

Transport and Works Act 1992

**Transport and Works
(Inquiries Procedure) Rules 2004**

**CROXLEY RAIL LINK
ORDER**

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Summary Proof of Evidence

ENVIRONMENT

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1 INTRODUCTION

1.1 Personal details

1.1.1 My name is Paul Jeffrey Reid. I am a technical director within the Engineering and Environment business unit of Mouchel. My specific responsibilities relate to environmental planning and design and the environmental assessment of many forms of development project.

1.1.2 I have twenty-five years experience in the planning, design and environmental assessment of new development with a strong focus on major infrastructure projects.

1.2 Role in relation to the proposed scheme

1.2.2 My involvement in the project dates back to August 2011 when I was asked to take on the role of technical director for the environmental inputs to the project following the departure of the previous director from Mouchel to pursue a managerial post in another environmental consultancy. Since then I have overviewed the completion of the environmental studies and assessments identified in the scoping opinion for the Environmental Statement, undertaken the final review and editing of the completed ES prior to authorisation by the project promoters and been the principal environmental advisor within the project planning, design and assessment team .

1.3 Scope of evidence

1.3.1 In this summary of my evidence I outline the principal issues associated with the environmental topics considered and reported in the ES published in January 2012 relative to concerns raised in objections which have been submitted following submission of the Transport and Works Act Order documentation.

2 THE FINDINGS OF THE ES AND CONSIDERATION OF OBJECTIONS

2.1 Environmental impacts and mitigation

2.1.1 The ES describes environmental proposals, which include landscape design proposals and environmental mitigation measures which have been developed in light of the findings of the assessments which have been undertaken. These include measures which the contractors appointed to construct the scheme will be required to adopt during construction to reduce the impact associated with a number of construction activities. The delivery of the construction related mitigation measures detailed in the ES have been secured by their inclusion in the Code of Construction Practice (CoCP) for the project which is in turn to be secured by way of the planning conditions committed to by the project promoters.

2.2 Cultural heritage

2.2.1 Concern has been raised that discontinuation of services to Watford Metropolitan Station will result in the deterioration of the existing grade 2 listed building. LUL has confirmed that the buildings and fabric of the station as a whole will be maintained to ensure there is no deterioration in the condition or composition of the listed building. Potential future use has, as of yet, not been identified pending the outcome of the application. Subject to the outcome alternatives for future use will be considered taking into account the building's listed status and the procedures which owners of such assets are required to pursue in the context of the statutory protection they are afforded.

2.3 Ecology

2.3.1 Concerns raised in objections relate to the waterways crossed by the proposed scheme, the importance of the disused branch line as a green corridor and fauna including badger, slow worm and bats.

- 2.4.2 The use of open span structures over the River Gade and Grand Union Canal and retention of existing structures over the River Colne will involve minimal loss of marginal or aquatic habitat at localised points along the watercourses. Adoption of mitigation measures as detailed in section 10.5.27 of the ES will also ensure potential impacts, such as sedimentation or spillage associated with construction will be appropriately addressed.
- 2.4.3 A specific point of concern has been raised in relation to the requirement to replace an existing culvert west of Ascot Road. The proposals provide for the introduction of a new and larger culvert along the existing line of the watercourse and the reinstatement of the profile in the channel of the watercourse and the marginal vegetation where it enters and exits the new culvert. This will ensure that the natural form and flow characteristics of the watercourse are safeguarded and the ecological value of existing green corridor is maintained.
- 2.4.4 In relation to the value of the existing tree-lined disused branch line as a green corridor, there will be temporary fragmentation of the tree and scrub canopy as sections of cutting and embankment slope are re-graded. The proposals provide for the replanting of the sections which will be removed with native tree and shrub species and with mixes which will serve to enhance the diversity of the existing planting and the restored green corridor.
- 2.4.5 In relation to fauna, the presence of a number of species has been established as part of the surveys and assessments undertaken. Appropriate design and construction-related measures have been identified as described in sections 10.5.34 to 10.5.56 of the ES to ensure the identified species are safeguarded in keeping with their nature conservation value and statutory requirements specific to each.

2.5 Townscape and visual impacts

2.5.1 Concerns raised in objections relate to the proposed viaduct, the value of the tree-lined disused branch line in the townscape and visual impacts associated with the re-introduction of trains along the disused branch line, particularly between Ascot Road and Stripling Way.

Proposed viaduct

2.5.2 The proposed nine-span design comprises a continuous structure with a steel/concrete composite deck and steel/concrete composite cantilevers. It is a form which provides for simple, conventional and safe construction. It provides a relatively shallow construction depth of the deck which serves to reduce the bulk of the structure and allows the maintenance of the required highway clearances over the A412. It enables the width of the piers to be kept to a minimum such that they can take the form of an elongated ellipse which will serve to reduce their bulk when viewed in elevation.

2.5.3 The introduction of an enclosure encasing the steel beams that make up the spans to the structure will ensure what would otherwise appear as a series of straight sections comprising the individual spans appear as a smoothly curved alignment.

2.5.4 The appearance of the viaduct and its relationship to the existing tree planting within the local townscape is illustrated in Figures 1 and 2 in Appendix A to my evidence (CRL/5/3). The photomontages show how the viaduct will appear in two viewpoints. The first is from the towpath alongside the Grand Union Canal. The second is adjacent to the Harvester public house beer garden on the A412. Both of these winter views clearly demonstrate the relationship between the viaduct and the principal tree canopy within the area and the extent to which the canopy will reduce the potential prominence of the viaduct from the area as a whole.

The disused branch line

- 2.5.5 The removal of tree planting to facilitate the increase from single to dual-track will partially break the integrity of a locally prominent linear landscape feature. The landscape proposals for the link recognise the impact and provide for the re-establishment of tree and scrub planting, and hence, the integrity of the planting along the corridor.

Visual impacts between Ascot Road and Stripling Way

- 2.5.6 Specific concerns have been raised by residents at Holm Oak Park, and Stripling Way and by Laurance Haines School to the extent that the appearance of the trains could distract some of the pupils.
- 2.5.7 In the case of Holm Oak Park, existing tree planting will be removed to enable cutting slopes to be re-graded. Views from the ground floor of the properties and external areas into the adjacent cutting will, however, continue to be screened by a dense evergreen hedge which marks the boundary with the rail corridor. The views from upper floor windows will tend to be focused over the corridor towards and beyond housing on the south side of the corridor. In the longer term they will be closed as proposed planting infills the opening created during the re-grading.
- 2.5.8 In the case of Stripling Way the re-introduction of trains along the disused branch line will open views from upper storey windows. Whilst the quality of the permanent outlook will not be significantly modified, the appearance of trains at intervals and at the first floor viewing level will result in a sense of intrusion. It has accordingly been concluded that a screen should be provided along the southern margin of the track. Figure 3 in Appendix A to my evidence (CRL/5/3) illustrates the location and height of the proposed screen in relation to properties at 42 and 44 Stripling Way.
- 2.5.9 In the case of Laurance Haines School, the potential for distraction has been discussed with the head of school and the chair of the governors and it has been

agreed that a screen/barrier will be provided along the boundary with the rail corridor. There is, at the present time, no agreement with the school regarding the detailed height and design form of the screen/barrier. Figure 4 in Appendix A to my evidence (CRL/5/2) illustrates a 2.4m high screen located on the existing boundary between the school and the railway land. This is the location and height which the promoters consider most appropriate. As the figure clearly indicates, a screen/barrier in this location of the proposed height will ensure children will not be able to view trains as they pass by and that the potential for visual distraction will be low. I discuss the value of the proposed screen/barrier relative to potential distraction associated with train-related noise in section 4.7 of my evidence.

2.6 **Noise and Vibration**

2.6.1 Concerns raised in relation to noise and vibration include construction noise, noise associated with trains providing the service on the link and vibration, either during construction or once the train service is running.

Construction-related noise

2.6.2 The assessment reported in the ES demonstrates the basis upon which construction noise limits will be established and agreed with Environmental Health Officers (EHOs) within Watford Borough Council and Three Rivers District Council. Should powers be granted, it will be the responsibility of the contractor to develop the proposals for the construction of the proposed scheme. Measures, levels and protocols agreed with the EHOs will be formalised by the contractors in the CoCP for the contract and will form the subject of a Section 61 agreement with the councils as provided for under the Control of Pollution Act

2.6.3 Particular attention will be paid to activities such as piling to ensure that the construction plant chosen, the programming and duration of relevant activities and the control measures adopted will control levels and their duration to the best

practicable minimum taking into account the effectiveness of the construction method and allowing for any other environmental considerations.

- 2.6.4 A number of the objections make reference to construction noise currently being experienced as a result of works being undertaken on the Overground Line between Wiggshall Road and Watford Junction. These works have involved major replacement of existing infrastructure along this section of line whereas the works proposed as part of the scheme and associated with the Overground Line are, by comparison, of a minor nature and will be of much shorter duration.

Operational train noise

- 2.6.5 The design of the modern rolling stock which will provide the service, adoption of high standards of rolling stock maintenance, including lubrication of moving parts, and use of continuously welded track will ensure operational noise levels are limited.
- 2.6.6 The assessments reported in the ES demonstrated that the predicted noise throughout the new sections of the proposed link, would not result in levels which are defined in the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 as being levels at which provision should be made for noise insulation.
- 2.6.7 Notwithstanding the findings relative to the Noise Insulation Regulations, two events have occurred since publication of the ES which have led to the promoters re-considering the approach to mitigation in the context of the proposed scheme.
- 2.6.8 Firstly, the assessment of operating noise levels reported in the ES has been updated to reflect a change in proposed service levels to 6 trains in each direction per hour between 6.00am and midnight and one train in each direction between midnight and 1.00am and 5.00am and 6.00am.

2.6.9 Secondly, London Underground Ltd (LUL) have been considering in detail the approach to mitigation of train- related noise where there are proposals for the construction of a new line. As a result the company has recently published a set of guidelines ‘Noise and Vibration Asset Design Guidance (G1323)’. The guidelines identify a design target for train related noise of less than a 5 dB(A) increase relative to residential and other sensitive receptors.

2.6.10 The results of the updated assessment relative to the representative receptors detailed in the ES are scheduled in Table 1. The results demonstrate that none of the receptors will qualify for assistance in accordance with the provisions of the Noise Insulation (Railways and Other Guided Transport Systems) Regulations but that two, receptors at the Gateway development (Receptor 3) and receptors on Cardiff Road to the west of the merge between the proposed link and existing Overground Line (Receptor 7) meet the 5 dB(A) parameter identified in LULs recently published guidelines. The project promoters have accordingly decided that provision should be made for the introduction of environmental barriers in these two locations as indicated in Figure 5 in the Appendix A to my evidence (CRL/5/3).

Table 1 – Updated operational noise assessment

Receptor	Monitored Levels $L_{Aeq, 1hr}$	110trains/day / each way			
		No barrier L_{Aeq}	Increase	Barrier L_{Aeq}	Increase
1	56.8	57.1	0.3		
2	56.1	56.2	0.1		
3	48.7	54.5	5.8	50.4	1.7
4a	50.5	53.5	3.0		
4	50.1	53.2	3.1		
5	66.6	66.6	0.0		
6	48.8	52.3	3.5		
7	50.2	56.2	6.0	51.7	1.5
8	50.8	50.8	0.0		
9	55.9	58.1	2.2		
10	57.2	57.6	0.4		
11	61.3	61.3	0.0		

- 2.6.11 Concerns have been raised that train-related noise associated with an increase in service frequency will be unacceptable for properties located in the vicinity of the existing Overground Line at Neal Street, Dyson Court and Shaftesbury Road. As can be seen from the figures in Table 1 levels for representative receptors reflecting the proximity of these properties (Receptors 8 and 9 demonstrate that the predicted increases in noise levels will be no greater than 2-2.5 dB(A).
- 2.6.12 Concern has also been raised in relation to Laurance Haines School that noise associated with trains running close the school boundary will, in combination with the appearance of the trains beyond the boundary, prove a distraction to some pupils,
- 2.6.13 As detailed in 2.5.9, the project promoters have held discussions with the school and concluded it would be appropriate to provide an environmental screen/ barrier between the school and the railway land. The proposal is that the screen/barrier will not only serve to prevent distraction associated with views of the trains but will mitigate train-related noise, particularly from the temporary classrooms which are the classrooms most closely located to the proposed scheme. The location and extent of the proposed screen/barrier is indicated in Figure 5 in the Appendix A to my evidence (CRL/5/3). A section indicating the location and height of the screen/barrier relative to the school buildings and playground is provided in Figure 4 in the Appendix A to my evidence (CRL/5/3). A screen/barrier in this location will have the effect of reducing the unmitigated increase in noise from the parts of the temporary classrooms and parts of the playground closest to the proposed scheme from some 5 dB(A) to less than 1 dB(A). This is a low level of increase which the promoters consider does not warrant consideration of further mitigation measures such as the introduction of double glazing.

2.6.14 A number of owners of house boats at Cassio Wharf have also raised concern in objections that noise associated with trains crossing the viaduct will have a detrimental effect on the amenity value of the moorings at the wharf. In light of these concerns changes in noise levels associated with trains passing over the viaduct in the immediate vicinity of the wharf have been calculated. These have been based on monitoring of existing noise levels at the wharf immediately north of the existing railway bridge, prediction of train related noise using the acoustic model for the proposed scheme and subsequent calculation of the anticipated noise levels based on the combination of the monitored levels and modelled levels. The results of the assessment have indicated there will be an increase in noise levels from the existing monitored level of 53dB(A) to levels of between 54-56dB(A). The increase will, therefore, have an adverse impact on noise in the vicinity of the wharf. The impact will, however, be slight in terms of the impact ratings described in the ES and is below the 5dB(A) increase which LUL has adopted as an indicator that mitigation should be considered.

Vibration

2.6.15 Assessments undertaken in relation to vibration during construction have established that the risk of complaint or cosmetic damage during construction is low based on parameters detailed in BS6472 Guide to evaluation of human exposure to vibration in buildings, and BS7385 Evaluation and measurement for vibration in buildings - Guide to damage levels from groundborne vibration

2.6.16 In relation to vibration associated with trains providing the service on the link, the detailed design will involve the application of appropriate standards relative to earthworks stability, track-bed design and tolerances for the installation of the continuously welded track. In light of these required design considerations it has been concluded the risk of disturbance or cosmetic damage associated with operation of the proposed scheme will be low.

2.7 **The water environment and drainage**

2.7.1 Concerns raised relate to impacts on surface water quality and flow characteristics, groundwater quality and supply and potential flood risk as a result of the presence and operation of the proposed scheme within the River Colne and River Gade floodplains.

Surface water quality

2.7.2 Risks identified in relation to surface water quality and flow characteristics relate to the discharge of run-off collected by the proposed drainage scheme to existing watercourses, the design of new structures over watercourses and pollution of watercourses where construction is required in close proximity to existing watercourses.

2.7.3 The proposals provide for surface water discharge at four locations on the River Colne. All four discharges provide for the passage of the drainage waters via petrol interceptors and silt traps and the regulation of discharge flow rates to a design standard of 5l/sec/ha as required by the Environment Agency. These are design measures which will ensure that the magnitude of impact will be negligible and that the proposed scheme will accordingly be neutral in relation to operational impacts associated with surface water discharge to existing watercourses. Planning conditions relating to the measures have been agreed with the Environment Agency subject to the approval of the local planning authorities.

2.7.4 As described earlier in section 2.4.2 (ecology) the use of open span structures over the River Gade and Grand Union Canal and retention of existing structures over the River Colne will involve minimal disruption at the crossing points.

2.7.5 The principal risk to surface water quality during construction will arise as a result of potential release of sediments associated with earthworks, aggregates and fines within storage areas and chemical pollutants such as cement, fuels and oils. The

potential for release of pollutants will arise where earthworks, construction compounds, storage areas and working areas will be in close proximity to any of the five watercourses which cross the alignment of the proposed scheme and where works are required to existing structures over watercourses.

Groundwater quality and supply

- 2.7.6 The principal risks to groundwater quality and supply relate to the need for the use of piled foundations for the construction of the viaduct and at the proposed stations as a potential conduit for contaminants in an area which is underlain by a vulnerable aquifer and the potential for infiltration of potentially polluted surface water run-off leading to contamination of the aquifer.
- 2.7.7 The construction related risk has been addressed by a commitment to adopt the use of bored piles. Once material from the initial bore has been abstracted, the borehole will be lined to prevent encroachment of contaminated material that may otherwise be deposited into the borehole as it is deepened. In the context of the scale of the works, the very low order of risk in light of the proposed method of piling and the extent of the aquifer, the risk to the aquifer will be negligible.
- 2.7.8 Proposed procedures relating to detailed design and methods of working during construction relating to the vulnerable aquifer and contaminated land have been agreed with the Environment Agency subject to the approval of the local planning authorities.
- 2.7.9 The risk of infiltration has been addressed by the use of a sealed piped drainage system with oil interceptors and silt traps and geo-synthetic lining of ballast and drainage trenches will ensure that pollutants carried in surface water run-off are captured and prevented from percolating to the underlying aquifer.

Flood risk

2.7.10 Concerns raised in relation to flood risk include impacts associated with the loss of existing floodplain capacity and obstruction of overland flood flows.

2.7.11 Proposed procedures relating to flood risk and finalisation of the Flood Risk Assessment for the proposed scheme during detailed design have been discussed with the Environment Agency and proposed planning conditions have been agreed subject to the approval of the local planning authorities.

2.8 Traffic and transport

2.8.1 It has been concluded that once the scheme is operational, the reduction in congestion and enhanced accessibility to public transport for local journeys and journeys to and from the wider area, including London, will be of significant practical and economic benefit to people within Watford and the surrounding areas.

2.8.2 The assessment of additional traffic expected during construction has concluded that the overall impact on existing traffic flows is unlikely to be significant. Minor disruption due to the construction works is not expected to have a significant effect on pedestrians, cyclists or users of bus and rail services.

2.9 Land use and community effects

2.9.1 Principal concerns raised relate to the Watford Road Play Area, Rickmansworth Sea Cadets and Morris Minors, Cassio Wharf and the Grand Union Canal, Holywell Allotments, Harwoods Recreation Ground and Laurance Haines School.

Watford Road play area

2.9.2 Issues related to the continued use of the play area are addressed in Mike Adams evidence (CRL/7/2). The issue of exchange land relative to the status of the play area as public open space is addressed in Rob Snell's evidence (CRL/6/2).

Rickmansworth and Watford Sea Cadets and Morris Minors playgroup

- 2.9.3 The location of the proposed viaduct in close proximity to the sea cadets and playgroup will be detrimental to the amenity value of the building and site used by both groups by virtue of associated visual impact and noise. The redesign of the adjacent play area will provide for the inclusion of a hedgerow with specimen trees along the boundary with the site used by the two groups. This will reduce the immediate visual impact, the impact on amenity will, however, remain detrimental.

The Grand Union Canal

- 2.9.4 Issues related to the continued use of the moorings at Cassio Wharf are addressed in Mike Adams evidence (CRL/7/2). In the context of the canal as an important and extensive green corridor used by members of the public, impacts at Cassio Wharf will be highly localised and not significant to the overall amenity value of the waterway.

Holywell Allotments

- 2.9.5 Construction of the proposed Watford Hospital Station will involve the permanent loss of some 35m² of land along the northern margin of the allotments. It is land which is outside of any of the plots and which is on the margin of an area which has been planted with trees. As such there will be no impact on the functional value of the allotments.

Harwoods Recreation Ground

- 2.9.6 Issues related to the continued use of the recreation ground are addressed in Mike Adams evidence (CRL/7/2).

Laurance Haines School

2.9.7 I have outlined the impacts related to the proximity of Laurance Haines School to the reinstated rail corridor under my evidence on townscape and visual impacts (section 2.5.9) and noise and vibration (section 2.6.12 – 2.6.13).

3 WITNESS DECLARATION

I hereby declare as follows:

- 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;
- I believe the facts that I have stated in this proof of evidence are true and that the opinions expressed are correct: and,
- I understand my duty to the inquiry to help it with matters within my expertise and I have complied with that duty.