Derivation of Climate Change Uplift for Non-modelled Watercourses

1.1 Introduction

1.1.1 Three watercourses within the study area have been identified as requiring floodplain compensation storage as a result of the proposed A14 scheme, but are not included in any of the existing hydraulic models. These watercourses are Cock Brook, Grafham Road Drain and Longstanton Brook.

1.1.2 A 1% (1 in 100) AEP water level has been established for all three watercourses, as explained below. However, the 2009 FRA did not include an allowance for climate change and to comply with the NPPF this needs to be considered when designing floodplain compensation.

1.1.3 For the scheme design life of 100 years, an allowance for climate change is provided by increasing flow estimates for the 1% (1in 100) AEP by 20% in accordance with NPPG guidance. Where hydraulic modelling is not available it is not possible to route the uplifted flood flows through a model to determine the predicted change in water level. Therefore an alternative method needs to be used to derive an increase in water level associated with climate change.

1.1.4 The 1% (1 in 100) AEP peak water levels for Grafham Road Drain and Longstanton Brook were extracted from Table 4.13 in the 2009 FRA; this is the best available data for these watercourses.

1.1.5 The 2009 scheme did not extend to Cock Brook and it was therefore not investigated as part of the 2009 FRA. As part of the consultation for this FRA, the EA and Alconbury and Ellington IDB were contacted but neither could provide any water level data for the Cock Brook. It has therefore been concluded that the best available information is the EA Flood Zone 3 mapping of the watercourse. The flood extent has been cross-referenced against ground levels from topographic survey to identify a peak water level for the 1% AEP event on Cock Brook.

1.1.6 This note explains how this climate change allowance has been derived based on the climate change allowance for the eleven modelled watercourses included within this FRA.

1.2 Modelled Watercourse Results

1.2.1 Eleven watercourses have been modelled for this FRA, with baseline and with-scheme scenarios run for each model. Each scenario has been run for the 1% (1 in 100) AEP and the 1% (1 in 100) AEP plus climate change.

1.2.2 Table 1 presents the change in water level at the location of the proposed scheme for the baseline runs, between the 1% (1 in 100) AEP and 1% (1 in 100) AEP plus climate change.

1.2.3 The with-scheme model levels have not been considered in this analysis. Changes in water level as a result of climate change are anticipated to occur irrespective of the proposed scheme changes.

Table 1: Difference in Water Level between 1% AEP and 1% AEP plus climate change

Watercourse	Modelled Increase in water level due to climate change at 1% AEP (m)
Alconbury Brook	0.03
Ellington Brook	0.08
Brampton Brook	0.08
River Great Ouse	0.14
West Brook	0.16
Oxholme Drain	0.08
Covell's Drain	0.10
Utton's Drove Drain	0.04
Oakington Brook	0.59
Beck Brook	0.16
Washpit Brook	0.07

1.2.4 The values in Table 1 present changes in water level between 0.03m and 0.16m, with the exception of Oakington Brook which has an increase in water level of 0.59m.

1.2.5 The climate change allowance identified for the Oakington Brook is significantly greater than the allowance derived for the remaining ten modelled watercourses. This may be attributed to its highly managed nature; a review of the catchment characteristics highlights that Oakington Brook has a considerably larger urban extent within its catchment than any other watercourse in this study area. Over a length of approximately 640m the Oakington Brook flows through the village of Bar Hill and a total of nine culverts, after which it flows through Menzies Cambridge Golf Course and a further four culverts prior to reaching the culvert beneath the A14. This is likely to result in the water levels on the Oakington Brook being influenced by local flow mechanisms at each culvert, as well by the urban area.

1.2.6 Conversely, Cock Brook, Grafham Road Drain and Longstanton Brook all have purely rural catchments, with only small settlements and farm access tracks crossing the watercourses. It has therefore been decided that the modelled water levels on the Oakington Brook should be viewed as atypical and excluded further from this assessment.

1.3 Conclusion

1.3.1 Following a review of the modelled catchments, a 0.16m increase in water level will be applied to the 1% (1 in 100) AEP levels on the Cock Brook, Grafham Road Drain and Longstanton Brook to represent the effects of climate change. This is consistent with the highest change in water level on the modelled watercourses, discounting the atypical response on Oakington Brook.

1.3.2 Table 2 summaries the 1% (1 in 100) AEP plus climate change water levels that will be used for these watercourses for floodplain compensation design.

Table 2: Increase in Water Level between 1% AEP and 1% AEP plus climate change

Watercourse	1% AEP baseline water level (mAOD)	1% AEP plus climate change water level (mAOD)
Cock Brook	15.20	15.36
Grafham Road Drain	16.45	16.61
Longstanton Brook	18.84	19.00