the very smallest permissible electrical and vehicle gauge passing clearance headrooms above the railway was considered in line with GL/RT1210 (**NR 41**), reducing the clearances to the minimum functional requirements but was eventually ruled out on the grounds of not providing an acceptable vertical gradient for the future electrification wire arrangements through the area and potentially restricting height available for future track maintenance and switch and crossing renewals on the adjacent 'Ladder Junction'.
- 3.2.10** Network Rail Infrastructure Projects follow the 8 stage GRIP process that governs how projects are developed and delivered from the early stages of output definition through option selection, detailed design construction and ultimately to project close out. GRIP stage 3 is option selection where options are developed to feasibility level such that they can be compared for option selection. Design development (Approval in Principle design) and ultimately detailed design follows after the option has been selected.

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

- 3.2.11** The solution selected and taken forward into design development (Option 3) was that which adopted normal electrical clearance (5175mm) above the railway, in accordance with GL/RT1210 (NR 41), and through the adoption of an efficient design of bridge deck could be achieved without any need to significantly raise the highway above its present levels, nor any need to steepen the highway approach gradients above their present maxima, nor any need to widen the existing bridge footprint or approach highway embankment footprint beyond the limits of the present bridge related land ownership footprint.
- 3.2.12** The proposed deck will consist of a new composite reinforced concrete and steel filler beam deck, with high containment parapets and steeple copings.
- 3.2.13** The existing arch brickwork spans and springing brickwork/stonework will be demolished and removed from site. The remediated remaining substructure will be used to carry the new superstructure. New reinforced concrete riser units and cill beams will be provided with the bearings set at a level to give the maximum headroom from the track to the soffit of the new bridge deck.

3.3 Bromham Road Bridge - Provision of cycleway

- 3.3.1** A cycleway has been a Bedford Borough Council (BBC) long-term aspiration. Although Network Rail is proposing to reconstruct the bridge (Option 3), the works proposed under the Order do not require reconstruction of the superstructure of the existing bridge. Nevertheless, since the application for the Order was made Network Rail and Bedford Borough Council have entered into an agreement to explore options for the future provision of a separate bridge for pedestrians and cyclists at this location, and for Network Rail to contribute to the design costs for this bridge. This activity is being led by Bedford Borough Council.
- 3.3.2** To provide a wider bridge incorporating a 3m cycleway would require full demolition of the bridge abutments to ground level as they are not big enough to accommodate a wider bridge span, and also and possible changes to the foundations, which is likely to impact on existing railway infrastructure as they would involve excavation in the track support zone, potential changes to cable routes, relocation of signalling equipment cases etc. It would also require amendments to the alignment of the existing approach road to cater for a wider road profile, which in turn would require more temporary and permanent land to be acquired, to construct the larger structure. Such works would result in a longer construction period and increasing disruption to local residents. It is also likely that such works may adversely affect the protected Plane trees to the east of the current bridge. The Network Rail bridge reconstruction authorised by the Order does not require reconstruction of the substructure.

3.4 Bromham Road Bridge - Construction Impact

- 3.4.1** In order to facilitate the reconstruction of Bromham Road Bridge it is first necessary to remove the services present in the deck of the existing bridge. To do this a temporary service bridge is required that can carry the services over the railway during the demolition and reconstruction of the new bridge. During the closure of Bromham Road the temporary bridge will also carry the temporary footpath diversion. Motor vehicles will need to follow the signed vehicular diversion over an alternative railway overbridge. On completion of the Bromham Road Bridge reconstruction the services will be diverted again into the new bridge deck and when the new bridge is opened the temporary structure can be removed.
- 3.4.2** The scaffolding structure will be located within the limits of the existing railway related land boundary to the north of the existing bridge. The bridge span and length of approaches for up to 3m distant from the trackside cess will be provided with 1.8m height plywood screening, which can be extended further to run the full length of the footpath approaches at the same height if there is confirmed to be a definite risk of the public being able to look down into adjacent dwellings and private properties in a more intrusive way than is possible from the present highway footpath approaches to the existing bridge.
- 3.4.3** Network Rail has also agreed with the Guinness Partnership (OBJ/8) to make privacy film available for windows on the south facing elevation of the Guinness Partnership's property to provide further privacy.
- 3.4.4** Opportunities for anti-social behaviour will be minimised by fencing off the area underneath the scaffold bridge so that it is not accessible to the public, and also through the provision of appropriate secluded area deterrent lighting along the temporary footway.
- 3.4.5** Safety of tenants should not be impacted as the works will be fenced off, and not accessible to residents or the public. The amount of space available for recreation will be reduced whilst the works are taking place, however once the works are completed, the impact will be minor.
- 3.4.6** Network Rail will also look at an appropriate surface treatment (painting) of the outer face of the plywood screening such that it reflects light more readily whilst still providing the privacy required.
- 3.4.7** Regarding the control of dust during the works it is an offence under the Environmental Protection Act 1990 (EPA) to cause nuisance to local neighbours by generating dust. The EPA requires that Best Practicable Means (BPM) must be taken to prevent dust causing a nuisance and it is the duty of the contractor to demonstrate that all reasonable remedial action has been implemented. Below are a list of measures and precautions for the management of dust on site

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

construction sites:

- Review material types and use during the design stage to eliminate sources of dust during construction, including to pre-cast construction
- Design out excavation where possible and avoid stock piling of materials on site
- Installation of wheel washing and road cleaning at site entrances where required
- All lorries to be fully sheeted
- Damping down of haul routes and other open areas of site
- Stock-piles to be fully sheeted, and located away from sensitive receptors
- Number of vehicle movements minimised for the importing of materials and removal of excavation and demolition arisings
- Use mains electricity rather than diesel generators
- Use low emission vehicles
- Engines switched off when not in use
- Continuous review of dust levels throughout construction phase to amend control measures accordingly

3.4.8 It is proposed that the boundary treatment will be replaced on a like-for-like basis.

3.4.9 Pedestrian access will be maintained at all times along Bromham Road, as will continued functionality for wheelchair, pram, and cycle traffic through the provision of the temporary scaffolding footbridge and its approach ramps. powered road vehicle traffic and local bus services shall be diverted away from the bridge area over alternative local routes that have been agreed with Bedford Borough Council, this will include routing via Ford End Road and also Bedford Western Bypass.

3.4.10 Powered road vehicle traffic and local bus services shall be diverted away from the bridge area over alternative local routes that have been agreed with Bedford Borough Council, this will include routing via Ford End Road and also Bedford Western Bypass. Existing access to the frontage and thresholds of the properties for tenants is not envisaged to be subject to any direct change or unresolvable disturbance during the course of the works.

3.4.11 The site will be active for approximately 400 days but for the majority of this time the noise level will be comparable with that of a highway environment. The noise level will be greater between July and September in the lead up and follow on works to the main reconstruction weekend (circa 60 days). However, during the demolition and reconstruction planned to take place during a 54 hour block during August 2019 noise levels will not pose a risk to health and safety of workers or local residents. Network Rail and its contractors will implement BPM to reduce noise pollution during construction,

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

following guidance stated in BS5228 Part 1 (**NR 40**). Additionally, Network Rail will continue to work closely with the local authority to manage disruption to the local community and promote engagement through notification letters and the operation of a 24 hour helpline: 03457 11 41 41, for all complaints and enquiries.

4. CONCLUSIONS

4.1. Irthingborough Road Bridge

The reconstruction of Irthingborough Road Bridge as designed does not prevent the construction of the Stanton Cross Route 2 Bridge nor its associated approaches. The area of interface is confined to the south west approach to Irthingborough Road Bridge where the earthworks for the Irthingborough reconstruction can be subsumed into that of the approach earthworks for the Stanton Cross Route 2 Bridge with no detriment to either.

4.2. Bromham Road Bridge - Cycleway

The inclusion of a cycleway as part of the reconstruction of the Bromham Road highway bridge does not form part of the remit received by Network Rail from the DfT for the L2C Route Clearance project as it is provided to enable the electrification and gauge clearance enhancement of the available headroom above the railway. The increase in width to accommodate a cycleway would result in a superstructure wider than the existing bridge substructure that is being reused. As such the cycleway introduces a significant increase in scope to the reconstruction, not only in the superstructure design but more importantly the substructure and earthworks that require minimal works only to accommodate the proposed (non cycle way) design.

4.3. Bromham Road Bridge – Construction Impact

Accepting the proximity of the temporary bridge, required to carry the footpath and utilities diversions, to the properties in question, its design takes into account the concern raised regarding intrusion, overlooking etc. and includes 1.8m screening to address this, as well as the additional measures set out at section 3.4 of this proof.

Whilst the bridge reconstruction site will be active for over a year the level of noise for the majority of this time will be equivalent to that of a normal highway environment. The removal of the old deck and the introduction of the new deck will be undertaken during a single weekend with increased noise during this time and for a period in the lead up to and following this weekend of approximately 60 days.

5. WITNESS DECLARATION

I hereby declare as follows:

- i. This Proof of Evidence includes all facts which I regard as being relevant to the opinions that I have expressed and that the inquiry's attention has been drawn to any matter which would affect the validity of that opinion;
- ii. I believe the facts I have stated in this Proof of Evidence are true and that the opinions expressed are correct; and
- iii. I understand my duty to the inquiry is to help it with matters within my expertise and I have complied with that duty.

**The Network Rail (London to Corby)(Land Acquisition, Level Crossing and Bridge Works)
Order
Proof of Evidence - Engineering**

Appendices

Appendix A

Irthlingborough Form 003 General Arrangement Drawings

- Proposed General Arrangement - Plan
- Proposed General Arrangement Approach Regrade
- Proposed General Arrangement Land Plan

Appendix B

Temporary and Permanent Land Requirements

Appendix C

Superimposed Irthlingborough Road Bridge and Route 2 bridge

Appendix D

- Bromham Road Bridge General Arrangement Drawing
- Bromham Road Bridge Public Access Scaffold Bridge Drawings 1 & 2

Appendix A

Irthlingborough Form 003 General Arrangement Drawings

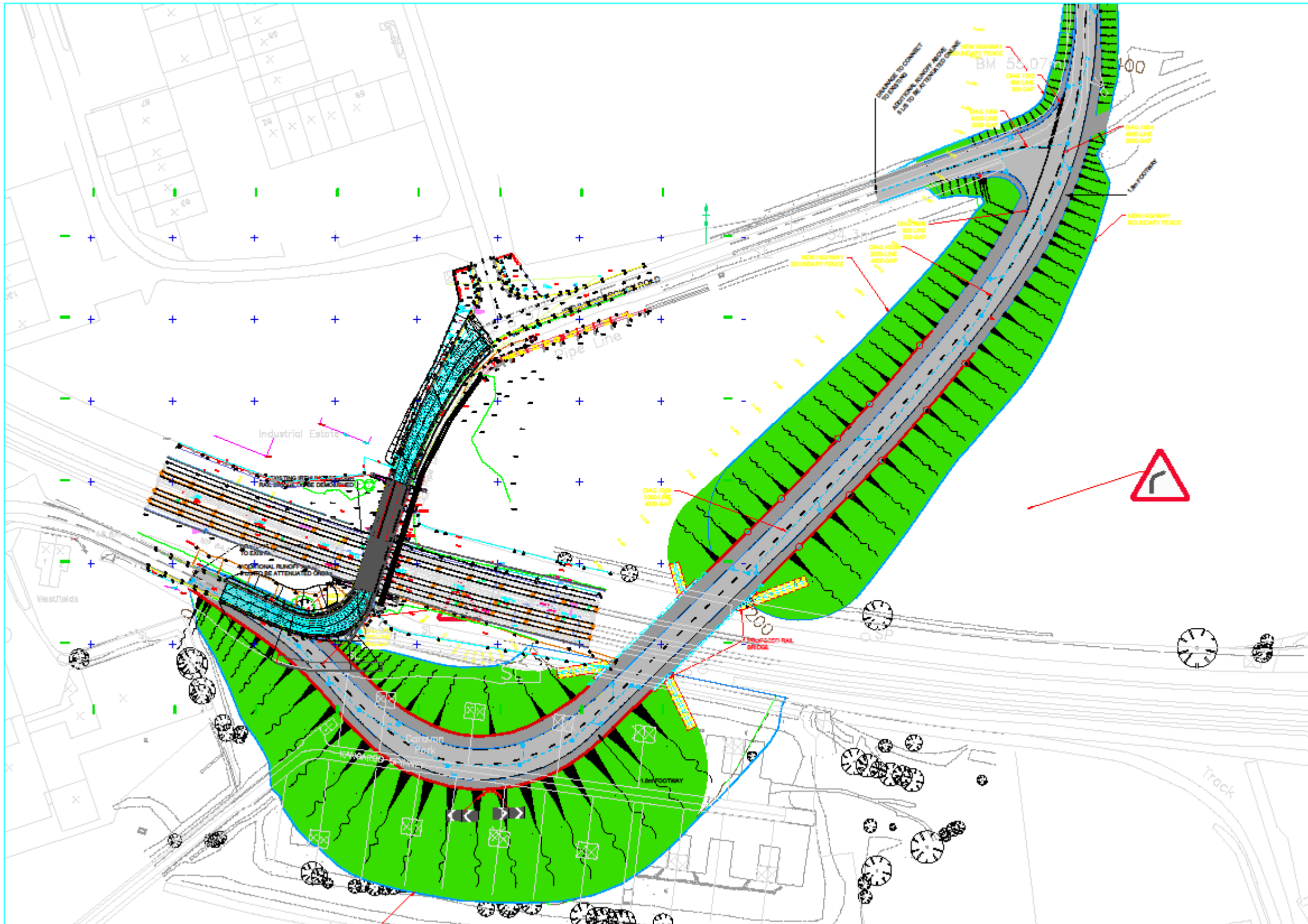
- Proposed General Arrangement - Plan
- Proposed General Arrangement Approach Regrade
- Proposed General Arrangement Land Plan

Appendix B

Temporary and Permanent Land Requirements

Appendix C

Superimposed Irthlingborough Road Bridge and Route 2 bridge



Appendix D

Bromham Road Bridge General Arrangement Drawing

Bromham Road Bridge Public Access Scaffold Bridge Drawings 1 & 2

