

The Planning Inspectorate
National Infrastructure Planning
Temple Quay House
2 the Square
Bristol
BS1 6PN

Our ref: WX/2019/133441/01-L11
Your ref: TRO40011

Date: 19 January 2020

Dear Sir/Madam

**METROWEST PHASE 1 DEVELOPMENT CONSENT ORDER APPLICATION
EXAMINATION DEADLINE 4 – RESPONSE TO ISSUE SPECIFIC HEARING 3
ACTION POINTS**

Please find hereunder the Environment Agency's responses to the pertinent Action Points raised in respect of ISH 3 agenda item 5 (Flood Risk, Drainage and Contaminated Waters):

Action 24

The Environment Agency and BCC Flood Experts who could not attend the hearing to listen to the digital recording and respond to any points raised in relation to agenda item 5. In particular they should provide a clear statement about the implications of Order land falling within flood zone 3a and 3b and the tests that the Secretary of State would need to apply in the event that this matter is not agreed by the end of the Examination.

The Agency's Flood Risk Management Officer has reviewed the recording of ISH 3 and has provided the following comments:

Functional Floodplain

For the purposes of applying the National Planning Policy Framework, "flood risk" is a combination of the probability and the potential consequences of flooding from all sources. Accordingly, the correct identification of the flood zone designation and the associated flood event return periods, is essential in determining actual flood risk.

Flood zone 3b (Functional Floodplain) comprises land where water has to flow or be stored in times of flood. Although the identification of functional floodplain should take account of local circumstances and not be defined only in terms of probability parameters, a means of establishing flood zone 3b is essential. Accordingly, land which would flood with an annual probability of 1 in 20 or greater, or is designed to flood in an extreme event, is viewed as functional floodplain.

For information, flood zone 3a (High Risk) comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

From a planning policy perspective, it is important to clearly distinguish areas of flood zone 3a (High Risk) from areas of flood zone 3b (Functional Floodplain). The National Planning Policy Framework (NPPF) and the associated National Planning Practice Guidance (NPPG) dictates what land uses are and what are not permissible within the respective flood zones. The NPPG (Flood risk and coastal change) provides definitions regarding Flood risk vulnerability classifications (Table 2), together with flood risk vulnerability and flood zone 'compatibility' (Table 3).

For example, only developments defined as either Water Compatible or Essential Infrastructure are permissible within areas identified as 3b (functional floodplain).

The NPPG further advises that any Essential Infrastructure development within either flood zone 3a (High Risk) or 3b (Functional Floodplain) should be designed and constructed to remain operational and safe in times of flood.

The determination of flood zone 3a and 3b is based on the applicant's flood model and the conclusions drawn by the applicant in their supporting FRA. This information can be found in paragraph 4.2.10 page 4-7:

4.2.10 Appendix N, DCO Document Reference 5.6 includes flood maps for the simulated events. These flood maps show the proposed Clange Road compound to be within the 20-year tidal River Avon flood extent, and outside of the tidal River Avon 10-year flood extent i.e. within simulated Flood Zone 3b.

Table 4.1 and 4.10 below, extracted from the applicant's FRA, shows that the line and compound would flood during a return period event of 1 in 10 for the present day. Providing further evidence to the fact that the site is within functional floodplain.

Table 4.1: Modelled maximum River Avon tidal flood depth relative to the lowest rail level of the DCO Scheme near Bower Ashton

Return period (years)	Maximum flood depth relative to lowest rail level (m)					
	Present day (2015)		Future year (2075)		Future scenario (2115)	
	Pre-development	Post-development	Pre-development	Post-development	Pre-development	Post-development
Base (Tidal):	No flooding	No flooding	No flooding	No flooding	No flooding	No flooding
With peak level midway between Mean High Water Spring and Highest Astronomical Tide						
1 (Tidal)	Not simulated	Not simulated	0.44	0.44	1.02	1.02
2 (Tidal)	No flooding	No flooding	0.64	0.64	1.09	1.09
5 (Tidal)	No flooding	No flooding	0.80	0.80	1.20	1.20
10 (Tidal)	0.15	0.15	0.90	0.90	1.29	1.29
20 (Tidal)	0.53	0.53	0.98	0.98	1.36	1.36
75 (Tidal)	0.74	0.74	1.11	1.11	1.52	1.52
200 (Tidal)	0.97	0.97	1.33	1.33	1.93	1.93
1000 (Tidal)	1.20	1.20	1.75	1.75	2.27	2.27

Table 4.10: Lowest simulated return period with flooding of railway alignment

Source of flood risk	Lowest simulated return period with flooding of railway alignment						Location of flooding (for lowest simulated return period for which flooding occurs)
	Pre-development			Post-development			
	Present day (2015)	*Future (2075)	*Future (2115)	Present day (2015)	*Future (2075)	*Future (2115)	
Coastal flooding	>1000 years	> 1000 years	Between 100 and 200 years	>1000 years	> 1000 years	Between 200 and 1000 years	Between Sheepway (road) and Portishead urban area
River Avon: Tidal	Between 5 and 10 years	< 1 year**	< 1 year	Between 5 and 10 years	< 1 year**	< 1 year	Near Bower Ashton and Ashton Vale
Longmoor and Collier's Brooks: Fluvial	1000 years	Between 50 and 75 years	Between 50 and 75 years	1000 years	Between 50 and 75 years	Between 50 and 75 years	Vicinity of railway crossing of Longmoor Brook
Drove Rhyne: Fluvial	> 1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	n/a
Easton-in-Gordano Stream: Fluvial	> 1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	n/a
Tidal River Avon levels propagating up Easton-in-Gordano Stream	>1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	> 1000 years	n/a

* With projected climate change and sea level rise

** Whilst the simulations undertaken show the railway to be flooded at Bower Ashton during the 1yr River Avon tidal event in 2075, the modelling includes a combination of several conservative modelling assumptions, and so the simulation results are likely to be overestimates. The 1 year tidal flood in 2075 is therefore considered likely to have only a relatively minor impact on railway operation (short duration, shallow depth above lowest rail level) and hence only minimal disruption to the railway service (further details are in Sections 4.2.20 to 4.2.24).

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The map below, extracted from appendix N part 2 Figure N-3, shows the 20 year return period event in 2015 tidal flood map also called the functional floodplain.



250 mm flooding at Clamage Road compound for a 1 in 20 year present day tidal event.

The Agency has validated the applicant's model and considered the model fit for purpose. This means that the hydrology calculation has been verified and the model build has been confirmed, ensuring a standard approach has been used. The Agency also checked the model has been calibrated against a known event, which

provides confidence that the model is able to represent reality. It is therefore, surprising to note the applicant now contends the model is over predicting flood risk.

If it substantiated that the model is over predicting flood risk, further attempts must be made to calibrate the model to additional known events. Any such changes/ updates to the model will need to be detailed in a report, for the Agency's assessment.

Further, if the model is over predicting, how accurate is the model at establishing floodplain compensation requirements, especially at Clanage Road? It is worrying to note the applicant's contention that the floodplain compensation provision at Clanage road is within model error.

SFRA update:

Bristol City Council (BCC) has recently released their updated SFRA, based on the CAFRA model. The CAFRA model used for this work built on the previous CAFRA model, but did not take into consideration the work undertaken by the Metrowest team on the CAFRA model, which made the model site specific.

Between the 2 versions of the SFRA, BCC has changed how it defines the functional floodplain. The new SFRA considers functional floodplain as land that would flood for a return period of 1 in 20 as a result of fluvial flooding only. Below is the definition of the functional floodplain extracted from the updated city wide SFRA 2020 document:

2.8 Functional floodplain

The Functional Floodplain is the land or areas where water has to flow or be stored in times of flooding. This SFRA defines the Functional Floodplain as the extent generated during a 1 in 20 annual chance fluvial flood event combined with a Mean High Water Spring (MHWS) tide. The aforementioned event reflects the most realistic flooding combination given the nature and flood mechanisms of the River Avon catchment. In certain parts of Bristol that are already developed upon, existing buildings would prevent the flow or storage of flood water on these areas. Therefore they are not defined as Flood Zone 3b (FZ3b), despite flood modelling initially

Regardless of whether the applicant refers to the area as functional floodplain or not, the risk remains. From the FRA, the Agency understands that the existing railway line floods during a return period event of 1 in 10 (tidal) for the present day and that the risk of flooding will increase with the predicted impact of climate change. Additionally, it is understood from the applicant's flood risk modelling, that nothing can be done to reduce the flood risk to the line, without increasing flood risk to third parties.

Notwithstanding the above, the line will not increase flood risk to third parties, provided mitigation measures designed to reduce flood risk to the line, are not adopted i.e. raising grounds.

In view of the above restriction and the aforementioned NPPG requirements, the operator must ensure that an agreed Emergency and Evacuation Plan is adopted and all necessary procedures are implemented during any flood event.

This must safeguard any users of the proposed service, together with the structural integrity of all pertinent infrastructure. As previously advised, the Council's Emergency Planning Officer must be satisfied in respect of the Emergency and Evacuation Plan's provisions.

Clanage Road

Lowering the ground level at the Clanage Road compound will increase the flood depth on the site and with the compound considered to be within the functional floodplain, it restricts what the applicant would be allowed to do on the site.

The Agency understands the entire compound area needs to be lowered to provide enough floodplain compensation. The welfare unit proposed on the compound area will need to be raised off the ground with a void underneath, to maintain flood water capacity. In addition, no materials of any kind would be allowed to be stored at ground level within the compound area, again, to maintain floodwater capacity at any time. If the applicant is unable to adhere to these strict requirements, the compound should be relocated.

Please note, a FRAP is a flood risk activity permit, not flood risk action plan, as stated.

Bridge/farm track culvert at Eason in Gordano

The bridge width and ground level must not be changed during the lifetime of the development, on the grounds it is viewed as essential for ensuring floodwater flows from one side of the railway to the other. This arrangement therefore provides a degree of line safety from the risk of flooding. The Agency will require confirmation from the applicant regarding the means by which the above requirement will be secured.

Action 27

To provide a plan showing the Clanage Road compound and adjoining track overlaid with the flood zones as advocated by the EA and by the Applicant to aid understanding of where the areas of dispute with regards to the functional floodplain lie. Including if available an indicative layout for the compound

As advised, the Agency always endeavours to use the best available information, which, in terms of the above Action Point, is considered to be the applicant's own mapping, as included above and attached.

Should you require further information regarding the above issues please contact the undersigned

Yours faithfully

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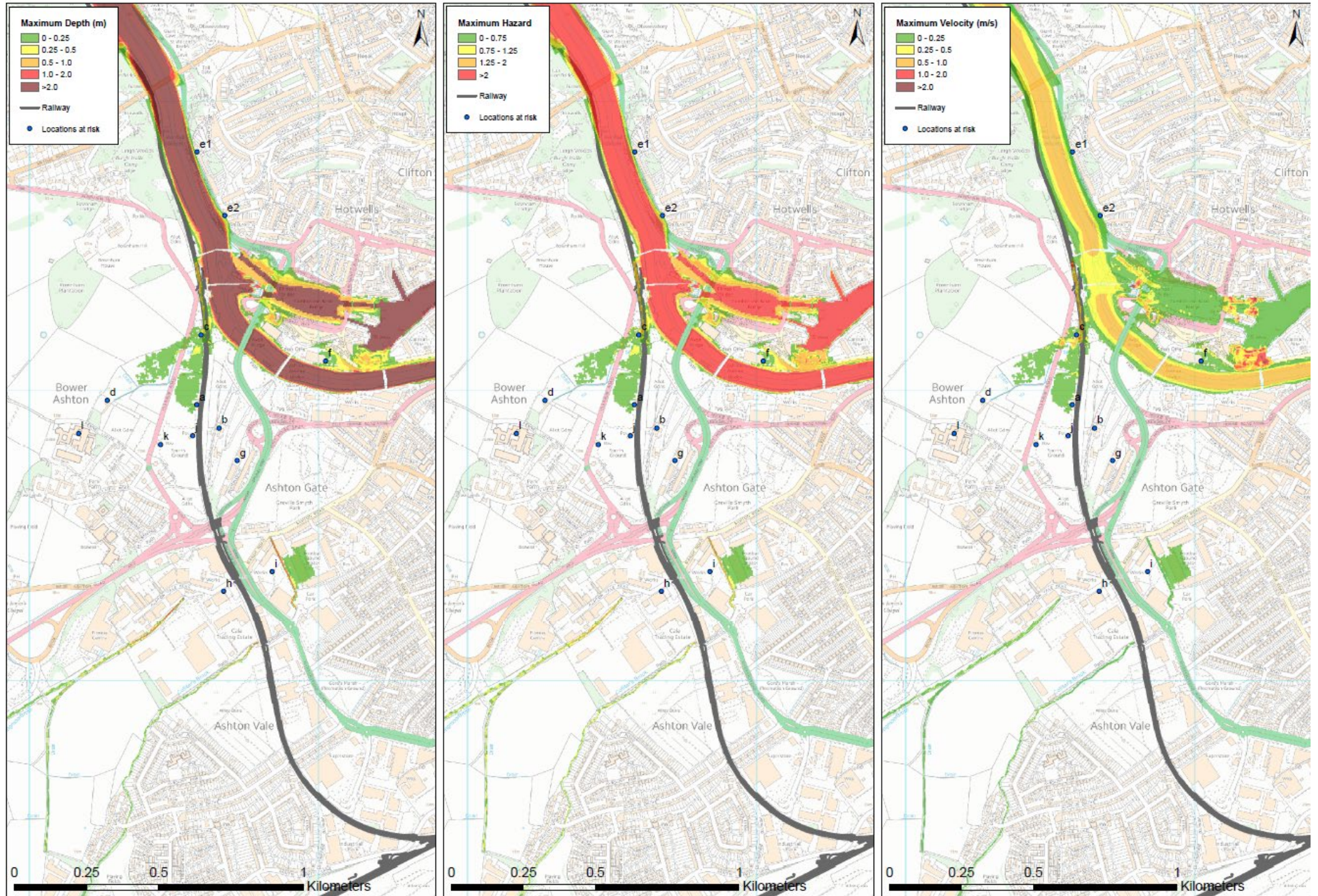


Figure N-3: Pre Development, 20year return period event in 2015 ,Tidal