Appendix B : Methodology for the Damage Assessment

This comprised of the following steps:

1. Building polygons as defined in the OS MasterMap data were used (© Crown copyright and database rights 2015 Ordnance Survey 100019340).
2. Properties were given a 'Multicoloured Manual (MCM) code' based upon their use.
3. All buildings under 25m^2 were assumed not to be residential or commercial properties (e.g. shed) and were removed from the analysis.
4. All properties 'wet' to less than 10cm were assumed to experience rain runoff but not surface water flooding. (Note that all properties in the model were 'wet' because they received rainfall so this assumption was used to separate properties getting wet and properties being flooded).
5. The average flood depth for each property was determined using the modelled depth outputs for the baseline and combined options, for a range of return periods (2, 30, 75, 100, 100 + climate change, 200 design flood events).
6. Using the Multicoloured Manual depth-damage data for short duration floods with no prior warning, a cost was associated with each flooding depth for each property.
7. Damage costs were set up to be capped at the value of the property (average values of flats, terraced, semi-detached and detached homes were sourced from www.home.co.uk), adjusted by the distributional impacts factor (which increases/decreases this price to account for social grade). Note that damages for properties in this appraisal did not reach the cost of the relevant property over the 100 year time horizon and therefore no capping was undertaken.
8. As well as including damage costs for residential and non-residential properties, damages to vehicles, and emergency services were included. These were based upon a factor of property damages, as advised in the MultiColoured Manual.
9. These damages (by event) were entered into the Defra Appraisal Spreadsheet. Damages for the baseline and combined options were totalled for each return period and were used to calculate the average annual damage, based on the summary of repeated damage calculated for the lifetime of the scheme.
10. The losses due to flood damage were calculated by discounting the damage values (using the Social Preference Rate, as outlined in Treasury Green Book supplementary guidance) to calculate the Present Value damages.
11. The high level cost estimates were assumed to be the initial capital outlay and a maintenance cost of 2.5% of the capital cost applied for every year of the scheme lifetime The present value cost was calculated using the Social Preference Rate, as outlined in Treasury Green Book supplementary guidance.
12. The cost difference between the baseline and combined option costs and damages avoided were used to generate an approximate net present value and cost benefit ratio result.

It is assumed that all combined options will last for 100 years.

Direct damages to properties is the loss caused to both residential and non residential property owners and residents as a result of inundation of the property during a flood event, allowing for damage to the building fabric and structure, and leading to damage of fixtures and fittings, furniture and loss of personal effects or stock.

Emergency service costs are the costs associated with the response of the emergency services during flood events, including police, fire and ambulance services, as well as local authority emergency response teams and the response of the Environment Agency.

Research into the costs to emergency services of flood events has shown that the cost is dictated by the density of settlements in the affected area, with a flood in a highly densely populated area leading to a cost represented by an uplift factor of 5.6% on property damages, while a flood in a less densely populated area will lead to a cost better represented by an uplift factor of 10.7% on property damages. We have used the 5.6% uplift in this appraisal.

Evacuation and Temporary Accommodation costs are the costs associated with short term emergency evacuation of residents during a flood event and providing them with accommodation following a flood event whilst properties are cleaned, repaired and generally made fit for habitation again.

Vehicle Damages are the costs associated with damages to cars and other vehicles in residential areas due to flood inundation. It is estimated that there are 1.15 average vehicles per household in the UK, with an average value of these being £3,100. Therefore, a value of £3,600 is taken per property at which the flood depth exceeds 0.35m above ground level, estimated to be the average depth at which vehicle damage will occur.