



The Hoad family of Parsonage Farm, and the Trustees and Executors of the Noel de Quincey Estate and Mrs Emma Ainslie of Moat Farm

ROTHER VALLEY RAILWAY

Transport and Works Act 1992 (TWA):
Application for the Rother Valley Railway
(Bodium to Robertsbridge Junction) Order

Proof of Evidence: Flood Risk

Chris Patmore CEnv, BEng, DIP EIA, MIEEnvSci, MCIHT, MCIWEM, MICRS
Reference: TWA/18/APP/02/OBJ/1002





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WSP

Mountbatten House
Basing View
Basingstoke, Hampshire
RG21 4HJ

Phone: +44 1256 318 800

Fax: +44 1256 318 700

WSP.com



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1 INTRODUCTION

1.1 PERSONAL DETAILS – QUALIFICATIONS AND EXPERIENCE

- 1.1.1. I am Chris Patmore. I am a Chartered Environmentalist, a Member of the Institution of Environmental Sciences, a Member of the Institution of Highways and Transportation and a Member of the Chartered Institution of Water and Environmental Management. I have a Bachelor of Engineering (BEng) degree in civil engineering and a Diploma (DIP) in environmental impact assessment.
- 1.1.2. I am a Technical Director of WSP UK Limited and have been engaged in the planning, assessment and detailed design of drainage and flood risk infrastructure for over thirty years.
- 1.1.3. WSP UK Limited is part of the WSP Group which has over 40,000 staff worldwide. WSP UK is a specialist firm of Engineering and Environmental Consultants.

1.2 DECLARATION

- 1.2.1. I am instructed by the Hoad family of Parsonage Farm, and the Trustees and Executors of the Noel de Quincey Estate and Mrs Emma Ainslie of Moat Farm.
- 1.2.2. This proof of evidence has been prepared to review the flooding and drainage matters in relation to the Rother Valley Railway's (RVR) application to reinstate the railway to Robertsbridge.
- 1.2.3. I have visited the site and am familiar with the watercourses, rivers and drainage in and around Robertsbridge.
- 1.2.4. The evidence which I have prepared for this Inquiry is true and has been prepared and is given in accordance with the guidance of my professional institutions.

1.3 STRUCTURE OF EVIDENCE

- 1.3.1. My proof of evidence is structured as follows:
- Section 2 refers to the Secretary of State's Statement of Matters and identifies the flood risk and drainage issues with which this Proof of Evidence is concerned;
 - Section 3 describes the existing flood risk and drainage conditions;
 - Section 4 sets out the planning history, the position of the Environment Agency and the matters which I consider arise from this;
 - Section 5 sets out the Secretary of State's request for further Environmental Information;
 - Section 6 sets out my assessment of the TWA Order application, including the impact of the scheme, management, access and floodplain;
 - Section 7 sets out the current position of the statutory authorities' consultation; and,
 - Section 8 contains my summary and conclusions.

2 SECRETARY OF STATE – STATEMENT OF MATTERS

2.1.1. On 29 November 2018, the Secretary of State issued a Statement of Matters he wished to be informed upon as part of his consideration of the application. My proof of evidence considers the following matters identified by the Secretary of State:

“3. The likely impact of the exercise of the powers proposed in the TWA Order on land owners, tenants, local residents, businesses and statutory undertakers including any adverse impact on their ability to carry out their business or undertaking effectively and safely and to comply with any statutory obligations applying to their operations during construction and operation of the scheme. Consideration under this heading should include.....c) the effects on flood risk, air quality, water and waste discharge and noise;

4. The measures proposed by RVR to mitigate any adverse impacts of the scheme including any protective provisions proposed for inclusion in the draft TWA Order or other measures to safeguard the operations of utility providers or statutory undertakers.

5. The extent to which the proposals in the TWA Order are consistent with the National Planning Policy Framework, national transport policy, and local transport, environmental and planning policies.

6. The adequacy of the Environmental Statement (including the data underpinning it) submitted with the application for the TWA Order, having regard to the requirements of the Transport and Works (Applications and Objections Procedure) Rules 2006.”

2.1.2. On 8 June 2020 the Secretary of State issued a letter requesting further environmental information pursuant to Rule 17 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (DPI/U1430/18/21 (TWA/18/APP/02)). The letter from the Inspector is contained as **(OBJ/1002/CP/2 - Appendix A1)** of this proof. The adequacy of the additional information is also discussed in this proof.

3 EXISTING CONDITIONS

3.1 BASELINE INFORMATION

- 3.1.1. This section of the proof has been prepared as an overview of the flood and drainage impacts to and from the proposed extension to the Rother Valley Railway.
- 3.1.2. This section outlines the potential susceptibility of the development proposals to flood risk and hence the concerns regarding deliverability and resultant flood risk for the scheme as presented on the following key drawings and documents:
- J C White – Title Plans (B2 to B6) dated 2016 **[CD RVR/23]**;
 - J C White – Plans (Sheets 1 to 8) dated 2017 **[CD RVR/23]**;
 - Halcrow – Gradient Profile Plans (RVG – G – 001 – 006) dated 2014 (**OBJ/1002/CP/2 - Appendix B**);
 - Temple Group – ES Vol. 4 – Figure 2.4 Permanent and Temporary Land Take, dated 2013. **[CD RVR/28]**;
 - Capita – Rother Valley Railway Flood Risk Assessment, dated December 2013 **[CD RVR/36]**;
 - Capita – Rother Valley Railway Flood Risk Assessment, dated June 2016 **[CD RVR/28]**;
 - Capita – Rother Valley Railway Modelling Report dated June 2016 **[CD RVR/37]**;
 - Capita – Rother Valley Railway, Flood Risk Assessment Addendum Report, dated March 2021 **[CD RVR/70-07-00]**;
 - Temple – Rother Valley Railway Track Reinstatement Project. Environmental Statement (ES) 2021 Update, Report Ref. not given, dated March 2021 **[CD RVR/70-01]**. (possibly referenced as “*ES Revalidation Report*”); and
 - Temple – Rother Valley Railway Limited Water Framework Directive Screening Assessment Technical Report – Final, dated February 2021 **[CD RVR/70-03]**.
- 3.1.3. The information that has informed this note has been gathered from the Rother Valley Railway Public Inquiry website, the planning application documents held on the Rother District Council portal (application reference RR/2014/1608/P **[CD RVR/07]**), publicly available investigations by third parties on adjacent land, and web-based interrogation of EA flood mapping information.

3.2 FLOOD RISK

- 3.2.1. In accordance with NPPF, its supporting guidance and BS 8533 2017 – “assessing and managing flood risk in development - code of practice”, the following potential sources of flood risk have been considered.

3.3 TIDAL

- 3.3.1. The site defined by the Order is not within a tidal flood risk area as confirmed by EA flood zone mapping.

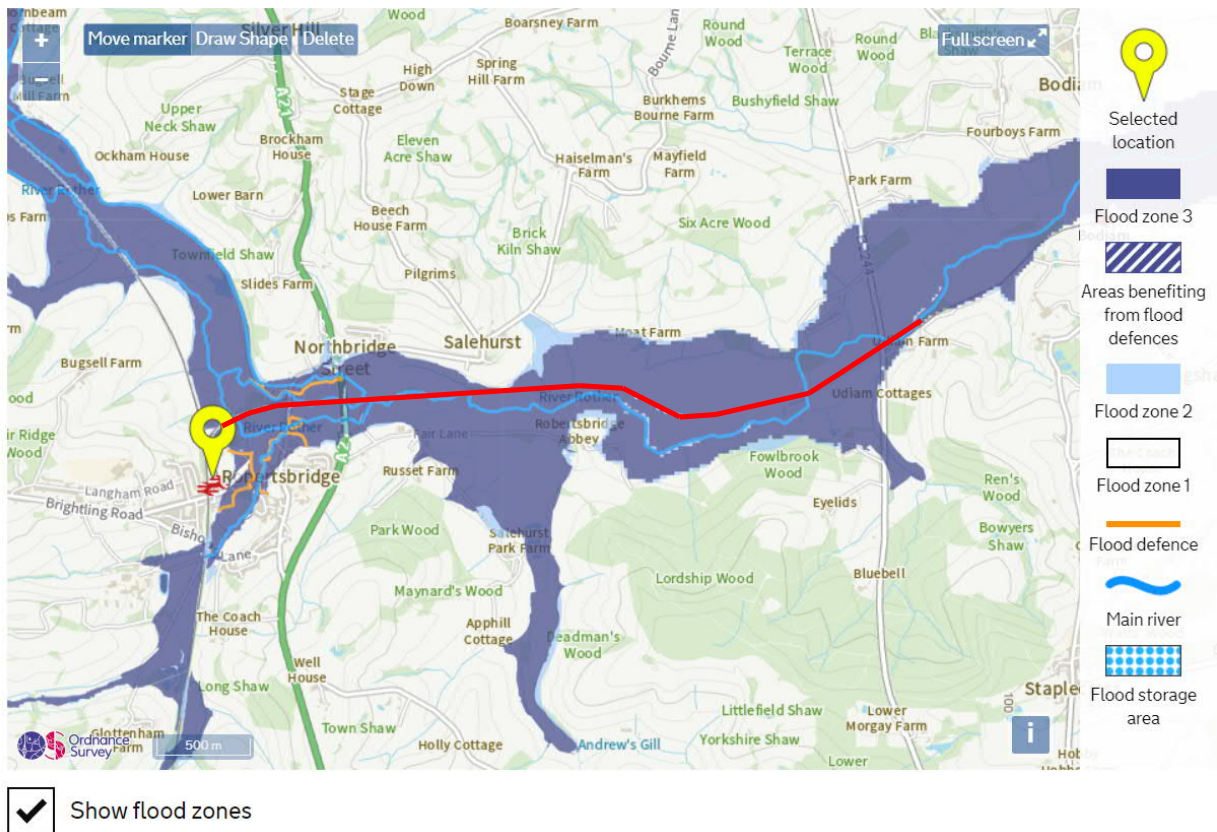
3.4 FLUVIAL

- 3.4.1. The site is totally within an identified fluvial flood risk area (Flood Zones 3 and 2) as confirmed by EA flood zone mapping (accessed March 2020) – **Figure 3.1**. **Photo 3.1** below shows an example of the extent of regular flooding at Moat Farm as occurred on 27th December 2020.
- 3.4.2. A review of the proposed alignment of the route (Halcrow drawings RVG – G – 001 to 006, a copy included as **OBJ/1002/CP/2 - Appendix B**) show that the railway is proposed mainly on an elevated alignment through this area with a number of bridges and culverts incorporated to maintain flood flow including crossings of the main River Rother.

Photo 3.1: View of Moat Farm, 27th December 2020

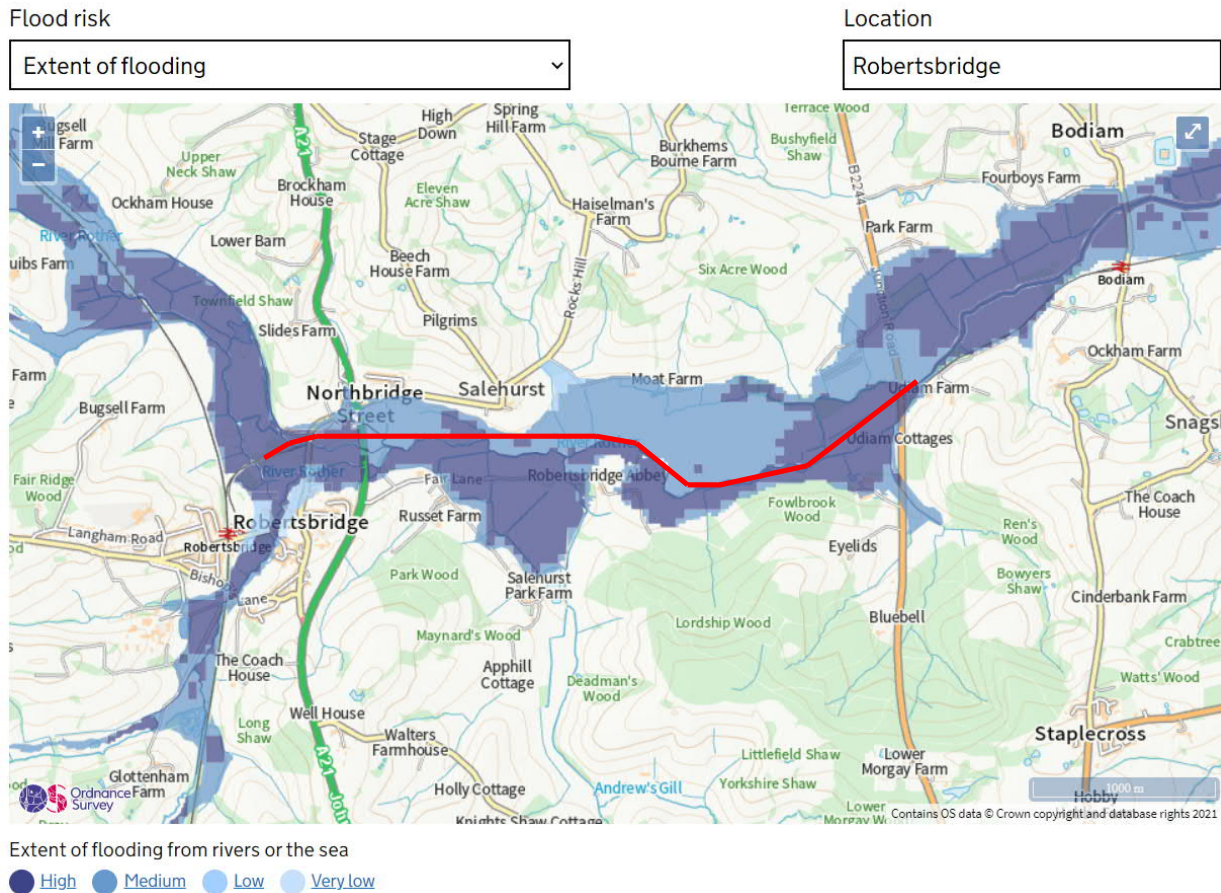


Figure 3.1: Extract from EA – Flood Map for Planning (April 2021)



- 3.4.3. This clearly shows that the proposed extension to the route is entirely within Flood Zone 3 and needs to consider flood risk both to the new development and from the works both during construction and in the long term. The specific design issues are discussed later in this proof.
- 3.4.4. The following map (**Figure 3.2**) is taken from the EA's "Long term flood risk information" maps:

Figure 3.2: Extract from EA – Long Term Flood Risk - Flood risk from rivers or the sea (April 2021) Extent of Flooding

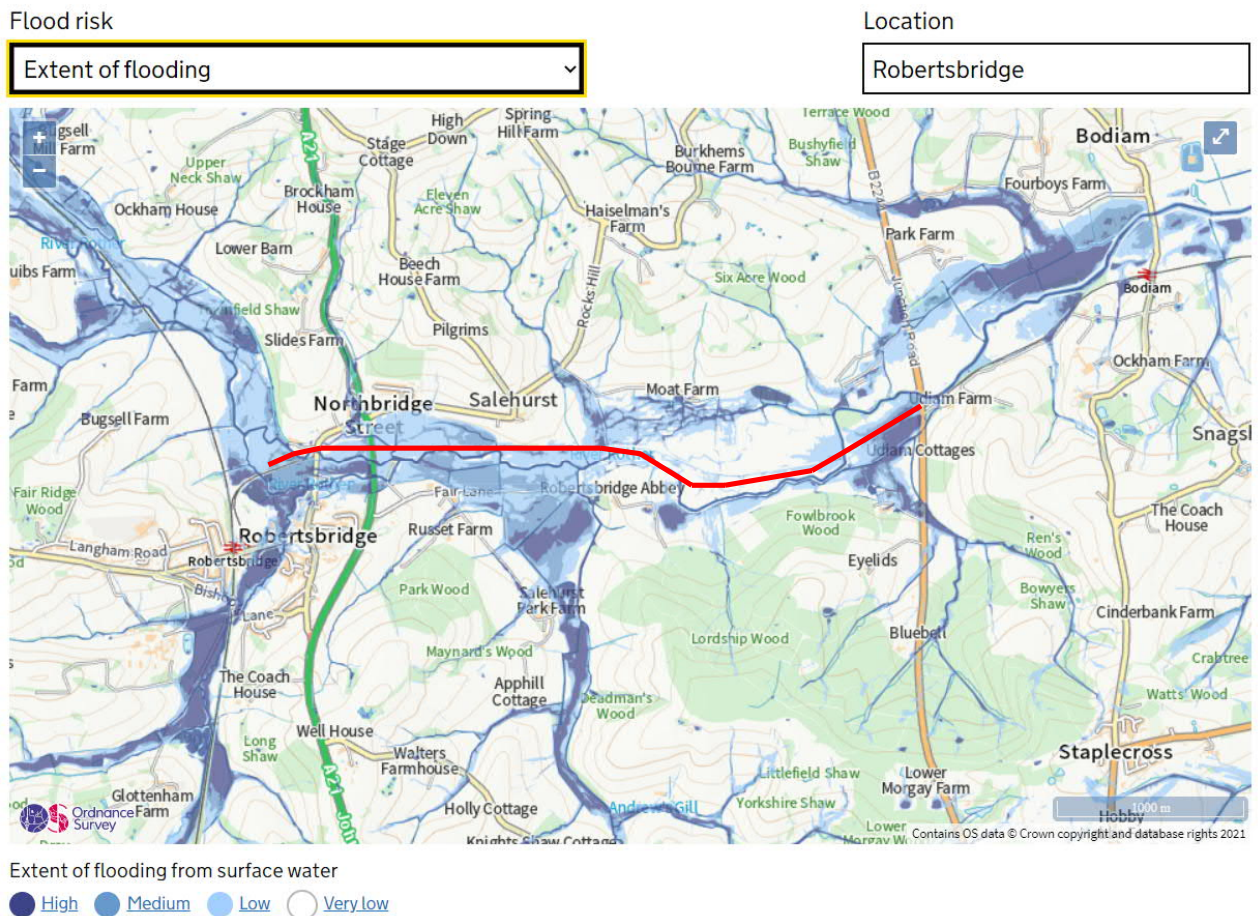


- 3.4.5. This shows a range of flood risk within the route from Medium to High.
- 3.4.6. The relevant definitions for “Medium” and “High” risk are found on the DEFRA website (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>):
- **High risk** means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.
 - **Medium risk** means that each year this area has a chance of flooding of between 1% and 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

3.5 SURFACE WATER FLOODING

- 3.5.1. This element is flooding related to rainfall on open ground. The EA published mapping suggests a number of potential surface water flow pathways flowing across the extents of the route and surrounding areas. These generally follow similar pathways to the fluvial (river) related flooding.

Figure 3.3: Extract from EA – Long Term Flood Risk - Flood risk from surface water (April 2021)



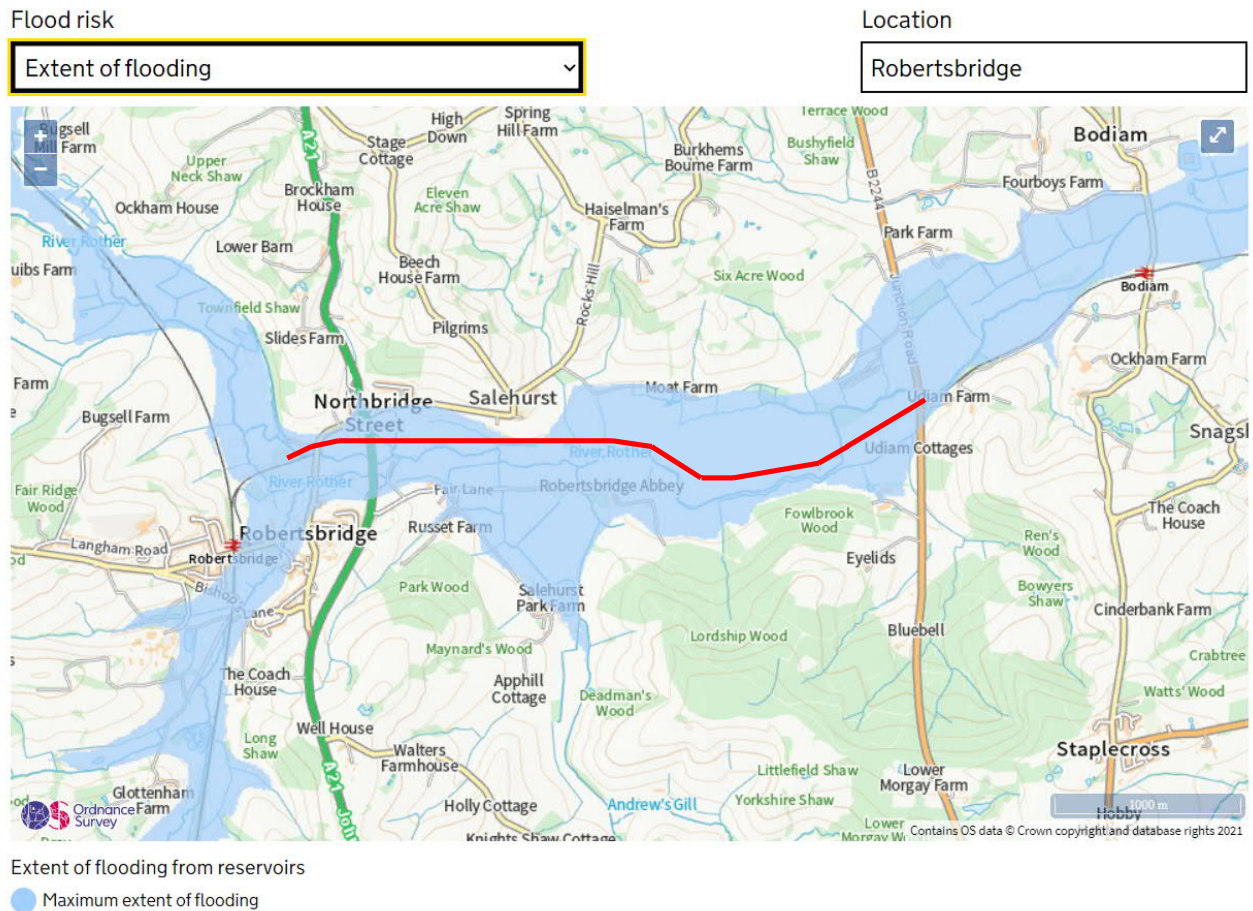
3.6 SEWER FLOODING

- 3.6.1. Flooding from drainage networks: This would relate to the risk of capacity being exceeded within any adjacent drainage and sewer network. Table 4.1 of the 2016 FRA [CD RVR36] suggests that there have been two recorded incidents of flooding in Robertsbridge that were partially attributed the flooding the combined sewer network (1993 and 2000).
- 3.6.2. No new information was supplied within the FRA Addendum [CD RVR/70-07-00] issued in response to the Inspectors letter.

3.7 ARTIFICIAL SOURCES

- 3.7.1. The EA mapping shows potential risk of flooding from reservoirs, canals or other artificial structures.
- 3.7.2. This is quoted in the 2016 Capita FRA (submitted as part of the planning application) as originating from the Darwell Reservoir and potentially Wadhurst Lake. This is a remote potential flood risk and as shown by the EA mapping would tend to follow the extents of the fluvial flood zones, effectively the river valley.

Figure 3.4: Extract from EA – Surface Water Flood Map (April 2021)



4 PLANNING HISTORY AND THE POSITION OF THE ENVIRONMENT AGENCY – ISSUES ARISING

4.1.1. The Environment Agency (“EA”) has been involved in the scheme for a number of years as a statutory consultee and their involvement is summarised below:

- December 2016 (representations on the Planning Application) – “***In accordance with the NPPF mitigation is required for any increase in flood risk and the post development scenario should show no impact on flood risk or a reduction compared to the baseline scenario. We recommend that conditions are put in place to manage this risk***” [OBJ/1002/CP/2 - Appendix A2];
- March 2017 – Planning Permission was issued (Ref. RR/2014/1608/P) with a number of pre-commencement conditions attached to respond to the concerns raised in the EA’s consultation responses, including Condition 4 (Buffer Zone), Condition 9 (Flood Risk Scheme of Mitigation), Condition 10 (Flood risk defence integrity method statement), and Condition 11 (Flood Plain storage compensation). I note that in particular Condition 11 provided that the applicant would need to demonstrate that there will be no loss of floodplain storage post development with any loss of floodplain storage to be compensated for on a volume by volume, level by level basis and in a suitable location. [CD RVR/07];
- June 2017 (representations to DfT at the TWA0 Scoping stage) – the EA noted that there were two key considerations that required further evidence. First, “***Demonstration that flood risk is not increased in agricultural land***” and secondly “***Demonstration that riverine ecology will not be adversely impacted***”. The EA letter noted that it could not discount the possibility that ecological mitigation may be required outside the red line boundary. The letter advised that “***The ES does not allay all environmental and flood risk issues and further work is still required***”. [OBJ/1002/CP/2 - Appendix A3];
- May 2018 (objection to TWA0 application) – the EA advised that RVR had not satisfied their concerns regarding flood risk to agricultural land nor that riverine ecology would not be adversely impacted. The letter stated that “***The current Flood Risk Assessment identifies increases in flood depths and it is therefore essential that further work is undertaken in the form of an appropriate flood storage compensation scheme to ensure that in the post-development scenario, there is, as a minimum, no adverse impact on flood risk compared to the baseline scenario***”. The EA did not consider that sufficient evidence has been produced in order to demonstrate that the proposed works will not create or exacerbate flood risk. The EA required planning conditions to be met in full before any Flood Risk Activity Permits (FRAPS) could be properly considered. The EA noted that the proposed structures (bridges, culverts etc) that are integral to the scheme have yet to be fully assessed in the context of a site wide FRA. The letter identified that the EA would need to continue to have access rights for maintenance, installation and data gathering from their assets. [OBJ/1002/CP/2 - Appendix A4];
- September 2018 (Statement of Case to TWA0 inquiry) – the EA letter noted that at the time the draft TWA0 application was made, the as-built designs, surveys, final assessments and revised modelling had not been submitted in order to discharge the pre-commencement conditions attached to the planning permission. [OBJ/0178];
- October 2018 (meeting between EA and WSP) – the EA confirmed that the areas of floodplain compensation have not yet been determined and that Condition 9 (attached to the planning

permission) would not be able to be discharged should a deliverable solution not be identified within the control of the applicant. [OBJ/1002/CP/2 - Appendix A5]; and

- March 2019 – EA withdraws its objection on the basis that (subject to the deemed approval/refusal issue) it had reached agreement with the applicant on an amended Part 3 of Protective Provisions. Confirmed in their letter dated 29 March 2019 [OBJ/1002/CP/2 - Appendix A6-1]

- 4.1.2. I understand that the EA has also been in discussions with RVR regarding the revised Flood Risk Assessment submitted in March 2021 (see below). However, the EA has not yet commented publicly on this revised Assessment and the associated technical reports.
- 4.1.3. Although the EA has reached a position where it has been able to withdraw its objection to application, this does not mean that there are no outstanding flood risk issues which are relevant to the matters on which the Secretary of State has asked to be advised (as set out below). In particular the EA's position is based on a combination of conditions and protective provisions which ensure that the proposed development cannot proceed unless and until certain measures are addressed. In that context, the EA is less concerned with (and has expressed no view about) whether those conditions and provisions can be satisfied: its interest in ensuring that there is no adverse impact on flood risk is dealt with simply by the fact that, if the conditions and protective provisions are not satisfied, the development cannot proceed.
- 4.1.4. The TWA application seeks authority to use compulsory purchase powers to acquire my clients' land. My understanding is that in order to authorise the use of compulsory purchase powers the Secretary of State will need to be satisfied, amongst other matters, that there are no impediments to the delivery of the scheme. In that context it is directly relevant to consider whether there is sufficient evidence to demonstrate that the conditions attached to the planning permission and the protective provisions which have been agreed with the EA can be satisfied
- 4.1.5. Within this context, this proof considers the implications of the planning conditions attached the planning permission dated 22 March 2017 (Ref. RR/2014/1608/P) [CD RVR/07] ("the Planning Permission") relating to flood risk matters. As set out above these conditions were imposed following the consultation responses issued by the EA to the planning application.
- 4.1.6. In respect of flood risk matters, the relevant attached to the Planning Permission are:

Condition 4:

"4. Buffer zone condition: the track shall not be brought into use until a scheme for the retention and management of a buffer zone, to be at least 8m wide between the top (NB: this is an incorrect, and significant, transcribing of the EA suggested planning condition as contained in their letter to the Local Planning Authority dated 19 December 2016 (a copy included as [OBJ/1002/CP/2 - Appendix A2] and is discussed later in this proof) of the railway embankment to the top of the riverbank has been submitted to and approved in writing by the Local Planning Authority.

The scheme shall include:

- a) plans showing the extent and layout of the buffer zone;***
- b) details of any proposed planting scheme (for example native species of local provenance);***

- c) *details of a management plan for the lifetime of the scheme including adequate financial provision and a named body responsible for its delivery;*
- d) *details of methods to be implemented should river bank repair works be required to maintain the width of the buffer strip. This must not include installation of sheet steel piling in the river;*
- e) *details of any proposed footpaths, fencing, lighting (fitted with back scatter guards to prevent light from being cast on the river) etc.; and*
- f) *an implementation programme.*

The scheme shall be implemented as approved.

Reason: To ensure the protection of wildlife and supporting habitat and secure opportunities for the enhancement of the nature conservation value of the site in accordance with Paragraphs 99, 109 and 118 of the National Planning Policy Framework and Policy EN5 of the Rother Local Plan Core Strategy. To ensure the objectives of the River Basin Management Plan (required by the Water Framework Directive, as transposed into English law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003) are being and can be delivered.”

Condition 9:

“9. Flood Risk Condition: No development shall take place until such time as a scheme to ensure any increase in flood risk is appropriately managed by providing appropriate mitigation measures, has been submitted to and approved in writing by the Local Planning Authority. All mitigation measures should take into account the flood risks over the lifetime of the development. They shall be implemented in full before the railway is brought into use.

Reason: To ensure that the proposed works will not increase flood risk elsewhere and take account of climate change in accordance with paragraph 99, 100 and 103 of National Planning Policy Framework. The proposal to change part of the existing flood embankment to a flood wall has not yet been modelled. This must be incorporated into the post development “with railway” model. Following submission of new details on the associated bridges and culverts forming part of the scheme, the implementation of these structures within the “with railway” flood model need to be reviewed. The applicant should demonstrate that the proposed bridges and culverts are set at appropriate levels to convey flood flows. Demonstration of sensitivity to culvert blockages is necessary to confirm the degree to which maintenance is required. Scour protection should be considered to ensure that the integrity of the railway embankment is maintained following a flood event, along the sections that will be allowed to overtop. A pre-commencement condition is necessary to secure these objectives.”

Condition 10:

10. Flood defence integrity condition: No development shall take place until a working method statement to cover all works to/close to flood defences and over/under and in the vicinity of the main river has been submitted to and agreed in writing with the Local Planning Authority. The method statement shall cover the following requirements:

- a) timing of works*
- b) methods used for works*
- c) machinery (e.g. location and storage of plant, material and fuel)*
- d) temporary works (e.g. access routes, temporary bridges, site compounds etc.)*
- e) protection of existing flood defences*
- f) site supervision*

The working method statement shall be implemented as approved.

Reason: To ensure that the construction phase of the works will not affect the integrity of flood defences in this area in accordance with of Policy EM8 of the Rother District Council Local Plan (2006) and the works do not affect The Environment Agency flood defence improvements and maintenance works.

The proposal incorporates a replacement of an existing flood embankment to a flood wall. The present and future integrity must be demonstrated to give assurance that people will not be put at risk of flooding. For the above reasons a pre-commencement condition is necessary."

Condition 11:

"11. Flood plain storage compensation: No development shall take place until a satisfactory scheme for compensatory flood storage has been submitted for the consideration and approval of the Local Planning Authority in consultation with the Environment Agency. The applicant will need to demonstrate that there will be no loss of floodplain storage post development with any loss of floodplain storage to be compensated for on a volume by volume, level for level basis and in a suitable location. The approved scheme shall be implemented at the same time the development approved in the application takes place and shall be completed before the railway is brought into use.

Reason: To prevent flooding elsewhere by ensuring that compensatory storage of flood water is provided. To accord with Policy EN7 of the Rother Local Plan Core Strategy."

- 4.1.7. These pre-commencement conditions were imposed at the Environment Agency's request because they did not consider at the planning application stage that sufficient information had been provided to address their concerns regarding Flood Risk Matters. My understanding from discussions with the Environment Agency (May 2021) is that none of these planning conditions have not yet been discharged.
- 4.1.8. In addition to the planning conditions, the EA has been involved in consultation regarding the drafting of the Protective Provisions under the draft Transport and Works Act Order [CD RVR01]. In the EA's original objection letter dated 24 May 2018 [OBJ/1002/CP/2 - Appendix A4] it stated:
"We have significant concerns about the disapplication of legislative provisions as outlined in Part 1- Sc5. (1) (a), (b) and (c) and object to the above Transport and Works Act Order on this basis."
- 4.1.9. These Protective Provision are aimed at allowing works and responsibilities that would normally be the responsibility of the EA to be transferred to the applicant, in this case Rother Valley Railway.

- 4.1.10. The Protective Provisions have now been redrafted and the EA removed its objection in March 2019 **[OBJ/1002/CP/2 - Appendix A6-1]** to the provisions via rewording of Part 3 **[OBJ/1002/CP/2 - Appendix A6-2]**. This proof makes reference to these provisions and the cross-relation to the planning conditions and separate legislation that is not replaced or superseded by the provisions.
- 4.1.11. Having reviewed the correspondence, the Planning Permission, all the technical information submitted to date, and based on my own discussions with the EA, it is my view that the substantive technical issues identified by the EA throughout the planning and TWA process have yet to be satisfactorily addressed. The following sections describe my view on these issues.

5 ENVIRONMENTAL INFORMATION

5.1.1. As noted above, one of the matters on which the Secretary of State has asked to be advised is the adequacy of the Environmental Statement submitted in support of the Application. On 8 June 2020 the Secretary of State issued a letter requesting further environmental information pursuant to Rule 17 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (DPI/U1430/18/21 (TWA/18/APP/02)). The letter from the Inspector is contained as **[OBJ/1002/CP/2 - Appendix A1]** of this proof.

5.1.2. On 8 March 2021, RVR responded to the Secretary of State's request. The information was uploaded to the Public Inquiry web site and made publicly available on 9 March 2021 **[CD RVR/70]**.

5.1.3. In relation to the flood risk and drainage related matters, the Secretary of State's letter stated:

“Water quality, hydrology and hydrogeology

• An updated flood risk assessment (FRA) making appropriate allowance for climate change in accordance with the Planning Practice Guidance on Flood Risk Assessments, which incorporates the revised UKCP18 climate projections and gives specific guidance in relation to Flood Zone 3b-Functional Floodplain. The updated FRA should include detailed justification relating to the Exception Test.

Reason: Subsequent to the 2016 Flood Risk Assessment submitted in the ES Addendum, the Met Office has published the higher resolution UKCP18 projections. The updated assessment is required to ensure that the flood model takes into account the most up to date river flow allowances, ensuring that any flood mitigation is of sufficient scope (for example, whether flood plain storage compensation is required and if it is, where it would be provided). An update to the Exception Test is required that demonstrates that the Proposed Development will provide wider sustainability benefits to the community that outweigh flood risk, that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall;

• A justification in support of the worst case assessment of likely significant effects to water quality.

Reason: ES Chapter 10 provides a qualitative assessment of emissions to water and groundwater during construction and operation. ES Chapter 10, paragraph 10.5.23 regarding mitigation states that “Surface water runoff management of the scheme and the potential water quality impacts from surface water leaching through potentially contaminated embankments and holt should to be discussed with the Environment Agency” and in relation to residual effects in paragraph 10.6.4 that “Further consultation with the Environment Agency with regards to the Scheme drainage design is required”. The summary of residual effects concludes that there are no residual effects during the construction phase. It is unclear, in light of the requirement for further consultations, how the conclusions address the worst case scenario for the Proposed Development;

• An updated Water Framework Directive (WFD) assessment taking into account design changes, such as reductions in culvert size (e.g. for otters). Where possible, the assessment should present evidence that the assessment has been agreed with the Environment Agency.

Reason: The 2016 ES addendum provided commentary on effects on ecology due to design changes, no update to the WFD analysis was provided in respect of the revised designs. The Applicant is reminded that the Secretary of State must exercise its relevant functions so as to secure compliance with the requirements of the WFD as outlined in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;

• An updated description of the methodology and approach used to collect baseline data used to inform the water quality, hydrology and hydrogeology baseline, including confirmation of the study area.

Reason: ES paragraph 4.2.1 states that individual study areas have been defined for each environmental discipline. The ES does not clearly identify the study area and basis for baseline data collection;”.

5.1.4. In response to this request, the following documents were issued by RVR, with the key water environment related documents highlighted:

- An Environmental Statement revalidation report which includes 7 appendices [CD RVR/70].
 - (a) Noise,
 - (b) Landscape,
 - (c) WFD report,
 - (d) Archaeology,
 - (e) Built Heritage,
 - (f) Traffic & Transport,
 - (g) Flood Risk Assessment (FRA),
 - (h) Major Accident Hazards.
- An updated Flood Risk Assessment
- A revised Non-Technical Summary
- A “signposting” report, detailing the documents that now comprise the totality of the environmental statement and explaining where the information requested by the Inspector is located.
- Appendices referred to in the original ES Vol 3 Section 6, requested by the Inspector; SLR Geographic maps and SL2 Geographic Flora maps.

5.1.5. It should be noted that within the March 2021 issue of further environmental information, there were a number of references to documents directly related to flood risk that were not included in the published information pack. These documents were later uploaded and only made publicly available on 13 May 2021.

5.1.6. The missing documents now made available include:

- The Flood Estimation Calculation Record [CD RVR/70-07-05];
- Hydraulic Modelling Report (March 2021) [CD RVR/70-07-04] referred to at paragraph 4.3.5 of the Flood Risk Assessment Addendum; and
- The appendices [CD RVR/70-07-01, 70-07-02 and 70-07-03] to the Flood Risk Assessment Addendum.

5.1.7. Having reviewed the correspondence, the further environmental information and based on my own discussions with the EA, it is my view that the substantive technical issues identified by the EA have not yet been satisfactorily addressed within the application as proposed. This includes the more



recently issued information presented in response to particular questions raised by the Inspector in respect of flood risk. The following sections describe my view on these issues and how these influence the implementation of the Order.

6 ASSESSMENT OF THE TWA ORDER APPLICATION

6.1 BACKGROUND

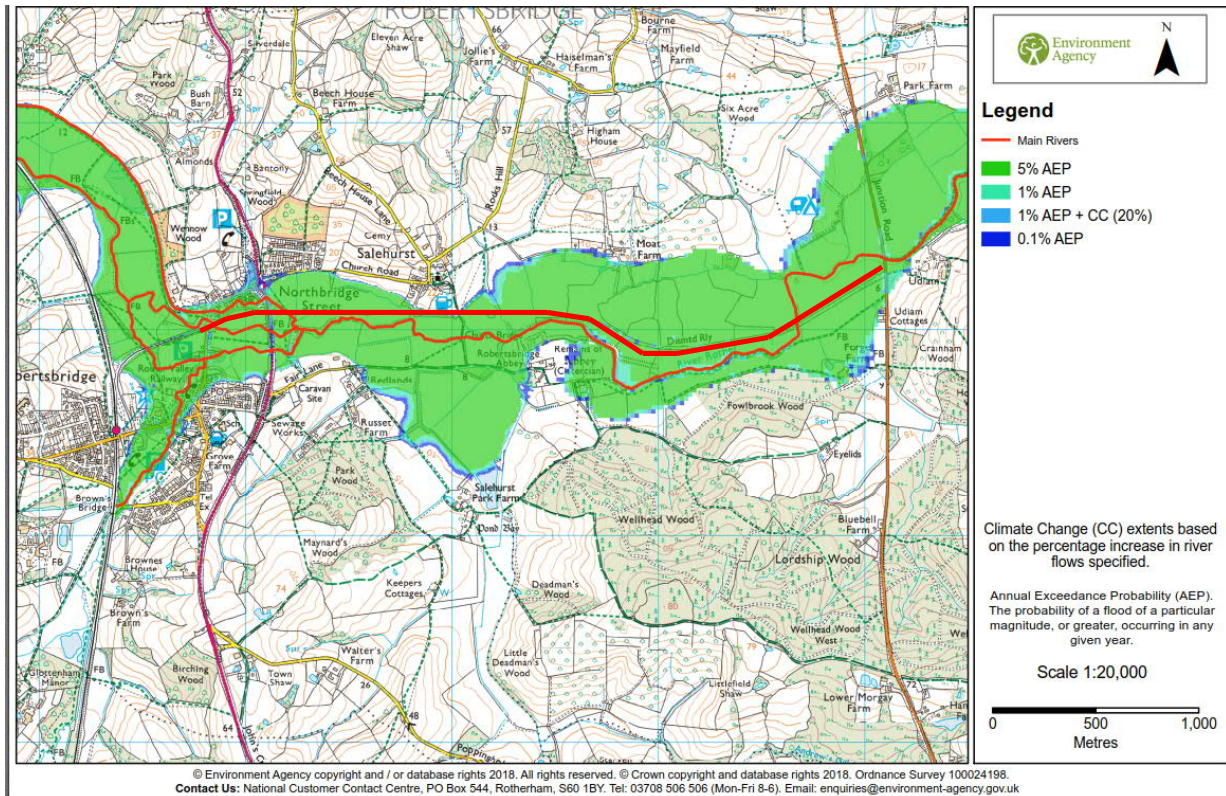
- 6.1.1. In terms of flood risk and drainage, this proof makes reference to the following key documents:
- Capita – Rother Valley Railway Flood Risk Assessment dated December 2013 [CD RVR/36];
 - Capita – Rother Valley Railway Flood Risk Assessment dated June 2016 [CD RVR/28];
 - Capita – Rother Valley Railway Modelling Report dated June 2016 [CD RVR/37]; and
 - Capita – Rother Valley Railway, Flood Risk Assessment Addendum Report, dated March 2021[CD RVR/70-07-00]
- 6.1.2. The following reviews the data supplied and my assessment of the impact and omissions and where this is directly related to the need to address the relevant Planning Conditions and Inspectors requests for further information.
- 6.1.3. This section reviews the validity of the documentation and the statement within the June 2014 Environmental Impact Statement [CD RVR/24] Section 4.6.9 discussing the Operational Effects:
- “4.6.9 The presence of the new railway embankment will result in a loss of floodplain storage and the bridge crossings will impact flooding by obstructing flood flows. Despite the new bridges being considerably wider, the FRA has concluded that the flood defences at Northbridge Street, North of Robertsbridge and Station Road would need to be raised by 0.3m in order to mitigate the increase in flood risk caused by the proposed Scheme.”***

6.2 FLUVIAL FLOOD RISK

Functional Flood Plain

- 6.2.1. The EA mapping of this area dated 2018 (reproduced as **Figure 6.1** with the full mapping contained in **OBJ/1002/CP/2 - Appendix C**) clearly shows that the route of the railway is located within Flood Zone 3b – functional floodplain (the 5% AEP area hatched in green). The FRA also makes reference to the fact that the railway line crosses “the functional floodplain” of the River Rother (Section 3.2.4 of the 2016 FRA) which is an area designated Flood Zone 3b by the EA.

Figure 6.1: EA Flood Mapping – Extract from Product 4 data request by WSP 2018 (see OBJ/1002/CP/2 - Appendix C) – showing extent of Functional Flood Plain (5% AEP)



6.2.2. Flood Zone 3b is defined in the NPPF Planning Practice Guidance as:

“This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map).”

6.2.3. In considering the application, the Capita FRA [CD RVR/28] had defined the railway as a “Less Vulnerable” use and located within Flood Zone 3. The NPPF Practice Guidance and the EA sequential test guidance (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones>) (Table 3) (shown below as **Table 6.1**) clearly states that “Less Vulnerable” use should not be permitted within Flood Zone 3b.

6.2.4. The FRA states:

“3.2.4 The railway does cross the 5% (1 in 20 year) AEP Flood Extent, which defines the functional floodplain. However, the majority of the railway line is above the 5% AEP flood level and the construction of the railway does not increase the extent of flooding.”

The paragraph then concludes by stating that the EA:

“has no objection to the railway crossing the functional floodplain”.

6.2.5. This appears to be the case when referencing the EA letter to Rother District Council dated 19 December 2016 (copy included as **OBJ/1002/CP/2 - Appendix C**). This response was to the

revisions of the levels of the railway and some of the culverts and bridge sections that actually allow the railway to be overtopped during the more extreme flood events.

Table 6.1: Table 3 of the Sequential Test Guidance

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate
Zone 2	Development is appropriate	Exception test required	Development is appropriate	Development is appropriate	Development is appropriate
Zone 3A	Exception test required	Development should not be permitted	Exception test required	Development is appropriate	Development is appropriate
Zone 3B	Exception test required	Development should not be permitted	Development should not be permitted	Development should not be permitted	Development is appropriate

- 6.2.6. The FRA Addendum Report appears to also acknowledge that the railway line is located within Flood Zone 3b but goes on to assess the application by reference to the Exceptions Test.
- 6.2.7. This analysis is misleading and dangerous, in at least two respects. First, crossing the functional flood plain cannot be mitigated by simply increasing the level of the asset. If this was the case, then anything could be built in the flood plain as long as it was high enough. There is nothing in the PPG which suggests that development which is located in functional floodplain becomes acceptable if the floor levels are raised to the extent that they are above the 1 in 20 level. The constructed track itself may be above the “5% AEP flood level” but this is not the same as where the route is sited (see **Figure 6.1**).
- 6.2.8. Second, under the terms of the PPF, the Exception Test does not apply in the case of “Less Vulnerable” development in Zone 3b.
- 6.2.9. In the present case, the issue of the “function Floodplain” was raised by the Secretary of State and hence responded to within the FRA Addendum. The FRA Addendum accepts that the railway is considered “Less Vulnerable” in flood terms rather than “Water Compatible” as has previously been stated and show the 5% AEP extents.
- 6.2.10. In my view, it is therefore clear that the scheme is located within the functional floodplain (i.e Zone 3b). Consequently, the proposal is in direct conflict with national guidance, which clearly states that “Development should not be permitted”. Whilst I note the EA’s position, I have not seen anything in their responses which explains how they have addressed this conflict.

KEY CONCLUSION 1

- 6.2.11. *Fundamentally, the proposals fail the NPPF sequential test and have not been fully justified as requested by the Inspector. The railway route is defined as “less vulnerable” and, as shown on the EA mapping is located fully within Flood Zone 3b. Thus “Development should not be permitted”.*
- 6.2.12. However, even if it were permissible to have regard to the Exception Test, I do not consider that the proposal would satisfy the necessary requirements.
- 6.2.13. Part 1 of the NPPF Exception Test states:
- “a) the development would provide wider sustainability benefits to the community that outweigh the flood risk”.***
- 6.2.14. The FRA Addendum makes reference to a separate report that Rother Valley Railway commissioned from Steer Group [CD RVR/09] to undertake an investigation into the benefits of the reinstated railway (no reference details are provided in the FRA Addendum). In my view the aim of the reference to benefits in the Exception Test is focused more on narrower environmental sustainability benefits. I am unclear that it can be applied to pure economic benefits alone. The FRA addendum does not identify any such wider sustainability benefits and solely relies on the alleged economic benefits of the proposals. However, I would refer to the evidence of Ellie Evans **OBJ/1002/EE/1** in this respect which concludes that these economic benefits of the proposals have been significantly overstated in the Steer Report. I further note that in the applicant's own Environmental Statement the overall benefit, even on its own analysis, is not considered to be significant. I do not consider that benefits which are classed as insignificant in Environmental Impact terms can constitute “wider sustainability benefits” of sufficient weight to pass the Exceptions Test. It should be noted that I do not consider that merely stating a cross reference to a separate document constitutes “addressing” the Exceptions Test. Again, there is no evidence that this has been accepted or even reviewed by the relevant approving authorities.
- 6.2.15. Part 2 of the Exception Test states;
- “(b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”***
- 6.2.16. For this, the FRA Addendum refers back to the new modelling and includes the statement ***“Based on the tolerances of modelling and the consequences of variations in maximum flood levels between the baseline and ‘with railway’ scenarios, it is concluded that flood risk is not increased by the proposed railway.”*** I believe this is a slightly erroneous statement based on the quoted water depths in Section 4.4.4 of the FRA Addendum. There are areas where depths are increased and other decreased. Consideration needs to be given to the impact on the individual areas that are impacted. This is covered to some extent with the tables in the FRA and FRA Addendum but is reliant on uncertainties in the model and the lack of sensitivity testing (discussed later in this proof).

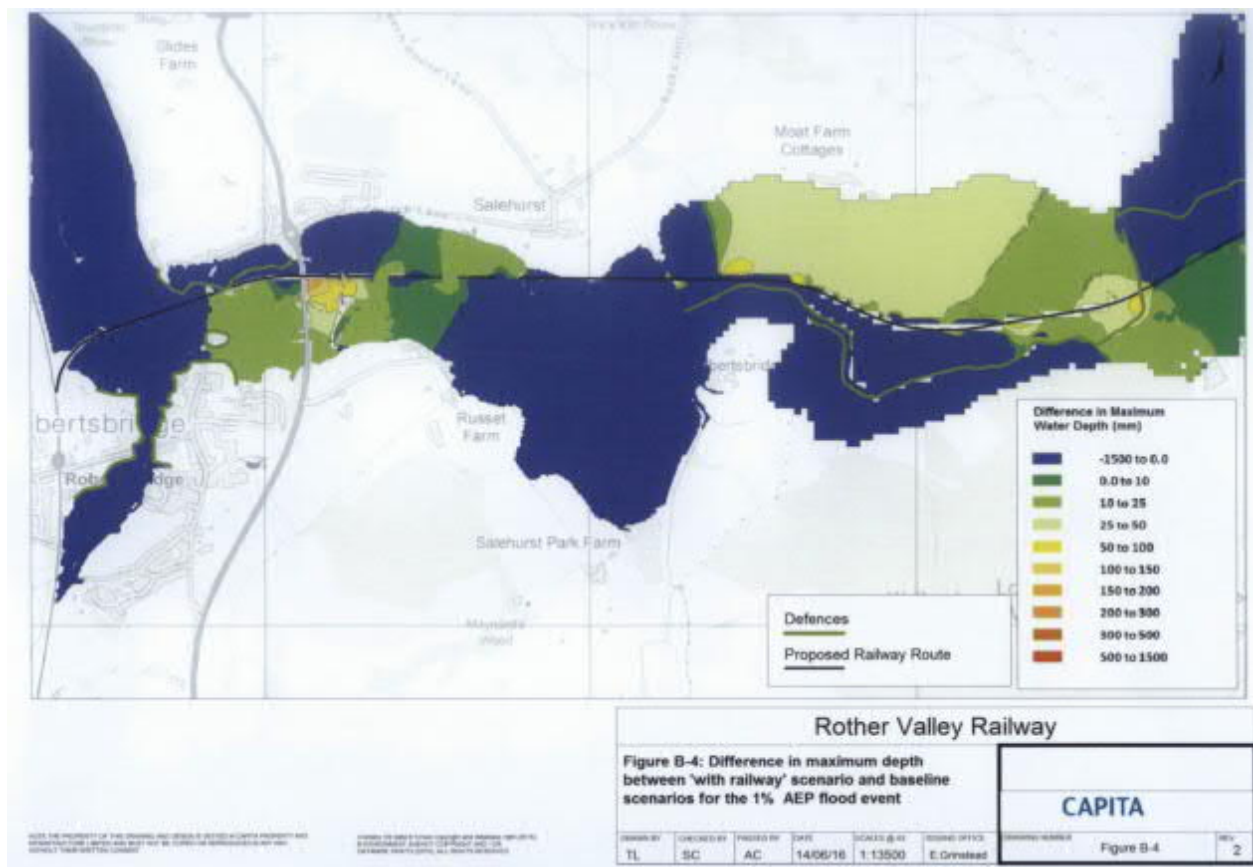
Impact of the Railway on Flooding

- 6.2.17. The following sections review the statement ***“the construction of the railway does not increase the extent of flooding.”***

Modelled Flood Events – Mapping Results

- 6.2.18. The Capita modelling contained within their report (Updated in 2016) [CD RVR/28] shows the following flood predictions as shown in **Figure 6.2**.

Figure 6.2: Capita Flood Mapping 2016 – Figure B-4 Difference in Maximum Depth Between “with railway” scenario and baseline scenarios for the 1% AEP Flood Event



- 6.2.19. This mapping is potentially misleading as the “benefit” mapping (Dark Blue) shows a range from -1,500mm to 0mm suggesting all this area potentially benefits from the scheme but equally, with a 0mm value, very little of this area could benefit. The banding of the benefit is effectively hidden in one large value range whereas the impacted areas are in 50mm bands.

- 6.2.20. The Executive Summary of the 2016 report states:

“Small sections of the defences are overtopped in both the existing (baseline) and “with railway” scenario in the 1% AEP and 1% AEP with climate change design flood events. The “with railway” scenario predicts a reduction of up to approximately 400mm in flood depth behind the defences in Robertsbridge in the 1% AEP with climate change design event. The “with railway” scenarios predicts a reduction of up to approximately 50mm in flood depth behind the defences in Northbridge Street in the 1% AEP design event.”

NOTE: AEP – annual exceedance probability

- 6.2.21. This is not what is shown on the mapping available and included in the FRA reports (2013 or 2016) **[CD RVR/28]** as the scale of the mapping and clarity of the depth banding does not enable this statement to be confirmed.
- 6.2.22. As the 2016 assessment was based on the old climate change allowances (pre 2018) and that an assessment using the latest allowances would likely further increase the flood depths shown across the scheme. Climate Change values and its potential to change the flood extents is a key issue raised by the Inspector and is discussed in this proof in **Section 6.4** below.
- 6.2.23. The FRA Addendum 2020 again produced similar mapping but having taken into account a number of updates to the modelling methodology as well as Climate Change factors. These are stated within the FRA Addendum to include:
- Revised design flows;
 - Latest Climate Change allowances; and
 - Increased spatial resolution of the model downstream of Salehurst
- 6.2.24. The colour banding is in different increments so cannot be directly compared like-for-like with the 2016 plans, but it now appears that there are areas with greater delineation and, in particular, the areas benefitting from a reduction in flood risk are now identified better.
- 6.2.25. It is also worth noting that a wider series of maps have been produced that include the 5% (1 in 20 flood event) and the 1% (1 in 100 flood event – as equivalent map to **Figure 6.2** above and reproduced as **Figure 6.3** below) and climate change allowance figures including the 1% plus 45% and 1% plus 105% climate change allowance reproduced as **Figure 6.4** below.

Figure 6.3: Capita Flood Mapping 2020 – Figure 4-7 1% AEP Design Flood Event - Difference in 'With Railway' and Baseline predicted Maximum Water Level

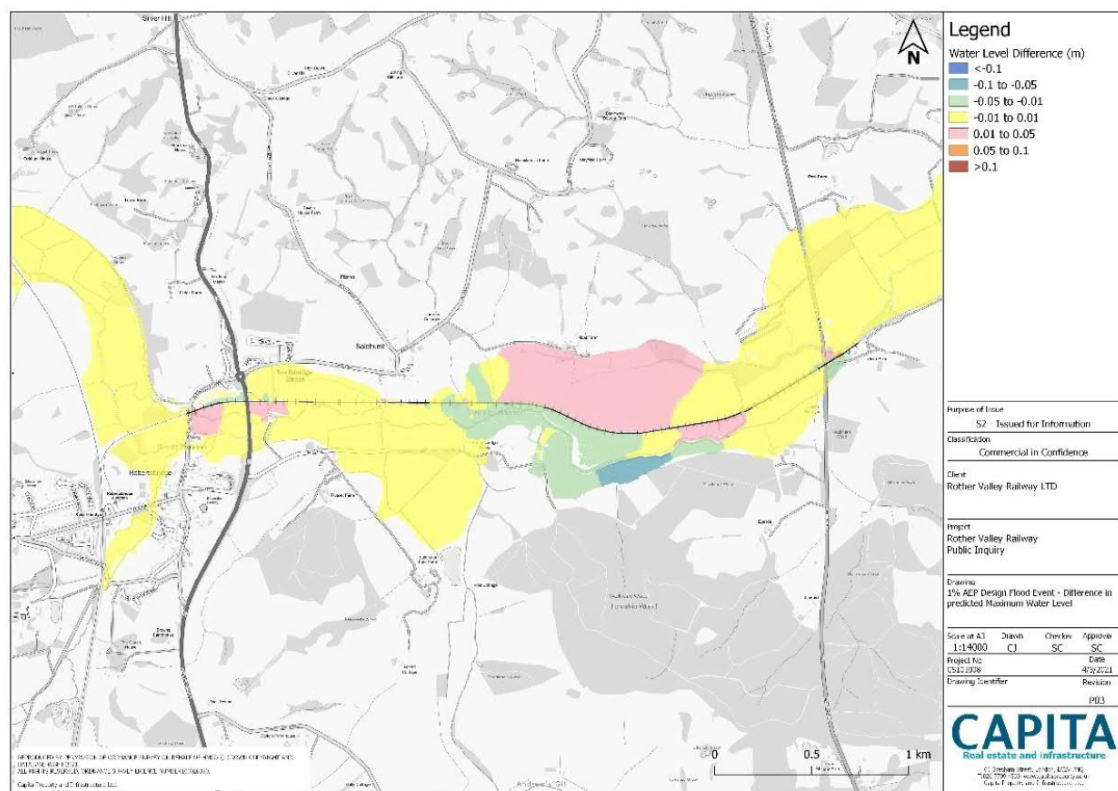


Figure 6.4: Capita Flood Mapping 2020 – Figure 4-9 1% AEP Design Flood Event with 105% allowance for climate change - Difference in 'With Railway' and Baseline predicted Maximum Water Level

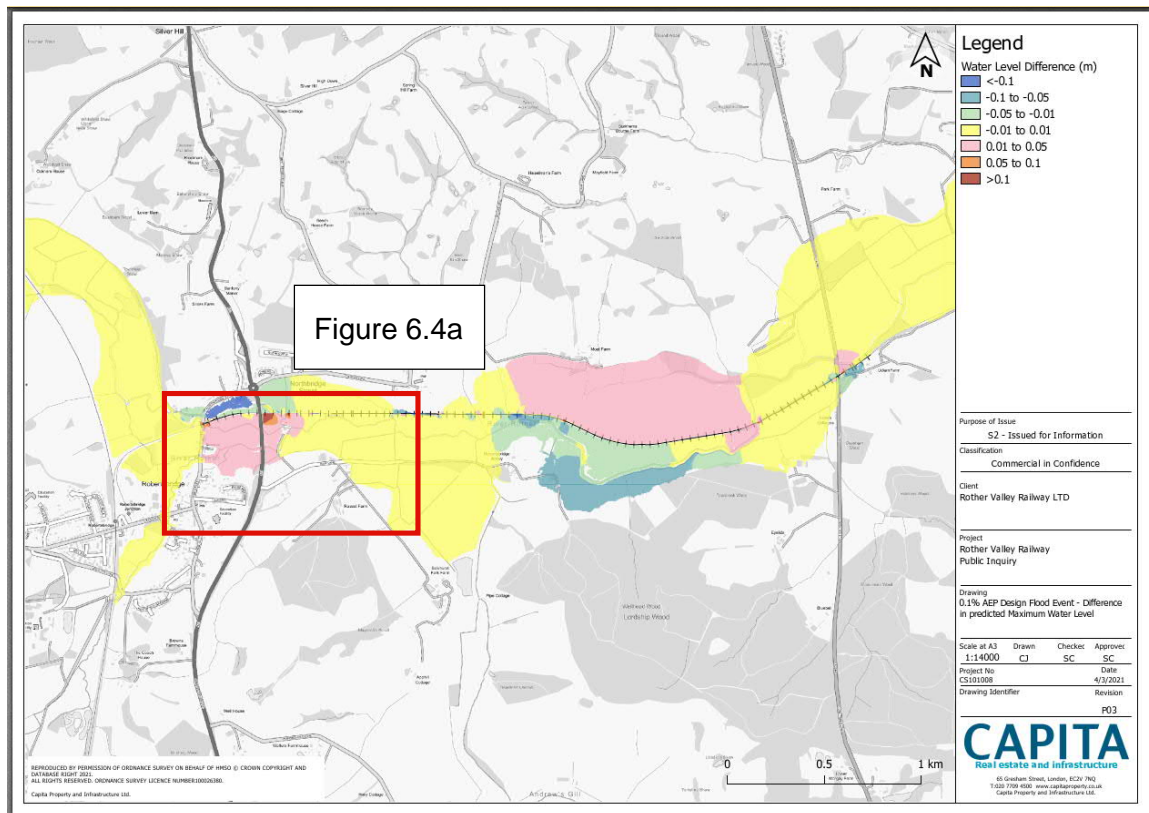


Figure 6.4a: Extract from Capita Flood Mapping 2020 – Figure 4-9 1% AEP Design Flood Event with 105% allowance for climate change - Difference in 'With Railway' and Baseline predicted Maximum Water Level



- 6.2.26. The FRA Addendum concludes that no significant receptors are at increased flood risk. From the information provided and within the limitations of the model testing, this seems to be mostly the case with (as stated) “only” agricultural areas at increased risk. However, the largest area of impacted land (hatched pink on the above plans) is immediately adjacent to the Moat Farm properties and as can be seen from the photograph above (**Photo 3.1**) very close to the threshold of the buildings and accesses.
- 6.2.27. A deeper impacted area is shown in dark red on the plan (Figure 5.4a) and this corresponds to an area immediately adjacent to the A21 with a predicted water level increase of above 100mm. Again, this is within “only” agricultural land but immediately adjacent to important wider public infrastructure.
- 6.2.28. My clients are the owners of the agricultural land which is predicted to encounter increased levels of flooding and as a result of increased level, increased duration of flooding – this latter impact has not been addressed in any evidence I have seen submitted by RVR. The impact of such increases will impact upon their ability to farm their land – as is addressed in the evidence of Mr Highwood [**OBJ/1002/AH1**].
- 6.2.29. Another area is showing increased flood depths extending across High Street / Northbridge Street. In my view this would be significant in terms of a detrimental impact on safe access routes.

KEY CONCLUSION 2:

- 6.2.30. *The original Capita modelling plans show large areas of potential flood benefit from the introduction of the railway. The “benefit” band has now been resolved from a single range to a more varied set of values that seems to now accord with the text of the original FRA and FRA Addendum. More detailed resolution on the mapping has only recently been made available (May 2021).*
- This mapping is showing areas that will experience deeper water depths that will also ultimately lead to longer periods of flooding and although located within areas identified in the FRA as “only” agricultural land (i.e. immediately adjacent to Moat Farm), are immediately adjacent to properties and essential infrastructure. This coupled with the increased depth of predicted flooding across High Street / Northbridge Street raises deep concerns over the sensitivity of the impacts that are not addressed in the modelling or reporting. In terms of addressing the NPPF Exception Test, this evidence is only showing minor areas of betterment and some of these are also within the “only” agricultural area. Not conclusively satisfying the Exception Test Part a) “the development would provide wider sustainability benefits to the community that outweigh the flood risk” as well as not conclusively demonstrating satisfying the Exception Test Part b) “the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”*
- 6.2.31. There are a number of issues regarding the approach to Flood Modelling which are relevant to the robustness of the conclusions of the FRA Addendum which I consider in the sections below.

Modelled Flood Events - Inflows

- 6.2.32. First, I have considered the modelled inflows. I have reviewed a copy of the summary Flood Modelling Report (2016) [**CD RVR/37**] that is referenced within the FRA (the full report has not been made available). The model inflows which, as well as using outdated climate change allowances, are derived directly from the 2011 EA study (i.e. predating ReFH2, FEH2013 rainfall data), does not account for the potential impact on peak flow estimation of any flood events in the catchment since this date).

- 6.2.33. Paragraph 5.1.5 of the 2016 summary modelling report states that ***“It was assumed that the hydrological inflows developed for the 2011 model were suitable for use in this study and provide the best estimate of design flows”***
- 6.2.34. The three largest recorded annual maximum peak flows at the nearest gauging station (Rother at Udiam) have occurred since the original hydrological analysis was undertaken (<https://nrfa.ceh.ac.uk/data/station/peakflow/40004>)
- 6.2.35. Capita (and the original EA model) adopted design flow events based on ReFH. However, a comparison of flow estimates in one location (S3) shows a 27% flow reduction in the 1% AEP estimates based on ReFH in comparison to the flow estimate indicated by the reported statistical analysis. ReFH calculated 47.3 cumecs whereas the Statistical estimate is 60.4 cumecs. This high degree of variations between two flow estimate suggests that further hydrological analysis is required. The sensitivity testing discussed earlier is absent and this could drastically impact the model results in terms of flood depths and area extents.
- 6.2.36. The FRA Addendum 2021, as stated above, appears to have been based on a model update that included *“Revised design flows”* and *“Increased spatial resolution of the model downstream of Salehurst”*. The model report that is referenced at paragraph 4.3.5 within the FRA Addendum as *“The Flood Estimation Calculation Record: Rother Valley and the Hydraulic Modelling Report (March 2021)”* was not included in the originally distributed information. This report was later made available in May 2021.
- 6.2.37. I have reviewed the report in so far as it reports the model parameters. The latest modelling report just describes updates to the 2016 model. These updates will be improvements to the 2016 model, but I have not seen the 2021 model itself and am therefore unable to confirm whether the 2021 model is appropriate or fit for purpose. In particular, it is unclear whether the updated 2021 model has incorporated sensitivity testing to address the variations in flow rates. If no such sensitivity analysis has been undertaken the results of the model in terms of predicted flood extent and depths could be significantly different to those set out in the FRA Addendum.

KEY CONCLUSION 3:

- 6.2.38. *Although a new model has been developed in response to the Inspectors concerns, this only directly addresses the concerns raised and does not include sensitivity testing of; inflow hydrology, topography, roughness characteristics, calibration against flood events and blockages. There is a risk that if this sensitivity testing has not been undertaken the “with railway” flood predictions in the FRA Addendum may not be robust.*

Topography assumptions

- 6.2.39. As well as the inflow hydrology, other factors influence the accuracy of any flood model. One of these is the accuracy of the topography used to build the model. The extent of surface features such as trees and buildings can result in variations in any surface model produced by LIDAR imagery (Light Detection and Ranging) which is a way to obtain level information for large areas without a full topographic survey. An aircraft flies over the area bouncing signals off the terrain to produce “point cloud” typically with an accuracy of +/- 100mm. This point cloud is then “smoothed” to take account of anomalies, removing buildings and other vertical features to create a bald earth model. The process to create this model reduces the accuracy and can have a reduced accuracy of around +/- 300mm for areas with tree cover and other vegetation.

- 6.2.40. For this site the presence of trees alongside the river (as shown on **Photo 6.1**) can alter the bank levels within the model and lead to perceived containment within the river that is not present in reality. The impact of this could be that out of bank flows occur more frequently than the model predicts (See also residual “Freeboard” allowance discussed in **Section 6.3** below). The model reports and data available to date does not discuss this potential impact on the sensitivity of the results.

Photo 6.1: Existing tree cover around the River Rother along the route showing how the vegetation could obscure accurate LIDAR referencing of the riverbank



KEY CONCLUSION 4:

- 6.2.41. *The accuracy of the model is dependent upon topography of the site. In this case there are large areas of tree cover close to the route and around the watercourses. Any LiDAR model used for this kind of analysis is usually “smoothed” of features such as trees (illustrated in Photo 6.1) and buildings. This creates increased inaccuracies in the levels, possibly in excess of +/- 150mm to +/- 300mm. This casts doubt the predicted flood levels in the modelling results. It may be that the predicted benefits have been overstated and that the predicted increase in flood levels understated. This information is directly related to the scheme being able to address Planning Conditions 9 and 11 in terms of compensation and extent of flood impact.*

Built Structures

- 6.2.42. The influences of structures on the performance of the model, in particular, the new culverts has not been fully assessed within the model and an important factor is the potential for blockages and how this can hold back water or divert it to other areas and thus changes the flood extents and impacts. This is emphasised within the EA planning conditions and not currently addressed within the recent FRA Addendum and the model that accompanies it.

KEY CONCLUSION 5:

- 6.2.43. *Although there are a number of modelled scenarios presented within both the Capita reports, blockage events on any of the bridge structures (existing and/or proposed) have still not been presented or commented on in the available information (including the more recent modelling). This is vital information in addressing and discharging Planning Condition 9 as blockages could lead to the redistribution of flooding as well as erosion and scour to the railway embankment, land and existing river.*

6.3 RESIDUAL UNCERTANTY ALLOWANCE “FREEBOARD”

- 6.3.1. Applying a freeboard is a method of making allowances for modelling uncertainties to protect access, buildings, structures and utilities. These uncertainties are related to input values, topography, structures, calibration of the data against real events and other factors. These are explained in more detail within the EA published document “*Accounting for residual uncertainty: updating the freeboard guide*” Report – SC120014 dated February 2017 (<https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/accounting-for-residual-uncertainty-an-update-to-the-fluvial-freeboard-guide>).
- 6.3.2. This freeboard (or residual uncertainty allowance) is then applied to any modelled flood levels to give a “design level” for features to provide a degree of protection against the impacts of flooding. Examples would be setting ground floor construction usually 300mm to 600mm above the flood level to protect the flood construction (timber joists, insulation and floor finishes) from water ingress and causing further damage. A similar allowance is recommended for any electrical installations, again to stop water ingress and damage.
- 6.3.3. This allowance does not change the mapped extents but is to be considered for all properties where the levels are close to and at the flood levels, even if they are located in Flood Zone 1 but adjacent to identified flood zones.
- 6.3.4. The application of the flood modelling results as presented in the 2016 documents and reported in the FRA Addendum, and the results themselves, shows that there remain significant issues relating to the impacts of the higher storm events. This is particularly the case as the events consider climate change. This coupled with the known modelling techniques and inherent uncertainties as described earlier in this proof mean that there remains a risk to the surrounding landowners in how they manage site uses and access.
- 6.3.5. Critically, there is no “freeboard” allowance included in the scheme proposals that would normally be expected for any new works subject to flood risk and usually insisted upon by the EA in applications within areas of flood risk. As a result, the design standard proposed for the works are very limited and short term. The proposals as they stand will lead to a decreasing level of safety and protection over time.
- 6.3.6. Under CDM, RVR has a responsibility to identify any issue that may have a safety implication on people and places and to consider how this is managed and operated particularly when the public may be involved.

- 6.3.7. I would expect that consideration of the residual uncertainty allowance “freeboard” requirements to have been applied. It should be noted that this uncertainty can be both ways i.e the flood levels could be higher or potentially lower.
- 6.3.8. My initial assessment suggests that a minimum of 600mm should be applied to the design flood level to allow for the intrinsic uncertainties within the model. With at least a 300mm allowance on the more extreme 1 in 100 year plus climate change design flood level, again covering for uncertainties. This intrinsic uncertainty directly links to the potential for flood compensation impacts and highlights that buildings and other structures could be indirectly impacted if less than 600mm above the predicted flood waters. This is due to the potential increased risk of waterlogging foundations and below ground utilities.

KEY CONCLUSION 6:

- 6.3.9. *In the context of development in the functional floodplain, it would be prudent to apply the methodology of the EA residual uncertainty “freeboard” analysis to take account for the inherent uncertainties in flood modelling. There is no explanation of the application of any sort of allowance or uncertainties to the calculations and thus allow the impact on existing and future adjacent structures, foundations of structures and infrastructure to be determined.*

6.4 CLIMATE CHANGE

- 6.4.1. Climate change is another of the specific issues identified by the Inspector. Another specific issue raised by the Inspector. Capita considered the impacts of climate change contained within the Flood Zone 3 areas. At the time of their studies (2013) the climate change factor to be considered for fluvial events was 20% over and above the 1 in 100 year event. In the 2016 update report [CD RVR/28] climate change is not quantified by Capita. In 2021 it has been amended again.
- 6.4.2. In 2016 the EA revised their allowances for climate change to a more regional basis and also dependent on the end use. The following table has been extracted from the guidance (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>).

Table 6.2: Extract from NPPF Technical Guidance (Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline))

River basin district	Allowance category	Total potential change anticipated for the ‘2020s’ (2015 to 2039)	Total potential change anticipated for the ‘2050s’ (2040 to 2069)	Total potential change anticipated for the ‘2080s’ (2070 to 2115)
South East	Upper end	25%	50%	105%
	Higher central	15%	30%	45%
	Central	10%	20%	35%

- 6.4.3. As stated previously the railway is considered to fall into the “less vulnerable” classification.
- 6.4.4. As discussed in Section 5.2 above, the NPPF Planning Practice Guidance (PPG) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>) states:

In flood zone 3b for:

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- **less vulnerable – development should not be permitted**
- water compatible – use the central allowance

6.4.5. However, even if the route, or parts of it, could be classified as being in Flood Zone 3a (Land having a 1 in 100 or greater annual probability of river flooding), then the following would have to be applied:

In flood zone 3a

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – use the higher central and upper end to assess a range of allowances
- **less vulnerable – use the central and higher central to assess a range of allowances**
- water compatible – use the central allowance

6.4.6. Using the above the following climate change allowances are to be used for any development shown to be within Flood Zone 3 (planning maps):

Table 6.3: Site specific Climate Change allowances determined by development types in Flood Zone 3a

Development Type	Flood risk vulnerability classification	Allowance category Upper end	Allowance category Higher Central	Allowance category Central
Railway	less vulnerable	105%	45%	35%

6.4.7. These allowances are considerably more than the 20% included within the documents accompanying the planning application and that which was considered and appears to have been accepted by the EA at the time. There are no site-specific climate change allowances for less vulnerable development located in Zone 3b, because policy dictates that less vulnerable development should not be allowed in Zone 3b. However, if there were to be any allowance, it could not logically be any less than the allowance for less vulnerable development in Zone 3a. Either way (i.e. whether the site is 3a or 3b), the Capita information did not address the higher allowances that should be applied.

6.4.8. It should also be noted that in 2017 the climate change allowances were also further revised to include recommendations for sites that are close to predicted flood zones.

“In flood zone 1 use the central allowance for essential infrastructure, highly vulnerable, more vulnerable and less vulnerable developments. For water compatible developments use none of the allowances.”

6.4.9. So, in addition to the allowances in NPPF PPG Table 2.2, these climate change values would be applicable but only if this is applied to permitted developments in Flood Zone 3a. As previously stated, this development is located in Flood Zone 3b, (where one would expect the standards to be at least as high as in Zone 3a) so this further demonstrates that the appropriate climate change

values were not used in the 2016 FRA and that as a result, the extent of flood impact was potentially seriously underestimated.

- 6.4.10. In light of the above and in response to the Secretary of State's letter (**OBJ/1002/CP/2 – Appendix A1**), the more recent 2020 FRA Addendum explains that the models have been updated to include the latest Climate Change allowances and uses both the 45% "Higher Central" value and 105% "Upper End" value. My review of these confirms that these are the appropriate values for the South-East region as set out in the NPPF. However, as discussed above, there is no analysis of the impact of climate change in terms of sensitivity testing. The modelling report does not fully address how these values interact with the flow rates, hydrology and structures, before and after the railway is in place.
- 6.4.11. More importantly, and in line with the Inspectors request, there is no evidence provided that the EA have reviewed or accepted the new model data and its findings.

KEY CONCLUSION 7:

- 6.4.12. *In order to address the modelling required to discharge Planning Condition 9 and 11 the impact of Climate Change needs to be determined and the impact on the proposed structures assessed in agreement with the Environment Agency. There is no evidence that the EA has accepted the new 2020 modelling or its results.*

6.5 FLOOD RESILIENCE

- 6.5.1. This subject is directly related to the EA's requirement under Planning Conditions 4, 9 and 10.
- 6.5.2. There are a number of ways a development can be made flood resilient. The following statement is taken from the Environmental Statement (ES) submitted as part of the 2016 application:
- "a) Flood resilient construction**
For the railway construction in an identified flood risk zone that includes Flood Zones 3a and 3b a number of key resilient measures should be employed."
- 6.5.3. The ES assessment (Vol. 2, Chapter 10) **[CD RVR/25]** references a number of mitigation measures related to groundwater and water quality both during construction and once in use but there is nothing which considers the materials used in construction of the tracks (ballast etc.) and the temporary storage of these materials. There is nothing new in the updated ES or FRA Addendum which addresses these issues.
- 6.5.4. Ballast materials for railways are known to be mobile during flood events (see **Photo 6.2** – which is an example of a section of track alongside a watercourse that was undermined during the 2007 flood events in Yorkshire). The current amended scheme proposals are to allow extreme flood waters to overtop the railway in sections to relieve the impounding of water that, in itself, could lead to further flooding. There is no discussion of the impact of the overtopping and the potential erosion of the tracks and embankments that could occur during a flood event and how this would be repaired (with the potential access and space requirements that would be required).
- 6.5.5. Mobilisation of material has the potential to disrupt or even block the watercourses along the route. As the material used for ballast is gravel based it would sink through any flood waters making

repairs and access harder and could lead to diversion of floodwaters and further erosion and damage.

Photo 6.2: Erosion of track and ballast – Stocksbridge Steelworks following the 2007 floods



- 6.5.6. The recent FRA Addendum include more details analysis of the more frequent 5% AEP design event (1 in 20 year flood) and states:

4.5.2 “...Sections of the railway between Salehurst and Robertsbridge Abbey, where the railway elevation will be similar to existing ground levels, are predicted to be at risk of flooding in the 5% AEP design event. Flood depths are predicted to be less than 0.3 m along most of this section, with a small section of railway predicted to flood up to 0.6 m in the 5% AEP design flood event. Approximately 500m of railway is also at risk to the west of Udiam and the B2244, Junction Road, with predicted flood depths less than 0.3m in the 5% AEP design event.”...

- 6.5.7. Chapter 16 of the additional environmental information report (Major Accident Hazards and Disasters) [CD RVR/70-08] considers the potential for accidents and hazards and the likely impacts. For the water environment it states:

“16.3.4 The results of the stage 1 assessment are presented in Appendix H and conclude that the Proposed Scheme is vulnerable to the following hazards which have a realistic chance of happening over the lifetime of the project:

- ***Persistent flooding which leads to a landslide/collapse of an embankment resulting in a potential derailment and/or the degradation of sensitive ecological receptors due to siltation of the River Rother and surrounding watercourses;***

- 6.5.8. This all suggests that overtopping of the railway and thus the mobilisation of materials that could cause damage or block waterways is potentially more frequent than the extreme events analysed or

has been commented on in previous reports. The reports are not clear on the definition of the statement “**persistent**” and, more importantly, not addressed in the FRA.

Photo 6.3: Existing railtrack (view West from A21 towards Robertsbridge) part flooded on 6 March 2020



KEY CONCLUSION 8:

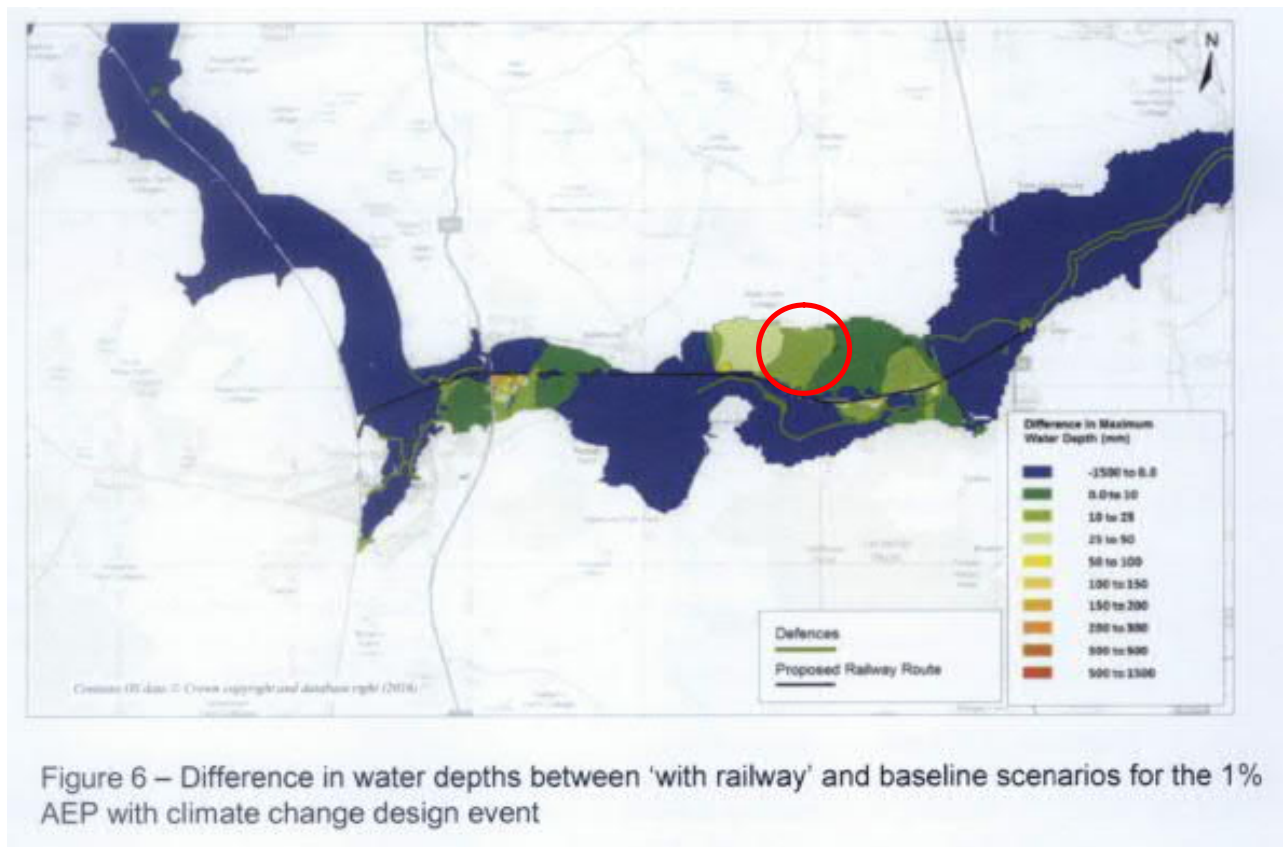
- 6.5.9. *Following the redesign of the track levels to address the predicted flooding there has not been any discussion or assessment of the impact of the movement and mobilisation of the track ballast and other materials during a flood event. Allowing overtopping of the embankment by flood waters will increase the risk of structural failure of the track and its embankments. This also has the potential to lead to blockages, pollution and disruption to the watercourse flows as the materials are washed downstream. In addition, the access requirements for repairs could be significantly different from those during construction. This information is essential to address Planning Condition 9.*

6.6 FLOOD COMPENSATION

- 6.6.1. For any development within a Flood Zone 3a or 3b, the EA will consider the loss of flood plain storage in addition to its classification, location and resilience. This is the reason for Planning Condition 11.
- 6.6.2. It is usual to agree the principles of deliverability of the compensation prior to planning rather than as a condition in this case. However, the 2016 Capita reports **[CD RVR/28]** state that flood plain volume will be lost and does not allow provisions for flood compensation.
- 6.6.3. I have reviewed the provided information and have not seen any evidence of flood compensation calculations or designs proposed.

- 6.6.4. Based on this site and the detail supplied in the 2016 FRA and other documentation, the issue of compensation was not reviewed or resolved. I would question the physical deliverability of a **“volume by volume, level by level basis and in a suitable location”** option for this as required to meet the planning condition and to safeguard the surrounding area.
- 6.6.5. No volume information was provided within the 2016 FRA or the summary 2016 Flood Modelling Report to be able to confirm if this information is available. Based on the FRA statements and the findings of their model outlined in the 2016 Capita Figure 6 (reproduced below) [CD RVR/28] suggest areas of farmland where flood levels increase from between 0 and 400mm.

Figure 6.6: Extract from Capita FRA (2016) – Figure 6



- 6.6.6. Taking the area highlighted on the above diagram (red circle) at an average increased water depth of 20mm over the area (estimated at 120,000m²) equates to a volume of approximately 2,400m³.
- 6.6.7. This is only one of the areas highlighted for an increase in flood depth. There are many others and some with a greater increase in predicted flood depth. Without the overall model details, it is very difficult to quantify the amount of additional flooded volume the scheme generates. Equally I do not know the volume in the areas of reduced flooding. It may be possible that the two volumes balance, but in my view, this is unlikely, considering the added physical volume of the railway embankment itself should also be considered in the calculations, that the two volumes balance. I have not seen any evidence that there would be no net loss. Indeed, the simple fact that the model mapping is showing areas with increased flooding shows that compensation has not been incorporated into the model. If compensation had been included, then there would be no perceptible change in flood extents.

6.6.8. The new FRA Addendum [CD RVR/70-07-00] and new mapping appears to suggest as stated in the FRA Addendum that:

“4.4.9 The model results have demonstrated that the proposed reinstatement of the railway does not increase the frequency or extent of flooding. It has also demonstrated that the railway does not adversely impact floodplain water levels upstream or downstream of the proposed development. Although both minor increases and decreases in maximum water level were predicted across the floodplain, the difference in predicted maximum flood levels is considered negligible, particularly with reference to the predicted flood depths. Overall, it is concluded there is no increase in flood risk.”

6.6.9. It is suggested that no flood plain compensation is required following the new modelling and even taking into account the updated Climate Change allowances. However, as stated above, the uncertainties as well as modelling for blockages or sensitivity testing has not been evidenced. The statement about compensation cannot therefore be verified on the available data.

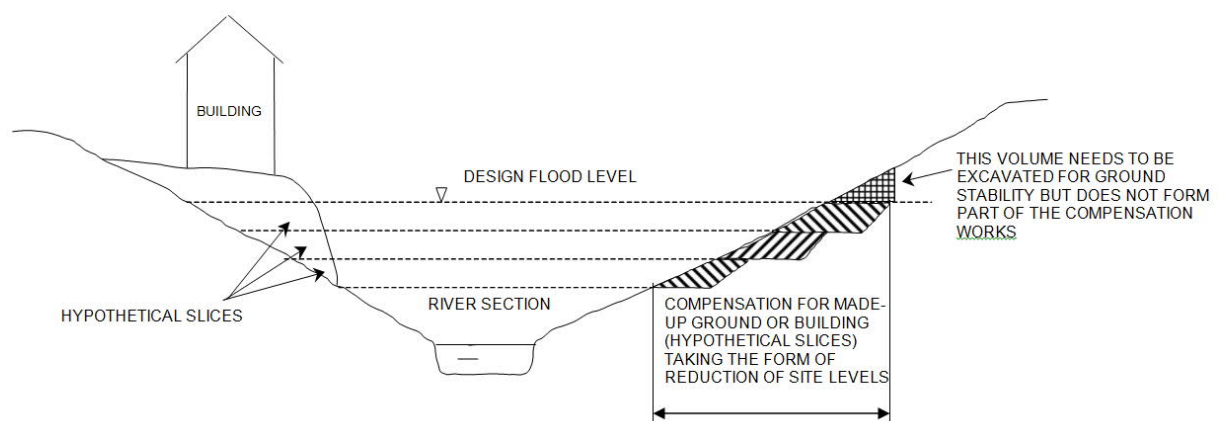
6.6.10. The statement that the increases are “negligible” (derived within EIA as a combination of magnitude against sensitivity) may be true for much of the modelled areas and in respect of the limits of the model testing, and considering the points I have raised above as Key Conclusions, but there are areas that will be more sensitive such as adjacent to Moat Farm. I do not consider that all areas can be considered “negligible” (see comments in **Section 6.2.26** and **Key Conclusion 2**).

6.6.11. If it established that compensation is required then in order to establish the requirements for the **“volume by volume, level by level basis and in a suitable location”** required to address the Planning Condition, the current model would have to be interrogated to consider how volumes can be readily obtained from the available data or that additional development of the model is required. I would anticipate that this additional analysis will be required. In turn the outputs can be assessed in terms of movements of volumes of water due to the introduction of the railway, its embankments and the culverting (as suggested in the EA Condition 11 imposed on the planning approval). Once the volumes are known the mitigation can be reviewed and the extent of compensation land identified.

6.6.12. Should compensation land be necessary, the EA requirement is illustrated below taken from the Environment Agency Operational instruction 178_05 document *“Flood Risk Management: considering the use of flood plain compensatory storage (England)”* dated 2009: **Figure 6.7**.

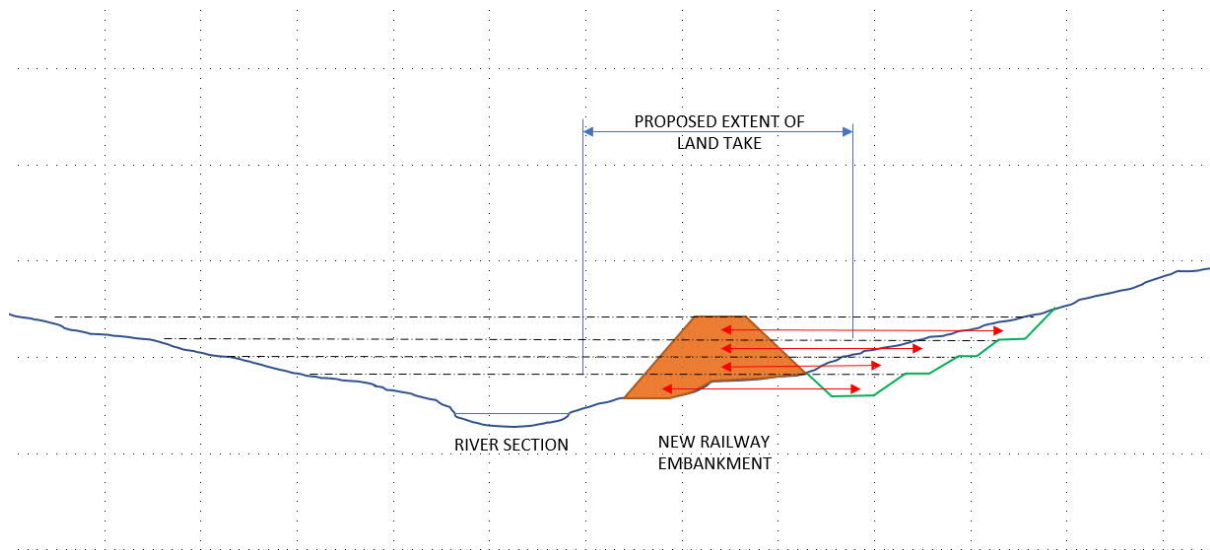
Figure 6.7: Extract from Environment Agency Operational instruction 178_05

Example of compensatory storage



- 6.6.13. Applying the above simple criteria highlights that the compensation is generally located in areas extending beyond the existing flood zones in order to effectively realign the flood outline and continue to provide the required storage.
- 6.6.14. For this scheme, these areas would be well outside the proposed site boundary and in areas that are not part of this Order. In order to demonstrate this, I have prepared an illustrative section of the site (**Figure 6.8**) for a location similar to the highlighted area in **Figure 6.6** close to Moat Farm (please note that this section is not to scale).

Figure 6.8: WSP Illustrative cross-section of railway embankment and flood compensation



- 6.6.15. This section only indicates how the compensation for the physical embankment may need to be applied and does not include additional compensation that could be required for the changes in flood levels to land that is remaining at the levels it currently is. **Photograph 6.4** illustrates flood water that would be displaced by the presence of the railway and its embankment. This water will need to go somewhere else. The extent of the water visible in the photograph is indicative of how far away from the line of the railway the compensation may need to be.

Photo 6.4: Flooding to the proposed route of railway (view west from B2244 6 March 2020) – this floodwater would be regularly displaced by the presence of the railway and its embankment



KEY CONCLUSION 9:

- 6.6.16. *Although the proposed route is within a valley subject to regular flood events and it is proposed to elevate the track on embankment above the existing site levels, there are no areas within the proposed temporary or permanent land take (as proposed within the Order) that would allow for the compensation on a level for level basis. Additional land may therefore be required that could be remote from the rail route and not subject to the Order as currently proposed.*
- 6.6.17. *A significant point to note is that the railway embankment is engineered with steep slopes to minimise land take. Any compensation would be within areas that are not engineered and have naturally shallower gradients; this will result in greater lateral land take to provide the volumes than the horizontal footprint of the railway embankment takes up.*

6.7 SURFACE WATER FLOODING

- 6.7.1. Neither the Capita FRA (2016) [CD RVR/28] or the more recent FRA Addendum [CD RVR/70-07-00] include significant detail in respect of surface water flooding, only to conclude (within the 2016 FRA):

“The proposed railway is considered at low to medium risk of surface water/sewer flooding. The track for the majority of its length is higher than the surrounding ground. Where the track elevation is close to ground levels to facilitate floodplain flows there is a greater risk of surface water ponding....” and:

...The areas immediately upstream of the proposed railway embankment are farmland/open spaces where local ponding of surface water adjacent to the railway embankment will not increase the risk of flooding to property.”

6.7.2. The later statement suggests changes to the surface water ponding close to the railway are expected but there is no analysis and the risk to the farmland is dismissed.

6.7.3. Operationally, any impact to the usability of the farmland adjacent to the tracks is a material consideration. NPPF states (para 102) that:

“a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”

6.7.4. This statement is not only applicable to fluvial and tidal flood risk but also to all other types of flood risk source, including surface water.

KEY CONCLUSION 10:

6.7.5. *The impact of changes to surface water flooding on the viability of the farmland adjacent to the route has not been considered. This source of flooding is only considered in terms of the railway project itself and no analysis has been carried out to determine if changes adjacent to the embankments would effectively render areas of farmland unusable or inaccessible (permanently or semi-permanently waterlogged for example). This additional waterlogging could be detrimental to the integrity of the existing flood defence structures as well as the river morphology and hence, ultimately the ecology etc. of the watercourses. This is contrary to the aims of Policy EN5 of the Rother Local Plan Core Strategy and local River Basin Management Plans. This needs to be addressed to satisfy Planning Conditions 4 and 10.*

6.8 GEOLOGY AND GROUNDWATER FLOODING

6.8.1. The groundwater risk in the Capita FRA’s [CD RVR28] only considers the impact to the railway and states:

“The proposed railway is considered at low risk of groundwater flooding. The proposed route is generally higher than the surrounding ground. The risk of groundwater flooding to the track will be managed by the train operators and serviced will be stopped.”

6.8.2. The ES (Vol. 2 Chapter 10) [CD RVR/25] states:

“Groundwater

10.5.24 The FRA states that the site post development plus mitigation would not increase groundwater flooding elsewhere or on the development itself.”

6.8.3. Unfortunately, there is no mention of the wider impact that the construction of an embankment on existing areas of waterlogging and high groundwater would have.

6.8.4. As with surface water, the introduction of a raised embankment, with compaction, and in parts, sheet piling walls (part of the proposed culvert construction) has the potential to alter the local groundwater profile. This could impound and locally raise groundwater that then can lead to greater frequency of waterlogging and groundwater flooding.

- 6.8.5. No further discussion on groundwater is contained in the more recent updated documentation.

KEY CONCLUSION 11:

- 6.8.6. *The impact of groundwater flooding on the viability of the farmland adjacent to the route has not been considered. Groundwater flooding is only considered in terms of the railway project itself and no analysis has been carried out to determine if high groundwater adjacent to the embankments would effectively render areas of farmland unusable or inaccessible (permanently or semi-permanently waterlogged for example). As with changes to surface water flooding, this additional waterlogging could be detrimental to the integrity of the existing flood defence structures as well as the river morphology and hence, ultimately the ecology etc. of the watercourses. This is contrary to the aims of Policy EN5 of the Rother Local Plan Core Strategy and local River Basin Management Plans. This needs to be addressed to satisfy Planning Conditions 4 and 10.*

6.9 MAINTENANCE AND ACCESS

- 6.9.1. It is the responsibility of riparian owners of watercourses (including the River Rother) to maintain the watercourse and banks to minimise flooding and maintain the function of that watercourse in such a way as to not impinge on the rights of others that benefit from its function (i.e to continue to allow drainage of upstream catchments that drain to that watercourse).
- 6.9.2. During a flood event safe access is also required for emergency vehicles. In the case of this site, the main reason for access would be repairs and damage to the river structures and proposed railway embankment following (or perhaps during) a flood event. This is not only for the new proposed structures but also the existing features such as the A21 road bridge etc.
- 6.9.3. As part of this function, suitable access is required to watercourses. In many cases this is covered by bylaws including those maintained by the EA in the management of Main Rivers (River Rother etc.). Recent work carried out by the EA on the River Rother in early May 2018 included removal of damaged trees that had the potential to block the river.
- 6.9.4. The EA access requirements are outlined in the revised “Final” Protective Measures: Schedule 8, Part 3 as issued by the Agency, a copy is attached as **(OBJ/1002/CP/2 - Appendix A6-2)**. In particular, the following clauses relate to the need for continued Agency access to areas of the site:

Part 3, 16 (2) (d) that states:

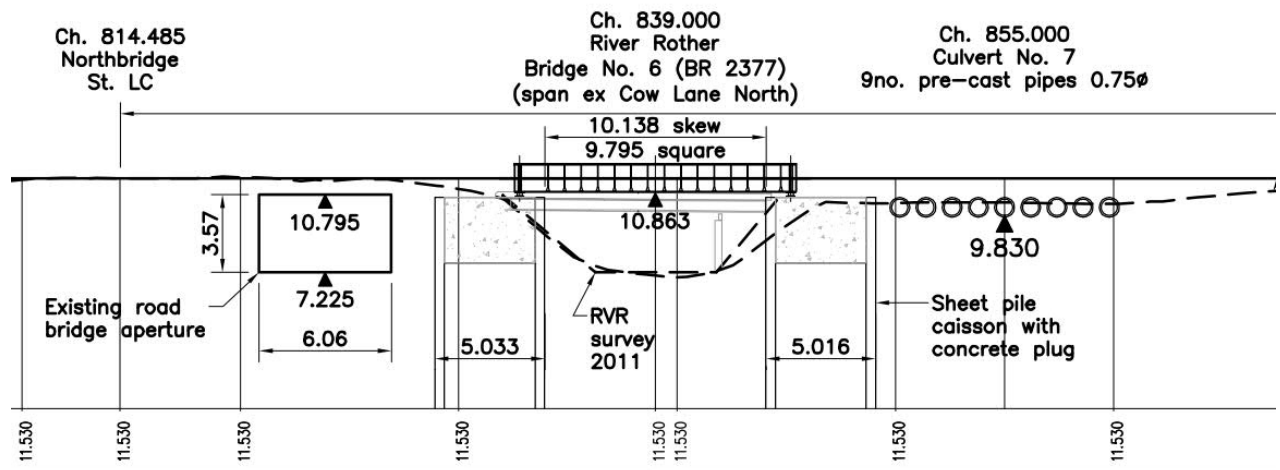
“(d) any work or operation that is in, on, under, over or within 8 metres of a drainage work which is or includes a main river or is otherwise likely to affect any such drainage work or the volumetric rate of flow of water in or flowing to or from any drainage work;”

Part 3, 19 (6) states:

“(6) If by reason of construction of the specified work the Agency’s access to flood defences or equipment maintained for flood defence purposes is materially obstructed, the Company must, within a reasonable period provide such alternative means of access to allow the Agency to maintain the flood defence or use the equipment no less effectively than before the obstruction.”

- 6.9.5. These provisions along with the requirements of Planning Conditions 4 and 10 demonstrate the need to maintain suitable access to the existing flood protection and river assets irrespective of the normal bylaw statutes.
- 6.9.6. The scheme includes a number of new crossings of the river and many minor watercourses as well as the introduction of pipe culverts to allow flood flow through the structure of the railway embankment. An example is shown in the Halcrow drawing RVR-G-001 Rev B submitted for planning (extract below and contained as **OBJ/1002/CP/2 - Appendix B1**).

Figure 6.9: Extract from Halcrow drawing RVR-G-001 Rev B



- 6.9.7. This increased number of crossing and structures has the potential to increase the occurrence of blockages and interference with the flood flow pathways. As discussed earlier in this proof, there does not appear to be any discussion or analysis of the impact of blockages on the flood plain operation or flood extents.
- 6.9.8. The EA's standard requirement for structures and crossing of flood plains is to limit blockages and to request a 600mm freeboard above the design flood level. In this case, 600mm will not be available and thus any floating debris mobilised by flood waters will easily be able to block the culverts. Silt will also build up (if not maintained) and the capacity of the culverts will deteriorate over time.
- 6.9.9. In terms of management, neither the FRA **[CD RVR/28]** 2016 ES **[CD RVR/25]** or the more recent FRA Addendum **[CD RVR/70-07-00]** comments on the on-going management of these structures; only in respect of after a flood event. It would normally be expected by most Lead Local Flood Authorities (LLFA) that details of the structures that are likely to be important to flood risk management are not only recorded but that they are maintained. This is part of the LLFA's responsibilities under the Flood and Water Management Act 2010. This is also reflected in the specific wording of Planning Conditions 4, 9 and 10.
- 6.9.10. Related to this is the only progressed evidence of assessment of any of the culverts and this is the "Approval in Principle: A21 Level Crossing and Mill Stream Flood Relief Culvert" document prepared by ARUP **[CD RVR/74-06]**. This report (AIP) has been prepared to address the existing culverted watercourse beneath the A21 and loading changes as a result of the railway. It states:

"As a consequence of the proposed level crossing, railway loading will impose a transient lateral surcharge on the existing culvert."

The purpose of this AIP is to outline the design of the level crossing and to demonstrate that the culvert will not be adversely affected by either railway loading, or construction plant used during the installation of the level crossing.”

- 6.9.11. Section 3.8: “Proposals for water management” of the AIP (produced in 2021) still references the 2016 FRA and as stated in my proof, this 2016 FRA has been significantly updated as it was not deemed suitable, not only by the Inspector, but confirmed within the FRA Addendum.
- 6.9.12. Based on historical evidence contained within the FRA, blockages of culverts and pipes due to lack of maintenance has caused flooding in the vicinity of the site in the past. **Photograph 6.5** below is part of the existing railway immediately west of The Clappers and shows a lack of existing maintenance.
- 6.9.13. It should be noted that the Protective Provisions (as detailed in the EA Statement of Case [OBJ/0178] do not remove the EA’s role in consenting works in and close to watercourses. These provisions do not allow access for works outside the “Order Land” should these be required for maintenance etc.

Photo 6.5: Existing “maintenance” of bridge/culvert



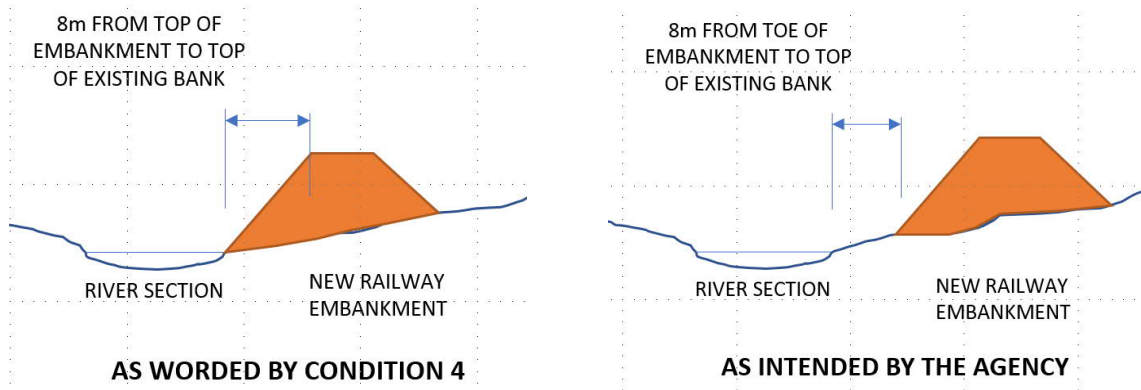
KEY CONCLUSION 12:

- 6.9.1. *In terms of management, neither the 2016 FRA, ES or more recent FRA Addendum comments on the existing on-going management of the culverts and bridge structures or the proposed long-term management of the new structures; only in respect of after a flood event. It would normally be expected by most Lead Local Flood Authorities (LLFA) that details of how these structures are likely to be maintained is an important part of flood risk management. This information is currently missing and throws doubt on the ability of the scheme to limit the impact of low maintenance on flood protection. This is also reflected in the specific wording and requirements of Planning Conditions 4, 9 and 10.*
- 6.9.2. *Without this maintenance, the integrity of existing structures is at risk along with the potential to cause additional flooding of areas not currently identified in the modelling (again; blockage sensitivity analysis has not been carried out on the flood modelling).*

6.10 BUFFER

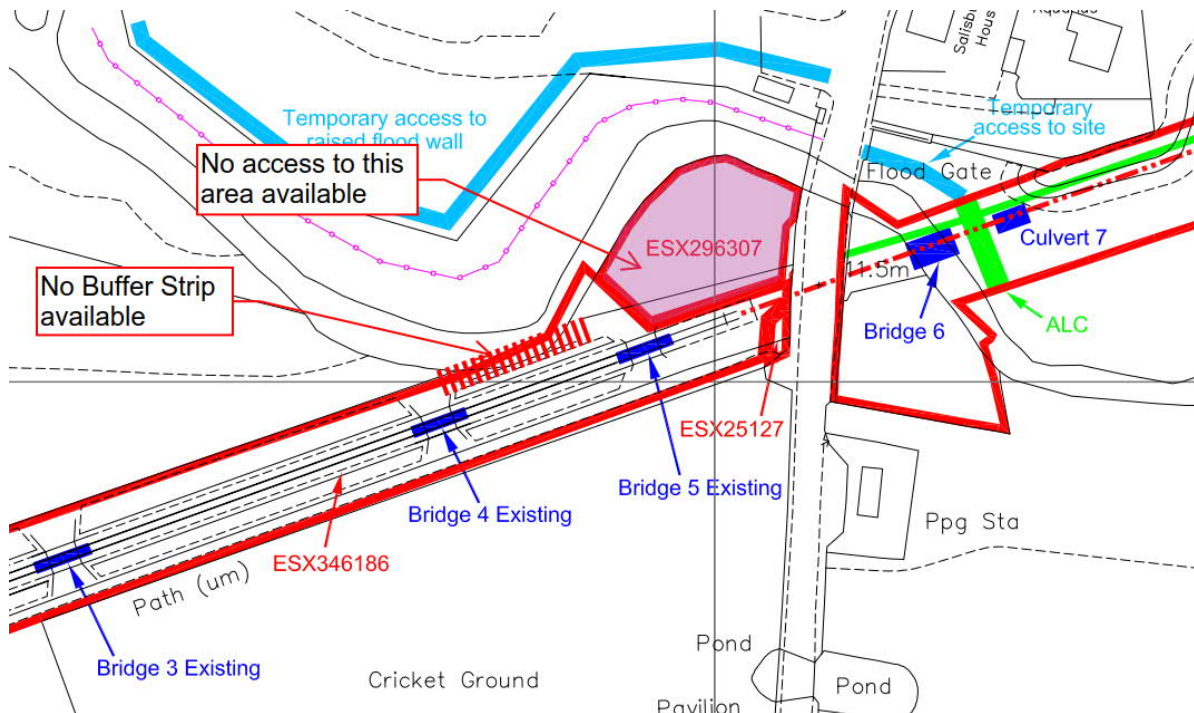
- 6.10.1. As well as the actual maintenance of the structures there is the issue of access to maintain them. The J C White plans (Sheets 1 to 8) dated 2017 (**CD RVR/23**) show a number of ancillary features in connection to the railway extension. The drawings show the location of the 27 culvert/bridge structures but in most of the locations there is no access provision shown. As these structures form part of the railway it would be expected that railway operatives would need to be able to gain access to the structures.
- 6.10.2. The Planning Conditions include Condition 4 which is specifically requested by the EA to safeguard a buffer to allow access as well as landscaping and long-term management of the buffer strip. The reasoning is laid out in the Planning Condition as well as being a typical and common standard requirement of the EA as described in the EA's flood risk activities: environmental permits process (<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits#check-if-the-activity-is-on-a-main-river>) that is not negated or over-ridden by the Order [**CD RVR/01**] or Planning Conditions [**CD RVR/07**].
- 6.10.3. The Planning Condition incorrectly states:
- “4. Buffer Zone Condition: the track shall not be brought into use until a scheme for the retention and management of a buffer zone, to be at least 8m wide between the top of the railway embankment to the top of the riverbank has been submitted to and approved in writing by the Local Planning Authority.”**
- 6.10.4. The word **“top”** is an incorrect, and significant, transcribing of the EA suggested planning condition and the word **“toe”** as contained in their letter to the Local Planning Authority dated 19 December 2016 (a copy is included as **OBJ/1002/CP/2 - Appendix A1**).
- 6.10.5. The sketch below (**Figure 6.10**) highlights the obvious difference as a result of the terms used. The buffer required is usually a flat or at least accessible area rather than a 1 in 3 or 1 in 2 slope as the railway embankment would be.

Figure 6.10: Buffer Strip Offset



6.10.6. This is a particular concern where the proposed embankment / rail track is very close to the existing river and watercourses. The particular locations include:

Figure 6.11: Between Existing Culvert/Bridge Structures 4 and 5



6.10.7. This location has also been highlighted in the EA's Statement of Case [OBJ/0178] – an extract reproduced below.

Figure 6.14: In and around New Culvert/Bridge Structures 12 and 13

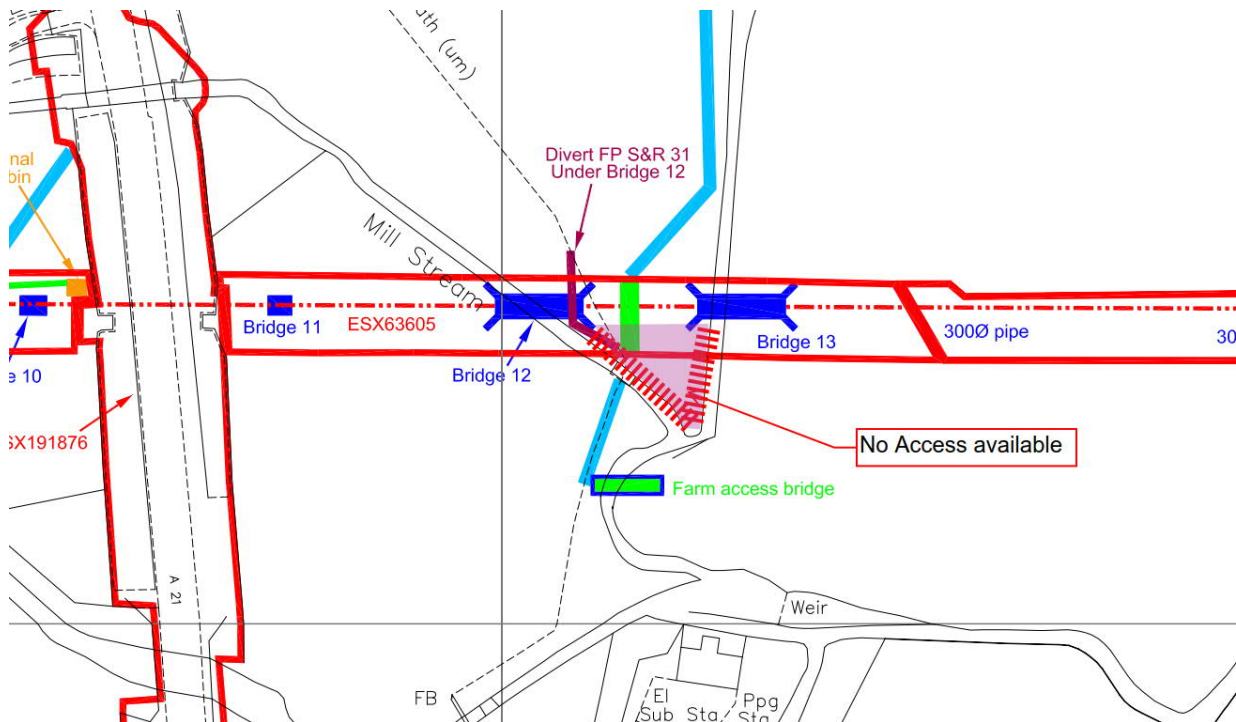
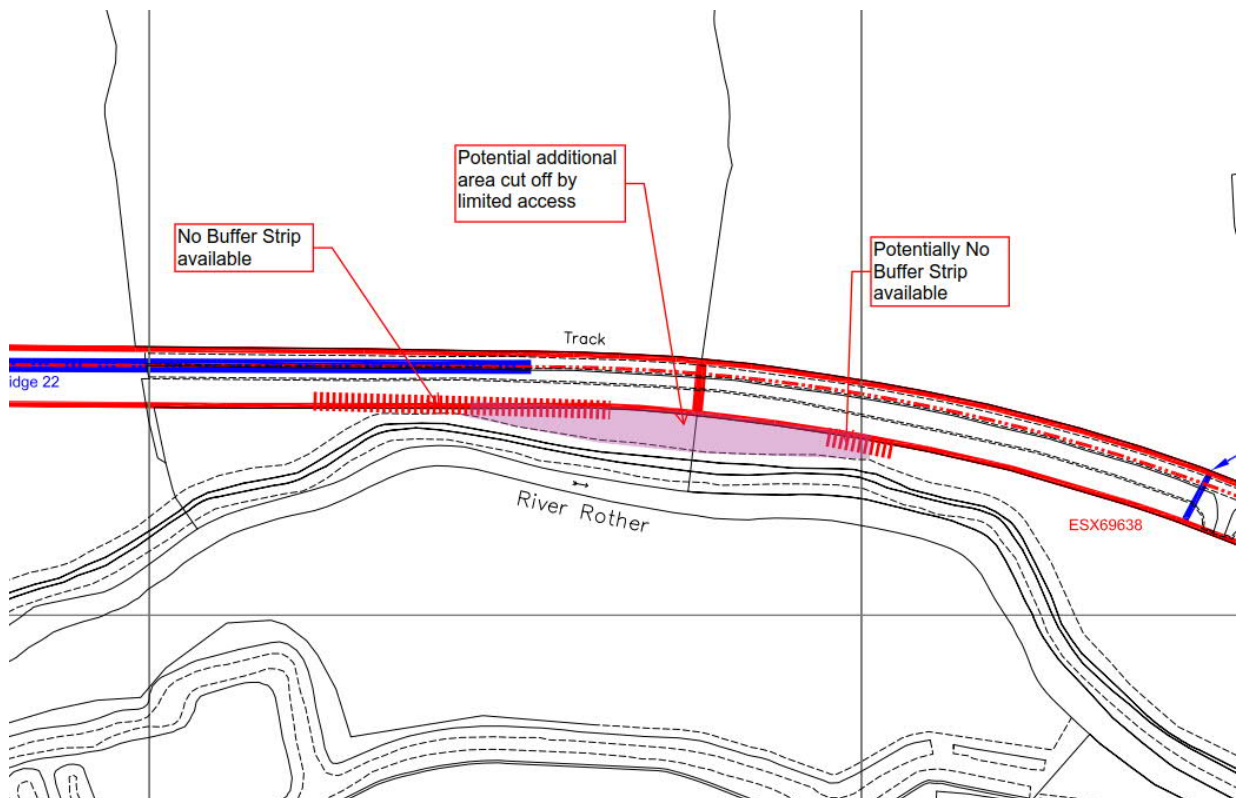


Figure 6.15: To the east of New Culvert/Bridge Structure 22



KEY CONCLUSION 13:

- 6.10.8. *There are no clear management programme or access arrangements for the majority of the 27 culvert/bridge structures along the route. Planning Condition 4 requires that the 8m buffer strip is maintained (although the wording is incorrect). The alignment of the route impinges on this buffer strip at a number of locations and thereby inhibits maintenance access as well as the provision of the ecological off-set required by the EA.*
- 6.10.9. *Is it also expected that the neighbouring landowners are either to maintain the railway structures or allow free access to the railway operators to maintain them. However, there has not been adequate space included within the limits of the Order to access areas for maintenance or general management of the adjacent land.*

6.11 WATER QUALITY

- 6.11.1. The following comments relate to water quality matters that are mainly commented upon within the original 2013 ES.

Risk and Proposed Mitigation - Construction Impacts

The ES states in Vol. 2 Chapter 10 [CD RVR/25]:

“10.5.12 Petrol, oil and chemicals would be stored out of the floodplain, and preferably above ground to minimise the risk of pollution from spills and leaks. Vehicles and plant would be washed in a dedicated, contained washing area with runoff collected and either treated and discharged to a water body with an Environmental Permit, or discharged to a foul sewer subject to agreement from the Sewerage Undertaker.”

- 6.11.2. There is no indication where the store is to be located – particularly with reference to the flood zones identified within the Capita reports as well as current EA mapping (**Figure 6.1** of this report) The distance from the works to any area outside the flood zones (including the functional flood plain) is considerable in parts and none of the plans and proposals identifies the storage location.
- 6.11.3. The only reference to a “Site Compound” is within the ES Vol. 4 Figure 2.4 Permanent and Temporary Land Take, dated 2013 [CD RVR/27] which shows a compound at the eastern end of the scheme. This location is within Flood Zone 3 and immediately adjacent to the River Rother. I would conclude that this is not a suitable location to meet the requirements of the EA and directly contradicts the assessment of potential impacts during the construction phase made in the ES. Thus, further explanation is needed. If an alternative storage location is required, this is not currently included or shown within the scheme proposals.
- 6.11.4. Part of the information submitted to address the Inspectors letter (**OBJ/1002/CP/2 – Appendix A1**) was an updated Water Framework Directive Assessment. The Inspector required:
- “An updated Water Framework Directive (WFD) assessment taking into account design changes, such as reductions in culvert size (e.g. for otters). Where possible, the assessment should present evidence that the assessment has been agreed with the Environment Agency.”***

6.11.5. The submitted document was the Temple, “Rother Valley Railway Limited Water Framework Directive Screening Assessment Technical Report – Final” Ref. N/A, Date. 26 February 2021 [CD RVR/70-03].

6.11.6. This report contains the following statement:

“6.1.3. However, a thorough and detailed assessment cannot be undertaken for the proposed scheme at this stage since elements of design are yet to be finalised. This section evaluates the preliminary design of the proposed scheme and provides recommendations ensure compliance with the Water Framework Directive to inform and guide detailed design.”

6.11.7. And concludes:

“7.1.5. Further investigation is required in order to investigate potential contaminated land within the old railway embankment. Condition 12 of the approved planning application (RR/2014/1608/PP) requires the Scheme to demonstrate that any potential contamination risk has been investigated and that an appropriate assessment is undertaken. Should contamination be confirmed, appropriate remediation methods will need to be undertaken during construction to ensure there is no leaching of contaminants and no resulting impact on surface or groundwater bodies. Condition 12 requires a remediation strategy to be produced if any contamination pathway is found. The work to dismiss Condition 12 This should be considered as part of the detailed WFD assessment.

7.1.6. Detailed, finalised design with exact locations and construction methodology plans are required to complete a further detailed WFD assessment. However, provided that the suggested mitigation measures outlined within this report are implemented within the final design this screening assessment suggests that the proposed scheme is unlikely to cause a significant detrimental impact on either the River Rother or the Kent Weald Eastern-Rother groundwater body.”

6.11.8. Based on these statements I conclude that:

- The submitted report does not represent a “detailed WFD assessment” as requested by the Inspector and suggests that more detail is required to meet and confirm that no impact is generated by the development of the railway;
- There is no information within this report to show or demonstrate that its finding has been agreed with the Environment Agency as requested by the Inspector; and
- There is no separate Environment Agency documentation that references or agrees the WFD assessment.

KEY CONCLUSION 14:

6.11.9. *To implement the requirements of the mitigation measures stated within the ES, to address Planning Condition 10 and for best practice pollution control, the current proposed Site Compound (only shown in sketch form and not on the main scheme drawings) must be located in an inappropriate location. Further explanation is needed and if an alternative storage location/s is/are required this is not currently included or shown within the scheme proposals and the boundary of the works.*

6.11.10. In addition, the construction of the railway is likely to be carried out by volunteers over a protracted time period and not in a single construction operation as envisaged by the ES (and as would normally be expected). As a result, some of the site management activities proposed by the EA to control pollution and protect the environment are unlikely to be well known or passed onto by those involved in construction and maintenance activities.

KEY CONCLUSION 15:

6.11.11. *There are a number of mitigation matters required to discharge the planning conditions requested by the EA. These relate to maintenance, operation, and management of critical features such as culverts, bridge structures and the railway embankment itself that all have significant roles to play in controlling flood risk, drainage and pollution control. There is no indication of how and by whom the environmental mitigation measures are actually going to be implemented and monitored. This is a specific requirement to address Planning Condition 10 and, to date, no evidence has been provided as to how this would be achieved.*

Risk and Proposed Mitigation - Operational Impacts on Drainage

- 6.11.12. As a note; the drainage of the operational scheme has not been discussed in great detail. However, with a granular material as the main form of construction it is unlikely that drainage for the majority of the scheme will be extensive. Pollution control measures would only be minimal as the gravel would be a natural filter material.
- 6.11.13. However, I note that the proof of Phil Clark (**OBJ/1002/PC/1**) which highlights changes to the crossfall of the A21 that are required to facilitate the railway crossing will result in changes to the way the carriageway will drain surface water. This has potential pollution impacts in that an accident at this location on the A21 could release harmful materials into the drainage system and/or directly to the River Rother as a result.

7 THE ENVIRONMENT AGENCY'S POSITION

- 7.1.1. During the evolution of this project the EA has issued a number of letters, the latest of which is dated March 2019 whereby EA withdrew its objection to the TWA application on the basis that (subject to the deemed approval/refusal issue) it had reached agreement with the applicant on an amended set of Protective Provisions.
- 7.1.2. The withdrawal of the EA's objection to the TWA application does not however address the issues identified above nor does it demonstrate that the planning conditions will be discharged – including Condition 11. I sought clarification from the EA in March 2020 (**OBJ/1002/CP/2 - Appendix D**) who confirmed their understanding that the ES was being updated and that the discharge of the Conditions requires significant further information, modelling and survey work.
- 7.1.3. More recently I sought further clarification as to EA involvement with the preparation and/or approval of the latest assessments and flood model as the EA has not publicly commented on the additional Environmental information. Their response is contained in **OBJ/1002/CP/2 - Appendix D**. The EA response (dated 23/04/21) states:

“We have discussed the flood modelling and Flood Risk Assessment with the applicant.

We have reviewed the methodology for the updated flood model and provided comments back to Rother Valley Railway.”

- 7.1.4. I therefore currently have no evidence to conclude that the EA has accepted the flood modelling, or that it is satisfied that the details provided to date, are sufficient to discharge the planning conditions attached to the Planning Permission. For reasons stated in this proof I do not believe that these conditions can be discharged within the limits of the Order as it stands. In addition, there are some fundamental design issues which require a larger area than the Order currently allows for, specifically additional land may be required:
- to provide flood compensation;
 - to provide the construction compounds and storage areas that are outside flood zones particularly Flood Zone 3b); and
 - To provide working areas and access to maintain the embankment, railway and its structures either for routine work or in response to an emergency.

8 SUMMARY AND CONCLUSIONS

- 8.1.1. The proposed railway route can be clearly defined as “less vulnerable” and, as shown on EA mapping, is located fully within Flood Zone 3b. Thus, in my opinion, as clearly stated in the NPPF and as questioned by the Inspector: *“Development should not be permitted”*.
- 8.1.2. The following additional key questions are raised, and conclusions made in relation to flooding, drainage and water quality in the approved planning application documentation. I do not feel these have been adequately addressed and as a result not only leave unanswered questions as to the suitability of the design as a whole but also lead to residual risks that are not resolved and potential mitigation measures and land take that has not been considered satisfactorily.
- 8.1.3. In summary, even if the Order is permitted, I cannot see that the RVR can discharge the EA planning conditions based on the available information or the information that could be provided within the limitations of the Order application boundary.

KEY CONCLUSION 1

- 8.1.4. Fundamentally, the proposals fail the NPPF sequential test has not been fully justified as requested by the Inspector. The railway route is defined as “less vulnerable” and, as shown on EA mapping, is located fully within Flood Zone 3b. Thus, *“Development should not be permitted”*.

KEY CONCLUSION 2:

- 8.1.5. The original Capita modelling plans show large areas of potential flood benefit from the introduction of the railway. The “benefit” band has now been resolved from a single range to a more varied set of values that seems to now accord with the text of the original FRA and FRA Addendum. More detailed resolution on the mapping has only recently been made available (May 2021).
- 8.1.6. This mapping is showing areas that will experience deeper water depths that will also ultimately lead to longer periods of flooding and although located within areas identified in the FRA as “only” agricultural land (i.e immediately adjacent to Moat Farm), are immediately adjacent to properties and essential infrastructure. This coupled with the increased depth of predicted flooding across High Street / Northbridge Street raises deep concerns over the sensitivity of the impacts that are not addressed in the modelling or reporting. In terms of addressing the NPPF Exception Test, this evidence is only showing minor areas of betterment and some of these are also within the “only” agricultural area. Not conclusively satisfying the Exception Test Part a) *“the development would provide wider sustainability benefits to the community that outweigh the flood risk”* as well as not conclusively demonstrating satisfying the Exception Test Part b) *“the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”*

KEY CONCLUSION 3:

- 8.1.7. Although a new model has been developed in response to the Inspectors concerns, this only directly addresses the concerns raised and does not include sensitivity testing of; inflow hydrology, topography, roughness characteristics, calibration against flood events and blockages. There is a risk that if this sensitivity testing has not been undertaken the “with railway” flood predictions in the FRA Addendum may not be robust.

KEY CONCLUSION 4:

- 8.1.8. The accuracy of the model is dependent upon topography of the site. In this case there are large areas of tree cover close to the route and around the watercourses. Any LiDAR model used for this kind of analysis is usually “smoothed” of features such as trees (illustrated in Photo 6.1) and buildings. This creates increased inaccuracies in the levels, possibly in excess of +/- 150mm to +/- 300mm. This casts doubt the predicted flood levels in the modelling results. It may be that the predicted benefits have been overstated and that the predicted increase in flood levels understated. This information is directly related to the scheme being able to address Planning Conditions 9 and 11 in terms of compensation and extent of flood impact.

KEY CONCLUSION 5:

- 8.1.9. Although there are a number of modelled scenarios presented within both the Capita reports, blockage events on any of the bridge structures (existing and/or proposed) have still not been presented or commented on in the available information (including the more recent modelling). This is vital information in addressing and discharging Planning Condition 9 as blockages could lead to the redistribution of flooding as well as erosion and scour to the railway embankment, land and existing river.

KEY CONCLUSION 6:

- 8.1.10. In the context of development in the functional floodplain, it would be prudent to apply the methodology of the EA residual uncertainty “freeboard” analysis to take account for the inherent uncertainties in flood modelling. There is no explanation of the application of any sort of allowance or uncertainties to the calculations and thus allow the impact on existing and future adjacent structures, foundations of structures and infrastructure to be determined.

KEY CONCLUSION 7:

- 8.1.11. In order to address the modelling required to discharge Planning Condition 9 and 11 the impact of Climate Change needs to be determined and the impact of the proposed structures assessed in agreement with the Environment Agency. There is no evidence that the EA has accepted the new 2020 modelling or its results.

KEY CONCLUSION 8:

- 8.1.12. Following the redesign of the track levels to suite the predicted flooding there has not been any discussion or assessment of the impact of the movement and mobilisation of the track ballast and other materials during a flood event. Allowing overtopping of the embankment by flood waters will increase the risk of structural failure of the track and its embankments. This also has the potential to lead to blockages, pollution and disruption to the watercourse flows as the materials are washed downstream. In addition, the access requirements for repairs could be significantly different from those during construction. This information is essential to address Planning Condition 9.

KEY CONCLUSION 9:

- 8.1.13. Although the proposed route is within a valley subject to regular flood events and it is proposed to elevate the track on embankment above the existing site levels, there are no areas within the proposed temporary or permanent land take (as proposed within the Order) that would allow for the compensation on a level for level basis. Additional land may therefore be required that could be remote from the rail route and not subject to the Order as currently proposed.

- 8.1.14. A significant point to note is that the railway embankment is engineered with steep slopes to minimise land take. Any compensation would be within areas that are not engineered and have naturally shallower gradients; this will result in greater lateral land take to provide the volumes than the horizontal footprint of the railway embankment takes up.

KEY CONCLUSION 10:

- 8.1.15. The impact of changes to surface water flooding on the viability of the farmland adjacent to the route has not been considered. This source of flooding is only considered in terms of the railway project itself and no analysis has been carried out to determine if changes adjacent to the embankments would effectively render areas of farmland unusable or inaccessible (permanently or semi-permanently waterlogged for example). This additional waterlogging could be detrimental to the integrity of the existing flood defence structures as well as the river morphology and hence, ultimately the ecology etc. of the watercourses. This is contrary to the aims of Policy EN5 of the Rother Local Plan Core Strategy and local River Basin Management Plans. This needs to be addressed to satisfy Planning Conditions 4 and 10.

KEY CONCLUSION 11:

- 8.1.16. The impact of groundwater flooding on the viability of the farmland adjacent to the route has not been considered. Groundwater flooding is only considered in terms of the railway project itself and no analysis has been carried out to determine if high groundwater adjacent to the embankments would effectively render areas of farmland unusable or inaccessible (permanently or semi-permanently waterlogged for example). As with changes to surface water flooding, this additional waterlogging could be detrimental to the integrity of the existing flood defence structures as well as the river morphology and hence, ultimately the ecology etc. of the watercourses. This is contrary to the aims of Policy EN5 of the Rother Local Plan Core Strategy and local River Basin Management Plans. This needs to be addressed to satisfy Planning Conditions 4 and 10.

KEY CONCLUSION 12:

- 8.1.17. In terms of management, neither the 2016 FRA, ES or more recent FRA Addendum comments on the existing on-going management of the culverts and bridge structures or the proposed long-term management of the new structures; only in respect of after a flood event. It would normally be expected by most Lead Local Flood Authorities (LLFA) that details of how these structures are likely to be maintained is an important part of flood risk management. This information is currently missing and throws doubt on the ability of the scheme to limit the impact of low maintenance on flood protection. This is also reflected in the specific wording and requirements of Planning Conditions 4, 9 and 10.
- 8.1.18. Without this maintenance, the integrity of existing structures is at risk along with the potential to cause additional flooding of areas not currently identified in the modelling (again; blockage sensitivity analysis has not been carried out on the flood modelling).

KEY CONCLUSION 13:

- 8.1.19. There are no clear management programme or access arrangements for the majority of the 27 culvert/bridge structures along the route. Planning Condition 4 requires that the 8m buffer strip is maintained (although the wording is incorrect). The alignment of the route impinges on this buffer strip at a number of locations and thereby inhibits maintenance access as well as the provision of the ecological off-set required by the EA.

- 8.1.20. Is it also expected that the neighbouring landowners are either to maintain the railway structures or allow free access to the railway operators to maintain them. However, there has not been adequate space included within the limits of the Order to access areas for maintenance or general management of the adjacent land.

KEY CONCLUSION 14:

- 8.1.21. To implement the requirements of the mitigation measures stated within the ES, to address Planning Condition 10 and for best practice pollution control, the current proposed Site Compound (only shown in sketch form and not on the main scheme drawings) must be located in an inappropriate location. Further explanation is needed and if an alternative storage location/s is/are required this is not currently included or shown within the scheme proposals and the boundary of the works.

KEY CONCLUSION 15:

- 8.1.22. There are a number of mitigation matters required to discharge the planning conditions requested by the EA. These relate to maintenance, operation, and management of critical features such as culverts, bridge structures and the railway embankment itself that all have significant roles to play in controlling flood risk, drainage and pollution control. There is no indication of how and by whom the environmental mitigation measures are actually going to be implemented and monitored. This is a specific requirement to address Planning Condition 10 and, to date, no evidence has been provided as to how this would be achieved.

CONCLUSION

- 8.1.23. Based on the information available and the consensus of the relevant parties as to how this site is to deal with flood risk and drainage, I do not consider that there is sufficient mitigation to adequately deal with any adverse flood risk and drainage impacts and also satisfy the Planning Conditions within the land comprised within the Order
- 8.1.24. Critically, there is not enough information to be able to confirm that the land comprised within the Order is sufficient to construct, operate and maintain the railway. This would be further exacerbated by the required access to undertake repairs resulting from a flood induced failure of the railway structure or blockage of any of the numerous culverts.
- 8.1.25. This is, fundamentally, an inappropriate development in Flood Zone 3b
- 8.1.26. The evidence which I provide for this TWA Order inquiry is true and has been prepared and given in accordance with the guidance of my professional institutions and I confirm that the opinions expressed are my true and professional opinion, and is are provided irrespective of by whom I am instructed.



Mountbatten House
Basing View
Basingstoke, Hampshire
RG21 4HJ

wsp.com

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