high water level in the Witham. All uncontrolled spillages over maintained defences on the Witham and tributaries were removed similar to the containment option.

Upstream of Grand Sluice on the Witham water levels were reduced from the existing by up to 155 mm for the return periods modelled. For the 10 year event, the reduction in level is transmitted as far as Branston Island, although the reduction for much of the length is less than 30 mm. At the other extreme, for the 100 year event there was no benefit to be gained from reduced water levels on the Witham upstream of Kyme Eau.

A larger 80 cumec pumping station was also modelled but this still resulted in no benefit from reduced water levels upstream of Branston Island, in fact, water levels increased by more than 300 mm for the 100 year event when compared to existing levels due to the removal of all uncontrolled overtopping.

The results therefore show that the pumping station option would not be sufficient hydraulically as an option on its own. Whilst levels in the Witham upstream of Grand Sluice can be significantly reduced, water levels upstream of Branston Island on the Witham, and on Barlings Eau and Kyme Eau would all be unaffected by the pumps. An 80 cumec pumping station would therefore not have as far reaching affect on water levels as the storage reservoir option and would cost more. The option has therefore not been considered further in the hydraulic analysis.

(v) Proposed Sea Lock (Relocation of tidal limit)

This option considered the re-location of the Grand Sluice downstream of Boston and the incorporation of a new sea lock. The new sea lock constructed in the model was that as described in the Balfour Maunsell Preliminary Report of July 1994[11]. The sea lock was set up as 22m wide, 150m long and with a sill level of -4.0 mAOD. The two sluice gates were set up as 17.5m wide with an invert of 0.0 mAOD. The minimum water level to be maintained in the Haven was to be 1.3 mAOD. Two locations were modelled for the new lock; the first at the downstream limit of the Haven, and the second close to the Hobhole pumping station (see Figure 8).

Both the modelled locations for the new sea lock and sluice gates resulted in substantial lowering of water levels in the Haven and through Boston (approximately 1.5 metres). However, there was no benefit to be gained from lower water levels in the Lower Witham system upstream of the old location for the Grand Sluice.

The sea lock and sluice gates at the downstream limit of the Haven would result in an increase in peak water level in the Witham upstream of Boston of some 170 mm for the 1 in 100 year event. This peak would be maintained for a shorter duration over each high water due to the increased efficiency of the new structure as compared to the existing. This increase in peak level is due to the inflows to the Haven from the Forty Foot Drain on the right bank and a number of pumped catchments on the left bank which, would have to be conveyed through the new structure. Under existing conditions these inflows are a free discharge into the tidal section of the Haven downstream of Grand Sluice.

Siting the sea lock and sluice gates in the Haven upstream of the Hobhole pumping station, so that the inflows on the left bank could be discharged downstream of the new structure, still resulted in higher water levels upstream of Boston than the previous existing water levels.

The modelling indicates that the relocation of the sea lock, whilst reducing levels through Boston, has no benefit on the Lower Witham system and has been considered no further.