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Flood Risk Assessment

of

Horsecroft Crescent

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SUTCLIFFE

SITE SPECIFIC FLOOD RISK ASSESSMENT

DOCUMENT VERIFICATION

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Revision History:

Rev	Date	Description	Prepared	Checked	Approved

Introduction

It is proposed to develop a site at Horsecroft Crescent, Leek ST13 6QL with a community centre.

The site is currently greenfield.

The proposed development is a single storey structure and a car parking.

The site area is approximately 1050m^2 and is located within an established residential area.

This flood risk assessment has been prepared for submission with the Planning Application.

The purpose of this flood risk assessment is to assess existing flood risk to the site by reviewing the strategic flood risk assessment (SFRA), produced for Staffordshire Moorlands District Council, and to assess the proposed flood risk for the propose development and apply recommendations given in the SFRA and recommend how any outstanding flood risk issues could be managed throughout the lifetime of the proposed development.

Sources of Flooding

There are many sources of flooding that need to be considered within a flood risk assessment, which are:

- Rivers / Streams
- Sea
- Reservoirs
- Canals
- Ground Water
- Sewers
- Over Land Flows

It is unlikely, or very rare, that any one site will be affected by all sources of flooding. Therefore, we must assess which forms of flooding are required to be assessed within this flood risk assessment.

Having reviewed the Environment Agency flood maps, sewer records, land topography and OS Maps we can assess the subject site as being potentially affected by the following sources of flooding, which will be individually assessed within this flood risk assessment.

- Rivers / Streams
- Reservoirs
- Ground Water
- Sewers
- Over Land Flows

Flooding Assessment

Rivers / Streams

An inspection of the Environment Agency Flood Maps, which were revised in November 2011, indicates that the site is not affected by flooding caused from Rivers or Sea. The site is located in a Zone 1 flood area, low risk.

In addition to the above, an inspection of the Strategic Flood Risk Assessment, 2008, for Staffordshire Moorlands District Council was made and no specific mention of the site or the area surrounding was made in relation to potential flooding from rivers or streams.

Therefore, there is a low risk of flooding from rivers / streams for this site.

Reservoirs

An inspection of the Environment Agency Flood Maps was made and the map for reservoir flooding indicates that the site is not potentially affected by reservoir flooding.

Approximately 1.2km to the north of the site is Tittesworth Reservoir. Anticipated flooding for the reservoir is identified on the Environment Agency map but the extent of the anticipated flooding, in the event of a dam failure, is located some 0.5km to the northwest of the site.

An inspection of the strategic flood risk assessment was made. No mention of reservoir flooding in relation to the development site is made within the SFRA.

Therefore, there is a low risk of flooding from reservoirs.

Ground Water

An inspection of the Environment Agency Flood Maps was made and the map for ground water indicates that the site is not within a potential flood area.

An inspection of the strategic flood risk assessment was made. No mention of ground water flooding in relation to the development site is made within the SFRA.

Therefore, there is a low risk of ground water flooding.

Sewers

Sewers, including site drainage, can flood for several reasons. The reasons are.

- Blockages
- Surcharged
- Undersized pipes

Should sewers flood, for whatever reason, then the site is potentially affected as it is located within a developed area that is fully services by sewers and drains.

The site falls downwards from east to west.

To the east and north of the site there is a 225mm Ø, and is approximately 1.5m deep. A surface water land drain also runs through the site and it is possible that this sewer may require diverting as part of the development.

The site and surrounding topography falls from east to west and we would expect that flooding from sewers, whether it is caused by surcharging, blockages or capacity issues would flow within the road width and not across the site due to the small diameter of sewers and potential volumes of water. There is a potential for flood water to enter the car park area. Should this happen then we would expect the water to run through the car park and across the open ground to the west of the car park.

As anticipated flow depths are anticipated to be shallow, as the volumes of water from a 225mm Ø sewer is small we would not expect that the velocity of the flows would cause danger to human life or property. As the sewers are located within the width of the road we would anticipate that any flood water created would be retained within the road width or pass through the car park area.

An inspection of the strategic flood risk assessment was made. No information regarding sewer flooding in relation to the development site is made within the SFRA.

Therefore, there is a low risk to human life and properties from flooding of sewers.

Overland Flow

Overland flow will occur when rainfall cannot be collected by the designed drainage system or/and the ground becomes waterlogged, or when sewers become full and cannot accept additional water.

Should overland flooding occur on this site then overland flow will pass generally in an east to west direction, following the general topography of the land.

Due to the topography of the preceding and adjacent land we would expect flow depths to be shallow.

As flows are anticipated as being shallow we would not expect the flows to be a risk to life or property.

An inspection of the strategic flood risk assessment was made. No information regarding overland flow in relation to the development site is made within the SFRA.

Therefore, there is a low risk of overland flooding.

Development Drainage

The National Planning Policy Framework (NPPF) directs us to ensure that the rate of discharge leaving a development site is no more than its previous use, and, where possible, to reduce that discharge.

An inspection of historical maps, google maps google earth shows us that the site is developed with 24 flats and associated paving. As the land is currently greenfield there is no impermeable area currently being drained. The greenfield runoff rate for the site has been calculated as being:

Q_{1yr}: 0.6 l/s

Q_{30yr}: 1.1 l/s

Q_{100yr}: 1.4 l/s

It is proposed to develop the site with a community centre and associated infrastructure. The total impermeable area of the development has been calculated as being approximately 705m^2.

In accordance with NPPF it is, therefore, necessary to reduce the drained impermeable areas to less than the previous impermeable areas. However, it is the intention of the NPPF and SFRA to reduce offsite surface water discharge as much as possible, and where possible to greenfield runoff rates. This can be achieved by employing sustainable urban drainage systems (SUDS). These techniques may typically include infiltration. Other simple ways of reducing surface water discharge off site is to free drain private drives, paths and patios to landscaped areas, such as grass and planted areas where natural surface infiltration and evaporation can occur. Careful detailing will be required to ensure that surface water runoff will flow to appropriate areas.

The desk top survey states that the area is overlain by boulder clay. Intrusive investigations on the development site have proved that soft to firm sandy clays are present at relatively shallow depths and that perched ground water is present in a number of boreholes. This suggests that the use of soakaways is not feasible.

However, by draining paths and patios to grass / landscaped areas it is possible to reduce the positively drained areas and allow surface infiltration / evaporation to occur.

The SFRA directs that sustainable urban drainage systems (SUDS) should be employed to ensure that no worsening of existing flooding problems elsewhere within the area.

Section 10.0 of the SFRA lists the type of SUDS systems that could be employed on site developments. It also states that the Environment Agency require that a reduction of 20% to discharge rates to account for Climate Change and its effect on future runoff volumes that climate change will have.

As the site is a greenfield site it should, therefore, be the intention of the designer to provide proposed runoff rates that match the calculated greenfield runoff rates for the site.

In addition to the above the site will also need to be considered for Category 4 of the Code for Sustainable Homes.

From the assessment we can, therefore, deduce that it will be likely that surface water will be required to be discharged to the surface water sewer network. And that the peak flow rates and volumes off site are anticipated as being maintained at greenfield runoff rates it will still be necessary to agree a location and maximum discharge rate with Severn Trent Water.

Conclusion & Recommendations

From the above we can conclude that there is an overall low risk of flooding to the development site.

It is likely that, due to the requirements of the SFRA that attenuation will be likely, especially to be able to manage the 100 year rainfall events that will be required to be designed for.

The SFRA states that there is no available reduction of existing discharge rates and that a greenfield runoff rate should be used.

At this stage of development design detailed calculations have not been carried out and will be required as part of the design development process which will follow on from Planning Approval.

A 30% climate change factor should be used in all attenuation calculations and it is likely that the preferred form of attenuation will be a permeable car park incorporating roof runoff as this will provide the best form of filtration and, therefore, least chance of blockages of any flow control used, which will require a small diameter orifice to achieve a greenfield runoff rate.

To enable the surface water site drainage to be progressed it will be necessary that the following be carried out. It will then be possible to design a suitable surface water drainage system that satisfies the criteria of the SFRA, LPA and other stake holders, such as the Developer and Severn Trent Water.

- Drainage investigation of both on and off site drainage to enable a suitable discharge location to be identified.
- A drainage investigation will identify the need of whether or not the sewer / land drainage passing through the site requires diverting.
- Communication with Severn Trent Water will be required to agree a maximum surface water discharge rate and its connection point with the public sewer.

Appendix A

Proposed Site Plan

N

Ramshaw View

Enhance existing Open space with paths / landscaping

14 No

Community Centre

Site boundary

Shops

Existing trees to be retained

Existing Bungalows

Horsecroft Crescent

Queens Drive

S - C
L 04

D - D
L 04

EXISTING COMMUNITY CENTRE ON SITE 45 - 160M2

NEW PROPOSED COMMUNITY CENTRE ACCOMMODATION SCHEDULE

Hall - 63 SqM
Kitchen - 11.5 SqM
Office - 12.2 SqM
Meeting Room 1 - 23 SqM
Meeting Room 2 - 12.2 SqM
Male Toilets - 11 SqM
Female Toilets - 13.4 SqM
Disabled Changing - 5.5 SqM
Cleaner's Store - 1.8 SqM
Storage - 7 SqM
Storage - 20 SqM
Plant - 2.3 SqM

Overall Total area - 230 SqM

Site Area 0.155 Hectares

Rev F	Community centre plan amended	CG	Jan 13
Rev E	Community centre plan amended	SK	Jan 13
Rev D	Parking area amended	CG	Dec 12
Rev C	Community Centre plan amended	CG	Dec 12
Rev B	Footpath amended	CG	Dec 12
Rev A	Community centre plan amended	CG	Dec 12

PROJECT
Horsecroft Avenue (Site 6)
Leek ST13 6QL

TITLE
Proposed Site Plan

SIZE A1

STATUS Planning

PROJECT No 1385 | DRAWING No L 03F

DRAWN by CG | CHECKED ...

DATE Sept 12 | SCALE (@A1) 1: 250

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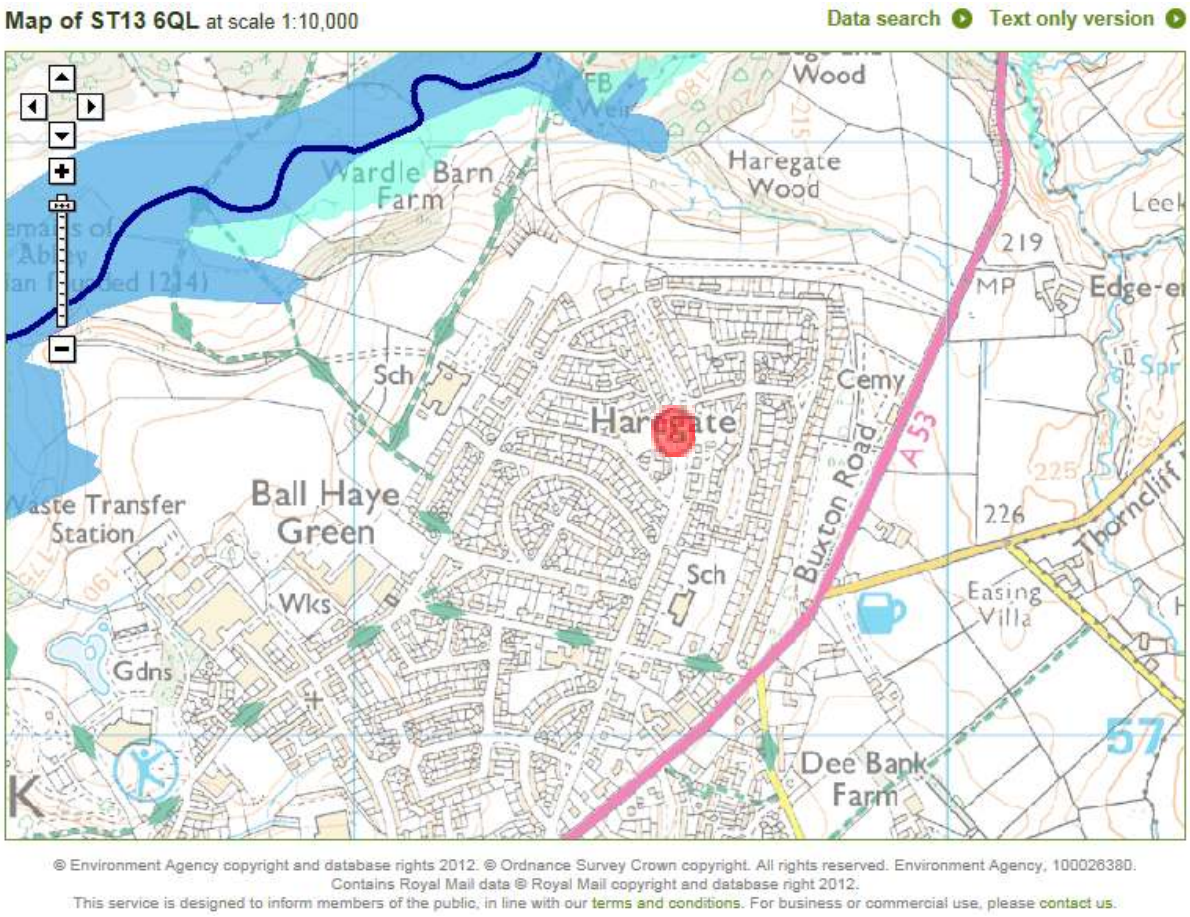
Appendix B

Environment Agency Flood Maps



Rivers & Sea

Map of X: 399,409; Y: 357,487 at scale 1:20,000 Data search Text only version

Reservoirs