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DEVELOPMENT SERVICES

2 8 NOV 2007

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MARKET BOSWORTH – PROPOSED MARINA DEVELOPMENT

FLOOD RISK ASSESSMENT

1.0 Introduction

1.1 The proposed development at Market Bosworth Marina will create impermeable hard surfaces on the site, which will cause runoff, and change the hydrology of the local environment.

As part of the planning process the Environment Agency have been consulted and have requested that a flood risk assessment be carried out to standards set out in PPS25.

The proposed development comprises the excavation of a new basin to form the Marina with access roads, car parks, buildings and hard surfaces associated with the day to day functioning of the Marina facilities.

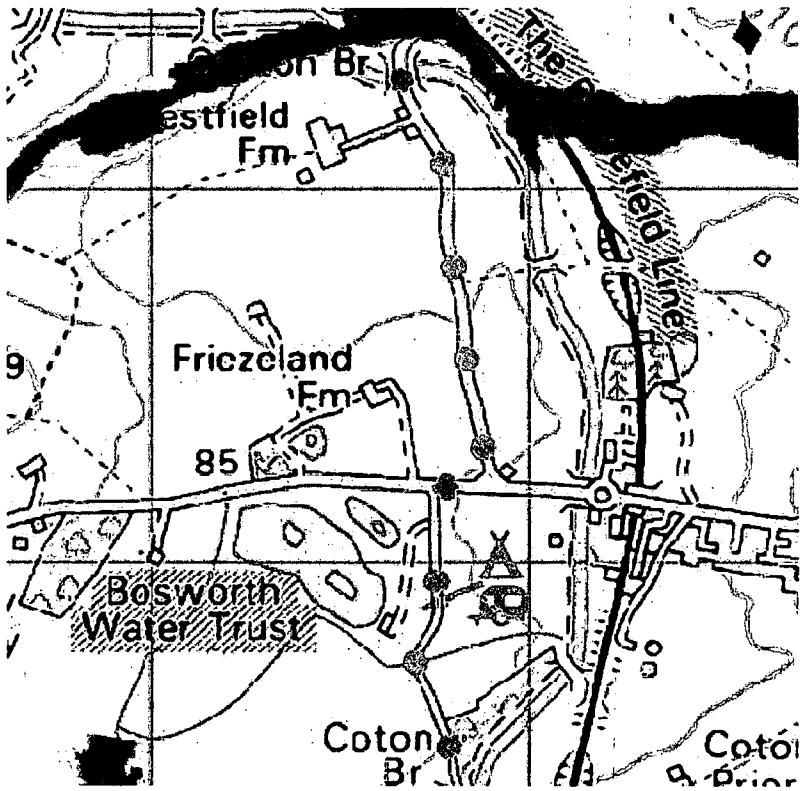
1.2 This assessment considers:

- river flooding
- risk of flooding from adjacent land
- risk of flooding to adjacent properties
- risks during the construction period
- final sustainable drainage proposals to protect the site and not exacerbate flooding up or downstream of the development.

1.3 This approach is consistent with Hydraulic Criteria – General Principles set out in the SUDS Manual CIRIA C697 p3-2 and guidance set out in PPS25.

2.0 River flooding - flood risk from surrounding watercourses

1.1 The site has been checked on the Environment Agency flood risk mapping site and is seen to lie outside any potential extreme flood zone, and would therefore appear to fall into Zone 1 Low probability, and so an FRA for external flooding sources is not required.



Referring in detail to table D1, as the developed area is greater than 1ha, an FRA for the effects of flooding of other areas due to hard surface runoff is required.

3.0 Risk of flooding from adjacent land

3.1 The new Marina itself will be at or above canal level and substantially above surrounding ground. The Marina infrastructure will therefore be above any risk of flooding from the canal.

3.2 The flow volumes within the existing stream are unaffected by the development with the line of the channel being relocated to the north of its current route substantially lower than the Marina infrastructure.

3.3 There are no other risks from adjacent land likely to affect the development.

4.0 Risk of flooding to adjacent properties

4.1 The two properties on the road junction will be protected from flood risk by both ground form that directs flows towards the outfall from the site and the SUDS scheme that will maintain greenfield runoff from the site to 5L/sec/ha up to the 1 in 100 year return period + 20% for climate change.

4.2 There is an exceedance route across the road where the stream flows from the site. This ensures there will be no flooding to adjacent properties even if design criteria are exceeded.

5.0 Risk of flooding during the construction period.

5.1 It is important to recognise that the Sustainable Drainage System proposed for the new development will improve the runoff characteristics of the site once construction is complete by collecting, cleaning and storing runoff to the 1 in 100 year return period with 20% allowance for climate change.

5.2 However, the construction of the basin will cause major disruption to the existing levels and increase the risk of silt runoff, pollution (oils in particular) and flooding of the watercourse due to compaction. It is proposed that this aspect of the project is discussed during detail design stage and a Construction Strategy agreed for the control of these possible problems. It may be beneficial to construct the soft SUDS storage features early in the contract to manage runoff during construction. The storage features will be reinstated and integrated into the overall SUDS scheme on completion of the project.

6.0 The SUDS proposals - Flood risk due to run-off from new development

6.1 All runoff from the new development on this site is to be designed to be stored and released slowly to limit flow into the existing drainage to or below current Greenfield run-off values, which have been assessed at the slightly conservative value of 5 l/s/ha.

6.2 An Outline Drainage SUDS Design Statement is attached to this FRA for information.

6.3 The Sustainable Drainage System has been designed in accordance with guidance in the SUDS Manual CIRIA C697.

6.4 Design Review

The design comprises 2 sub-catchments, sub-catchment A, approx. 4149M^2 of hard surface, and sub-catchment B approx. 7257M^2 of hard surface. Each sub-catchment collects runoff in similar ways and will need to store approx. 270M^3 and 472M^3 respectively to meet the 1 in 100 year return storm with an allowance for climate change. Detail storage volumes will be provided and agreed at detail drainage design stage.

6.2 **Sub-catchment A** collects runoff directly from the first part of the site entrance and access road around the Marina basin into a grass swale that flows to a road crossing near the site entrance. Simple rip rap stone swale-drops allow water to flow down slopes in excess of 1 in 50 to the wetland swale to the NW of the access road. Both the grass collector swale and the wetland swale will infiltrate to some extent but importantly will filter and clean the water providing two treatment stages. Storage is provided in the wetland swale with the balance of storage in the low nutrient lake.

6.3 **Sub-catchment B** collects runoff in a similar way to sub-catchment A and comprises part of the entrance road, the main part of the Marina infrastructure including roofwater and runoff from the boatyard that has passed through an agreed interceptor.

Again a simple cross kerb and swale-drop allows water to flow to the wetland swale to the NE of the road. The collector swales along roads and hard surfaces are simple grass swales that only fill during rainfall and appear as grass verges with shallow depressions at other times. The wetland treatment swales beyond the main access road are shallow wetland features that provide secondary treatment to runoff collected from the development. They are sized to treat and store 'first flush' runoff and storage volumes up to the 1 in 30 year storm.

Initial storage is provided in the wetland swale with the balance in the low nutrient lake.

The SUDS techniques have been selected to encourage loss of the first 5mm of rainfall as Interception Storage in swales and basins, as recommended in the SUDS Manual and in most conditions much of the runoff from hard surfaces will infiltrate within the site.

6.4 Overall Site

Overall site discharge from the low nutrient lake will be limited to 38 l/s, which is the equivalent of the 'greenfield rate' of runoff for the whole site.

7.0 Conclusion

The developments to this site will not have an impact on external areas, as flow rates have been maintained at or below existing run off levels.

There is no risk from river flooding, the canal should not pose a risk as its level is independently maintained and the SUDS proposals will control runoff to 'greenfield rates of runoff.