

Aston Lodge Flood Study - Residents Association Presentation Executive Summary

1. BACKGROUND

- 1.1 The Aston Lodge estate was impacted by significant and catastrophic flood events in August 2004. These resulted in the flooding of a large number of properties. Haswell Consulting Engineers (now incorporated within Severn Trent Water Limited) were appointed to undertake a study of the flooding problems in the Aston Lodge estate. Stone, and to provide an understanding of the problem as well as provide indicative options to resolve the flooding.

2. APPRECIATION OF THE PROBLEM

- 2.1 Hydrological (estimation of flows) and hydraulic analysis (mathematical river modeling) were undertaken to gain an understanding of the watercourse system, specifically to assess capacities of open sections and structures (culverts, bridges etc.)
- 2.2 The model and flows were calibrated, as far as possible, to known flood extents gathered through consultations with the Aston Lodge Residents Flood Association (ALRFA) and through results of a questionnaire survey of residents.
- 2.3 The hydraulic analysis showed that the main cause of flooding was the restricted capacity of the existing system to deal with flows of an approximate 100-year return period level (a storm event which has a 1% chance of occurring in any one year). In particular the restricted capacity of the culverted section of watercourse under Mercer Avenue (adjacent to Springfield Drive and Harrow Place - 'Springfield culvert') and the Lichfield Road Bridge culvert result in out of bank flooding upstream and consequent flooding of roads and properties.
- 2.4 It is not possible to simply upsize the restrictive culverted sections of watercourse as this would increase pass-forward flows and potentially place at risk from flooding properties downstream of the culverts. The options considered further in the study did not therefore include the sole upsizing of existing system elements.
- 2.5 The steep gradient of the catchment results in a rapid response to heavy rainfall. A number of properties (specifically those with relatively low threshold levels on the steep area around The Redlands and on Lichfield Road) are at potential risk of 'pluvial' flooding (flooding direct from overland flow from intense rainfall that is unable to get into the drainage system). Improvements to the watercourse system will not address these localised issues and individual flood protection measures such as raising local levels or kerb heights are recommended.

3. FLOOD ALLEVIATION OPTIONS

- 3.1 Several options for flood relief were considered, however through assessment of constraints and feasibility two main options have been identified:

Option 1 - Upstream storage on Springfield reach

Option 2 - Bypass culvert & distributed upstream storage

- 3.2 In order to reduce the flood risk to properties on the Aston Lodge estate the most effective and feasible solution(s) is to control/limit flows entering the watercourse system through the estate to the existing capacity of the system.
- 3.1 Option 1 proposes to control flows to the capacity of the most restrictive structure on the system - the Springfield culvert. This would involve the storage of excess flows (7700m³ for 100-year event) upstream of the estate (currently agricultural land) during extreme rainfall events.
- 3.4 Option 2 proposes to control flows to the capacity of the Lichfield Road Bridge culvert and includes a bypass culvert to the Springfield culvert to relieve capacity issues related to that system and the provision of two smaller storage areas – one on the Springfield reach (2850m³ for 100-year event) and one on the "Blackies" reach (2100m³ for 100-year event) (to the rear of Farrier Close and immediately to the north of the junction of Saddler Avenue & Mercer Avenue).
- 3.5 Outflows from the storage areas would be controlled by a weir structure. The maintenance of this structure would be critical to the ongoing flood protection. The design of the storage areas could be undertaken to ensure it is of high ecological/environmental value e.g. as a wetland feature with sufficient capacity to store excess flood flows during extreme events.

4. OPTION COSTS

- 4.1 The indicative cost for providing Option I at the 100-year level is £91,300 (this does not include land purchase/ landowner compensation costs). This is the most cost-effective solution and currently the preferred option.
- 4.2 The indicative cost for providing Option 2 at the 100-year level is £207,900 (this does not include land purchase/ landowner compensation costs).
- 4.3 An outline DEFRA cost-benefit analysis has been undertaken suggests a 100-year cost benefit of £289,920. The cost-benefit ratio is therefore approximately 3:1 for Option 1.

5. DESIGN COMMENT

- 5.1 The recommended option is Option I - upstream storage in land to the north of Aston Lodge. The feasibility and costs of the option are dependent on consultation and negotiation with the relevant landowner.
- 5.2 The design of any upstream storage will need to be robust to guard against the flooding that would result should the impounding structure fail.
- 5.3 The watercourse system is a Critical Ordinary Watercourse, due to the large number of people and properties at risk of flooding and as such is due to become designated Main River in April 2006. Any design work will need to be undertaken in full consultation with the Environment Agency.