Rother Valley Railway
LIMITED
IN ASSOCIATION WITH THE KENT & EAST SUSSEX RAILWAY
Patrons: Gregory Barker MP, Chris Green MA FCIT
ROBERTSBRIDGE (RVR) STATION, STATION ROAD,
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John Henderson,
NDD SE Assistant Asset Manager
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Federated House
London Road
Dorking
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11th February 2013

Dear Mr Henderson.

Rother Valley Railway – A21 Level Crossing Scheme
Consultation Response

We are please to enclose our consultation response compiled on our behalf by Mott MacDonald. That in reply to Glen Thompson's letter of 4th May 2012 and your subsequent comments received by email on 14th September 2012.

Our response to your points follows the consultation procedure laid down by the lead Government Authority The Office of the Rail Regulator (ORR). That process for consultation when seeking Powers to Construct and Operate a railway level crossing is detailed in Office of the Rail Regulator document: 'Level Crossings: A guide for managers, designers and operators. Railway Safety Publication No. 7. December 2011'.

In addition to the points you have raised, and that we have covered in the Mott MacDonald response report attached, you also sought clarification in two further matters:

- Supply information on what protection the Highways Agency would have in the event that Rother Valley Railway ceased trading, particularly in respect of the ongoing maintenance or eventual removal of the proposed level crossing.

  Response: RVR could arrange in consultation with the Office of the Rail Regulator for a provision to require the railway operator to have in place such protection by way of such as a charge of the railway assets to the estimated cost of removing the rails etc from the crossing and resurfacing the road as a normal carriageway. In any event those works would be a relatively straightforward task and not envisaged to be significantly expensive.

- Supply information on the proposed public liability insurance of Rother Valley Railway.

  Response: As part of any TWA/Level Crossing Order granted to operate the railway and level crossing the railway operator is required to maintain a minimum level of Public Liability Insurance. The current minimum level of insurance required by the ORR is £5m.

We hope the enclosed is of assistance as we moved forward toward making formal application for Powers to construct and operate the railway

Yours sincerely

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Rother Valley Railway A21 Robertsbridge

Highways & Traffic Assessment Report
(Response to HA Comments on A21 Crossing)

January 2013

Rother Valley Railway Ltd

Rother Valley Railway LIMITED

Mott MacDonald

Rother Valley Railway A21 Robertsbridge

Highways & Traffic Assessment Report
(Response to HA Comments on A21 Crossing)
January 2013

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	16.11.12	M D Lewis	M Price	M D Lewis	First Issue
B	13.12.12	M D Lewis	M Price	M D Lewis	Second Issue
C	17.01.13	M D Lewis	R E Murdock	R E Murdock	Third Issue
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Content

Executive Summary

Rother Valley Railway (RVR) Limited is seeking to reconstruct a section of railway between Bodiam and Robertsbridge in East Sussex. This section is the final missing link in the Kent and East Sussex Railway (KESR).

The reconstructed railway line will enable the direct interchange of passengers between KESR and the mainline railway network at the new Robertsbridge Junction Station. Once complete this will enable visitors to use the country's public transport system to access the KESR and to use the line as a leisure transport corridor serving popular attractions such as the National Trust's Bodiam Castle and the historic town of Tenterden.

In order to complete the restoration, RVR is proposing to construct a level crossing on the A21 Robertsbridge Bypass.

The Level Crossing Approval Process

The proposed restoration of the railway, and the construction of the associated level crossings, is proposed to be enacted under the Transport & Works Act (TWA) and/or Level Crossings Act (LCA), 1983.

The lead Government Authority in the making of an Order to construct and operate a Level Crossing is the Office of the Rail Regulator (ORR).

The process for seeking Powers to Construct and Operate a railway level crossing is detailed in Office of the Rail Regulator document: 'Level Crossings: A guide for managers, designers and operators. Railway Safety Publication No. 7. December 2011'. That can be found at:
http://www.rail-reg.gov.uk/upload/pdf/level_crossings_guidance.pdf

As the first stage in this procedure, RVR has developed and refined designs and specifications for the proposed crossing that have been considered at length by the overseeing organisation, the Office of Rail Regulation (ORR).

Following completion of the initial stage of the level crossing approval process 20th January 2012 the ORR issued a Letter of No Objection in Principle to the proposed level crossings.

As detailed in the procedural guidelines for such an application, RVR now seeks to consult with the Local Highway Authority(s) as consultees in the level crossing approval process. This process of consultation began in early 2012.

This further report presents technical work done in response to questions raised by the Highways Agency (HA) in particular in connection with the A21 level crossing.

As one part of that process the Highways Agency has suggested a formal 'Application for a Departure from Standard' be submitted to HA by RVR. The RVR does not consider a response in such format is appropriate to the application process outlined in the Office of the Rail Regulator document: 'Level Crossings: A guide for managers, designers and operators Crossing Order'. Instead RVR has sought to cover such issues in this report and response.

1. Introduction

1.1 Background

The Kent and East Sussex Railway (KESR) has progressively reopened the old railway line between Tenterden and Bodiam Castle, which became the current terminus of the line in 2000.

Rother Valley Railway (RVR) is a heritage railway charity aiming to restore the final missing link for the KESR by recreating the link between Robertsbridge and Bodiam, a distance of approximately 3 miles.

Completion of this link will restore the original line to Robertsbridge Junction Station and so provide a direct public leisure transport connection between mainline railway passenger services and the KESR.

RVR began work on restoring the railway in 2010 and are following the original rail alignment. To date: -

- About 1 mile of the new railway has been built from Bodiam as far as Junction Road.
- At the western end the line has recently been rebuilt from Robertsbridge Junction Station to the outskirts of the village.
- RVR has now commissioned the construction of the new Robertsbridge Junction Interchange Station.

To date RVR has committed about £1.5 million to these first phases of the works and has available funding to complete the remaining 'central' section of the line once Powers have been secured.

To complete the link, RVR needs to cross the A21 Robertsbridge Bypass and this represents the last major hurdle to the ultimate restoration of some 13 ½ miles of heritage railway.

The proposed route follows that of the original railway and crosses the A21 to the south of the Northbridge Street roundabout. The proposed design will use a full barrier locally monitored and controlled level crossing to provide a safe at grade intersection between the A21 and the railway.

1.2 Project Chronology

The following table sets out the approximate chronology and / or timeframe of the scheme development to date: -

Milestone	Timeline	Key Outcomes
Rother Valley Railway (RVR) Discussions with Office of Rail Regulator (ORR)	Early 2011	Initial discussions and ORR visits to proposed level crossing sites
RVR letter to ORR	19th July 2011	Sets out proposed level crossing details and submission of Mott MacDonald (MM) Level Crossing Impact study Issue Revision 'D'
ORR letter to RVR	24th August 2011	Response and Report comments.
RVR email to ORR	6th November 2011	Submitted updated MM Level Crossing Impact study Issue Revision 'E'
ORR letter to RVR	20th January 2012	Summary Response with no objection in principle
RVR letter to Highways Agency (HA)	23rd May 2012	Submitted ORR letter dated 23rd March 2012 and MM Level Crossing Impact study Issue Revision 'E'

Meeting between Rother Valley Railway and Highways Agency	19th April 2012	Initial consultation regarding process and next steps
HA letter to RVR	4th May 2012	Set out next steps for RVR to address with respect to traffic, safety and consultation.
Meeting between RVR and HA	7th September 2012	Discussed revised position between HA and RVR as part of the consultation agreement.

Table 1-1: Chronology of events regarding RVR and the scheme development

1.3 Report Structure

The sections of the report consider the following headings: -

Section 1 – Location and Scheme Description;

Section 2 – Scheme Options;

Section 3 – Comparison of Scheme Options;

Section 4 – Traffic Assessment;

Section 5 – Road Safety Assessment; and

Section 6 – Journey Time Assessment.

In addition, several appendices are included within this report which provided supplementary evidence in support of the respective headline findings of **Sections 4** to **6** outlined above.

The accompanying appendices are as follow: -

Appendix	Title	Document Reference	Revision
A	Non-Motorised User (NMU) Context Report;	313090/ITD/ITQ/001	D
B	NMU Audit Report;	264223/ITD/ITQ/126	D
C	Traffic Impact Study (this is an earlier report that we are providing additional information on;	288755/ITD/ITW/001	E
D	Traffic Impact Study – Supplementary Technical Note (following HA comments dated 14th September 2012);	313090/ITD/ITQ/003	D
E	Personal Injury Accident Analysis Technical Note	313090/ITD/ITQ/004	D
F	Journey Time Analysis Technical Note	313090/ITD/ITQ/007	C

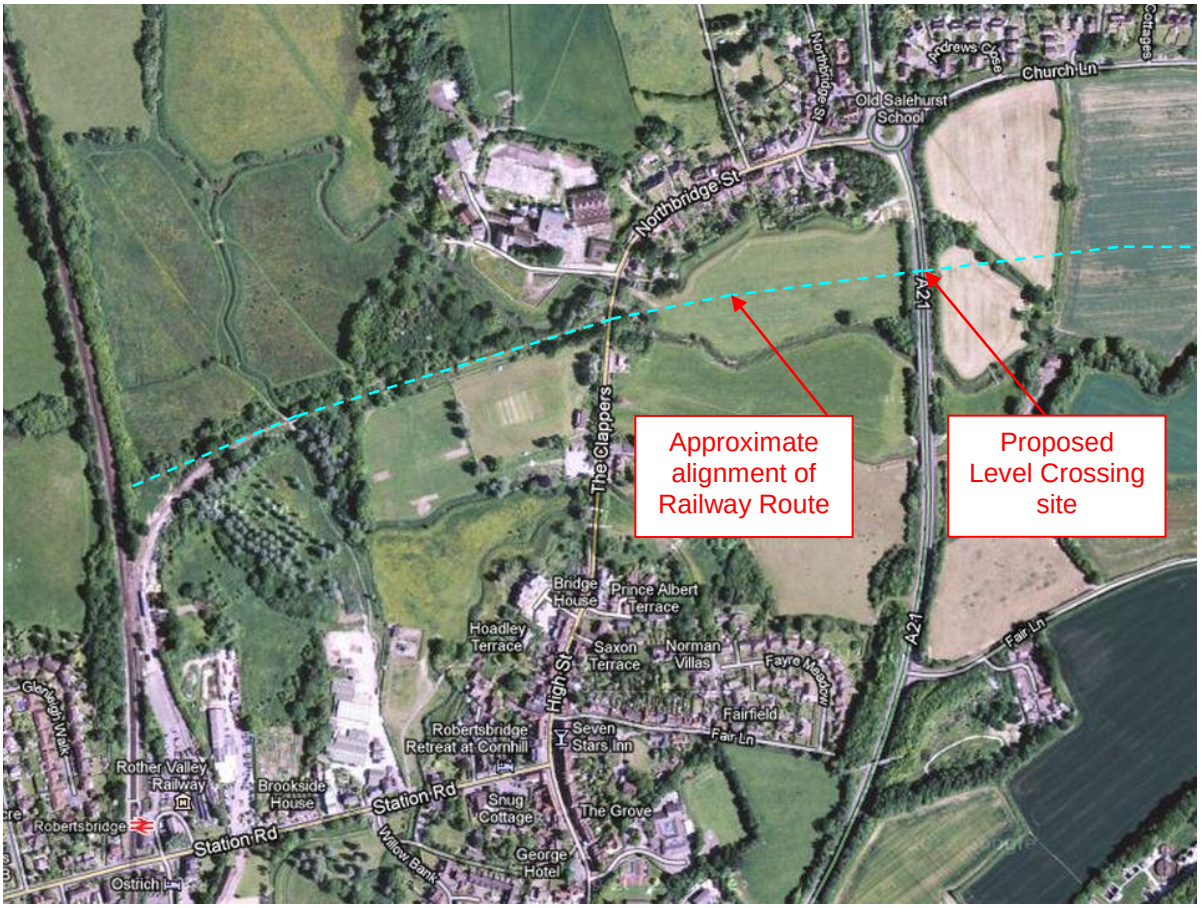
2. Location and Scheme Description

2.1 Location

The proposed level crossing is located on the A21 Robertsbridge Bypass in East Sussex at a position approximately 135m south of the Northbridge Street Roundabout.

Robertsbridge itself is a small village located approximately 10 miles north of Hastings and 13 miles south east of Royal Tunbridge Wells. The Section ID for the crossing location is 1400A21/841.

Figure 2-1: A21 Robertsbridge bypass, Northbridge Street roundabout and the proposed level crossing location.



i. Source: Imagery ©2012 DigitalGlobe, GeoEye, Getmapping plc, Infoterra Ltd & Bluesky, Map data ©2012 Google

2.2 Scheme Description

The proposed scheme comprises the construction of an at-grade level crossing of the A21. The crossing would comprise full carriageway width locally monitored and controlled barriers in order to prevent vehicle and NMU incursion onto the crossing in accordance with the requirements of the Level Crossing Guidelines As Above. The proposal also comprises the extension of the existing 40mph speed limit south of the A21 roundabout junction with the C18 Northbridge Street, provision of new signs and road markings in accordance with the requirements of the Traffic Signs Regulations and General Directions (TSR&GD) and the Traffic Signs Manual standards and/or the guidance document "Level Crossings: a Guide for Managers, Designers and Operators – Rail Publication 7 (December 2011)", all as appropriate.

3. Scheme Options

3.1 Overview

RVR has considered options for grade separation at the A21; with both an underbridge and overbridge being investigated. It is understood that both of these options would be preferable to a level crossing according to ORR policy; however it was found that a level crossing represents the most practical solution for a range of technical reasons.

In its submission to ORR a study by consultants Halcrow (Technical Note: RVR-EW-001 15th May 2011) confirmed that the short distance between the river bridge adjacent to Northbridge Street and the A21 would result in an unacceptably steep gradient up or down resulting in safety issues and that an under bridge would put the railway track under the A21 much lower than the adjacent river. In addition flooding of the underbridge option would be inevitable and is anticipated to occur several times during the course of a year. These events would lead to a deposit of silt and collection of debris along the railway line which would require removal prior to the line re-opening and cause train safety adhesion risks. The level crossing option would have a significantly reduced environmental impact in comparison to any other option.

Furthermore the flood assessment model work recently undertaken by consultants Capita Symonds for RVR has considered flooding in the area near the A21 at Northbridge Street and in particular its effect on the adjacent bunded and protected housings area. The River Rother immediately adjacent to the proposed Northbridge level crossing is a ‘pinch point’ in the flow of the river at times of significant flood flow. The model used when the flood protection scheme was built some years ago assumes that the river can overtop its banks into the field between Northbridge Street and the A21 level crossings, so in effect increasing the rivers flow capacity in that area. Remodelling that scheme with the level crossings requires the reconstructed railway embankment joining those two level crossings to have a number of flood culverts openings under the railway line to enable that flood flow to continue to run southwards under the railway at that location. A cutting built for an A21 underbridge would therefore require that flood flow to continue to be able to pass across the railway in volume at times of significant flood flow so completely filling such cutting with water, mud and detritus and so make such a cutting impractical.

3.2 Level Crossing

The proposed level crossing would be constructed from a monolithic precast concrete slab with embedded rail, such as the EDILON LC-H system or similar. This system offers minimal settlement and rapid installation; typically requiring a short weekend closure to install. EDILON LC-H systems have also been shown to require very little maintenance over their operational life and would allow a seamless connection to the adjacent road surface. The slabs can be manufactured to provide high skid resistance values using special concrete mixtures on the top surface. The railway embankment required for construction of a level crossing would have an average height of 1.66m.

4. Comparison of Scheme Options

4.1 Road Safety (Road Users)

It has been agreed with HA that any necessary detailed road safety audit is premature at this stage, however, the HA has requested that the needs of non-motorised users (NMUs) be considered. To that end, an NMU Context report (313090/ITD-ITQ-001) and an NMU Audit report (264223FD-ITD-ITQ-126) have been prepared.

These are shown at **Appendix A** and **B** respectively.

Potential road safety impacts include the following:

- Traffic queuing back towards the Northbridge Street roundabout north of the crossing.
- Possibility of northbound traffic tailing back from Northbridge Street roundabout and blocking the crossing.
- Risk of unreliability associated with theft, vandalism or failure of the crossing equipment.

It is considered that the provision of a level crossing at this location would be even safer than a full barrier locally monitored signalman controlled level crossing on the national rail network all as in **Appendix E**. This is due to the following reasons:

- As a tourist line, it will have fewer days of operation;
- A limited proportion of journeys will take place under dusk/night conditions;
- Trains will be limited to speeds set by agreement with the ORR but typically +/- 15mph at the crossing location; and
- Few trains are timetabled to run during the weekday rush hours when traffic density on the A21 will be at its peak.

4.2 Maintenance/Durability

As detailed above, the proposed level crossing construction will limit maintenance to a negligible level.

4.3 Environmental

Rother District Council's (RDC) Local Plan (Adopted: July 2006, Section 9.25) offers support to the extension of the KESR between Bodiam and Robertsbridge on the basis that it does not compromise the integrity of the floodplain or flood protection measures surrounding Robertsbridge. RVR has commissioned consultants Capita Symonds to review the impact of the reconstruction of the railway which work is currently moving toward satisfactory completion.

RVR has also consulted with the High Weald area of outstanding natural beauty (AONB) unit which has not presented any objection in principle to the reinstatement of the line on its original alignment.

4.4 Network Availability

The construction of a level crossing would require a short weekend closure of the A21 during the quietest part of the year.

4.5 Traffic Assessment

A traffic impact study produced by Mott MacDonald in September 2011 reported forecast impacts on the A21 as a result of the proposals.

These are amplified as a result of HA's initial comments and are detailed further in **Section 5** of this report.

5. Traffic Assessment

5.1 Overview

Mott MacDonald produced a Traffic Impact Study in September 2011 (Doc. Ref. 288755/ITD/ITQ/001/D) which sets out the assessment of the proposed crossing and the forecast impacts as a result of its operation.

The Traffic Impact Study sets out to report forecast maximum and average northbound and southbound A21 queue lengths for the following scenarios based on the timetabled operation of the proposed crossing: -

- Traffic flows for the 'current year' (2010);
- Traffic flows for the 'design year' (five years hence): 2016; and
- Traffic flows for the 'design year' (ten years hence) 2021.

It is recognised that significant queuing is forecast for the design year, 2021. On occasions, for example Bank Holidays, queues are forecast to exceed 1km.

The Traffic Impact Study (Doc. Ref. 288755/ITD/ITQ/001/E, October 2011) is referenced at **Appendix C**.

5.2 Highways Agency comments on Traffic Impact Study

Comments on elements of this study were received by Mott MacDonald, from the Highways Agency (via email dated 14th September 2012).

These comments are summarised as follows: -

5.2.1.1 Flow Data

The HA's consultants, Parsons Brinckerhoff (PB), have noted that whilst acceptable for the purposes of this assessment: -

> *"it should be noted that hourly vehicular arrivals are unlikely to be uniform particularly around the peak hours and further work may therefore be necessary."*

Furthermore: -

> *"The use of averages to determine weekday and weekend flows for spring, summer and autumn will result in profiles that do not represent peak flow conditions. A more robust and recommended approach would be to assess the worst case weekday and weekend profiles and also look at the upper quartile of weekend and weekday flow data."*

Response - This has been considered and is shown in Section 5.2 of the Technical Note referenced at **Appendix D**.

5.2.1.2 Traffic Growth

> *"TEMPRO has been used to growth the 2010 TRADS flows to 2016 and 2021 to represent five and ten year opening date scenarios. The use of dataset 62 and NTM factors is accepted together with the associated growth factors."*

Response - Hence, there are no actions arising in this regard.

5.2.1.3 Queuing Analysis

The HA's consultants, PB, also note that: -

> *"The proposed level crossing is situated approximately 140m south of the Northbridge Street roundabout. Therefore, assuming a length of 5.75m per vehicle, a queue of 24 vehicles or more, associated with the crossing in the southbound direction, would result in queue interaction with the junction and represent an unacceptable risk to road safety. Notwithstanding the above recommended changes to the flow data and closure times, the spreadsheet model indicates that queues of 24 vehicles or more could occur during extreme flow days such as bank holidays."*

Furthermore: -

> *"Chapter 5 states that on extreme flow days the A21 is already congested and therefore the introduction of the level crossing would not have a discernable impact on traffic as it would already be queuing. This conclusion is not supported as the level of queuing associated with the congestion is not quantified and is likely to vary on an annual basis. As such, the introduction of the level crossing is likely to exacerbate the queuing conditions which could cause queuing back to the Northbridge Street roundabout.*
>
> *There is also an additional danger that if traffic is queuing the barriers could close on a vehicle which has not made it fully across the level crossing due to the slow moving traffic. This could however, be mitigated in the design if the crossing is controlled by a signalman with CCTV coverage of the crossing in addition to the yellow box markings."*

Response – With regard to the HA's consultants concerns regarding vehicles queuing and the operation of the barrier, there is no danger to queuing traffic that the barriers could close on a vehicle. This is due to the proposed level crossing being of the Full barrier Local Monitored and signalman controlled type. This will not be an 'automatic', or unmanned / unmonitored level crossings.

Furthermore, the operational sequence for closing the level crossing by the signalman being: -

- Turn on road stop lights plus warblers.
- Once the level crossing site is seen to be clear the signalman will lower half only of barriers (diagonally opposite and immediately facing the oncoming direction of road traffic).
- Then, when ready, and after ensuring no road traffic remains within the level crossing envelope, the signalman will lower the other pair of diagonally opposite barriers – so completely isolating the road from the railway.
- Then turn the railway signals to 'clear' for the passage of the railway train – the maximum speed of which is set in discussion with the overseeing body the Office of the Rail Regulator but anticipated to be set in the region of +/-15 mph.

With respect to queuing capacity, the theoretical capacity of a link is taken from the Highways Agency advice note TA46/97. Annex D of TA46/97 refers to the Congestion Reference Flow (CRF). The CRF is an estimate of the capacity of a link when it is considered to be congested (i.e. the hourly traffic demand exceeds the maximum sustainable hourly throughput of the link. The CRF for the maximum sustainable hourly lane throughput is defined as: -

CAPACITY = [A – B * Pk%H]

Where, Pk%H is the percentage of 'Heavy Vehicles'.

A and B parameters are dependant on road standard;

	A	B
Single Carriageway	1380	15.0
Dual Carriageway	2100	20.0
Motorway	2300	25.0

Figure 3.2 (page 16) of the Traffic Impact Study (Doc. Ref. 288755/ITD/ITQ/001/D) indicates that the southbound flows for the Spring / Autumn profile exceed the CRF in 2010.

Furthermore, it is considered that from a traffic operation perspective, the interruption of vehicle flow on bank holidays at the proposed RVR level crossing will be of much the same effect as at the various pedestrian crossings and traffic light controlled junctions already existing on the A21 between Tonbridge and Hastings.

5.2.1.4 Road Safety

At present there is not considered to be an accident problem at the location of the proposed crossing. The HA's consultants have raised the concern that the introduction of a new level crossing and the associated reduction in speed limit from 70mph to 40mph would inhibit the free flow of traffic and increase the road safety risk. It is also unclear how the speed reduction will be enforced.

It is also asserted by the HA's consultants, PB, that: -

"the risk is further increased if the queue interacts with the Northbridge Street roundabout which it is forecast to do during peak flow days. Given that the above changes to the spreadsheet model are likely to result in greater forecast levels of queuing and the frequency of queue interaction with the roundabout the road safety risk is likely to increase."

Response – The speed limit at the crossing location is already 40mph. The extension of the road speed restriction would form a part of the level crossing powers contained within the TWA Order / Level Crossing Order application. If the Order is made, the additional short section of 40mph road will become subject to the normal speed restriction enforcement procedures already in place on the A21.

6. Road Safety Assessment

6.1 Background

In the HA's correspondence (letter dated 4th May 2012), it was requested that: -

> *"To demonstrate what the impact would be on road safety (an entirely additional issue from rail safety). As discussed there is already a collision record of Killed, seriously injured and slight collisions that highway authorities are challenged with and the HA seek developer mitigation to ensure that the collision record does not worsen."*

And;

> *"To include an assessment of what impact the development would have on changing behaviours of traffic diverting through Robertsbridge. This should include consideration of the impact on collision record at the A21 junction with George Hill."*

6.2 A21 near site of proposed crossing

With respect to the A21 itself, the data shows that there are three Personal Injury Accidents (PIA) within a 250m search radius of the site. Of these, only one (Sussex Police Ref. 0805073) is considered to be relevant to the site. This involved a motor vehicle overtaking another vehicle and was classified as slight in severity.

6.3 Comparative analysis of other sites

In order to make an informed decision on the possible impacts of a full barrier controlled level crossing, six sites have been reviewed with respect to their historical collision data.

The full details of the road safety (comparative analysis) are shown at **Appendix E**.

The choice of these sites has been directed by RVR, who considered that they have representative characteristics similar to those exhibited by the proposed crossing site on the A21 at Robertsbridge.

The perceived generalised dangers associated with railway level crossings come primarily from accidents at 'open' level crossings, half barrier level crossings, automatically operated (unmonitored) level crossings and user worked crossings.

The type of level crossings proposed by RVR are of the Full Barrier type, local monitored & controlled by a railway signalman. These are also classified as MCG, MOB & MOB-CACTV crossings in the reports referred to below.

Two learned reports provide a useful detailed overview of railway level crossing data:

- Railway Accident Investigation Branch (RAIB) (a UK Government Agency). Study of 'Open' crossings – but that contains detailed comparative performance data for 'Full Barrier' crossings – as the type proposed by RVR.

Source: http://www.raib.gov.uk/cms_resources.cfm?file=/110728_R122011_AOCLs_Class_Inv.pdf

- Centre for Transport Studies: Andrew W Evans Imperial College London. This paper investigates level crossing performance over the period 1946 to 2009.

Source: http://www.cts.cv.ic.ac.uk/html/ResearchActivities/publicationDetails.asp?PublicationID=1432

It is therefore considered that full barrier level crossings are regarded as having a good safety record as demonstrated both in this report and the learned studies referred to above.

7. Journey Time Assessment

7.1 Overview

This section considers an assessment of the use by drivers of the route via Robertsbridge village (C18) as an alternative to the A21.

As part of the overall assessment, journey time surveys have been conducted along the A21 and Northbridge Street (the C18 through Robertsbridge). That in response to a question from HA as to if the route through Robertsbridge might provide an alternative to traffic seeking to avoid a level crossing closure on the A21.

The surveys were undertaken on Tuesday 23rd October for the following periods: -

- AM peak (0630 – 0830);
- Inter-peak (0930 - 1130); and
- PM peak (1630 – 1830).

The routes surveyed are as follows: -

- A - A21(T) mainline, southbound (through the site of the proposed level crossing).
- B – C18 via Robertsbridge village, southbound (avoiding the site of the proposed level crossing).
- C - A21(T) mainline, northbound (through the site of the proposed level crossing).
- D – C18 via Robertsbridge village, northbound (avoiding the site of the proposed level crossing).

7.2 Journey Time Survey Findings

Unsurprisingly, the journey time via the C18 Northbridge Street, through Robertsbridge is longer than the direct route via the A21 Robertsbridge Bypass.

The journey times along the A21 between the reference points takes approximately 3 minutes 30 seconds, whilst journey times via the C18 Northbridge Street take approximately 5 minutes.

The standard deviation for the journey times has been calculated and the variance from the mean has been determined. There is a high confidence that journey times on this route fall within +/- 1 standard deviation of the mean journey time.

It is considered unlikely that traffic would divert from the A21 at Robertsbridge, along the C18 in order to avoid any queuing that may occur as a result of the proposed level crossing being in operation. The full results of the journey time surveys are shown at **Appendix F**.

8. Conclusions

8.1 Tourist Heritage Railway Transport

Completion of the railway line between Bodiam and Robertsbridge Junction Station will enable the direct interchange of passengers between KESR and the mainline railway network. Once complete this will enable visitors to use the countries public transport system to access the KESR, rather than at present largely by private car or coach. With proper access to the mainline railway system at Robertsbridge Junction the line will be able to operate as a public leisure transport corridor serving popular attractions such as the National Trust's busy Bodiam Castle and the historic town of Tenterden.

This will create a heritage railway transport link that will provide tangible public transport benefits as well as benefit the local economy as a result of an increase in tourism. The railway will also serve to reduce traffic movements on local rural roads by encouraging tourist to use the UK's public transport network to visit the KESR and the local attractions such as Bodiam caste and Tenterden that the line serves. The level crossing is considered to represent the only real feasible solution for crossing the A21.

8.2 Engineering

With respect to design of the Level crossing, such works are not covered by existing Design Manual for Roads and Bridges (DMRB) / Manual of Contract Documents for Highway Works (MCHW). Therefore those aspects which can be applied, such as the Stopping Sight Distance (SSD), road markings, position of signage etc, will be done so in accordance with the above standards and/or the guidance document "Level Crossings: a Guide for Managers, Designers and Operators – Rail Publication 7 (December 2011)", all as appropriate.

8.3 Traffic Assessment

The traffic impact study indicates that a level crossing operating under the sample timetable will cause only marginal delays to traffic on the A21.

Queuing is forecast to occur on occasions, however, the A21 currently experiences significant congestion, queuing and delay on Bank Holidays. In fact analysis of traffic flow data shows that the A21 experiences congestion reference flows (CRF) which suggest that the maximum sustainable hourly throughput of the link is exceeded. Installation of the proposed level crossings will barely effect overall journey times.

8.4 Road Safety

The provision of a full width barrier controlled level crossing does introduce some potential road safety impacts. The proposal has been the subject of a NMU Audit report (**Appendices A** and **B**) as requested by HA. The conclusions of this are that there is little current NMU activity along this section of the A21 (be it pedestrian, cyclists or equestrian activity).

Appendices

Appendix A. Non-Motorised User (NMU) Audit - Context Report

Appendix B. Non-Motorised User (NMU) Audit Report

Appendix C. Traffic Impact Study

Appendix D. Traffic Impact Study – Supplementary Technical Note

Appendix E. Personal Injury Accident Analysis Technical Note

Appendix F. Journey Time Analysis Technical Note

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Non-Motorised User (NMU) Audit - Context Report

January 2013

Rother Valley Railway Limited

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Rother Valley Railway Limited

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	15th November 2012	B Pledge	M Lewis	R Murdock	First Issue
B	13th December 2012	B Pledge	M Lewis	R Murdock	Second Issue
C	17th January 2013	M Lewis	R Murdock	R Murdock	Third Issue
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Content

Executive Summary

The Kent and East Sussex Railway (KESR) operates between Tenterden in Kent and Bodiam Castle in East Sussex. The line is currently difficult to access by public transport.

The Rother Valley Railway (RVR) Heritage Trust is currently reconstructing the railway line between the line's current terminus at Bodiam and Robertsbridge Junction Station to enable the direct interchange of passengers between KESR and the mainline railway network. Once complete that will enable visitors to use the country's public transport system to access the KESR and to use the line as a leisure transport corridor serving popular attractions such as the National Trust's Bodiam Castle and the historic town of Tenterden.

This report sets out the Non-Motorised User (NMU) Context Report requirements as defined in the Highways Agency standard HD42/05 'Non-Motorised User Audits'. The NMU Context Report provides a summary of all available information relevant to existing and potential patterns of use by NMUs within the design life of the scheme.

This NMU Context Report sets out the opportunities and objectives to improve conditions for NMUs in relation to the proposed scheme.

1. Introduction

1.1 Background

This NMU Context Report has been prepared at the outset of the preliminary design and relates to footways, footpaths, public rights of way (PROW), permissive paths, cycleways and other local routes potentially impacted upon by the proposed A21 Rother Valley Railway level crossing proposal. It has been prepared following the guidance given in the Highways Agency's standard HD42/05 – Non-Motorised User Audits.

The report takes into account work to date with respect to NMUs, primarily in relation to the existing route and also to adjacent communities and suggests mitigation measures (where appropriate).

It is understood that as part of the scheme development, an Environmental Statement has not yet been prepared. It is envisaged that this statement will be prepared at a later date as part of the Transport & Works Act / Level Crossing Order application process.

2. Scheme Description

2.1 Overview

The proposal comprises the construction of a new full-barrier controlled railway level crossing across the A21(T) Robertsbridge Bypass, some 135m south of the existing roundabout with the C18 (Northbridge Street).

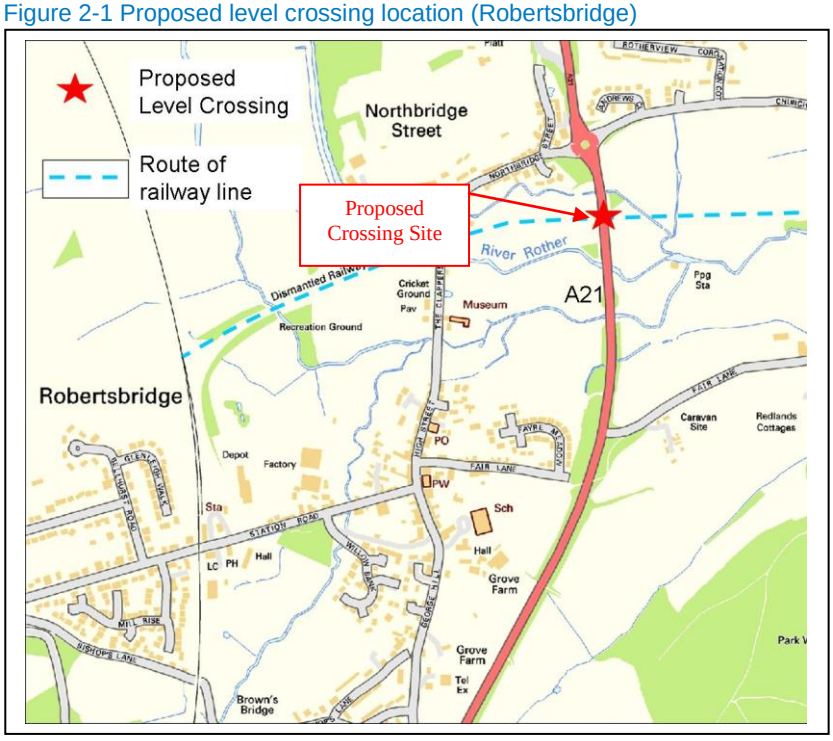
View of A21 looking south towards proposed level crossing site

Source: Mott MacDonald

The A21 at this location is a two-lane, two-way all purpose trunk road (APTR). The carriageway cross-section at this location is 7.3m wide with 1.0m wide hardstrips. For the purposes of this assessment, it is considered as being of 'S2' standard.

The location of the proposed level crossing site is shown overleaf in **Figure 2-1**.

Figure 2-1 Proposed level crossing location (Robertsbridge)



Source: Background Mapping - Ordnance Survey data © Crown copyright and database copyright 2010

3. Policy Context

3.1 Planning and the Strategic Road Network

The policy context in which this process is being developed is twofold, and is outlined as follows: -

The Level Crossing Approval Process

The proposed restoration of the railway, and the construction of the associated level crossings, is proposed to be enacted under the Transport & Works Act (TWA) and/or Level Crossings Act (LCA), 1983.

The lead Government Authority in the making of an Order to construct and operate a Level Crossing is the Office of the Rail Regulator (ORR).

The process for seeking Powers to Construct and Operate a railway level crossing is detailed in Office of the Rail Regulator document: 'Level Crossings: A guide for managers, designers and operators. Railway Safety Publication No. 7. December 2011'. That can be found at:

http://www.rail-reg.gov.uk/upload/pdf/level_crossings_guidance.pdf

RVR has developed and refined designs and specifications for the proposed crossing that have been considered at length by the overseeing organisation, the ORR.

Following completion of the initial stage of the level crossing approval process 20th January 2012 the ORR issued a Letter of No Objection in Principle to the proposed level crossings.

As detailed in the procedural guidelines for such an application, RVR now seeks to consult with the Local Highway Authority(s) as consultees in the level crossing approval process. This process of consultation began in early 2012.

Department for Transport / Highways Agency Development Protocols

The Department for Transport (DfT) Circular 02/2007 March 2007 sets out the parameters for development on the Highways Agency (HA) network.

This states that: -

42. The Agency will adopt a graduated and less restrictive approach to accesses on the remainder of the strategic road network, but there will still be a presumption in favour of using existing accesses and junctions. Any additional junctions or increased junction capacity should be identified in the LDD and/or RTS and will be considered within the context of the Agency's forward programme of works.

43. Regardless of the status of the road, developers will be required to ensure that their proposals comply in all respects with design standards and other requirements. Where there would be physical changes to the network, schemes must be submitted to road safety and non-motorised user audit procedures. The Design Manual for Roads and Bridges sets out details of the Secretary of State's requirements for access design and audit. If necessary, further advice is available from the Agency. The Secretary of State may direct that planning permission not be granted for any planning application which fails to meet these requirements or which, for any other reason, raises significant safety concerns.

44. The Agency should be consulted on any development proposals where a new access onto a local road is required, which in turn feeds a strategic road and has the potential for a material effect.

45. LPAs will need to consult the Agency over any development which may affect the users of a strategic road, even though it may not lead to an increase in traffic. Examples of such development would include earth mounds, wind farms and golf courses. The Agency should also be consulted on applications for signs or advertisements visible from the strategic road network."

4. NMU Activity

4.1 NMU Flows

Mott MacDonald has been unable to directly source data from any public authority relating to pedestrian, cycle and equestrian activity along the A21 at Robertsbridge (between the roundabout with the C18 to the north and the roundabout with the A2100 to the south).

However, as part of the scheme development proposals, RVR has undertaken a number of surveys to conduct counts of NMU movement along the A21 at the location of the proposed level crossing in order to quantify the level of activity that does occur.

Initial surveys conducted by RVR on Wednesday 14th November 2012 for the 12-hour period 0700-1900 showed that no pedestrians, cyclists or horses were recorded as passing the site.

Further surveys conducted at the site of the proposed A21 level crossing on Sunday 13th January 2013 for the 12-hour period 0700-1900 again showed that no pedestrians, cyclists or horses were recorded as passing the site. The results of both surveys are provided at **Appendix A**.

Furthermore, Mott MacDonald considers that there is likely to be no, or little, NMU activity along this section of the A21. This is based on the premise that the A21 at this location acts as a bypass to the east of Robertsbridge and its primary function is the efficient and expeditious movement of traffic, north–south along the A21 corridor.

Nevertheless, the use of the A21 at this location does permit the passage of NMU traffic and so this report considers the pedestrian, cycle and equestrian usage even though those flows are clearly extremely low.

4.1.1 Pedestrians and pedestrian routes

There is no pedestrian provision along the A21(T) Robertsbridge Bypass.

Signed pedestrian routes run perpendicular to the A21 near the location of the proposed level crossing. However, these are situated in adjacent fields and grazing land and do not necessitate the crossing of the A21. There is also an overbridge for east-west movements located approximately 200 metres south of the location of the proposed level crossing, near Redlands Lane.

The location of adjoining footpaths, bridleways and cycleways are shown in **Figure 4.1** overleaf.

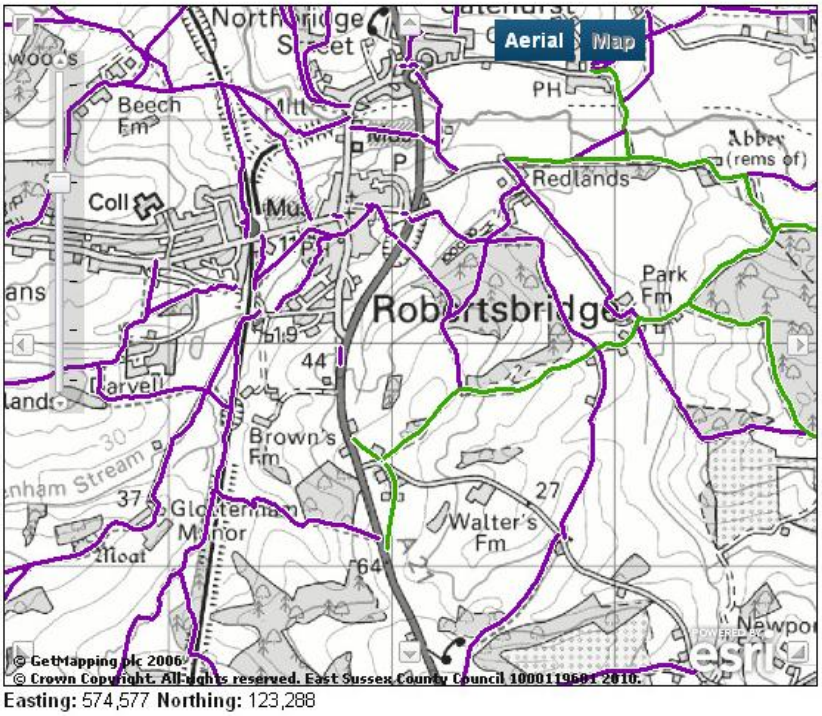
4.1.2 Cyclists and cycle routes

According to the SUSTRANS website (www.sustrans.org) the A21 does not form part of the National Cycle Network at this location.

There are 1.0m wide hardstrips along which cyclists can potentially travel and at the time of a site visit in October 2012 are considered to be relatively free of detritus.

Figure 4-1 shows the location of current footpaths, cycleways and bridleways in the Robertsbridge area.

Figure 4-1:Location of footpaths, bridleways, cycleways etc



Source: East Sussex County Council website (www.eastsussex.gov.uk)

Key:-

- Footpaths
- Bridleways

- Licensed Cycleway

It can be seen, that the A21 does not form part of any other function for cyclists, pedestrians or equestrians.

There is one footpath that passes beneath the A21 close to the site of the proposed level crossing.

4.1.3 Equestrians and equestrian routes

Figure 4-1 above shows the location of existing bridleways. None of these are affected by the scheme proposal.

4.1.4 Flows and speed of motorised traffic

The Highways Agency publishes traffic data collected from Automatic Traffic Counters (ATCs) at various locations on the motorway and trunk road network on their TRADS2 website (http://trads.hatris.co.uk/). Data for the whole of 2011 is available and hourly traffic flows have been downloaded for use in this study from two sites on the A21:

- Site No. T/04/215 – southbound on the A21 Robertsbridge Bypass southern section (Grid reference E574125, N124015)
- Site No. T/04216 – northbound on the A21 Robertsbridge Bypass southern section (Grid reference E574128, N123929)

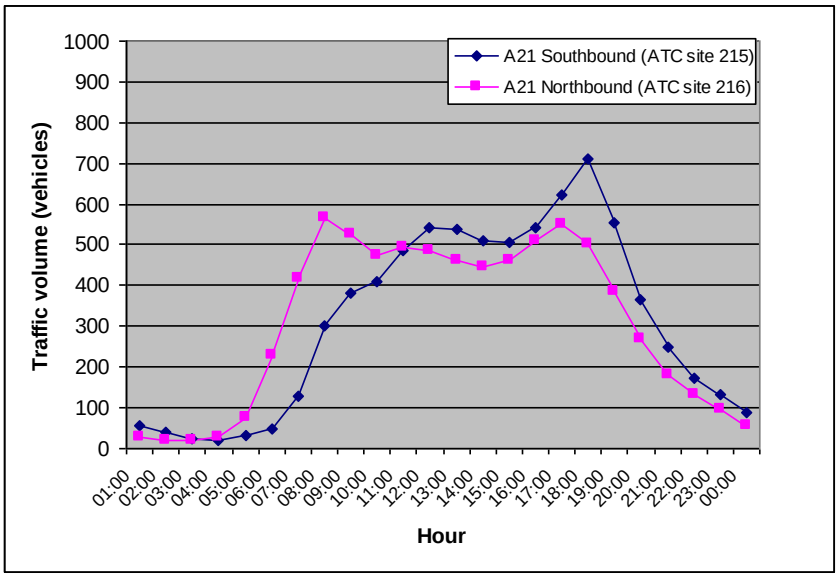
Traffic data has been summarised as annual average daily traffic (AADT) for the purposes of this NMU Context Report.

Figure 4-2 2011 AADT on A21 near Robertsbridge

Table Heading Left	Southbound	Northbound	Total
AM Peak	541	565	
PM Peak	711	551	
AADT Total	7,472	7,427	14,899

Source: TRADS2 website: Online Reporting (Period report 01/01/2011 to 31/12/2011)

Figure 4-3 2011 AADT Flow Profile on A21(T) near Robertsbridge



Source: TRADS2 website: Online Reporting (Period report 01/01/2011 to 31/12/2011)

4.1.5 Accident Data

Personal Injury Accident (PIA) data has been obtained from Sussex Police. Data for the most recent five-year period has been requested and data supplied covered the period 1st November 2005 to the 30th November 2010.

The purpose of obtaining historic accident data is to review the current road safety record in the vicinity of each of the proposed level crossing sites. The road safety record will inform the assessment of the physical extent of any necessary changes to speed limits required on the approaches to the crossings. An assessment has also been made of the potential impact of the introduction on the road safety record, either positive or negative.

According to the records of Sussex Police, there has been only one PIA recorded near the vicinity of the site, which involved a vehicle travelling southbound overtaking another vehicle near Redlands Lane.

For full details on the road safety record of the A21 at this location, refer to MM Report on A21 PIA Analysis (Doc. Ref. 313090-ITD-ITQ-004).

4.2 Potential and Actual Impacts

It is considered that the construction of a proposed full barrier-controlled level crossing in itself would not have an adverse affect on the movements of NMUs in this area.

Furthermore, it is considered that there are no immediately identifiable conflict points that would impact NMUs.

4.3 Existing Assessment

Mott MacDonald understands that there has been no previous assessment of the effects on the NMU routes as part of the proposed works.

4.4 NMU Objectives

Based on the above, the objectives of the NMU assessment are to:

- Ensure continuity of existing NMU routes where applicable;
- Maintain safety for vulnerable NMU users on the A21 and where it intersects with the existing highway network; and
- Ensure the design of the proposal is cogniscent of NMU requirements.

4.5 NMU Audit

The NMU Audit is a separate document prepared by Mott MacDonald which examines the potential impacts on non-motorised users as a result of the proposals.

Please refer to the Mott MacDonald report 'A21 Non-Motorised User Audit Report – Rother Valley Railway' (Doc. Ref. 264223FD-ITD-ITQ-126-C).

Appendices

Appendix A. Results of NMU Surveys (Wednesday 12th November 2012 and Sunday 13th January 2013)

Non-Motorised User Audit

A21 Rother Valley Railway Non-Motorised User (NMU) Audit Report

January 2013

Rother Valley Railway Limited

Non-Motorised User Audit

A21 Rother Valley Railway Non-Motorised User (NMU) Audit Report

January 2013

Rother Valley Railway Limited

Robertsbridge Junction (RVR) Station, Station Road, Robertsbridge, Sussex TN32 5DG

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	15/11/12	M D Lewis	B A Pledge	R E Murdock	First Issue
B	12/12/12	M D Lewis	B A Pledge	R E Murdock	Second Issue
C	17/01/13	M D Lewis	R E Murdock	R E Murdock	Third Issue
D	25/01/13	M D Lewis	R E Murdock	R E Murdock	Fourth Issue

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Content

1. Introduction

This report describes a Non-Motorised User (NMU) audit carried out for a proposed full barriered locally controlled and monitored, railway level crossing of the A21 near Robertsbridge, East Sussex. The proposals comprise the construction of a new at-grade embedded rail on a pre-cast concrete slab, lifting gated barriers which extend the full width of the carriageway and associated road markings and signs.

The audit was carried out for the Design Team in October 2012 in accordance with Highways Agency standard, HD42/05 'Non Motorised User Audits'.

The report has been prepared as a stand-alone Preliminary Design Stage NMU audit. The audit team has prepared the 'Rother Valley Railway Non-Motorised User Audit Context report (dated November 2012), prepared by Mott MacDonald's Integrated Transport Division (Southampton).

The Audit Team comprised:

- M Lewis (NMU Audit Leader) BEng, C.Eng, MICE
- B Pledge(NMU Audit Team Member) AMCIHT, AMIHE

The audit comprised of: -

- An examination of the scheme preliminary design drawings
- A site visit on Tuesday 23rd October 2012; and
- A review of the Context Report, dated November 2012.

2. Background

The following reports and data were reviewed during the Audit process:-

2.1 Context Report

The Context Report identifies three main objectives for the A21 proposed level crossing. These, and the design features that have been incorporated to satisfy them, have been included in the Preliminary Design as described below.

Table 2-1: Summary of Design Objectives and Design Feature

Objective	Design Feature
Ensure continuity of existing NMU routes where applicable	The alignment of the proposed railway corridor runs perpendicular to the A21. this route is used as a footpath link. East-west pedestrian route, grade-separated from the A21 to be secured.
Maintain safety for vulnerable NMU users on the A21and where it intersects with the existing highway network	No (or little NMU) activity expected – and largely unaffected by the proposed A21 crossing.
Ensure a design of NMU measures compliant with user requirements.	The design has been undertaken with the needs of NMU taken into account.

2.2 Road Safety Audit

At the time of writing, it is understood that no road safety audits have been prepared in association with the proposed scheme. It is envisaged that road safety audit(s) will be carried out at a later date as part of the Transport & Works Act / Level Crossing Order application process.

2.3 Summary of Pedestrian Movements

Mott MacDonald has been unable to directly source data from any public authority relating to pedestrian, cycle and equestrian activity along the A21 at Robertsbridge (between the roundabout with the C18 to the north and the roundabout with the A2100 to the south).

However, recent surveys of NMU movements at the site of the proposed A21 level crossing were undertaken on Sunday 13th November 2013 for the 12-hour period 0700-1200. These show that no pedestrians, cyclists or horses were recorded as passing the site.

3. Items Raised in this Audit

3.1 Issue 1

Location: Existing pedestrian footpath

The alignment of the proposed extension of the railway between Bodiam (to the east) and Robertsbridge (to the west) bisects the A21 at a distance approximately 140 metres south of the A21 roundabout junction with the C18.

This railway route, crosses adjoining fields and grazing meadows, which are signposted as pedestrian footpaths / rights of way. As the scheme develops, it is important that the pedestrian footpath routes are maintained.

This may necessitate the fencing of the RVR railway line to prevent unauthorised intrusion along the corridor.

Figure: 3-1: View looking south along A21 and view of adjoining grazing meadows with RoW.

Source: Mott MacDonald

Action Taken

The existing pedestrian footpath routes will be retained and not interfered with resultant from the new railway and the A21 level crossing.

The RVR railway line will be fenced to normal railway standards to prevent unauthorised intrusion along the corridor.

3.2 Issue 2

Location: at site of proposed at-grade crossing

Drawings prepared by Rother Valley Railway (Drwg. No. A21-LC-01) show the proposed layout for the level crossing.

These feature a full (carriageway) width barrier to prevent vehicular traffic and NMUs incurring into the level crossing.

Cyclist activity on the A21 is considered to be low.

Action Taken

Cyclists who do travel along the A21 will be held at the stop line with other traffic when the level crossing barriers are lowered, closing the road and preventing access to all, including NMUs. The barriers would be incorporated into the railway corridor fence line. No supplementary NMU access across the railway would be provided at the level crossing.

4. Audit Team Statement

I certify that this audit has been carried out in accordance with HD 42/05.

NMU Audit Leader

M D Lewis BEng (Hons), CEng, MICE

Signed:

Date: 25th January 2013

Senior Road Safety Engineer
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NMU Audit Team Member

B A Pledge, AMCIHT, AMIHE

Signed:

Date: 25th January 2013

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Appendices

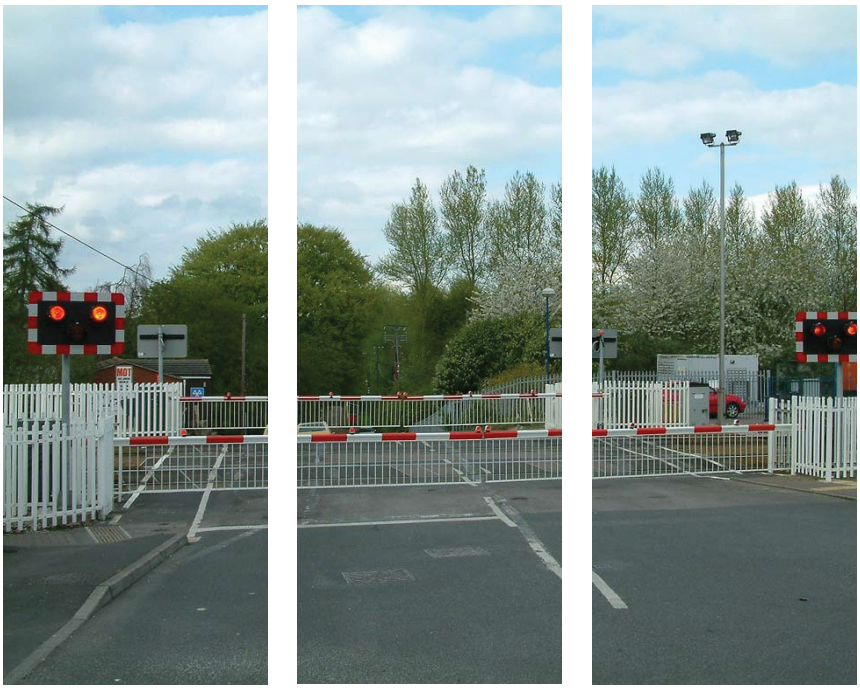
Appendix A. List of Documents / Drawings Reviewed

A.1. Documents / Drawings

Drawings / Documents reviewed by the Audit Team

Document Number.	Rev	Title
288755/ITD/ITW/001	D	Rother Valley Railway (Proposed Level Crossings) Traffic Impact Study
313090/ITD/ITQ/001	D	A21 Rother Valley Railway Non-Motorised User (NMU) Audit – Context report

Source: Mott MacDonald



Rother Valley Railway
Proposed Level Crossings

Traffic Impact Study

October 2011

Rother Valley Railway Limited

Rother Valley Railway LIMITED

Mott MacDonald

Appendix C

Traffic Impact Study

Revision E dated October 2011

Please see copy of this report
previously submitted.

Rother Valley Railway A21 Robertsbridge

Traffic Impact Study - Supplementary Technical Note

January 2012

Rother Valley Railway Limited

Rother Valley Railway A21 Robertsbridge

Traffic Impact Study - Supplementary Technical Note

January 2012

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description	Standard
A	19 October 2012	SLA	MDL	MDL	First Issue	
B	15 November 2012	SLA	MDL	MDL	Second Issue	
C	12 December 2012	SLA	MDL	MDL	Third Issue	
D	17 January 2013	SLA	MDL	REM	Fourth Issue	

Content

1. Introduction

1.1 Introduction

In October 2011, Mott MacDonald produced a Traffic Impact Study (Document Reference: 288755/ITD/ITW/001/E) on the behalf of Rother Valley Railway Limited. As set out in the 2011 report, the Rother Valley Railway Heritage Trust is proposing to reconstruct part of the historical railway line, between Tenterden in Kent and Bodiam in East Sussex, with three proposed level crossings along the route.

Part of this previous work looked at traffic flows on the A21, assessing the likely traffic impact from the proposed level crossing on this trunk road.

As described in Section 2.2.1 of the Mott MacDonald report: -

> *"The Highways Agency publishes traffic data collected from ATCs at various locations on the trunk road and motorway network on their TRADS2 website (http://trads.hatris.co.uk/). Data for the whole of 2010 is available and hourly traffic flows have been downloaded for use in this study from two sites on the A21:"*

These being: -

- Site no T/04/215 – southbound on the A21 Robertsbridge Bypass southern section (Grid reference E574125, N124015); and

- Site no T/04216 – northbound on the A21 Robertsbridge Bypass southern section (Grid reference 574128, N123929).

The initial work assessed 'typical days' in 2010 for:

- Spring/Autumn – Average weekday (Monday to Friday);
- Spring/Autumn – Average Saturday;
- Spring/Autumn – Average Sunday;
- Summer – Average weekday (Monday to Friday);
- Summer – Average Saturday; and
- Summer – Average Sunday.

The initial work also looked at a 'non typical' day in 2010 for:

- May Day Bank Holiday Monday; and
- August Bank Holiday Monday.

Further to the interrogation of the TRADS database, a spreadsheet model was built to forecast the maximum queuing resulting from barrier closures at the level crossings. Inputs to the model included:

- Times of closure of the barrier based on the draft Rother Valley Railway (RVR) timetable;
- Duration of each closure – assumed to be 51 seconds based on the information provided by ORR/HMIR (refer to Appendix B of the October 2011 report);
- Hourly flows for 2010, in vehicles per minute, at times of barrier closure for each of the average day types and Bank Holidays referred to above for the spring/autumn and summer periods;

- An assumed rate of flow over the crossing after the barrier has been raised. This was assumed to be one vehicle every 2 seconds or 30 vehicles per minute, based on previous experience; and
- Traffic growth rates derived from TEMPRO for 2010 to 2016 and 2010 to 2021.

The model outputs the maximum and average queue lengths in vehicles at the time when the barrier opens to traffic.

1.2 Review of methodology

The Highways Agency (HA) reviewed the methodology adopted, as outlined in Section 1.1, appraising the suitability of this approach. In a letter dated 4th May 2012, the HA requested that the assessments should also consider 2009 and 2011 traffic data.

In addition to examining the 2009 and 2011 data, Parsons Brinckerhoff (PB), acting as consultants to the HA, were asked to review the Traffic Impact Study, providing comments on the methodology. An email from the HA to Mott MacDonald dated 14th September set out PB's comments, as per **Appendix A** of this Supplementary Technical Note. In broad terms, PB's comments comprised the following:

- Assess the worst case weekday and weekend profiles for 2010;
- Examine at the upper quartile of weekday and weekend flow data for 2010; and
- Apply 112 second closure time to weekday and weekend flows for 2010.

Also of relevance is the distance between the site of the proposed crossing and the proximity of the Northbridge Street roundabout to the north, which is approximately 140m and also the view *"that barrier closures of 51 and 112 seconds would have no discernible effect on overall journey times in most cases as drivers would be in a queue anyway"* (Section 5.4.2, Rother Valley Railway Proposed Level Crossing Traffic Impact Assessment, 2011).

These elements will be looked at in turn in the following sections of this report.

2. Comparison of 2009 and 2011 data

2.1 Introduction

TRADS data has been downloaded for the following sites:

- T/04/215 – southbound on the A21 Robertsbridge Bypass southern section (Grid reference E574125, N124015); and
- T/04/216 – northbound on the A21 Robertsbridge Bypass southern section (Grid reference E574128, N123929).

At the request of the HA, 2009 and 2011 data has been compared with that of 2010. Monthly data, by hour, has been compared to assess the variability of traffic flow. It should be noted that Bank Holidays have been excluded from this exercise, as they can skew results, particularly as there were more Bank Holidays in 2011.

Traffic data, by month, for each of the three years has been downloaded from TRADS. The average hourly flow across 24 hours (per month) have been calculated, and it is this that has been compared. Weekdays and weekends have been compared separately, and all months have been compared.

Sections 2.2 and **2.3** summarise the findings by direction of travel.

2.2 T/04/215 – southbound

Comparing weekdays in 2009 with weekdays in 2010, across the year, there was a 3% decrease in traffic flow, although traffic flows in the months of February, March, April, June July and October 2010 exhibited higher flows than in the comparative 2009 months.

Comparing weekends in 2009 with weekends in 2010, traffic flows were 5% higher in 2009.

Comparing weekdays in 2010 with weekdays in 2011, there was a 2% increase.

Comparing weekends in 2010 with weekends in 2011, traffic was 4% higher in 2011.

Table 2.1: Comparison of 2009 and 2010 flows - SB

	% difference weekdays	% difference weekends
Jan	-12%	-12%
Feb	1%	-2%
Mar	1%	-2%
Apr	2%	1%
May	-1%	-4%
Jun	2%	-2%
Jul	0%	5%
Aug	-3%	-8%
Sep	-10%	-13%
Oct	1%	2%
Nov	-2%	0%
Dec	-17%	-21%
Average	-3%	-5%

The red highlight denotes months where 2010 had lower flows than 2009 or 2011. Blue denotes months where 2010 had higher flows than 2009 or 2011. Green denotes no change.

Table 2.2: Comparison of 2010 and 2011 flows - SB

	% difference weekdays	% difference weekends
Jan	11%	12%
Feb	7%	3%
Mar	-2%	0%
Apr	-1%	11%
May	-5%	-6%
Jun	-3%	-2%
Jul	0%	-4%
Aug	-1%	-1%
Sep	0%	-3%
Oct	-2%	2%
Nov	-1%	3%
Dec	24%	29%
Average	2%	4%

The red highlight denotes months where 2010 had lower flows than 2009 or 2011. Blue denotes months where 2010 had higher flows than 2009 or 2011. Green denotes no change.

2.3 T/04/216 – northbound

Comparing weekdays in 2009 with weekdays in 2010, across the year, there was a 5% decrease in traffic flow. The TRADS data shows that 2009 had slightly higher values than 2010.

Comparing weekends in 2009 with weekends in 2010, traffic flows in 2009 were 7% higher.

Comparing weekdays in 2010 with weekdays in 2011, there was a 1% variation in traffic flow, with 2010 having slightly lower flows.

Comparing weekends in 2010 with weekends in 2011, there was a 2% increase in traffic flow, with 2011 having slightly higher values.

Table 2.3: Percentage difference between 2009 and 2010 flows - NB

	% difference weekdays	% difference weekends
Jan	-11%	-16%
Feb	-2%	-5%
Mar	0%	-6%
Apr	-2%	-2%
May	-4%	-11%
Jun	1%	-3%
Jul	1%	2%
Aug	-6%	-6%
Sep	-11%	-15%
Oct	-1%	1%
Nov	-3%	-1%
Dec	-17%	-23%
Average	-5%	-7%

The red highlight denotes months where 2010 had lower flows than 2009 or 2011. Blue denotes months where 2010 had higher flows than 2009 or 2011. Green denotes no change.

Table 2.4: Percentage difference between 2011 and 2010 flows - NB

	% difference weekdays	% difference weekends
Jan	11%	12%
Feb	7%	-1%
Mar	-4%	-1%
Apr	-2%	3%
May	-5%	-3%
Jun	-4%	-5%
Jul	-4%	-7%
Aug	-2%	-4%
Sep	-2%	-2%
Oct	-1%	2%
Nov	0%	2%
Dec	23%	28%
Average	1%	2%

The red highlight denotes months where 2010 had lower flows than 2009 or 2011. Blue denotes months where 2010 had higher flows than 2009 or 2011. Green denotes no change.

3. Sensitivity test: weekday and weekend – 2010

3.1 Introduction

At the request of PB, the TRADS database has been interrogated to determine the busiest weekday and weekend for 2010.

A 'yearly tabular report' for each of the two sites has been sourced from TRADS. This produces information by month for each day (24 hours). Weekdays have been isolated from weekend days. Flows have been ranked by busiest weekday and busiest weekend day, so the highest 24 hour flow could be identified.

In order to assess a worst case scenario, the highest flows for the northbound and highest flows for the southbound were identified. The days may not be the same, but in terms of completeness, it was considered appropriate to determine the worst day for each TRADS site.

The original assessment carried out in October 2011 looked at seasonality and 'typical' and 'non typical' days, i.e. Bank Holidays were classed as 'non typical'. PB has requested that the busiest day should be identified, and for the purpose of this assessment, Bank Holidays have been included.

3.2 T/04/216 – southbound

The busiest weekday for southbound traffic has been determined as Friday 4th June. The busiest weekend day has been determined as Saturday 28th August. A profile for each day is shown in **Figures 3.1** and **3.2**.

Figure 3.1: Friday 4th June 2010 – 24 hour profile

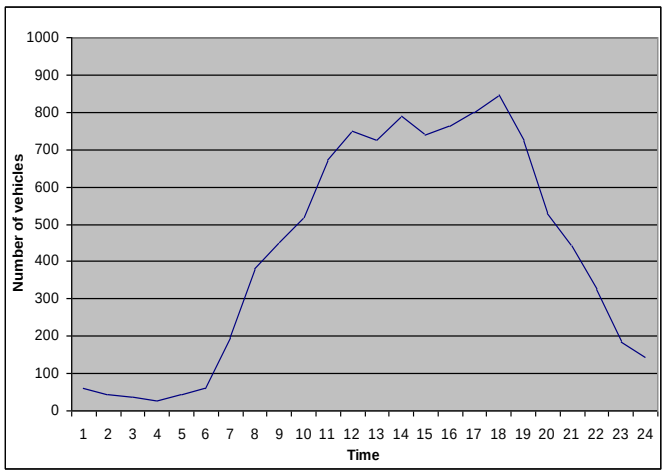
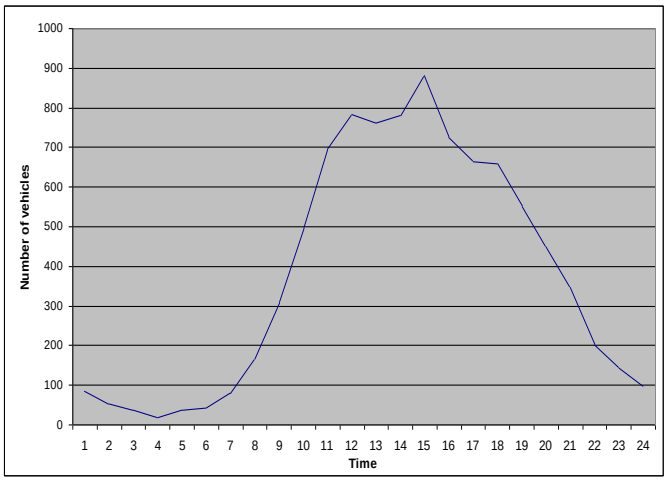


Figure 3.2: Saturday 28th August 2010 – 24 hour profile



For northbound traffic, the worst weekday was identified as being a Bank Holiday. Therefore, in order to provide a robust assessment, the second busiest weekday has been identified and assessed.

However, for southbound traffic, the busiest weekday has been identified as being a non Bank Holiday. In light of this no additional weekday analysis has been undertaken. Section 5 of this report, which examines the resultant queues from the sensitivity test (e.g worst weekday), does not report on southbound Bank Holiday queues.

3.3 T/04/216 – northbound

The busiest weekday for northbound traffic has been determined as Monday 3rd May. The busiest weekend day has been determined as Sunday 4th July. A profile for each day is shown in **Figures 3.3 and 3.4**.

Figure 3.3: Monday 3rd May 2010 – 24 hour profile

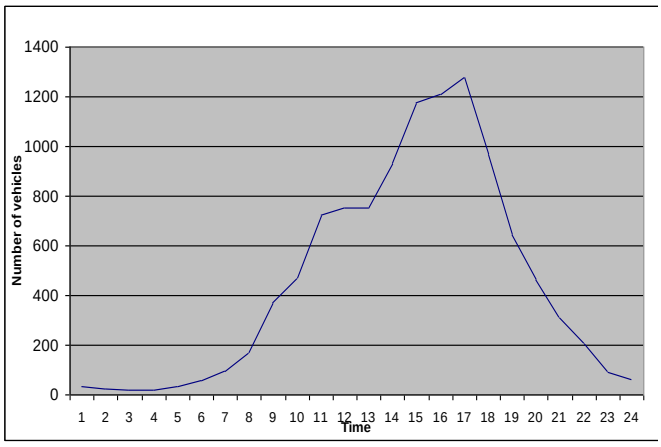
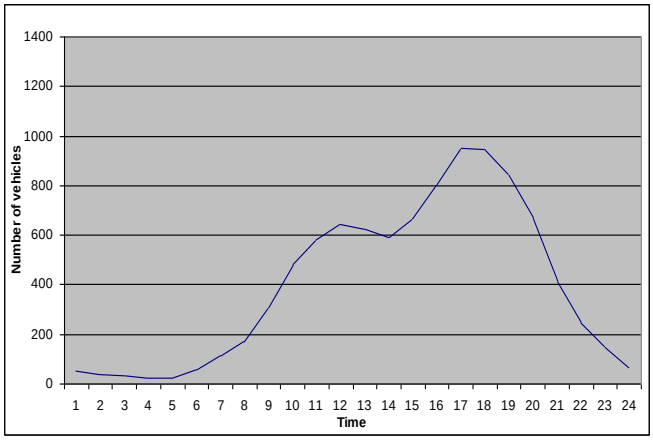


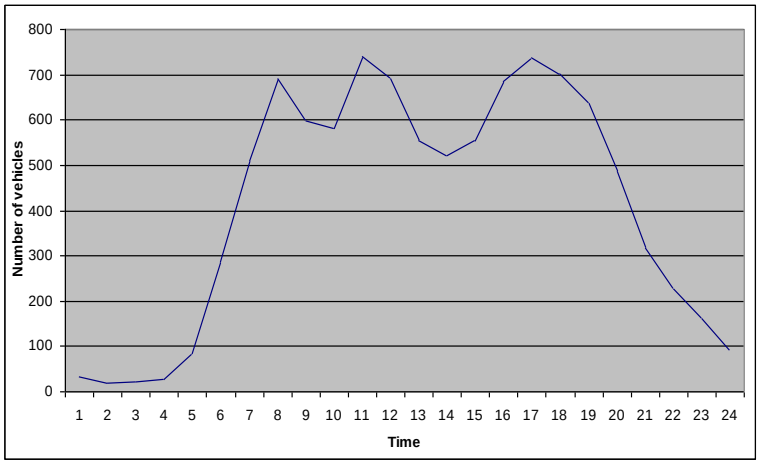
Figure 3.4: Sunday 4th July 2010 – 24 hour profile



3.4 T/04/2016 – northbound (non bank holiday weekday)

Where the busiest day has been identified as a Bank Holiday, a second day (non Bank Holiday) has been identified. For northbound traffic, Monday 3rd May 2010 has the highest flows, but this happens to be a Bank Holiday. The TRADS data shows that Friday 4th June was the second busiest day in 2010 in terms of total 24 hour traffic flow. **Figure 3.5** shows the daily profile for this data.

Figure 3.5: Friday 4th June 2010 – 24 hour profile



The traffic flows for these identified weekdays and weekend days have been used in the Queue Model, which was developed during the initial RVR traffic impact assessment work.

4. Assessment of upper quartile 2010

4.1 Introduction

Further to determining the busiest day and weekend day for both northbound and southbound traffic on the A21, PB has requested that Mott MacDonald,

> *"look at the upper quartile of weekend and weekday flow data" (email dated 14 September 2012).*

The TRADS data which has been generated in **Section 3** has also been used for this exercise. The 24 hour traffic flows have been ranked into ascending order, so that the 75th percentile value can be determined. From this, the upper quartile can be identified.

The results are shown in **Table 4.1**

Table 4.1: Upper quartile for 2010

Direction/day	75th percentile flow	Busiest 24 hour flow
NB weekday	8,167	10,866
NB weekend b/h	7,886	9,476
NB weekend non b/h	8,167	9,953
SB weekday	8,238	10,246
SB weekend	7,612	9,060

It can be seen that the busiest flows assessed are significantly higher than the 75th percentile.

5. Revised queue model

5.1 Introduction

The Queue Model designed as part of 2011 Mott MacDonald report has been used to assess queue lengths for the busiest weekday (for northbound this will be for the Bank Holiday and non-Bank Holiday) and busiest weekend day.

As per Section 4.3 of the October 2011 report,

> *"Using the 2010 traffic flow data and the traffic growth factors from TEMPRO, a set of forecasts of traffic queue propagations has been produced…the analysis for the A21 has identified where a traffic queue at the closed level crossing has the potential to block the upstream roundabout, 140m to the north of the crossing. For each barrier closure throughout the day, derived from the preliminary timetable, calculations have been undertaken for each day type…"*

The previous work assumed that the traffic volume in a given hour would arrive at the level crossing at a uniform rate, and a barrier closure period of 51 seconds (0.85 minutes applied). PB has recommended that a flat or uniform profile should not be used, and that *"a worst case scenario of 112 seconds closure time is applied to the weekday and weekend flows to assess the impact"* (email dated 14 September 2012).

5.2 Traffic profile

In order to generate an arrival profile which is not uniform, the peak segment within an hour, e.g. 1045-1100 in the hour 1000-1100, has been determined. TRADS data is hourly and not by minute; calculating traffic flows for a non-uniform arrival rate is therefore not possible.

Therefore, to account for the varying arrival time of vehicles, traffic flow per minute for a given hour has been factored by 20% and 40% in order to model a peaking effect.

5.3 Closure period and assessment year

At the request of PB, a 112 second (1.87 minutes) closure time has been applied to the model.

For the purposes of this assessment, the Queue Model has been run for 2021.

Growth rates have been applied to the 2010 TRADS data. The rates used in the previous work have been applied to the revised queue model; PB has confirmed that *"the use of dataset 62 and NTM factors [are] acceptable together with associated growth factors"* (email dated 14 September 2012).

5.4 Results

Tables 5.1 to **5.3** show the results for three scenarios:

- Hourly uniform profile;
- Hourly profile with 20% factor; and
- Hourly profile with 40% factor.

Each of the three scenarios has results for the busiest weekday and busiest weekend day. Furthermore, the northbound direction has results for a Bank Holiday. This is because the Bank Holiday represents the busiest weekday.

As discussed in **Section 3.2**, southbound Bank Holiday queues are not reported.

Table 5.1 shows that for a uniform profile, the maximum queue length predicted by the model is 265m. When looking at the likely average queue length, southbound traffic for both weekdays and weekends have an average of queue of 162m, with northbound traffic having an average queue of 149m on weekdays and 152m on weekends.

Table 5.1: Modelling results for 2021 – uniform profile

Day type	Northbound		Southbound	
	Maximum queue (m)	Average queue (m)	Maximum queue (m)	Average queue (m)
Weekday (not Bank Holiday)	155	137	177	154
Weekend	198	147	183	148
Bank Holiday	265	205	n/a	n/a

Note: All queue lengths are in metres (rounded up to the nearest whole metre)

Table 5.2 shows the results of the plus 20% profile. It can be seen that the maximum queue length on the busiest day (a Bank Holiday) is predicted to be 383m in 2021; with an average queue length of 247m.

The model shows that on the busiest day (non Bank Holiday), the maximum forecast queue length is 265m for both northbound and southbound traffic on weekdays and weekends. The model shows average queue lengths as between 172m and 185m. Weekdays and weekends show very similar results in terms of forecast traffic queues.

Table 5.2: Modelling results for 2021 – profile plus 20%

Day type	Northbound		Southbound	
	Maximum queue (m)	Average queue (m)	Maximum queue (m)	Average queue (m)
Weekday(not Bank Holiday)	265	172	265	185
Weekend	265	172	265	184
Bank holiday	383	247	n/a	n/a

Note: All queue lengths are in metres (rounded up to the nearest whole metre)

Table 5.3 shows the results for 2021 with a plus 40% profile.

Table 5.3: Modelling results for 2021 – profile plus 40%

Day type	Northbound		Southbound	
	Maximum queue (m)	Average queue (m)	Maximum queue (m)	Average queue (m)
Weekday(not Bank Holiday)	265	195	265	209
Weekend	277	193	265	208
Bank Holiday	2971	648	n/a	n/a

Note: All queue lengths are in metres (rounded up to the nearest whole metre)

The model results indicate a significant increase in Bank Holiday queuing in 2021; with a maximum queue of 2,971m and an average queue of 648m. The weekday (non-Bank Holiday) and weekend show a slight increase in queuing when compared to the plus 20% profile.

For the busiest weekday, the model indicates that northbound traffic would have an average queue length of 195m and southbound traffic would have an average queue length of 209m.

For the busiest weekend day, the model indicates that northbound traffic would have an average queue length of 193m and southbound traffic would have an average queue length of 208m.

In summation, applying the busiest weekday and weekend day to the queue model, queues would extend north beyond the Northbridge Street roundabout for southbound traffic. Furthermore, as stated in **Section 4.4** of the previous Mott MacDonald report: -

> *"It should be borne in mind that although the proposed level crossings would impact on the free flow of traffic level crossing this would not occur every day. The 2011 schedule of days of operation of the KESR indicates that trains will run on 181 days of the year, i.e. approximately 50%. As noted previously the RVR would run to a similar schedule". Further details of this can be found in the October 2011 report.*

A second important point noted by the previous work stated that: -

> *"the presence of the [level] crossing would have little noticeable effect on overall journey times, given the signification congestion that currently occurs on the A21".*

It is also noted that at the busiest bank holiday periods, vehicles held at the level crossing released to proceed in effect move forward to rejoin the rear of the traffic queue they were already following – excepting that a number of cars will have been assisted in joining the A21 traffic flow from side road connections to the A21 using any queue gap that is created for a distance either side of the level crossing.

6. Summary

This Technical Note (TN) has been completed to address the comments provided by the Highways Agency (HA) and Parsons Brinckerhoff (PB), based on the Mott MacDonald report issued in October 2011. The following sets out the key findings of this TN:

6.1 General

- Comparing 2010 TRADS data with 2009 and 2011 data, the variation across the years is between +/- 2% and +/- 7%.
- The busiest weekday for southbound traffic is determined as Friday 4th June and the busiest weekend day is determined as Saturday 28th July.
- The busiest weekday for northbound traffic is determined as Monday 3rd May and the busiest weekend day is determined as Sunday 4th July. Monday 3rd May was a Bank Holiday, hence this could be classed as 'non typical'. The second busiest weekday was Friday 4th June.
- Trains would normally run on about 50% of the days of the year with typically seven trains operating per day in both directions during the summer months. Trains would not generally start running until after 10:00 and would continue throughout the day at around hourly intervals until approximately 18:00.
- In 2010, the busiest average hour for weekday traffic in a southbound direction was 1700-1800. The busiest average hour for weekend traffic in a southbound direction was 1200-1300.
- In 2010, the busiest average hour for weekday traffic in a northbound direction was 0700-0800. The busiest average hour for weekend traffic in a northbound direction was 1000-1100.
- All modelling results are for the year 2021, using the approved growth rates.
- Based on comments from PB, the level crossing barrier has been assessed for closure period of 112 seconds (1.87 minutes).
- Traffic is forecast to grow by between 8-11% from 2010 up to 2021 (as detailed in the Mott MacDonald October 2011 report).

6.2 Queuing

It is important to note from Section 5.4.2, Rother Valley Railway Proposed Level Crossing Traffic Impact Assessment, 2011, that despite the queue model showing traffic exceeding 140m north of the crossing: -

> *"long queues currently occur on occasions on the A21, particularly at Bank Holidays, and this would occur in the future irrespective of whether or not a level crossing was present"*

Key findings from this TN show that:

- The longest forecast traffic queue, on a typical day, is estimated to be on a weekday in the southbound direction (with a 40% profile uplift), with average forecast queue lengths of 209m.
- The busiest weekday, with a 20% profile uplift, was in the southbound direction, with a predicted average queue of 185m (maximum queue of 265m).
- The busiest weekend day, with a 20% profile applied was in the southbound direction, with a predicted average queue of 184m (maximum queue of 265m).

In light of these key findings, the capacity of the A21 was exceeded in 2010 and a flow of 1,649 vph would have caused notable congestion anyway on the A21. *"Barrier closures of 51 and 112 seconds would have no discernible effect on overall journey times in most cases as drivers would be in a queue anyway"* (Section 5.4.2, Rother Valley Railway Proposed Level Crossing Traffic Impact Assessment, 2011).

Appendices

Appendix A. Correspondence

Rother Valley Railway A21 Robertsbridge

Personal Injury Accident Analysis Technical Note

January 2013

Rother Valley Railway Limited

Rother Valley Railway LIMITED

Mott MacDonald

Rother Valley Railway A21 Robertsbridge

Personal Injury Accident Analysis Technical Note

January 2013

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	15.11.12	B A Pledge	M D Lewis	M D Lewis	First Issue
B	11.12.12	B A Pledge	M D Lewis	M D Lewis	Second Issue
C	17.01.13	B A Pledge	M D Lewis	R E Murdock	Third Issue
D	25.01.13	B A Pledge	M D Lewis	R E Murdock	Fourth Issue

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Content

1. Introduction

1.1 Overview

Mott MacDonald has been commissioned by Rother Valley Railway Limited (RVRL) to undertake a number of highway, traffic and road safety analyses in support of a proposed railway level crossing of the A21 at Robertsbridge, East Sussex.

This Technical Note examines the personal injury accident (PIA) data for a range of sites which exhibit similar characteristics to the proposed site at Robertsbridge. The purpose of this is to see to what extent, if any, the presence of the level crossing, is considered to be a contributory factor.

In addition, reference is also made within this report to railway industry reports concerning railway level crossing safety performance.

Seven sites have been identified in collaboration with RVR and these are outlined in the following table: -

Site No.	Site Name	Road	Location / Town	Site OSGR	PIA Search Criteria *(5 years data 01/01/2007 to 31/12/2011)*
1	Rail level crossing at Cooksbridge	A275	Cooksbridge Nr Lewes	540093; 113435	A275 only – 250m radius search of level crossing
2	Rail level crossing at Etchingham	A265	Haremere Hill, Etchingham	571517; 126263	A265 only – 250m radius search of level crossing
3	Rail level crossing at Lyminster	A284	Lyminster, Nr Littlehampton	502722; 103881	A284 only – 250m radius search of level crossing
4	Rail level crossing at Robertsbridge	Brightling Road/Station Road	Station Road, Robertsbridge	573313; 123213	Brightling Rd/Station Rd only – 250m radius search of level crossing
5	Rail level crossing at Woodgate	A29	Lidsey Road, Chichester	493797; 104325	A29 only – 250m radius search of level crossing
6	Rail level crossing at Drayton	B2144	Drayton Lane, Chichester	489049; 104414	B2144 only – 250m radius search of level crossing
7	Proposed rail level crossing A21, near Robertsbridge	A21(T)	North of Robertsbridge	574118; 124080	A21 only – 250m radius search of OSGR co-ordinates

Table 1-1: List of sites featuring PIA analysis

2. Analysis of PIA Data

2.1 Overview

PIA data has been obtained from the Road Policing Unit, Sussex Police. At each site, detailed in the table above, a search for PIA records occurring between 01/01/2007 to 31/12/2011 (latest five years' of data available) has been requested.

Where there are sites with an existing rail level crossing (Sites 1 to 5) a circle search radius of 250 metres has been used and a full narrative report was provided. From these narrative reports, PIAs involving the operation of the rail level crossing have been analysed further, to determine weather it was a contributory factor in the accident.

At the proposed rail level crossing site on the A21 near Robertsbridge (Site 7), a search radius of 250 metres has also been used. All accidents occurring with the five-year period are described within this Technical Note.

All accidents occurring with the five year period are described within this section of this Technical Note.

2.1.1 Site 1: Rail level crossing at Cooksbridge

Location: A275 Cooksbridge, Nr Lewes (E540093; N113435). Total PIAs in five-year search: 4 (0 Fatal, 1 Serious, 3 Slight).

- Two of the PIAs (both Slight) involved stationary traffic due the level crossing being in operation.
- One was side impact accident, occurring after being beckoned out from a side road (in traffic).
- The other was on approach to the level crossing, travelling too fast, and colliding with a stationary queuing vehicle.

2.1.2 Site 2: Rail level crossing at Etchingham

Location: A265 Haremere Hill, Etchingham (E571517; N126263). Total PIAs in five-year search: 0 (0 Fatal, 0 Serious, 0 Slight).

No PIAs recorded.

2.1.3 Site 3: Rail level crossing at Lyminster

Location: A284 Lyminster, Nr Littlehampton (E502722; N103881). Total PIAs in five-year search: 5 (0 Fatal, 0 Serious, 5 Slight).

None of the PIAs were considered to be related to the operation of the Level Crossing.

2.1.4 Site 4: Rail level crossing at Robertsbridge

Location: adjacent to Network Rail Station, Station Road, Robertsbridge (E573313; N123213). Total PIAs in five-year search: 1 (1 Fatal, 1 Serious, 0 Slight).

One PIA was recorded and this is deemed to be in relation to the Level Crossing.

- Fatal accident involving a car passing through the Level Crossing at excessive speed. The vehicle was travelling east when it grounded on the railway section and lost control. This resulted in a collision with seven parked cars, and the fatality of one pedestrian and slight injury to another.

2.1.5 Site 5: Rail level crossing at Woodgate

Location: A29 Lidsey Road, Chichester (E493797; N104325). Total PIAs in five-year search: 5 (0 Fatal, 2 Serious, 3 Slight).

None of the PIAs were considered to be related to the operation of the Level Crossing.

2.1.6 Site 6: Rail level crossing at Drayton Lane

Location: B2144 Drayton Lane, Chichester (E489049; N104414). Total PIAs in five-year search: 5 (0 Fatal, 1 Serious, 4 Slight).

- One PIA (Slight) involved stationary traffic due the level crossing being in operation.
- Rear end shunt type accident in northbound traffic queue at the level crossing.

2.1.7 Site 7: Proposed Rail level crossing site at Robertsbridge

Location: A21 North of Robertsbridge (E574118; N124080). Total PIAs in five-year search: 3 (0 Fatal, 2 Serious, 1 Slight).

The details for all three PIAs that occurred near the proposed rail level site are as follows:

- Occurring on the A21 southbound, approx 170m north of the junction with Redlands Lane. Slight injuries were sustained to both car drivers a vehicle (V1) overtook another (V2) on the hatched separation markings. V2 pulled nearside, causing it to swerve and collide with V1. V1 overturns and V2 strikes the nearside barrier.

- Occurring on the A21 southbound, north of the Northbridge Street Roundabout. Serious accident after a motorcyclist (V1) attempted to overtake a car (V2) prior to roundabout. V2 turned right to access the offside (northbound) lay-by, causing V1 to collide in its side. Rider of V1 received serious injuries.

- Occurring on the A21 northbound, just north of the Northbridge Street Roundabout. Serious injuries caused to a solo motorcyclist when re-starting after stalling. Due to vehicle defect (throttle stuck open) the motorcycle collided with pedestrian guard rail.

2.2 Proposed investigation of Rail level crossing site at A487 Porthmadog

It was suggested in the Highways Agency letter dated 4th May 2012 that the A487 Porthmadog Heritage Railway level crossing might provide a suitable comparison for the RVR proposals. The A487 level crossing is built tramway style whereby the railway runs along the centre of the highway, in the same direction as the road traffic, rather than across the highway at an acute angle as is more normal and as the RVR proposals. The Porthmadog level crossing brings with it entirely different safety considerations such as cyclists running along the line of the railway if they do not follow the alternative safe signposted route. In addition, the Porthmadog crossing does not have any form of barriers / gates to close off the highway and footways while the road is being crossed by a train.

The level crossings proposed for RVR are modern crossings where the railway crosses over the road at an acute angle and incorporate full barriers. There is no commonality between the A487 Porthmadog crossing and those proposed for RVR.

3. Level Crossing Safety Reports

The type of level crossings proposed by RVR are of the Full Barrier type, locally monitored and controlled by a railway signalman. These are also classified as MCG, MOB and MOB-CACTV crossing in the reports referred to below.

The perceived generalised dangers associated with railway level crossings come primarily from accidents at 'open' level crossings, half-barrier level crossings, automatically operated (unmonitored) level crossing and user worked crossings.

Full Barrier level crossings are used extensively, including such as the East Coast mainline with trains operating at 125 mph.

3-1: Example of typical East Coast Main Line Level Crossing

Source: Rother Valley Railway Limited

Two learned reports provide a useful detailed overview of railway level crossing data: -

- Railway Accident Investigation Branch (RAIB) (a UK Government Agency). Study of 'Open' crossings – but that contains detailed comparative performance data for full barrier crossings – as the type proposed by RVR. That report is at:

  http://www.raib.gov.uk/cms_resources.cfm?file=/110728_R122011_AOCLs_Class_Inv.pdf

The RAIB general website is at: http://www.raib.gov.uk/home/index.cfm

- Centre for Transport Studies : Andrew W Evans Imperial College London

This paper investigates level crossing performance over the period 1946 to 2009. That report is at:

http://www.cts.cv.ic.ac.uk/html/ResearchActivities/publicationDetails.asp?PublicationID=1432

As in both the above studies, locally monitored Full Barrier Level Crossings (also classified as MCG, MOB & MOB-CACTV crossings in these reports) have and excellent safety performance record.

There do not appear to be any full barrier level crossings currently installed on heritage railways. Heritage railways operate at maximum speeds of 25mph, being very much lower than generally seen on mainline Network Rail level crossings. That lower speed must by nature mean that a heritage railway full barrier crossing will perform even better, because of reduced train stopping distances than those studied in the above learned reports.

The proposed Rother Valley Railway level crossings will operate with maximum train speeds set by agreement with the Office of the Rail Regulator (ORR). Train speed on the whole line is a maximum speed of 25mph, and are anticipated to be set in the region of +/- 15mph at the level crossings, assisting trains to stop on sight of the crossing being blocked for any reason.

The Kent & East Sussex Railway operates the existing railway from Tenterden to Bodiam (where it will join the Rother Valley Railway). It has several level crossings, including over two 'A' roads that all use traditional hand worked level crossing gates to close off the highway and footpath.

4. Conclusions and Recommendations

The broad conclusions of this Technical Note are as follows: -

1. The choice of those level crossing sites reviewed in detail above, has been directed by RVR, who considered that they have representative characteristics similar to those exhibited by the proposed RVR level crossing site on the A21 at Robertsbridge.

2. Full barrier level crossings are demonstrated in the report and associated learned studies as having a good accident record.

Rother Valley Railway A21 Robertsbridge

Journey Time Analysis Technical Note

January 2013

Rother Valley Railway Limited

Rother Valley Railway LIMITED

Mott MacDonald

Rother Valley Railway A21 Robertsbridge

Journey Time Analysis Technical Note

January 2013

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	15.11.12	B A Pledge	M D Lewis	M D Lewis	First Issue
B	12.12.12	B A Pledge	M D Lewis	M D Lewis	Second Issue
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Content

1. Introduction

1.1 Overview

Mott MacDonald has been commissioned by Rother Valley Railway (RVR) to undertake a number of highway, traffic and road safety analyses in support of a proposed railway level crossing of the A21 at Robertsbridge, East Sussex.

This Technical Note displays and examines the Journey Time data undertaken on a series of surveys that were completed on Tuesday 23 October 2012. The purpose of this is to see how journey times could be affected, should vehicles use the alternative route via Robertsbridge village, to avoid the proposed level crossing.

Four routes were surveyed (two northbound and two southbound). These are outlined in the following table:-

Route	Route Description	Start point	End point
A	A21(T) mainline, from north to south (through the proposed level crossing).	Passing the A21 north lay-by entrance	A21 southbound exit at A2100/A21 Vinehall Road Roundabout
B	Via Robertsbridge village, from north to south (avoiding the proposed level crossing)	Passing A21 north lay-by entrance	A21 southbound exit at A2100/A21 Vinehall Road Roundabout
C	A21(T) mainline, from south to north (through the proposed level crossing).	A21 southbound exit at A2100/A21 Vinehall Road Roundabout	Passing the A21 north lay-by entrance
D	Via Robertsbridge village, from south to north (avoiding the proposed level crossing)	A21 southbound exit at A2100/A21 Vinehall Road Roundabout	Passing A21 north lay-by entrance

Table 1-1: List of journey time survey routes

The routes are shown in Figure 1.2 below: -

2. Analysis of Journey Time Data

2.1 Overview

After examining the historic tidal traffic flow from TRADS database, three separate time periods were determined to record journey time data. They were as follows;

- Morning traffic peak (07:00 – 08:00hrs);
- Off peak (10:00 – 11:00hrs), and;
- Evening traffic peak (17:00 – 18:00hrs).

For each route surveyed (A, B C and D) several 'runs' were completed within the different time periods, to record journey times in varying traffic conditions.

The table below displays the average time to complete each route:

	Average time to complete route (mins:secs)		
Route	Morning peak	Off peak	Evening peak
A	03:51	03:41	03:57
B	06:12	04:27	05:51
C	03:21	03:13	03.13
D	04:43	04:48	04:44

*Green denotes the longest time taken to complete route.

The standard deviation for the journey times has been calculated and the variance from the mean has been determined. There is a high confidence that journey times on this route fall within +/- 1 standard deviation of the mean journey time. This suggest that the reliability of the journey along the A21 is not significantly variable, based in the data recorded.

3. Conclusions

The journey time surveys were conducted on a single day and comprised four runs northbound and southbound on Routes A, B, C and D respectively during the AM peak.

A further two runs, northbound and southbound, were conducted in the inter-peak, per direction on routes A - D (inclusive).

Finally, a further four runs were conducted, northbound and southbound, on routes A – D (inclusive for the PM peak.

The broad conclusions that can be drawn are that, the sample sizes, whilst not numerous, indicate, not unsurprisingly, that the route along the A21 Robertsbridge Bypass, is significantly quicker than that via the C18 Northbridge Street.

The increase in journey time is similar to the period the crossing is closed to road traffic, leaving aside the fact that a west-bound train will also cause the C18 Northbridge Street crossing to be closed. Furthermore, traffic attempting this would encounter the lead vehicle of the platoon of traffic released from the A21 crossing leading to delays re-entering the A21.

Therefore, it is considered that there is no time advantage for A21 traffic diverting via the C18 through Robertsbridge when the proposed level crossing barriers are closed.