



Secretary of State for Transport c/o
Transport Infrastructure Planning Unit
Department for Transport
Great Minster House (33) Horseferry
Road
London
SW1P 4DR

Our ref: RA/2021/142965/01-L01

Date: 17 May 2021

transportinfrastructure@dft.gov.uk

Dear Sir/Madam

THE NETWORK RAIL (HUDDERSFIELD TO WESTTOWN (DEWSBURY) IMPROVEMENTS) ORDER. APPLICATION TO THE SECRETARY OF STATE UNDER SECTION 6 OF THE TRANSPORT AND WORKS ACT 1992 FOR AN ORDER UNDER SECTIONS 1 AND 5 OF THAT ACT. HUDDERSFIELD TO WESTTOWN.

We received confirmation from Network Rail on the 31st March 2021 that they have applied to the Secretary of State for Transport for the above mentioned proposed Transport and Works Act 1992 Order (TWAo).

We note from the application that the applicant is also seeking deemed planning permission for the development proposed within the Order, and our comments below reflect this.

While we have no objection in principle to the scheme that Network Rail are proposing, there are a number of matters which require further consideration or discussion, that will affect the draft TWAo, as submitted. These matters, and how they may be addressed, are discussed below, together with advice regarding other matters within our remit.

Draft Transport & Works Act Order

Disapplication of legislative provisions – flood risk activity

We note that the applicant is seeking to dis-apply the requirement for a flood risk activity permit under the Environmental Permitting Regulations (EPR) 2016. The Environment Agency would have to agree to such disapplication.

We do not currently have sufficient information on the locations and activities to be undertaken to confirm that we would agree to a disapplication of this nature and we are therefore objecting on these grounds. We recommend further discussion with applicant

discuss this in more detail, after which may be able to update our position. The impact of the scheme on existing and future flood risk mitigation and maintenance work is something that we would like to discuss in more detail.

Should we agree in the future to any disapplication, we would request the insertion of Protective Provisions into the draft Order. The applicant has included Protective Provisions for the Environment Agency within Section 19, Part 3 of the draft Order. We have reviewed these provisions and would suggest they are replaced with the enclosed wording, which brings them into line with our nationally agreed standard Protective Provisions.

As the draft Order was submitted as a PDF document, we have been unable to track the changes made. However, we have marked up some specific points within the enclosed document and would be happy to discuss the changes in more detail with the applicant, if required.

Disapplication of legislative provisions - surrender of an environmental permit

Article 6 of the draft Order affects two sites, currently regulated by the Environment Agency, known as Thornhill Quarry and Forge Lane Quarry, and would require the Environment Agency to accept any application by Network Rail for the surrender of the existing environmental permits.

Following discussions with the applicant, our understanding is that, for Thornhill Quarry, Network Rail will seek permanent land take and to transfer the environmental permit from the current operator and close the site. However, should this not be possible, the applicant seeks powers under Schedule 6, to dis-apply legislative provisions relating to the surrender of the environmental permit. Under the EPR, we must accept a surrender application once we are satisfied that the necessary measures have been taken, whereas through the proposed approach, the provisions are prospective.

In addition, the Forge Lane Quarry site, for which land is required temporarily for works relating to the construction of the new viaduct, has been the subject of some compliance issues. Our understanding is that, for this site, the intention is for the permit to remain with the current operator and for temporary land take and rights to be included within the Order.

The approach of dis-applying the EPR legislation to this effect is not one that we have accepted in the past and given some of the complexities surrounding this site, we would prefer the applicant to seek agreement for the works with the current operator directly. There has not yet been any exceptional reasoning provided for why this should not be done through the normal EPR process.

It is also unclear, given the information provided to us thus far, whether a variation or other agreement would be required by the Environment Agency and therefore whether a permit transfer would be required. We have made the applicant aware of the situation, encouraged them to enter enhanced pre-application permitting discussions with us, and commit to working with them to agree a way forward. However, until further discussions have taken place and an approach agreed, we must object to the Order as submitted, as we are not currently in a position to agree to the legislative disapplication being sought.

Should it be concluded that it is necessary to include such provisions, we would need to agree some alternative wording to the Order.

Flood Risk

We have reviewed the submitted Environmental Statement (ES), specifically Chapter 11: Water Environment (Volumes 2i and 2ii), as well as the submitted Flood Risk Assessment (FRA), which forms Appendix 11-1.

The submitted FRA does not adequately assess the flood risks posed by the development. In particular, the FRA fails to:

- Assess the flood risk from all sources for the full scheme, taking into account the impacts of climate change;
- Assess the requirements for compensatory storage for the full scheme, to ensure no increase in flood risk or transfer of flood risk to others, taking into account the impacts of climate change;
- Propose sufficient flood risk mitigation for the risks identified; or
- Assess the impacts of climate change on access and egress for the full scheme and consider the requirement for flood emergency planning, including flood warning and evacuation of people for a range of flooding events up to and including the extreme event.

In light of the above, we are objecting to the Order as submitted. Additional detail on these points may be addressed is provided below:

Assessment of Risk

The FRA states that scheme lies within Flood Zones 2 and 3. However, the FRA should highlight any areas of the scheme which lie within Flood Zone 3b, the functional floodplain, and Flood Zone 3ai, which is previously developed functional floodplain as designated within the Kirklees Strategic Flood Risk Assessment (SFRA). Not only that, but the FRA should consider the risks to and from the development in all scenarios, up to and including the 1% plus climate change (design event).

The FRA's current assessment draws a number of conclusions based on a 1D model that has been produced using data supplied from the Environment Agency. However, the application does not include the outputs of this modelling. In addition, we would have expected to see consideration of the H++ scenario in the consideration of climate change impacts, to enable sensitivity testing.

The application also does not assess the risk for all temporary works, such as construction compounds (ie. the full scheme).

It is important that the FRA provides this complete picture of the risk. This can then be used to demonstrate that there is no increase in flood risk resulting from the scheme (ie. no loss of flood storage volume, impact on river levels, flow or velocity), or any transfer of flood risk to others (including water spilling into nearby watercourses).

As is standard practice with all re-run modelling for an FRA, the modelling should be submitted to us for review, in order to check whether it is fit for purpose. This would have ideally been done prior to formal submission of the application. We will contact the applicant directly to arrange this.

Compensatory Flood Storage

The FRA does not assess the requirement for compensatory storage up to and

including the 1% annual probability event (the design event) including an allowance for climate change, for all elements of the scheme. An assessment of storage lost has been made for certain aspects of the scheme, for example around the Thornhill Quarry area (page 88 of the FRA). However, it needs to be assessed for the full extent of the scheme. It is not clear whether this has been assessed and that the applicant has concluded that compensatory storage is not required anywhere else (we consider this to be unlikely) and has simply not shared the outputs, or whether this assessment has just not been undertaken.

The FRA will need to demonstrate that any compensatory storage identified as being required across the whole scheme, can be provided to offset any losses in floodplain within the design event extent, to ensure that there is no transfer of flood risk beyond the site boundary.

With respect to the assessment that has been discussed within the FRA (for the Thornhill Quarry area), it is not clear how the compensatory storage volume has been calculated. We would expect to see a clear comparison of the flood storage pre- and post- development for the 1% annual probability event plus climate change scenario, for example, through figures showing pre- and post- development flood outlines across the entire scheme. We would then expect the compensatory storage to be at a level-for-level and volume-for-volume basis. It is not clear what model runs have taken place to assess the impact of the development pre- and post- development. The FRA indicates that any compensatory storage should be level for level and volume for volume, but it's not clear how the resulting 700m³ has been calculated.

In areas of Flood Zone 3ai and 3b, it is of particular importance that the FRA demonstrates there is no loss of flood storage up to and including the design event, so that flood water can continue to be stored in these areas and that there is no alteration of existing flood flow routes. The Kirklees SFRA and Local Plan indicate that areas of Flood Zone 3ai have the same probability of flooding as those in Flood Zone 3b, and that, where possible, redevelopment of these areas should reduce the built form, extensions should have the same or smaller footprint, and areas acting as the functional floodplain should be retained as undeveloped.

We highlight areas of the scheme in and around Mirfield Station as an example of where the FRA needs to demonstrate, through the submission of further information, that all permanent and temporary elements of the scheme (such as compounds) have been considered, to ensure no increase in flood risk from the scheme, no loss of flood storage up to the design event, no changes to existing flow routes for all sources of flood risk, potential flood depths, any flood risk mitigation required and safe access and egress during the design flood. There are areas of 3b and 3ai developed functional floodplain in this and other areas of the scheme.

Another example, would be the new proposed viaduct over the River Calder. For example, taking into account the training walls, embankments and piers in demonstrating that there is no loss of storage or alteration of existing flood flow routes.

Flood Risk Mitigation Measures

The FRA must clearly indicate the location of any flood risk mitigation required to address fluvial flood risk. The scheme involves new stretches of track, as well as new platforms, underpasses, lifts and new bridges. Although these all form part of an existing railway, opportunities should be sought to ensure that all new elements are flood resilient now and in the future.

In various parts of the application, reference is made to the Scheme-Wide Drainage Strategy, which forms Appendix A of the FRA, for flood risk mitigation measures. However, this report has limited information on fluvial flood risk, instead concentrating largely on issues such as the risk from surface water, ordinary watercourses and storm runoff.

Safe Access and Egress

The Environment Agency are not the competent authority on matters of safe access/egress or emergency planning. Our role is to ensure that enough information is provided within the FRA for the decision-maker and emergency planners to make an informed decision about whether the development will be safe.

The FRA does not demonstrate that safe access / egress is provided for site users (during both construction and operational phases), except for some discussion around the new footbridge at Mirfield station. Wherever possible, safe access routes should be provided that are located above design flood levels and avoiding flow paths (i.e. 'dry')". If 'dry' safe access / egress is not possible, the proposed routes can be 'wet', but must be 'safe'. This is defined by the UK flood hazard rating using the FD2320 methodology, calculated according to flood depth, velocity and likely debris factor.

If no safe route is possible and the applicant intends to rely on an emergency plan, then sufficient data needs to be included in the FRA for the decision-maker to understand whether emergency planning proposals are acceptable. This includes, but is not limited to, information on flood extents and velocities. We recommend that the applicant discusses this further with the relevant competent authority.

Additional Advice

Surface Water Management

Please note that we have not undertaken a detailed review of the submitted Drainage Strategy, nor do we intend to provide any comments on it. As the lead local flood authority, we expect that Kirklees Council will be responsible for advising on surface water management for the scheme.

Updated Climate Change Allowances

An update to the peak river flow allowances is expected in July 2021. Should the applicant wish to discuss what this means for their development, they should contact me on the details at the bottom of this letter.

Request for Meeting

We are conducting the early stages of flood risk mitigation pre-feasibility study work in the area. Our project manager would like to arrange to discuss this further with Network Rail in relation to known existing flood risk and potential co-ordination of works and funding. We suggest it may be useful to hold a meeting to discuss further the information within this response to resolve these matters. We will be in touch directly with the applicant to arrange this.

Biodiversity

We have reviewed Chapter 9: Biodiversity, of the ES and we accept the findings, mitigation recommendations and conclusions within this section of the document. We also agree with and support the inclusion of Condition 4 in Document NR12 - Request for Deemed Planning Permission and Statement of Proposed Conditions - which requires the submission of a Landscape and Ecological Management Plan (LEMP), to be agreed in writing with the local planning authority. This will detail the mitigation measures to be implemented for protected species, such as otter and water vole, as well as monitoring and maintenance schedules.

Water Quality

We are satisfied that the main risks to water quality have been identified and mitigation proposed. It is anticipated that these risks will be most significant during the construction phase. We understand that site-specific Pollution Prevention and Incident Control Plans will be completed for all construction activities in the scheme and submitted with planning permission for approval by the planning authority, as part of Part B of the Code of Construction Practice (CoCP), which will be secured by the proposed Condition 5. We would like to see these plans have followed the principles of managing pollutants on site outlined in Network Rail's document "Pollution Prevention (Land and Water)". In addition we agree with the recommendations in the documents that in-channel work is carried out in isolated areas to minimise the risk of pollution.

All pollution prevention measures should be planned well in advance of starting work on any particular site and this should include an assessment of the requirement for any water discharge or groundwater activity permits under the EPR 2016. Permits must be in place before making any discharge that needs to be permitted.

We have reviewed the Water Framework Directive (WFD) Assessment, which forms Appendix 11-2 of the ES, and agree with its conclusions and recommendations. We provided early comments on the draft WFD assessment, which focuses on the new Ravensthorpe Viaduct crossing, during pre-application discussions. These comments have been clearly actioned, including the update of the reporting of WFD data to the 2019 classifications.

We agree with the hydromorphology mitigation, as set out in the WFD assessment, specifically that:

- Hydraulic modelling will be used to further inform the design of the viaduct, including comparison of velocities (and potential for scour) between the baseline and the proposed works both upstream and downstream;
- The length of bank to be physically modified (hard engineering) will be minimised;
- Grey/green measures shall be used to "soften" the aesthetic of the river training walls, where practicable; and
- Softer measures shall be used at the transition area between the hard bank protection and the natural riverbank.
- Shrubs and trees will be planted along riparian corridor downstream of the viaduct to enhance riparian connectivity and complexity.

These proposals are outlined in the Environmental Mitigation Plan (Figure 2-3) and further details will be included in the LEMP and the Environmental Design Plan (Land Contamination and Hydrogeology) under Part B of the CoCP, which are secured by Conditions 4 and 5, respectively.

Groundwater & Contaminated Land

The reports have identified that works will be carried out in areas where there is historic contamination associated with landfills, historic landfills, chemical works, geo-hazards, past and present industrial activities and where there is existing remediation infrastructure. It has also been identified there are likely to be areas where unexpected contamination occurs.

The reports acknowledge that there is a risk to controlled water, should mitigation measures and pollution prevention measures not be carried out successfully. The particular risks to controlled waters include:

- Existing historic contamination/gas
- Unexpected contamination
- Mobilising contaminants during construction, piling, de-watering, and through the use of sustainable urban drainage systems
- Existing remediation infrastructure
- Management and re-use of contaminated soil
- Piling/deep foundations impacting groundwater flow paths
- Groundwater body GB40402G700400 POOR status

For this reason, we have suggested some additional considerations for the proposed Environmental Design Plan (EDP). These are set out in the section below on proposed conditions.

Additional Advice

Code of Construction Practice (Part A)

The CoCP - Part A has outlined the use of the following guidelines and approaches, which we support:

- Mitigation measures to address the potential for encountering land contamination
- PPGs, CIRIA 532, CIRIA C736, BAT
- Best practice guidelines regarding mitigation measures to protect the water environment for WFD objectives.
- Land Contamination: risk management (LCRM)

Abandoned Mine Activities

The Aire & Calder Carb. Limestone/Millstone Grit/Coal Measures (GB40402G700400) body is at poor status, due to diffuse, point source pollution from abandoned mine activities. The developer is encouraged to identify and record localised and wider environmental benefits to the water environment through the remediation of contaminated land/groundwater and to support WFD improvements.

Statement of Proposed Conditions

Condition 4 – Landscaping and Ecology

As mentioned above, we support the inclusion of this condition to secure appropriate mitigation measures.

Condition 5 – Code of Construction Practice

As mentioned above, we support the inclusion of Condition 5. We agree with the requirement of this condition to submit and approve Part B of the CoCP prior to commencement of development for each stage. In addition to the plans specifically identified in the condition (i. to ix), the ES refers to assessments not identified in the list. The following plans and programmes (where appropriate) should also be included within Part B of the CoCP, forming part of the Land Contamination & Hydrogeology Environmental Design Plan (EDP):

- Coal mining risk assessment
- Piling risk assessment in accordance with the Environment Agency's "Piling and penetrative ground improvement methods on land affected by contamination"
- Hydrogeological risk assessment where piling or deep foundations may alter groundwater flow pathways
- Hydrogeological risk assessment for de-watering
- Pre-, during, and post-construction groundwater monitoring
- Soil sampling to provide a soil quality baseline
- Water Framework Directive – Benefits Assessment

Condition 10 – Contaminated Land

We agree with the requirements of Condition 10 to ensure that the presence of contamination is identified, the risks assessed, and proposed remediation works are agreed.

Condition 11 – Unexpected Contaminated Land

We agree with the requirements of Condition 11 to ensure that the presence of unexpected contamination is identified, the risks assessed, and proposed remediation works are agreed.

Condition 15 – Scheme wide Drainage Strategy

We request that the following wording is added to this condition, or is included as an independent condition:

Other than with the written consent of the local planning authority, No drainage systems for the infiltration of surface water to the ground are permitted in areas where the previous use of the development site presents a risk of contamination. Any proposals for such systems must be supported by an assessment of the risks to controlled waters. The development shall be carried out in accordance with the approved details.

Reason: To ensure that the development does not contribute to, and is not put at unacceptable risk from or adversely affected by, unacceptable levels of water pollution caused by mobilised contaminants. This is in line with paragraph 170 of the National Planning Policy Framework.

Document NR12 proposes only Condition 15 in respect to flood risk, again suggesting that the scheme is carried out in accordance with the Scheme Wide Drainage Strategy. Based on the limited scope and detail of the Scheme Wide Drainage Strategy other flood risk conditions are likely to be required, should the matters discussed above be suitably addressed. For example, in order to secure specific flood risk mitigation measures, and details around the provision of compensatory flood storage.

Should you require any further information or clarification on the matters raised, please contact me on the details below.

Yours faithfully

Miss Lizzie Griffiths
Sustainable Places - Planning Specialist

Direct dial 020 302 58439

Direct e-mail lizzie.griffiths@environment-agency.gov.uk

13.S3.3 SAFE ACCESS AND EXIT

This guidance note:

- Presents simple methods for assessing the conditions that constitute safe access and exit that can be applied at the **site-specific** scale, i.e. as part of a FRA.
- Provides the Environment Agency (EA) with a means of communicating to Local Planning Authorities (LPAs) and Developers the likely flood risk to people associated with access and exit from the site.
- Is designed to be complementary to a separate EA guidance document¹⁶¹ that provides specific guidance to EA staff regarding the EA's policies and principles.

This guidance note does NOT:

- Set parameters that dictate whether or not development should be permitted, as this is dependent on the acceptability of the residual risk after provision of suitable mitigation measures and a decision for the LPA.
- Set parameters that dictate whether the EA should object to a development on the grounds of safe access and exit, as this is a policy issue for the EA.

13.1 Contents

Introduction
Requirements for Safe Access and Exit
Approach
Data and Information
Roles and Responsibilities
Processes and Procedures
Tools and Technologies
Audit and Control

13.2 Introduction

New developments are required to provide safe access and exit during a flood and the measures by which this will be achieved should be clear in the Flood Risk Assessment (FRA). Safe access and exit is required to enable the evacuation of people from the development, provide the emergency services with access to the development during a flood and enable flood defence authorities to carry out any necessary duties during the period of flood.

A safe access or exit route is a route that is safe for use by occupiers without the intervention of the emergency services or others.

Safe routes should be identified both inside and beyond the boundary of the new development. Even where a new development is above the floodplain and considered acceptable with regard to its impact on flood flows and flood storage, it should be demonstrated that the routes to and from the development are also safe to use.

A route can only be completely safe in flood risk terms if it is dry at all times.

¹⁶¹ 114_04 Safe Access and Exit From New Development During Flood Conditions

13.3 Requirements for Safe Access and Exit

The requirements for safe access and exit from new developments in flood risk areas are as follows, in decreasing order of preference:

- Safe dry route for people and vehicles
- Safe dry route for people
- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However the public should not drive vehicles in floodwater.

Where a dry route is not possible and a route with low flood hazard is identified, the route should not have any service covers that could be removed, or other underwater hazards. It is often difficult to see underwater hazards even in shallow water, particularly at night or if the water is silty. In addition, the route should be clearly marked, for example using painted posts.

13.4 Approach

For a given development, it must be decided whether safe exit and access constitutes dry access routes or depth and velocity combinations that are below appropriately precautionary thresholds.

This decision needs to be made by the LPA in consultation with the Emergency Services and will need to take into consideration the proposed use of the development, the vulnerability of the occupants and the availability of emergency services and flood forecasting.

Any raising of ground levels to ensure safe exit and access will need to be considered in the FRA to ensure that there is no obstruction to flood flow routes and that there is no loss of flood storage capacity.

Three levels of complexity in approach are recommended in this guidance note.

- **Simple Approach**, which is based on providing a dry route up to an acceptable flood level. This approach is most precautionary and generally will be most appropriate for small and relatively low risk sites.
- **Intermediate Approach**, which is intended to identify a route with acceptable flood hazard if a dry route is not possible. This approach is based on analysis of the flood hazard (a combination of depth and velocity). This approach is also precautionary and can be applied to most sites. However, costs of site design might make it worthwhile for developers to consider the detailed approach.
- **Detailed Approach**, which is based on a more rigorous analysis of the flood hazard.

Both the intermediate and detailed approaches are based on the Flood Risks to People methodology.

These three approaches should not be confused with the tiered risk assessment approach in the Framework for Assessing and Managing Flood Risk for New Development.¹⁶² The level of assessment being undertaken (whether level 1, 2 or 3) does not preclude the use of any of the approaches described above. The selection of approach will depend on the scale of the risk and the degree of precaution that

¹⁶² See Activity Chart Process 2a – Tiered Risk Assessment

will be applied to the management of that risk. However, it is not unreasonable to envisage that more often than not, the complexity of the approach will increase if a level 2 or level 3 assessment is required.

The approach described in this guidance note concentrates on pedestrian access, as vehicles have not been considered in the Flood Risks to People methodology. However, a limited review was undertaken as part of the Defra/EA R&D project FD2321 *Flood Risk to People Phase 2* looking at safe flood depths for vehicles. In summary, this review concluded the following:

Vehicles should not be used when:

- The presence of water stops the engine functioning;
- The vehicle floats; or
- The vehicle becomes difficult to control.

Cars will stop and/or float in water as shallow as 0.5m, whilst some emergency vehicles may survive in water of 1m. A fire engine remains controllable in depths of 0.5m up to a flow velocity of 5 m/sec, due to high-level air intakes/exhausts.

13.5 Data and Information

The data and information required to assess safe access and exit depends on the complexity of the approach undertaken, as follows:

Simple Approach

- Flood levels for suitable annual probabilities (advisable to look at the 1% and 0.1% annual probabilities for fluvial flooding or the 0.5% and 0.1% for tidal/coastal flooding).¹⁶³
- Minimum ground levels along access and exit routes.

Intermediate Approach

- Flood depths and velocities for suitable annual probabilities across the development site and surrounding the development site, determined from hydraulic modelling.
- Simple lookup table relating depth and velocity to danger to people (provided in this guidance note).

Detailed Approach

- Flood depths and velocities across the development site and surrounding the development site, determined from hydraulic modelling.
- An appropriate means for determining the hazard factor for the site should be determined from the Flood Risks to People report.¹⁶⁴

13.6 Roles and Responsibilities

- The Emergency Services are the competent authorities for providing advice on entering and evacuation through floodwater and it may be necessary for them to have an input to the FRA.
- The Developer must ensure that safe access and exit are considered in the FRA.

¹⁶³ This information should be available from the EA. Alternatively, guidance of how to obtain flood levels, etc. can be found in the section called Tools and Technologies in this guidance note.

¹⁶⁴ HR Wallingford *et al.* (unpublished) *Flood Risks to People Phase 2: The Risks to People Methodology*, Defra/EA R&D Project Technical Report FD2321/TR1, due March 2005.

- The role of the Environment Agency is to support planning for safe access and exit from new developments and to object to proposals that omit suitable access and exit measures.
- The LPA in consultation with the Emergency Planning team within the local authority and the Emergency Services must decide whether safe exit and access is provided.

13.7 Processes and Procedures

13.7.1 Simple Approach

In the absence of hydraulic modelling to provide depths and velocities, the precautionary position would be to demonstrate that a development site has access and exit routes that are above flood levels for acceptable annual probability events.¹⁶⁵

If the development is behind defences, this would be the water level at the defence. Whilst this may be conservative, prediction of the actual flood level behind defences requires hydraulic modelling. If it would be impractical to design such routes, then it is necessary to undertake hydraulic modelling or obtain the results from an existing assessment (possibly available from a SFRA for the area) and then undertake either the intermediate approach or detailed approach described below.

13.7.2 Intermediate Approach

Danger to people is assessed using flood hazard, which can be expressed as a combination of flood **depth** and **velocity**. Hydraulic modelling or the use of results from an existing assessment are needed to predict flood depth and velocity.

The Flood Risks to People project has developed the following equation to relate the flood hazard to flood depth and velocity:

$$\text{Flood Hazard Rating} = ((v + 0.5) * D) + DF$$

Where:

v = velocity (m/s)

D = depth (m)

DF = debris factor

For this intermediate approach a precautionary approach has been adopted and a debris factor of 0.5 has been used for depths below and equal to 0.25 m and a debris factor of 1.0 has been used for depths above 0.25 m. These are conservative estimates based on an urban environment, as defined in the Flood Risks to People project. Based on this, the hazard rating equation has been applied to various combinations of flood depth and velocity to produce a matrix of hazard ratings. Applying thresholds to these hazard ratings defines the danger to people at various depths and velocities as shown in Table 13.1.

Therefore, if depths and velocities have been determined for the site, then this table can be used to estimate the danger to people.

¹⁶⁵ This would be agreed with the LPA, based on advice from the EA.

Table 13.1 Danger to people for different combinations of depth and velocity

Velocity (m/s)	Depth of flooding (m)											
	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.00												
0.10												
0.25												
0.50												
1.00												
1.50												
2.00												
2.50												
3.00												
3.50												
4.00												
4.50												
5.00												

Key:

Danger for some

Danger for most

Danger for all

For details regarding the danger classifications of ‘danger to all’, ‘danger to most’ and ‘danger to some’ reference should be made to HR Wallingford (2005) *Flood Risks to People Phase 2, The Flood Risk to People Methodology*, Environment Agency\Defra R&D Technical Report FD2321/TR1, March 2005. However, the following provides a very simplified guide as to the groups of people that should be considered as falling into these danger classifications:

- Danger for some – includes children, the elderly and the infirm.
- Danger for most – includes the general public
- Danger for all – includes emergency services

The outputs of the Flood Risk to People project indicate that flood depths below 0.25 m and velocities below 0.5 m/s are generally considered low hazard. When designing safe access and exit routes, the combinations of depth and velocity on the routes should correspond to the white boxes in the above diagram. As flood depth and/or velocity increase the hazard to people increases. Combinations of depths and velocities in the white boxes (below the ‘danger for some’ class) are ‘very low hazard’, but a hazard does remain.

Depending on circumstances, alternative debris factors can be used based on the recommendations from the Flood Risks to People project.

13.7.3 Detailed Approach

Table 13.1 is a simple translation of a depth and velocity combination at selected points in the development site into a danger to people category. For large, complex developments this could be a time consuming exercise and difficult to test multiple options. Therefore, a more detailed approach would be to undertake flood hazard mapping across the area being considered based on the results of hydraulic modelling.

The advantage of this approach is that the mapping can also usefully inform the flood warning and emergency planning for the site.

13.8 Tools and Technologies

13.8.1 Determining Flood Hazard

It is possible to use either the lookup table provided in this guidance note or refer to the Flood Risks to People project, which provides a discussion of alternative methods for calculating flood hazard and suitable variations in debris factor depending on the characteristics of the site.

13.8.2 Hydraulic Modelling

There are a range of hydraulic modelling methods that can be used to estimate flood depths and velocities. Methods are summarised below (in the order of least complex to most complex):

- **Existing flood maps and topographic data.** Existing maps can be used to estimate flood depth but do not provide any information on velocities. For some simple applications of the method it may be appropriate to estimate peak velocities based on normal depth calculations or even expert judgement. Any assumptions made should be conservative (assuming high velocities).
- **Conveyance calculation.** The new Conveyance Estimation System (CES) can be used to estimate velocities across a floodplain for river valleys without defences.¹⁶⁶
- **One-dimensional hydraulic models** with defined flood storage areas and active floodplain channels, e.g. ISIS Flow or MIKE11 software, can be used to estimate average velocities. Maximum velocities can be significantly higher in some parts of the floodplain, e.g. where water spills over a defence, in narrow streets and any other “pinch points” in the floodplain.
- **Flow routing using a “raster” GIS system**, e.g. the JFLOW model used for the fluvial component of the EA’s Extreme Flood Outline project.
- **Two-dimensional hydraulic modelling using a fixed grid**, e.g. the TUFLOW hydraulic model that has been used for modelling the floodplain of the tidal Thames or HYDRO F that was used for the tidal component of the EA’s Extreme Flood Outline project.
- **Two-dimensional hydraulic modelling using a triangular mesh**, e.g. the Telemac 2D model. This can provide good velocity estimates but model run times are significantly longer than grid based models.

Outputs from the raster and two-dimensional models can be converted directly to flood hazard as they provide depth and velocity at regular intervals across the flood hazard areas.

Flood velocities produced by one and two-dimensional models will be average velocities for a cross-section or grid cell. There will be considerable variation of flow velocities within a river cross-section and for all modelling approaches peak flow velocities may be much higher than the average velocities reported for a cross-section or grid-cell. This is particularly the case in urban areas where flows may be concentrated in narrow streets and between buildings.

13.9 Audit and Control

When checking the analysis of depths and velocities, due consideration needs to be given to the accuracy of the model predictions, which will depend on the type of model used, as listed in Tools and Technologies.

¹⁶⁶ See <http://www.river-conveyance.net>

12.2 Water management

Policy LP27

Flood risk

Proposals for development which require a Sequential Test in accordance with national planning guidance will need to demonstrate that development has been directed to areas at the lowest probability of flooding, following a sequential risk based approach. The whole Kirklees district should be the starting point for the sequential test with applicants required to provide justification where a smaller area of search is proposed. If following application of the sequential test, there are no reasonably available sites which could accommodate the development in zones with a lower probability of flooding, it should also be demonstrated that a sequential approach has been applied within sites. This is to ensure that highly vulnerable and more vulnerable uses are directed towards the areas of lowest flood risk within the site. Proposals will also need to demonstrate that the exception test is passed, where applicable, as set out in national planning policy.

Proposals within flood zone 3ai will be assessed in accordance with national policies relating to flood zone 3a but with all of the following additional restrictions:

- a. no new highly vulnerable or more vulnerable uses will be permitted;
- b. less vulnerable uses may only be permitted provided that the sequential test has been passed and;
 - i. where extensions are linked operationally to an existing business or,
 - ii. where redevelopment of a site provides buildings with the same or a smaller footprint;
- c. all proposals will be expected to include flood mitigation measures such as compensatory storage which should be identified and considered through a site specific Flood Risk Assessment;
- d. development will not be permitted on any part of the site identified through a site specific Flood Risk Assessment as performing a functional floodplain role.

Proposals must be supported by an appropriate site specific Flood Risk Assessment in line with national planning policy. This must take account of all sources of flooding set out in the Strategic Flood Risk Assessment and demonstrate that the proposal will be safe throughout the lifetime of the development (taking account of climate change). The proposal must also not increase flood risk elsewhere and where possible should reduce flood risk. Mitigation measures, where necessary, should be proposed.

Proposals involving building over existing culverts or the culverting or canalisation of water courses will not be permitted unless it can be demonstrated to be in the interests of public safety or to provide essential infrastructure and that there will be no detrimental effect on flood risk and biodiversity. Where feasible, development proposals should incorporate re-opening of culverts, modification of canalised water courses and consideration of mitigation measures to achieve a more natural and maintainable state.

Proposals for natural management such as targeted vegetation planting in upper catchments and along river banks will be supported in appropriate locations where consistent with national and local plan policies and relevant water catchment management plans to reduce flood risk and improve water quality.



Secretary of State for Transport c/o
Transport Infrastructure Planning Unit
Department for Transport
Great Minster House (33) Horseferry
Road
London
SW1P 4DR

Our ref: RA/2021/142965/02-L01
Your ref: TWA/21/APP/01/REP/03
Date: 06 July 2021

transportinfrastructure@dft.gov.uk

Dear Sir/Madam

THE NETWORK RAIL (HUDDERSFIELD TO WESTTOWN (DEWSBURY) IMPROVEMENTS) ORDER. APPLICATION TO THE SECRETARY OF STATE UNDER SECTION 6 OF THE TRANSPORT AND WORKS ACT 1992 FOR AN ORDER UNDER SECTIONS 1 AND 5 OF THAT ACT. HUDDERSFIELD TO WESTTOWN. ENVIRONMENT AGENCY STATEMENT OF CASE.

Thank you for your letter, dated 18 May 2021, advising of the Secretary of State's intention to hold a public inquiry into the Order application.

We request that our earlier letter of objection, dated 17 May 2021, be treated as our Statement of Case. We have already previously enclosed our suggested Protective Provisions together with our letter of objection. However, we also enclose the below documents/extracts, so that they might be referred to as part of our evidence:

- Kirklees Council Strategic Flood Risk Assessment extracts
 - Map G – Huddersfield Town Centre, Paddock, Edgerton, Marsh
 - Map J – Bradley, Deighton
 - Map K – Bradley, Deighton
 - Map W – Mirfield
 - Map HH – Ravensthorpe, Dewsbury West, Dewsbury East
- Kirklees Council Local Plan – Policy LP27 Flood Risk
- Flood Risk Assessment Guidance for New Development Phase 2: Framework and Guidance for Assessing and Managing Flood Risk for New Development - Full Documentation and Tools: R&D Technical Report FD2320/TR2. Chapter 13.

Since raising our objection, we have met with the applicant to discuss our concerns and commit to continuing to work with the applicant and their consultants to address them. As a result, we anticipate that we will be filing further representations prior to the public

Environment Agency
Lateral 8 City Walk, LEEDS, LS11 9AT.
Customer services line: 03708 506 506
www.gov.uk/environment-agency

Cont/d..

inquiry, as and when the applicant makes additional information available to us. At this stage, we would wish to give evidence at the inquiry, but this position may change, in which case we will notify you.

Yours faithfully

Miss Lizzie Griffiths
Sustainable Places - Planning Specialist

Direct dial 020 302 58439

Direct e-mail lizzie.griffiths@environment-agency.gov.uk

THE NETWORK RAIL (HUDDERSFIELD TO WESTTOWN
(DEWSBURY) IMPROVEMENTS) [DRAFT] ORDER

SCHEDULE 19 PART 3
FOR THE PROTECTION OF THE ENVIRONMENT AGENCY

17—(1) The following provisions of this Part of this Schedule shall apply for the protection of the Agency unless otherwise agreed in writing between Network Rail and the Agency.

(2) In this part of this Schedule—

“the Agency” means the Environment Agency;

“construction” includes execution, placing, altering, replacing, relaying and removal and “construct” and “constructed” shall be construed accordingly;

“drainage work” means any main river and includes any land which provides or is expected to provide flood storage capacity for any main river and any bank, wall, embankment or other structure, or any appliance, constructed or used for land drainage, flood defence or tidal monitoring;

“the fishery” means any waters containing fish and fish in, or migrating to or from, such waters and the spawn, spawning ground, habitat or food of such fish;

“main river” means all watercourses shown as such on the statutory main river maps held by the Agency and the Department for Environment Food and Rural Affairs including any structure or appliance for controlling or regulating the flow of water in or out of the channel;

“plans” includes sections, drawings, specifications, calculations and method statements;

“specified work” means so much of any work or operation authorised by this Order as is in, on, under, over or within 8 metres of a drainage work or is otherwise likely to—

- (a) affect any drainage work or the volumetric rate of flow of water in or flowing to or from any drainage work;
- (b) affect the flow, purity or quality of water in any watercourse or other surface waters or ground water;
- (c) cause obstruction to the free passage of fish or damage to any fishery;
- (d) affect the conservation, distribution or use of water resources; or
- (e) affect the conservation value of the main river and habitats in its immediate vicinity;

“watercourse” includes all rivers, streams, ditches, drains, cuts, culverts, dykes, sluices, basins, sewers and passages through which water flows except a public sewer.

18—(1) Before beginning to construct any specified work, Network Rail must submit to the Agency plans of the specified work and such further particulars available to it as the Agency may within 28 days of the receipt of the plans reasonably request.

Commented [GLR1]: We suggest that 8 metres would be sufficient here, as 16m applies predominantly to tidal watercourses. However, should any quarrying or excavation work be necessary within 16m, this will need to be reflected within the provisions. The applicant should confirm one way or another.

(2) Any such specified work must not be constructed except in accordance with such plans as may be approved in writing by the Agency, or determined under paragraph 28.

(3) Any approval of the Agency required under this paragraph—

- (a) must not be unreasonably withheld or delayed;
- (b) is deemed to have been refused if it is neither given nor refused within 2 months of the submission of the plans or receipt of further particulars if such particulars have been requested by the Agency for approval and
- (c) may be given subject to such reasonable requirements as the Agency may have for the protection of any drainage work or the fishery or for the protection of water resources, or for the prevention of flooding or pollution or in the discharge of its environmental duties.

(4) The Agency must use its reasonable endeavours to respond to the submission of any plans before the expiration of the period mentioned in sub-paragraph (3)(b).

19- Without limiting paragraph 18, the requirements which the Agency may have under that paragraph include conditions requiring Network Rail, at its own expense, to construct such protective works, whether temporary or permanent, before or during the construction of the specified works (including the provision of flood banks, walls or embankments or other new works and the strengthening, repair or renewal of existing banks, walls or embankments) as are reasonably necessary—

- (a) to safeguard any drainage work against damage; or
- (b) to secure that its efficiency for flood defence purposes is not impaired and that the risk of flooding is not otherwise increased,

by reason of any specified work.

20—(1) Subject to sub-paragraph (2), any specified work, and all protective works required by the Agency under paragraph 19, must be constructed—

- (c) without unreasonable delay in accordance with the plans approved under this Part of this Schedule; and
- (d) to the reasonable satisfaction of the Agency,

and the Agency shall be entitled by its officer to watch and inspect the construction of such works.

(2) Network Rail must give to the Agency not less than 14 days' notice in writing of its intention to commence construction of any specified work and notice in writing of its completion not later than 7 days after the date on which it is completed.

(3) If the Agency reasonably requires, Network Rail must construct all or part of the protective works so that they are in place prior to the construction of any specified work.

(4) If any part of a specified work or any protective work required by the Agency is constructed otherwise than in accordance with the requirements of this Part of this Schedule, the Agency may by notice in writing require Network Rail at its own expense to comply with the requirements of this Part of this Schedule or (if Network Rail so elects and the Agency in writing consents, such consent not to be unreasonably withheld or delayed) to remove, alter or pull down the work and, where removal is required, to restore the site to its former condition to such extent and within such limits as the Agency reasonably requires.

(5) Subject to sub-paragraph (6) and paragraph 25, if, within a reasonable period, being not less than 28 days beginning with the date when a notice under sub-paragraph (4) is served upon the Applicant, Network Rail has failed to begin taking steps to comply with the requirements of the notice and has not subsequently made

reasonably expeditious progress towards their implementation, the Agency may execute the works specified in the notice and any expenditure incurred by the Agency in so doing shall be recoverable from Network Rail.

(6) In the event of any dispute as to whether sub-paragraph (4) is properly applicable to any work in respect of which notice has been served under that sub-paragraph, or as to the reasonableness of any requirement of such a notice, the Agency shall not, except in the case of an emergency, exercise the powers conferred by sub-paragraph (5) until the dispute has been finally determined in accordance with paragraph 28.

21—(1) Subject to sub-paragraph (6) Network Rail must from the commencement of the construction of any specified work maintain in good repair and condition and free from obstruction any drainage work which is situated within the limits of deviation and on land held by Network Rail for the purposes of or in connection with the specified works, whether or not the drainage work is constructed under the powers conferred by this Order or is already in existence.

(2) If any such drainage work which Network Rail is liable to maintain is not maintained to the reasonable satisfaction of the Agency, the Agency may by notice in writing require Network Rail to repair and restore the work, or any part of such work, or (if Network Rail so elects and the Agency in writing consents, such consent not to be unreasonably withheld or delayed), to remove the work and restore the site to its former condition, to such extent and within such limits as the Agency reasonably requires.

(3) Subject to sub-paragraph (5) and paragraph 25, if, within a reasonable period, being not less than 28 days beginning with the date on which a notice in respect of any drainage work is served under sub-paragraph (2) on Network Rail, it has failed to begin taking steps to comply with the requirements of the notice and has not subsequently made reasonably expeditious progress towards their implementation, the Agency may do what is necessary for such compliance and any expenditure incurred by the Agency in so doing shall be recoverable from Network Rail.

(4) If there is any failure by Network Rail to obtain consent or comply with conditions imposed by the Agency in accordance with the provisions of this Part of this Schedule the Agency may serve written notice requiring Network Rail to cease all or part of the specified works and Network Rail must cease the specified works or part thereof until it has obtained the consent or complied with the condition unless the cessation of the specified works or part thereof would cause greater damage than compliance with the written notice.

(5) In the event of any dispute as to the reasonableness of any requirement of a notice served under sub-paragraph (2), the Agency shall not, except in the case of an emergency, exercise the powers conferred by sub-paragraph (3) until the dispute has been finally determined in accordance with paragraph 28.

(6) This paragraph does not apply to drainage works which are vested in the Agency, or which the Agency or another person is liable to maintain and is not proscribed by the powers of this Order from doing so.

22- Subject to paragraph 9, if by reason of the construction of any specified work or of the failure of any such work, the efficiency of any drainage work for flood defence purposes is impaired, or that drainage work is otherwise damaged, such impairment or damage must be made good by Network Rail to the reasonable satisfaction of the Agency and if Network Rail to do so, the Agency may make good the impairment or damage and recover any expenditure which it reasonably incurs in so doing from Network Rail.

23- 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, Network Rail must provide such alternative means of access that will allow the Agency to maintain the flood defence or use the equipment no less effectively than was possible before the obstruction within 24 hours of Network Rail becoming aware of such obstruction.

[Nothing in paragraphs 20(4), 21(3), 22, 23(3) and 23(4) authorises the Agency to execute works on or affecting an operational railway forming part of Network Rail's network without the prior consent in writing of Network Rail, such consent not to be unreasonably withheld or delayed]

24—(1) Network Rail must take all such measures as may be reasonably practicable to prevent any interruption of the free passage of fish in the fishery during the construction of any specified work.

(2) If by reason of—

- (a) the construction of any specified work; or
- (b) the failure of any such work,

damage to the fishery is caused, or the Agency has reason to expect that such damage may be caused, the Agency may serve notice on Network Rail requiring it to take such steps as may be reasonably practicable to make good the damage, or, as the case may be, to protect the fishery against such damage.

(3) Subject to paragraph 9, if within such time as may be reasonably practicable for that purpose after the receipt of written notice from the Agency of any damage or expected damage to a fishery, Network Rail fails to take such steps as are described in sub-paragraph (2), the Agency may take those steps and any expenditure incurred by the Agency in so doing shall be recoverable from Network Rail.

(4) Subject to paragraph 9, in any case where immediate action by the Agency is reasonably required in order to secure that the risk of damage to the fishery is avoided or reduced, the Agency may take such steps as are reasonable for the purpose, and may recover from the Applicant any expenditure incurred in so doing provided that notice specifying those steps is served on the Applicant as soon as reasonably practicable after the Agency has taken, or commenced to take, the steps specified in the notice.

25 - Network Rail shall indemnify the Agency in respect of all costs, charges and expenses which the Agency may incur —

- (a) in the examination or approval of plans under this Part of this Schedule;
- (b) in the inspection of the construction of the specified works or any protective works required by the Agency under this Part of this Schedule; and
- (c) in the carrying out of any surveys or tests by the Agency which are reasonably required in connection with the construction of the specified works.

26—(1) Network Rail is responsible for and shall indemnify the Agency against all costs and losses not otherwise provided for in this Part of this Schedule which may be incurred or suffered by the Agency by reason of—

- (a) the construction, operation or maintenance of any specified work; or

Commented [GLR2]: Please note that we have left in this paragraph from the draft Order, despite it not forming out of our standard Protective Provisions. It is assumed that Network Rail would require this to be included and this would seem to be a reasonable request.

(b) any act or omission of Network Rail, its employees, contractors or agents or others whilst engaged upon the construction, operation or maintenance of any specified work.

(2) For the avoidance of doubt, in sub-paragraph (1)—

“costs” includes—

- (a) expenses and charges;
- (b) staff costs and overheads;
- (c) legal costs; and

“losses” includes physical damage.

(3) Network Rail shall indemnify the Agency against all liabilities, claims and demands arising out of or in connection with the authorised works or otherwise out of the matters referred to in sub-paragraph (1)(a) and (b).

(4) For the avoidance of doubt, in sub-paragraph (3)—

“claims” and “demands” include as applicable—

- (a) costs (within the meaning of sub-paragraph (2)) incurred in connection with any claim or demand;
- (b) any interest element of sums claimed or demanded;

“liabilities” includes—

- (a) contractual liabilities;
- (b) tortious liabilities (including liabilities for negligence or nuisance);
- (c) liabilities to pay statutory compensation or for breach of statutory duty; and
- (d) liabilities to pay statutory penalties imposed on the basis of strict liability (but does not include liabilities to pay other statutory penalties).

(5) The Agency must give to Network Rail reasonable notice of any such claim or demand and no settlement or compromise shall be made without the agreement of Network Rail which agreement shall not be unreasonably withheld or delayed.

27- The fact that any work or thing has been executed or done by Network Rail in accordance with a plan approved by the Agency, or to its satisfaction, or in accordance with any directions or award of an arbitrator, shall not relieve Network Rail from any liability under the provisions of this part of this Schedule.

28- Any dispute arising between Network Rail and the Agency under this Part of this Schedule, if the parties agree, is to be determined by arbitration under article 58 (arbitration), but otherwise is to be determined by the Secretary of State for Environment, Food and Rural Affairs and the Secretary of State for Transport acting jointly on a reference to them by Network Rail or the Agency, after notice in writing by one to the other.