



Hampshire
County Council

BARNCROFT INFANT SCHOOL REDEVELOPMENT

FLOOD RISK ASSESSMENT

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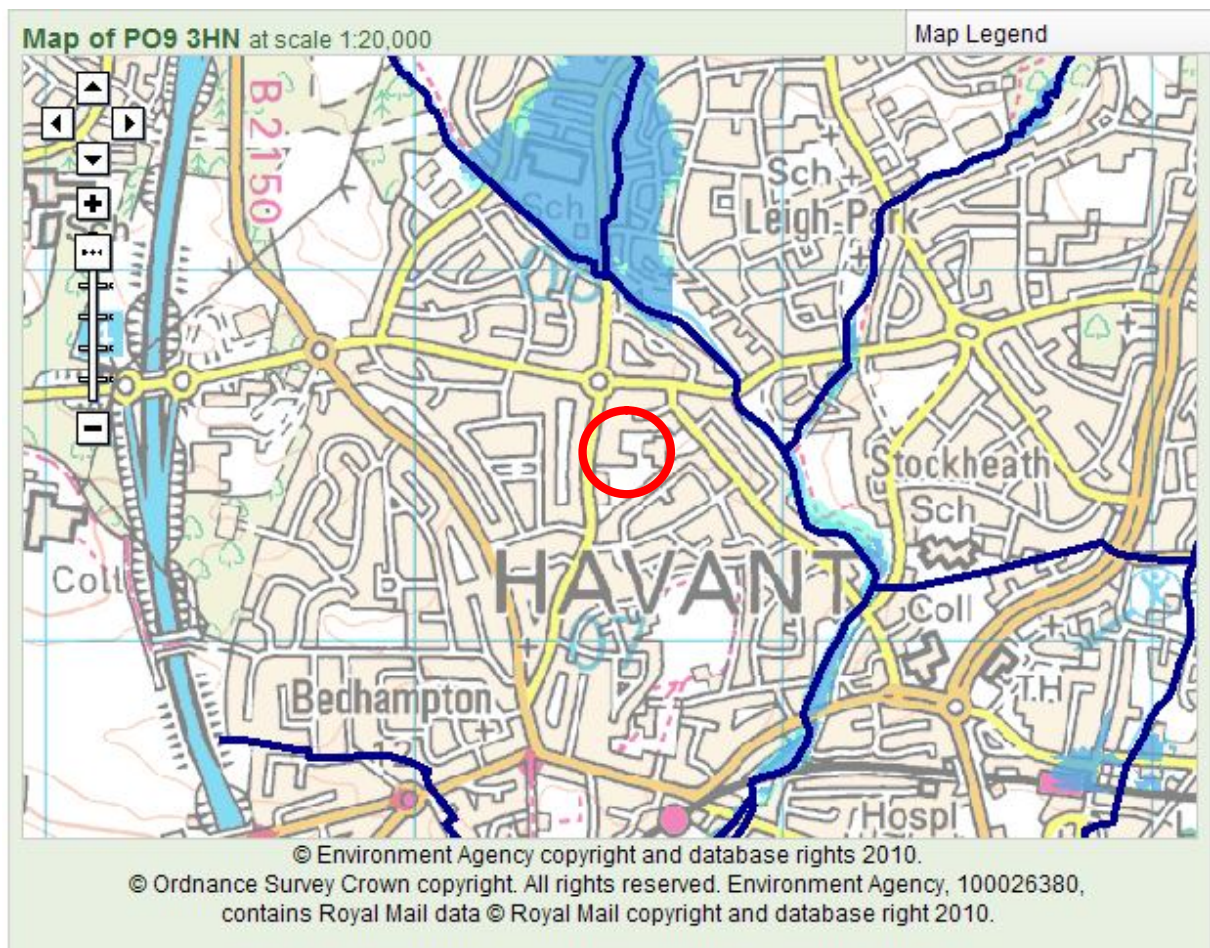
1 Introduction

The Barncroft School Development is a proposal to develop 39 dwellings on a site in Havant currently accommodating Barcroft Infant School and a piece of land south-west of Barncroft Junior School. The proposed development area for the school is more than 1.1 hectare in area.

Environment Agency maps indicate that the site is located in Flood Zone 1 where the lowest annual probability of flooding occurs, that being a probability of less than 1 in 1000 for any given year.

The Environment Agency Flood Zone Map (Figure 1) illustrates that there are areas within Havant, which are within Flood Zone 3. A review of the Environment Agency Flood Zone Maps concluded that the site would not become an isolated island as the result of an extreme event and there would be safe access and egress from the site to the B2150 via Barcroft Way and Purbrook Way during an extreme event.

Figure 1: Environment Agency Flood Zone Map with the Barncroft School site highlighted.



Although the site is located within Flood Zone 1, The Local Planning Authority has advised that there are flood issues in this area and therefore the Flood Risk Assessment is required.

2 Objectives

The main objectives of this report (as recommended in Planning Policy Statement 25) are to:

- Identify potential sources of flooding;
- Identify the probability of flooding;
- Provide justification for the development of the site in terms of the Sequential Test;
- Provide a conceptual surface water drainage strategy for the site.

3 Existing land use

The existing land is currently mostly brownfield site comprising infant school, junior school and the associated playground areas including green fields. The total hardstanding area is 0.471ha.

The existing site plan including the existing drainage scheme and storm water runoff rates is included in Appendix A

The site slopes gently from west to east. The geological survey map indicates that the site lies in an area of London Clay. The ground conditions on the site confirm this being mostly made ground over stiff clay.

Ground water was not encountered during the site investigation. Trial pits were excavated to a maximum depth of 3.6m.

4 Existing watercourses

The Hermitage Stream catchment is one of the main rivers in Havant, which outfalls to Langstone harbour. The catchment area of this river covers approximately 20km² including the Barncroft school site.

The site is located outside of the Hermitage flood plain and so is not at risk of flooding from the Hermitage Stream.

The site is not near the sea and so the potential for flooding by the sea is negligible.

There are no reservoirs or other artificial water sources nearby to contribute a flood risk.

5 Historic Flooding

The British Hydrochronology database has been searched with reference to the Hampshire Rivers Group. The Chronology is intended to contain records of rainfall, runoff, snow, etc. It is limited to Great Britain and to the years up to 1935 only. Two references were found, identifying flood events in Havant in 1919 and 1922. None of the extracts reference flooding in close vicinity of the site.

More recent and significant event, not included in the British Hydrochronology was found in the Environment Agency "South East Hampshire Catchment Management Plan" dated 2007 and include flooding events of 1960/1, 1994, 1995 and 2000/1. During the winter 2000/2001, prolonged heavy rain fell over a number of months and the elevated water table was considered to be the most significant cause of flooding in the Hermitage Stream catchment, causing widespread flooding. The distribution of the other flooding incidents tends to show relatively small number of properties flooding in a large number of places.

In 2005 the Hermitage Stream was recorded to flood due to surface water drainage surcharging. Correspondence with Southern Water does not consider flooding from the sewers as an issue in vicinity of the site. Refer to Appendix B Southern Water letter dated 22/11/2007.

6 Flooding from other sources

The sources of flooding within the catchment relate to underlying geology and urban development. Changes in the type of flooding in recent times have possibly been most affected by increasing urban development.

“South East Hampshire Catchment Flood Management Plan” prepared by the Environment Agency in 2007 states the flooding of Hermitage Stream is mostly caused by surface water drainage, when the runoff exceeds the channel capacity of the river system.

However, Southern Water has been contacted with regards to their surface water sewer network capacity, and they have confirmed that there is a spare capacity to accommodate additional flows. Refer to Appendix B.

As per Havant Borough Council website small overtopping of the drainage could be observed in Havant as a result of drainage blockages of poor drainage maintenance. The Barncroft Development site is however not affected by these incidents.

The EA have confirmed that one of the main sources of flooding in Hermitage Stream Catchment area is ground water flooding from levels rising locally up to ground levels, however during the site investigation dated 2010 there was no ground water encountered in any of the window sample holes and therefore ground water is not expected to pose any risk of flooding.

7 Proposed development

The new development area will be approximately 0.557ha. The proposed finished floor level of the new buildings has to be yet established, this will be done during the detailed design. The proposed development layout can be found in Appendix C.

8 Sequential assessment

The Environment Agency Indicative Flood Zone Map indicates that the proposed site is within Flood Zone 1. In accordance with the terms of Annex D of Planning Policy Statement 25 (PPS25), the proposed development passes the Sequential Test and is appropriate for development.

9 Surface water drainage strategy

As the site is within Flood Zone 1, the surface water strategy will be bound by good practice and the requirements of PPS25.

The proposed drainage strategy for the site has considered the results obtained from the site investigation and is based on the worst case ground condition being clay. The geology of the site will preclude natural infiltration to the ground. Therefore the use of soakaways is not a viable option for dealing with storm water drainage on Barncroft School site.

The objectives of the drainage strategy are:

- Attenuate runoff from the proposed increase in hardstanding to the existing 1 in 2 year flow of 48.9l/s. this has been agreed with Southern Water and the Environment Agency attached in Appendix B;
- Manage surface water runoff from the site so that it does not increase third party's flood risk;

- Attenuate surface water flows for the 30 year return period in below ground attenuation and for 100 year plus 30% flows (allowance for climate change) within the site boundary in above ground features
- Determine an appropriate means of discharging surface water from the site

Barncroft Infant School currently discharges surface water to the 750mm diameter Southern Water storm water sewer which runs east along the southern boundary of the school. This discharges some 200m east of the school into the Hermitage stream. The school has currently three un-attenuated points of connection to this sewer.

The total impermeable area of the infant school, including roofs and all external hard standing areas comes to 4710m². For the purpose of modelling, the site has been divided into two areas 'A left hand side' 1781m² and 'B right hand side' 2929m² respectively. These discharge to two connections points on the existing surface water sewer.

Modelling the two areas using MicroDrainage the whole Infant School site currently develops:

1:2 Year Design Storm	48.9 l/s
1:30 Year Design Storm	86.3 l/s
1:100 Year Design Storm	101.1 l/s

The calculations are in Appendix D with the break down of the left and right side of the school shown in the table on drawing R.J502775.03/001 of Appendix A.

Having consulted with Southern Water it has been agreed that the allowable discharge rate to Southern Water's storm sewer from the new development will be that of the 2 year return period storm from the existing impermeable area of the infant school.

Therefore, any developments on the infant school land and the land to the south west of Barncroft junior school will need to limit their combined surface water discharge rate to the existing 48.9 l/s. Detailed proposals for the attenuation and storage required to limit discharge to the public sewer need to be submitted to Southern Water for approval once a development proposal is finalised.

The current intention is to attenuate flows for up to the 30 year return period in adopted oversize storm sewers. For storms greater, up to 100 year (+30%), the flows will have to be attenuated in appropriately designed external areas such as car parking or by using bunds where necessary to retain the water. Levels will need designing so that surface water flows away from any buildings so as not to pose a flood risk. The volumes to be stored in oversize pipes and above ground are shown in Table 1.

The Environment Agency have been consulted and their approval gained for this flow rate as it offers a significant improvement in the existing non attenuated situation.

The storage requirements shown below have been calculated by splitting the 48.9 l/s across both sites. The Appendix E shows the preliminary drainage design.

Table 1: Attenuation requirements based on 48.9 l/s overall discharge for the combined housing sites in m³ based on different storm frequencies.

30 year / m ³ in pipes	100 year +30% / m ³	100 year 30% Above ground storage / m ³
46 m³	111.8 m ³	65.8m³

Further detail and calculations are provided in Appendix F. Please refer to drawing R.J502775.03/006 in Appendix E for the preliminary drainage design.

The 30 year return period requires 46m³ of storage and this will be provided by using the oversized pipe. The supporting calculations are in Appendix F. Southern Water will adopt oversized pipes and it is recommended to liaise with them during the design stage to discuss the proposal and flow control devices.

The 100 year +30% return period storm requires 111.8m³ of storage, supporting calculations are in Appendix F. With the 30 year storm being stored below ground 65.8m³ of above ground storage is required. It is recommended that area of the development site of 329m² is appropriately designed with respect to its levels to retain flood water on site to the depth of 200mm within the landscaped areas.

10 Conclusions

The new development site in Havant is currently a school site comprising of Barncroft Infant School and a piece of land to the south-west of Barncroft Junior School. The proposal is to develop 39 dwellings on these sites.

The total sites' area is over one hectare. Of this 0.471 hectare is hardstanding and comprise infant school and the associated paving and playground areas.

The topography of the site slopes mostly towards east. Some areas are sloping towards north and south.

Historically flooding from Hermitage Stream has not affected the Barncroft site. Recent events include flooding in 1960/1, 1994, 1995 and 2000/1. However none of these flooding events affected the site directly.

No flooding from sewers or any other sources has been recorded on Barncroft site.

The site is located in Flood Zone 1 with the minimal annual probability of flooding is less than 1 in 1000 for any given year. The safe access and egress to the site can be provided to B2150.

Surface water runoff will be managed on site using the oversized pipes and the above ground features up to the 100 year storm plus 30% for the climate change. An existing discharge rate of 48.9l/s for a 1 in 2 year design flow has been calculated using a MicroDrainage model. This discharge rate has been agreed with the EA and Southern Water. However the detailed design of this proposal will require to be submitted to both Authorities.

The soil investigation confirmed that there is no potential for the site to drain into the ground.

Appendix A - Existing Site Drainage

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