

Report

April 2021



TEMPLE

LEADERS IN ENVIRONMENT,
PLANNING & SUSTAINABILITY.

Report for – Rother Valley Railway Limited
Rother Valley Railway Track Reinstatement Project
A21 crossing options- environmental review
FINAL



Document version control

Version	Date	Author	Reviewed by	Reviewed and approved by
1.0	8/4/2021	R Slatcher	Victoria Hoskins	A Mayes

Report for: **David Gillet**
Rother Valley Railway Ltd

Main contributors: **Robert Slatcher**

Copy to:

This report has been prepared by Temple Group Ltd with all reasonable care and diligence within the terms of the contract with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the contract. We accept no responsibility to third parties to whom this report, or any part, thereof is made available. Any such party relies upon the report at their own risk.

Contents

1.0	Introduction	1
2.0	Options	2
2.1	Option 1 – at-grade level crossing	2
2.2	Option 2 – rail under existing highway	2
2.3	Option 3- rail over existing highway	2
2.4	Option 4 – rail under raised highway	2
3.0	Environmental appraisal of options	4
4.0	Conclusion	11

Appendices

Appendix A – A21 Crossing Options Feasibility Report

1.0 Introduction

- 1.1.1 The purpose of this report is to provide an environmental review of options to allow the proposed Rother Valley Railway reinstatement across the A21.
- 1.1.2 The options considered are those described in the A21 Crossing Options Feasibility Report, Arup (2019), included in Appendix A. The report identified four potential crossing options:
- At-grade level crossing;
 - Rail under the existing highway;
 - Rail over the existing highway; and
 - Rail under a raised highway.
- 1.1.3 This report has employed a scoring matrix to compare the environmental performance of each option across a range of environmental disciplines aligned to the topics considered as part of the Environmental Impact Assessment undertaken for the project.
- 1.1.4 As the project is fundamentally a reinstatement of the former railway, the level-crossing option is considered the baseline option as this closely replicates the elevation profile of the original railway. The other three options have been appraised in comparison to the baseline option.
- 1.1.5 The assessment is a high-level subjective assessment of comparative impacts associated with each option. The assessment is based solely on the primary impact and has not considered the potential for mitigation. The assessment identifies impacts only. It does not describe effects and therefore does not seek to assign any significance to what is described.
- 1.1.6 The assessment has been undertaken using the following scoring scale:

Worsening in environmental performance compared to the baseline option	-
Environmental performance is comparable to the baseline option	0
Improvement in environmental performance compared to the baseline option	+

2.0 Options

2.1 Option 1 – at-grade level crossing

- 2.1.1 This option consists of a low volume railway embankment between 1-2m in height on the approaches to the highway and an at-grade level crossing of the A21. The highway alignment would be unaffected by the crossing. Streetlighting would need to be extended southwards from the roundabout to the crossing.
- 2.1.2 Construction would necessitate potential night-time closures and/ or temporary speed restrictions in order to allow construction of the level crossing.
- 2.1.3 Operation of the level-crossing would on an average operational day (noting that the railway does not operate for many days during the winter) require 10 closures of around a minute or less each time.

2.2 Option 2 – rail under existing highway

- 2.2.1 This option would consist of a 640m long reinforced concrete U-shaped box structure to convey the railway below ground-level. The walls of the box structure would extend approximately 1m above existing ground-level to prevent flood water from high-frequency flood events. Inverted siphons would be required to convey watercourses north to south across the structure. Post-construction, the highway would be reinstated on its existing horizontal and vertical alignment.
- 2.2.2 Construction is likely to necessitate a temporary off-line diversion of the A21, approximately 400m in length and would require two bridges and two culverts to be constructed. Highway works could take between 6 months and a year.
- 2.2.3 Operation would necessitate a pump station to manage water ingress into the box structure.

2.3 Option 3- rail over existing highway

- 2.3.1 The solution selected to achieve the grade separation in this option is a viaduct in order to minimise third-party land acquisition and reduction in floodplain capacity associated with a large embankment.
- 2.3.2 The viaduct solution would consist of two sections of embankment, up to 3m in height, at either end of an approximately 500m long viaduct which would be up to 8m above existing ground level. There would be no permanent change to the highway in this option.
- 2.3.3 Construction adjacent to and over the A21 is likely to necessitate road closures which may require temporary diversions and may extend for at least 6 months.

2.4 Option 4 – rail under raised highway

- 2.4.1 This option is similar to Option 2, except by raising the highway, the depth and length of the concrete U-shaped structure for the railway can be reduced. The A21 would be raised by up to 2m above existing levels on a 300m long embankment. The concrete U shaped

structure would be 60m in length either side of the A21. It is considered possible to utilise culverts to convey flood flows north-south across the structure.

- 2.4.2 Construction is likely to necessitate a temporary off-line diversion of the A21, in excess of 400m in length and would require two bridges and two culverts to be constructed. Highway works could take between 9 months and a year and half.

3.0 Environmental appraisal of options

	Phase	Option 1		Option 2		Option 3		Option 4	
Noise and Vibration	Construction	There would be construction noise associated with the formation of embankments, installation of the level-crossing and construction of crossing structures and culverts.	o	It is anticipated that the construction phase noise and vibration impacts would be greater than Option 1 due to the requirement for significant excavation activity and additional piling and foundation works.	-	It is anticipated that the construction phase noise and vibration impacts would be greater than Option 1 due to the requirement for significant piling works for the viaduct piers.	-	It is anticipated that the construction phase noise and vibration impacts would be greater than Option 1 due to the requirement for significant excavation activity and additional piling, earthwork and foundation works.	-
	Operation	Noise would be created from the operation of trains, the level-crossing and stationary traffic at the crossing.	o	Noise from the level-crossing and stationary traffic would be avoided in this option. In addition the U-shaped structure could screen noise from the trains along this section of track. Noise from the trains could increase due to the increased power required to get up the slope, although this would be largely screened by the retaining walls.	+	The elevated track could allow operational train noise to propagate further and increase noise impacts at sensitive receptors. In addition noise from the trains could increase due to the increased power required to get up the viaduct. Noise from the level-crossing and stationary traffic would be avoided in this option but the impacts from these are considered to be less than the noise from the train.	-	Noise from the level-crossing and stationary traffic would be avoided in this option. In addition the U-shaped structure could screen noise from the trains along this section of the track.	+
Air Quality	Construction	There would be emissions to air from construction plant and	o	Greater air emissions are anticipated in this option due to the increased plant	-	Greater air emissions are anticipated in this option due to the	-	Greater air emissions are anticipated in this option due to the	-

		the potential for dust generation from the movement of material to form the track embankment.		requirements associated with the larger scope of work. There is a greater dust risk due to the requirement to excavate a large volume of material and subsequently remove the material from site.		increased plant requirements associated with the larger scope of work. There would be a slight reduction in dust risk due to the reduction in embankment works.		increased plant requirements associated with the larger scope of work. There is a greater dust risk due to the requirement to excavate a large volume of material and to create the highway embankment.	
	Operation	Operational air emissions would come from the operation of the rolling stock and from stationary vehicle traffic at the level-crossing.	o	Operational air emissions from trains could be greater due to the effort required to change gradient. There would be no stationary vehicle emissions.	o	Operational air emissions from trains could be greater due to the effort required to change gradient. There would be no stationary vehicle emissions.	o	Operational air emissions from trains could be greater due to the effort required to change gradient. There would be no stationary vehicle emissions.	o
Landscape and visual	Construction	Adverse landscape and visual impacts would occur from the removal of existing vegetation and the introduction of construction activity into a rural landscape.	o	Adverse landscape and visual impacts would occur from the removal of existing vegetation and the introduction of major construction activity into a rural landscape. Larger scale of construction likely to result in a greater impact than Option 1.	-	Adverse landscape and visual impacts would occur from the removal of existing vegetation and the introduction of major construction activity into a rural landscape. Larger scale of construction likely to result in a greater impact than Option 1.	-	Adverse landscape and visual impacts would occur from the removal of existing vegetation and the introduction of major construction activity into a rural landscape. Larger scale of construction likely to result in a greater impact than Option 1.	-
	Operation	The railway and level-crossing would introduce new features to the landscape, albeit the railway is a reinstatement of a former piece of infrastructure. Existing streetlighting would be extended southwards.	o	The operational scheme would consist of a large piece of concrete infrastructure that would be incongruous in this rural setting.	-	The operational scheme would consist of a large piece of concrete infrastructure that would be incongruous in this rural setting. The structure would be elevated and would be highly visible to the surrounding receptors.	-	The operational scheme would consist of a large piece of concrete infrastructure that would be incongruous in this rural setting. This option would also alter the highway, increasing landscape change away from the railway	-

							corridor.	
Ecology	Construction	Construction works will require the removal of vegetation and works to watercourses.	o	Construction works are likely to require the removal of more vegetation, especially in relation to the temporary highway diversion. Works to watercourses would be required.	-	Construction works are likely to require the removal of more vegetation, especially in relation to the temporary highway diversion. Works to watercourses would be required.	-	Construction works are likely to require the removal of more vegetation, especially in relation to the highway raising and temporary diversion. Works to watercourses would be required.
	Operation	It is not anticipated that the operational railway would have any ecological impacts.	o	Inverted siphons would limit the movement of wildlife along the river.	-	It is not anticipated that the operational railway would have any ecological impacts. The viaduct would improve ecological connectivity north-south in comparison to Option 1.	+	It is not anticipated that the operational railway would have any ecological impacts.
Water	Construction	Construction activity in the flood plain poses a pollution risk to the watercourse in the absence of best practice construction mitigation.	o	Construction requires considerable excavation work within the floodplain and management of ground and surface water. Greater risk of water pollution from dust due to excavation activity.	-	Construction phase impacts are considered to be comparable to Option 1.	o	Construction requires considerable excavation work within the floodplain and management of ground and surface water. Greater risk of water pollution from dust due to excavation activity.
	Operation	A series of viaducts and culverts are used to ensure there is no increase in flood risk.	o	Option will require inverted siphons which may not be fit for purpose and are difficult to maintain. Use of inverted siphons may increase flood risk upstream.	-	The use of a viaduct would avoid the requirement for culverts to convey flood flows. This would reduce maintenance requirements to ensure the structure are working effectively.	+	The measures employed in Option 1 to convey water north-south would be deliverable in this option.
Land quality	Construction	Intrusive groundworks	o	Significant ground	-	Extensive piling poses	-	Significant ground

		pose the potential to remobilise contaminants potentially present in the ground.		excavation works poses greater potential to remobilise any contaminants present in the ground.		greater potential to remobilise any contaminants present in the ground.		excavation works poses greater potential to remobilise any contaminants present in the ground.	
	Operation	No operational impact associated with this option.	o	No operational impact associated with this option.	o	No operational impact associated with this option.	o	No operational impact associated with this option.	o
Archaeology and cultural heritage	Construction	There is the potential for encountering previously unidentified features of archaeological value during groundworks.	o	Increased requirement for ground disturbance and excavation, increases the potential for encountering previously unidentified features of archaeological value.	-	There is the potential for encountering previously unidentified features of archaeological value during groundworks.	o	Increased requirement for ground disturbance and excavation, increases the potential for encountering previously unidentified features of archaeological value.	-
	Operation	The permanent scheme could change the setting of the listed buildings located at Northbridge Street.	o	The larger scale and different infrastructure proposed in this option poses a greater potential to alter the setting of listed structures than the baseline.	-	The large highly visible infrastructure proposed in this option poses a greater potential to alter the setting of listed structures than the baseline.	-	The larger scale and different infrastructure proposed in this option poses a greater potential to alter the setting of listed structures than the baseline.	-
Socio-economics	Construction	The construction phase will support local construction jobs and spend on construction material.	o	The larger scale of construction would result in greater construction cost. However, the specialised nature of the construction would mean that it is unlikely that that construction spend would be local. There may be a temporary economic impact associated with the temporary highway diversion and closure works.	o	The larger scale of construction would result in greater construction cost. However, the specialised nature of the construction would mean that it is unlikely that that construction spend would be local. There may be a temporary economic impact associated with the temporary highway	o	The larger scale of construction would result in greater construction cost. However, the specialised nature of the construction would mean that it is unlikely that that construction spend would be local. There may be a temporary economic impact associated with the temporary highway	o

					diversion and closure works.		diversion and closure works.	
	Operation	The operational scheme will create local jobs and tourist revenue. There is an economic impact associated with the level-crossing down time, but this is minor compared to the overall economic benefit.	o	No change compared to the operational scheme, although impacts associated with level-crossing down time are avoided.	o	No change compared to the operational scheme, although impacts associated with level-crossing down time are avoided.	o	o
Land use and agriculture	Construction	There would be temporary land acquisition to facilitate construction activity.	o	Due to the scale of the construction work there is likely to be a greater requirement for temporary land acquisition.	-	Due to the scale of the construction work there is likely to be a greater requirement for temporary land acquisition.	-	-
	Operation	There would be permanent land acquisition and severance of agricultural land holdings.	o	There would be permanent land acquisition and severance of agricultural land holdings.	-	Permanent land acquisition and severance of agricultural land holdings would be reduced compared to Option 1. It is assumed that agricultural access underneath the viaduct could be maintained.	+	-
Traffic and transport	Construction	Works would generate construction traffic to deliver construction material and embankment fill to site. Temporary disruption to the A21 during night-time closures for the installation of the level-crossing.	o	It is anticipated that construction phase traffic numbers would be greater due to the increase in construction material and removal of excavated material. Disruption to the A21 through temporary diversion of the highway.	-	It is anticipated that construction phase traffic numbers would be greater due to the increase in construction material. Disruption to the A21 through temporary diversion of the highway.	-	-

	Operation	Operation of the level-crossing would result in journey time delays on the A21.	o	No operational traffic impacts	+	No operational traffic impacts	+	No operational traffic impacts	+
Human health	Construction	Construction activity could create noise, air quality and dust impacts	o	Construction related impacts to human health in the absence of mitigation could be greater than Option 1 due to the greater scale of infrastructure needed to be built.	-	Construction related impacts to human health in the absence of mitigation could be greater than Option 1 due to the greater scale of infrastructure needed to be built.	-	Construction related impacts to human health in the absence of mitigation could be greater than Option 1 due to the greater scale of infrastructure needed to be built.	-
	Operation	No operational impacts to human health anticipated.	o	No operational impacts to human health anticipated.	o	No operational impacts to human health anticipated.	o	No operational impacts to human health anticipated.	o
Climate change	Construction	Greenhouse Gas emissions would be generated by construction plant. Construction materials would contain embodied carbon.	o	Greater use of concrete and construction effort associated with additional infrastructure would generate more Greenhouse Gas emissions and have a greater embodied carbon.	-	Greater use of concrete and construction effort associated with additional infrastructure would generate more Greenhouse Gas emissions and have a greater embodied carbon.	-	Greater use of concrete and construction effort associated with additional infrastructure would generate more Greenhouse Gas emissions and have a greater embodied carbon.	-
	Operation	Stationary vehicles during level-crossing closures have the potential to increase Greenhouse Gas emissions during operation.	o	Additional train fuel usage associated with gradient changes would increase Greenhouse Gas emissions. Increased emissions from stationary vehicle traffic would be avoided. In the absence of quantification it has been assumed that these impacts are comparable.	o	Additional train fuel usage associated with gradient changes would increase Greenhouse Gas emissions. Increased emissions from stationary vehicle traffic would be avoided. In the absence of quantification it has been assumed that these impacts are comparable.	o	Increased emissions from stationary vehicle traffic would be avoided. Operational train emissions are considered comparable to Option 1.	+

Overall			Greater construction phase impacts associated with the extensive additional infrastructure required for this option. The use of inverted siphons to convey north-south water flows have adverse impacts on ecology and flood risk.	-	Greater construction phase impacts associated with the additional infrastructure required. Viaduct would be highly visible and would result in adverse landscape, visual and setting impacts for listed buildings. It is noted that use of a viaduct does reduce impacts to watercourses by reducing the requirement for culverts and reduces severance impacts for agricultural land holdings.	-	Greater construction phase impacts associated with the extensive additional infrastructure required for this option. Greater construction impacts associated with the regrading of the highway.	-
---------	--	--	--	---	---	---	---	---

4.0 Conclusion

- 4.1.1 It is considered that from an environmental perspective Option 1 has the least impact, primarily due to it being the design solution with the least associated infrastructure. The greater infrastructure associated with Option 2, 3 and 4 will require more construction activity, greater use of materials and a longer and more disruptive construction programme.
- 4.1.2 Option 2 poses considerable challenges in relation to watercourses and the effective operation of the floodplain through the introduction of inverted siphons. Use of inverted siphons are usually opposed by the Environment Agency unless it can be demonstrated that there are no suitable alternative options.
- 4.1.3 Option 3 introduces a highly visible concrete viaduct into a rural landscape with potential impacts to the Area of Outstanding Natural Beauty (AONB) and the settings of listed buildings in Northbridge Street.
- 4.1.4 Option 4 will necessitate the raising of the A21 and the introduction of new embankments adjacent to the highway or an engineered retaining structure to minimise land acquisition and additional impacts on the floodplain.
- 4.1.5 All alternative options perform better in relation to the operation of the A21 as they avoid the requirement for a level-crossing. However, the solutions identified in order to avoid the requirement for a level-crossing come with numerous consequential environmental impacts. The assessment has not considered mitigation when comparing options. However, it should be noted that some of the impacts identified may generate adverse effects that could not be adequately mitigated and would not be acceptable to statutory stakeholders. This is of particular relevance to flood risk and landscape impacts within the AONB.

Appendix A – A21 Crossing Options Feasibility Report