

Executive Summary

Atkins were commissioned to undertake a preliminary feasibility assessment of the mechanisms of flooding in the Cayton area. This feasibility report was required to determine whether potential flood mitigation options were feasible to proceed to the more detailed assessment and modelling stage. In addition, Atkins were required to determine the impact of the drainage remedial works on the proposed A165 Scarborough Leebberston Diversion and the impact of upsizing 2 highway culverts.

On 10th August 2002 after an estimated 118mm of rainfall fell in the early morning, properties in Cayton and Eastfield were severely effected by flooding. In total 65 houses, a caravan site and factory within Cayton were flooded.

The main reason for flooding has been found to be insufficient capacity in the 2 main culverts along the watercourses of Coulston and Beck Hole which pass through Cayton. The event of August 2002 is estimated to be an extreme event in the order of 1 in 50-200 years. Increased run off from recent development further higher up the catchment may also have attributed to a more intense flashy regime. A combination of additional factors such as blocked trash screens culvert debris appear to have increased the severity of flooding.

The mitigation option which appears to have the most robust cost benefit ratio of 2.67, was the storage and upgrading option. This consists of 50,000m³ of storage in 2 ponds combined with additional trash screens along the watercourse, regular maintenance and enhancement of the open channel section within Cayton. The storage is proposed in a field owned by McCains currently used for sports and all relevant land ownership issues would need to be addressed.

The outfall from the balancing pond on the Eastway Link is proposed to discharge into Coulston Watercourse. This study has found the existing watercourse to be seriously under-capacity and cannot accommodate a 1 in 5 year event. Therefore, unless flood alleviation measures are adopted along the system, additional flows should not be allowed to discharge into the existing system. The proposal to upgrade the section of 225mm diameter culvert under Lime Kiln Drive on Beck Hole Watercourse will help to increase the standard of protection to between a 1 in 50 to 1 in 100 year event.

The risks associated with the assessment are mainly due to the estimated 100 year flood envelope and the number of properties currently estimated to be affected. However, as this is based upon historical data combined with the robust benefit cost ratio, it is felt that this risk is within manageable limits. A detailed modelling exercise in the next phase should more accurately define the flood envelope and confirm flood storage requirements.

It is, therefore, recommended that this scheme is progressed to the detailed modelling and assessment phase.