

High Speed Rail (Crewe – Manchester)

Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement

Volume 5: Appendix WR-005-0MA08

Water resources and flood risk

Flood risk assessment

MA08: Manchester Piccadilly Station

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1 Introduction

1.1 Structure of this appendix

- 1.1.1 This report is an appendix to the water resources and flood risk assessment which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision Environmental Statement (AP2 ES) for the Manchester Piccadilly Station (MA08) area.
- 1.1.2 This appendix provides details of changes to the flood risk assessment (FRA) since the production of the High Speed Two (HS2) (Crewe – Manchester) Environmental Statement (ES)¹ (the main ES) and the HS2 High Speed Rail (Crewe – Manchester) Background Information and Data (BID)² (the main BID reports) which accompanied the main ES published in 2022.
- 1.1.3 An assessment of the impact of the original scheme on flood risk was undertaken as part of the water resources and flood risk assessment reported in the main ES Volume 2: Community Area report: Manchester Piccadilly Station (MA08).
- 1.1.4 This appendix should be read in conjunction with Volume 5, Appendix: WR-005-0MA08 of the main ES for the Manchester Piccadilly Station area (MA08).
- 1.1.5 In order to differentiate between the original scheme and subsequent changes, the following terms are used:
- ‘the original scheme’ – the hybrid Bill (the Bill) scheme submitted to Parliament in 2022, which was assessed in the main ES;
 - ‘the SES1 scheme’ – the original scheme with any changes described in SES1 that are within the existing powers of the Bill;
 - ‘the AP1 revised scheme’ – the original scheme as amended by SES1 changes and AP1 amendments;
 - ‘the SES2 scheme’ – the original scheme with any changes described in SES1 (submitted in July 2022) and the SES2; and
 - ‘the AP2 revised scheme’ – the original scheme as amended by SES1 and SES2 changes (as relevant) and AP2 amendments.

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

² High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

- 1.1.6 The purpose of this document is to report any changes or updates to environmental information and scheme design or assumptions that have occurred since the main ES, which will result in a change in effects and/or the introduction of new effects on flood risk receptors.
- 1.1.7 This FRA considers SES2 changes to baseline data and two AP2 amendments which were identified in the Manchester Piccadilly Station (MA08) area that had implications for flood risk.
- 1.1.8 A separate report for the hydraulic modelling of the River Medlock described in this assessment can be found in SES2 and AP2 ES Volume 5, Appendix: WR-006-00008.
- 1.1.9 Maps relevant to this report are contained in the SES2 and AP2 ES Volume 5, Water resources and flood risk Map Book: Map Series WR-05 – Modelled Baseline and Post Development Flood Extent 1 in 100 including climate change (CC) (1%+CC) Annual Probability of River Flooding and Map Series WR-06 – Modelled Baseline and Post Development Flood Extent 1 in 20 (5%) Annual Probability of River Flooding.

1.2 Assessment methodology

- 1.2.1 This FRA has been carried out in general accordance with the requirements of the National Planning Policy Framework (NPPF)³. The NPPF aims to prevent inappropriate development in areas at risk of flooding. Where development is necessary in such areas, the NPPF requires local planning authorities to ensure any development is safe from flooding, does not increase flood risk elsewhere and reduces flood risk where possible.
- 1.2.2 The methodology, design criteria and data sources used in this FRA are set out in the main ES Environmental Impact Assessment Scope and Methodology Report (SMR)⁴, and the SES2 and AP2 ES Volume 5, Appendix: CT-001-00005 Water resources and flood risk– Technical note– Updated guidance on flood risk assessment.

³ Ministry of Housing, Communities and Local Government (2021), *National Planning Policy Framework*. Available online at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.

⁴ High Speed Two Ltd (2021), *High Speed Rail (Crewe – Manchester), Environmental Statement, Environmental Impact Assessment Scope and Methodology Report*, Volume 5, Appendix CT-001-00001. Available online at: <https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement>.

Part 1: Supplementary Environmental Statement

2 Flood risk baseline

- 2.1.1 The original flood risk baseline is set out in the main ES Volume 5, Appendix: WR-005-0MA08.
- 2.1.2 In the main ES, hydraulic modelling was carried out due to the presence of the Manchester Piccadilly Station approach viaduct within the River Medlock floodplain, and removal of an existing culvert. This modelling was carried out using the UK Climate Projections 2009 (UKCP09) CC allowances. The guidance for application of the UKCP09 was to use the Upper End allowance, which in this case was an increase in peak river flows of 70%.
- 2.1.3 In July 2021, the Environment Agency published revised guidance for assessing the impact of CC on peak river flows to reflect the UK Climate Projections 2018 (UKCP18)⁵. The revised guidance indicates that for essential infrastructure, the Environment Agency's 'Higher central' allowance for peak river flow should be used. The revised guidance provides peak river flow allowances by management catchment instead of river basin district. The River Medlock is located within the Irwell Management Catchment.
- 2.1.4 The baseline environmental information has since been updated to include new CC guidance. The corresponding peak river flow CC allowance for the Irwell Management Catchment is 46%. This leads to a reduction in the peak river flows which need to be applied compared to the main ES.
- 2.1.5 No new or removed receptors have been identified for the SES2 scheme.

⁵ Environment Agency (2022), *Flood risk assessments: climate change allowances*. Available online at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

3 Flood risk assessment

3.1 River Medlock

3.1.1 This FRA focuses on:

- assessing the change in impact of the SES2 scheme, compared to the original scheme, on peak flood levels and extents relative to the SES2 baseline. This incorporates a reduction in the CC allowance from a 70% increase in peak river flow to a 46% increase in peak river flow, in accordance with the Environment Agency's updated CC guidance;
- assessing the significance of any changes to peak flood levels and flood extents associated with the modifications to viaduct and highway alignment (SES2-008-002). This design change consists of a change in Bill powers required for alterations to the pier structures beneath the Piccadilly Station approach viaduct and gyratory northbound highway alignment;
- determining whether changes to flood risk impacts relative to those reported in the main ES have the potential to lead to new or different significant flood risk effects;
- determining whether the embedded mitigation and additional mitigation measures included in the SES2 scheme can be refined in the event that new or different significant effects are identified, without resorting to additional Bill powers to mitigate the change in flood risk impact; and, if not,
- establishing what additional mitigation may be required in order to reduce the change in flood risk impact as far as reasonably practicable.

3.1.2 Hydraulic modelling of the River Medlock has been updated taking into account the updated CC allowance and the SES2 design change modifications to viaduct and highway alignment (SES2-008-002). The hydraulic modelling results are set out in the hydraulic modelling report (SES2 and AP2 ES Volume 5, Appendix: WR-006-00008).

3.1.3 The Piccadilly Station approach viaduct will cross substantial areas of floodplain (flood zones 2 and 3) associated with the River Medlock. The modifications to viaduct and highway alignment (SES2-008-002) allows for the provision of a rail expansion device on the Manchester Piccadilly Station approach viaduct. This leads to the removal of one viaduct pier and revised spacing of the other piers, where the viaduct crosses the River Medlock.

3.1.4 The modelled impact of the SES2 scheme on the River Medlock peak flood levels and extents relative to the SES2 baseline and design change remain the same as those reported in the main ES.

3.1.5 Consequently, there are no new or different impacts on flood risk relating to the SES2 baseline update and design change (SES2-008-002).

4 Flood risk management measures

- 4.1.1 The approach to flood risk mitigation on the original scheme is set out in the main ES Volume 5, Appendix: WR-005-0MA08. The need for additional measures arising from the SES2 scheme is considered below.
- 4.1.2 No new or different flood risk effects have been assessed as a result of the design change for the modifications to viaduct and gyratory northbound highway alignment (SES2-008-002).
- 4.1.3 In the main ES, replacement floodplain storage (RFS) is proposed for the River Medlock on a precautionary basis. This is to address potentially significant flood risk effects caused by the loss of floodplain storage due to the construction of viaduct piers within the floodplain.
- 4.1.4 Since the peak river flow CC allowance in SES2 has been reduced, the RFS provided within the original scheme will remain precautionary. Therefore, no changes to the location and design of the RFS presented in the main ES are proposed.
- 4.1.5 The modelling indicates that it is possible to fully mitigate the effects with the embedded mitigation, and no further mitigation measures are required resulting from the SES2 scheme.
- 4.1.6 As set out in the main ES, the next stage of the design development process will involve incorporation of topographical survey information into the existing hydraulic models to improve how they represent the existing watercourses.
- 4.1.7 The River Medlock is also potentially impacted by an AP amendment as described below in Part 2.

Part 2: Additional Provision 2 Environmental Statement

5 AP2 amendments and flood risk implications

5.1.1 Table 1 shows the AP2 amendment in the Manchester Piccadilly Station (MA08) community area that has implications for flood risk.

Table 1: AP2 amendments with implications for flood risks

AP2 amendment	Description	Implications
AP2-008-002	Additional land permanently required for provision of an access ramp from the realigned B6469 Fairfield Street to the Network Rail viaduct deck at Manchester Piccadilly Station	Change in river flooding due to increased width of the bridge crossing of the River Medlock for the realigned Fairfield Street

5.1.2 This FRA focuses on:

- assessing the significance of any changes to peak flood levels and flood extents associated with the increased width of the realigned Fairfield Street bridge crossing due to Provision of an access ramp (AP2-008-002); and
- any additional mitigation required to manage new or different significant flood risk effects on urban receptors as amended by the AP2 ES.

6 Flood risk baseline

6.1 River Medlock

- 6.1.1 The flood risk baseline is set out in the main ES Volume 5, Appendix: WR-005-0MA08. A summary of the flood risk relevant to this amendment is set out below.
- 6.1.2 As described in Section 2, the baseline environmental information has been updated to include the new CC guidance. The guidance indicates a 'Higher central' peak river flow CC allowance for the Irwell Management Catchment of 46%. Hydraulic modelling of the River Medlock has been updated taking into account the updated CC allowance and the AP2 amendment: provision of access ramp (AP2-008-002).
- 6.1.3 The provision of access ramp (AP2-008-002) includes a new Network Rail access ramp which will cross the River Medlock adjacent to realigned B6469 Fairfield Street. Both the realigned Fairfield Street and this access ramp will require a new bridge crossing of the River Medlock just upstream of the culvert beneath the existing approach to the current Manchester Piccadilly Station. This will lead to an additional crossing of the River Medlock in this location.
- 6.1.4 The receptors upstream and downstream of the original scheme that are at potential risk from the two AP2 amendments at the River Medlock are as set out in the main ES. The receptors are set out below and the relative vulnerability to flooding of each receptor (as defined in NPPF and Table 55 of the SMR⁴) is also indicated:
- secondary electrical sub-station (essential infrastructure);
 - residential properties (more vulnerable);
 - commercial properties (more vulnerable and less vulnerable);
 - several roads and streets (less vulnerable); and
 - a car park (less vulnerable).
- 6.1.5 No new receptors have been identified as a result of the AP2 amendment.

7 Flood risk assessment

- 7.1.1 The overall approach to flood risk mitigation on the original scheme is set out in the main ES Volume 5, Appendix: WR-006-0MA08. The need for additional measures arising from the AP2 amendment: Provision of an access ramp (AP2-008-002) is considered below.
- 7.1.2 Hydraulic modelling has been updated to include the modifications for the provision of an access ramp (AP2-008-002). The hydraulic modelling results are set out in the hydraulic modelling report (SES2 and AP2 ES Volume 5, Appendix: WR-006-00008).
- 7.1.3 This assessment has not identified any new or different significant effects on flood risk associated with the AP2 amendment (AP2-008-002).

8 Additional flood risk management measures

- 8.1.1 No new or different flood risk effects have been assessed as a result of the amendment for the provision of an access ramp (AP2-008-002).
- 8.1.2 Mitigation in the form of RFS was embedded into the design in the original scheme and remains unchanged. This mitigation addresses the loss of floodplain storage volume caused by the intermediate piers of the Piccadilly Station approach viaduct crossing, and bridge crossing of the realigned Fairfield Road. No additional flood risk management measures are required.
- 8.1.3 A redundant culvert is to be removed for environmental reasons, and as set out in the main ES appropriate hydraulic controls will be introduced to mitigate for any adverse impacts on flood levels downstream resulting from improved channel conveyance. The approach and design of such controls will be undertaken in consultation with the Environment Agency.
- 8.1.4 Further topographical survey, other surveys as required, hydraulic modelling, including incorporation of the RFS, design development, and refinement of the mitigation measures will be undertaken during design development to ensure no significant effects on flood risk.
- 8.1.5 The above activities will be undertaken in close consultation with the Environment Agency and the Lead Local Flood Authority (LLFA).

9 Summary of significant flood risk effects

- 9.1.1 The AP2 revised scheme will not result in any new or different significant flood risk effects over those reported in the main ES.

9.2 Conclusions

- 9.2.1 This FRA presents the impacts and effects of the AP2 revised scheme on flood risk, taking into account avoidance and mitigation measures described in Volume 2, Community Area report for the Manchester Piccadilly Station area of the main ES. No additional mitigation measures have been identified, relating to the SES2 baseline, SES design change and the AP2 amendment. No change is required to the RFS mitigation to address the loss of River Medlock floodplain storage volume from that set out in the main ES.
- 9.2.2 The assessment indicates that, subject to the implementation of the avoidance and mitigation measures identified, and the measures included in the draft water resources operation and maintenance plan (Volume 5, Appendix: WR-007-00000), the AP2 revised scheme will not result in any new or different significant adverse effects on flood risk in the Manchester Piccadilly Station area.
- 9.2.3 Further assessment and refinement of the models and mitigation measures will be undertaken during design development to ensure that flood risk impacts do not exceed those reported for the AP2 revised scheme.

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