NOTE TO FILE

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Contract	Rossendale SFRA Update
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Subject	Technical Modelling Report

1 Overview

Climate change has been modelled in accordance with the Environment Agency's latest guidance on climate change allowances for flood risk assessments[1], which was updated in 2016 to reflect results from the UK Climate Projections 2009 (UKCP09) study. Existing model inflows for the 1% AEP event have been increased by 70% to represent the published upper end long-term climate change projection with the entire hydrograph subject to this adjustment. Models have been run using ISIS v3.7 and TUFLOW 2016-03-AB-w64.

2 Hydraulic Models

2.1 2007 Cowpe Brook

This 1D ISIS model was successfully run for the defended scenario. Climate change enhanced inflows were applied within the ISIS .DAT file and therefore an alternative 'CC70' version of the model has been created. The existing model parameters remain unchanged.

Upon review, the outputs from this model were considered unreliable and therefore have been excluded from the SFRA.

2.2 2008 Whitewell Brook

This 1D ISIS model was successfully run for the undefended scenario. Climate change enhanced inflows were applied within the ISIS .DAT file and therefore an alternative 'CC70' version of the model has been created. The existing model parameters remain unchanged.

As this model is 1D, it was not possible to produce a reliable flood outline for the climate change scenario. Therefore, estimates of climate change at a site were based on the current Flood Zone 2, assuming that in 100 years Flood Zone 2 will become Flood Zone 3. Using the modelled climate change maximum depth at the relevant river node and a 2 m resolution Digital Terrain Model (DTM), an estimate could be made of the possible maximum flood depth on the site in the future.

2.3 2009 Dearden Brook

It was not possible to run this linked 1D-2D (ISIS-TUFLOW) model as a working TUFLOW control file (.TCF) was not supplied. Model therefore excluded from the SFRA.

2.4 2011 Irwell Limy

It was not possible to run this linked 1D-2D (ISIS-TUFLOW) model due to the significant poor convergence when run with climate change enhanced inflows. The various methods employed to stabilise the model were not sufficient and further work (beyond the scope of this study) would be required in order to successfully run this model for the upper end climate changed enhanced 1% AEP event.

The 1% depths were used in the SFRA on any relevant sites.

2.5 2011 Whitewell Brook

This linked 1D-2D (ISIS-TUFLOW) model was successfully run using the defended TUFLOW control file (.TCF), labelled 'DEF', as the existing .TCF was not made available for this study. Climate change enhanced inflows were applied using a 'CC70' ISIS event data (.IED) file. The existing model parameters remain unchanged.

This model covers the downstream end of Whitewell Brook to the confluence with the River Irwell. The climate change outline and depth output were used to assess future risk to relevant sites in the SFRA.

2.6 2011 Greave Clough

The supplied ISIS event file (.IEF) shows that this model was previously run as an ISIS-only model and the supplied TUFLOW files were saved in a file labelled 'DEL', which further suggested that these files had been discarded. Therefore, this model was run successfully as a stand-alone 1D ISIS model for

[1] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

scenario A, which is assumed to represent the existing scenario. Climate change enhanced inflows were applied a 'CC70' ISIS event data (.IED) file. The existing model parameters remain unchanged.

Upon review, the outputs from this model were considered unreliable and therefore have been excluded from the SFRA.

2.7 2012 Alden Brook

This model comprises stand-alone 1D ISIS and 2D TUFLOW models. The 1D ISIS model was run using an alternative 'CC70' model with climate change enhanced inflows. The existing model parameters remain unchanged. It was not possible to run the 2D TUFLOW model as the '2d_mat_alden_building.MIF' file was not available.

This model did not affect any sites therefore was excluded from the SFRA.

2.8 2012 Irwell Vale

This linked 1D-2D (ISIS-TUFLOW) model was successfully run for the existing scenario. Climate change enhanced inflows were applied using a 'CC70' ISIS event data (.IED) file. The existing model parameters remain unchanged.

The climate change outline and depth output were used to assess future risk to relevant sites in the SFRA.

2.9 2012 River Spodden

This 1D ISIS model was successfully run for the defended scenario A, which is assumed to represented the existing scenario. Climate change enhanced inflows were applied using a 'CC70' ISIS event data (.IED) file. The model has been run using an adaptive timestep of 1 second; this was changed from the existing fixed 1 second timestep in order to improve model convergence.

As this model is 1D, it was not possible to produce a reliable flood outline for the climate change scenario. Therefore, estimates of climate change at a site were based on the current Flood Zone 2, assuming that in 100 years Flood Zone 2 will become Flood Zone 3. Using the modelled climate change maximum depth at the relevant river node and a 2 m resolution Digital Terrain Model (DTM), an estimate could be made of the possible maximum flood depth on the site in the future.

2.10 2013 Rochdale and Littleborough

This model has a long runtime (approximately 26 hours) and is located on the very edge of the study area. The model did not initially run with the upper end climate change enhanced inflows and the work required to stabilise the model is beyond the scope of this study.

This model was therefore excluded from the SFRA.