Halton Borough Council

Strategic Flood Risk Assessment

To accompany
Core Strategy
Sustainability Appraisal
Report

October 2007 (Version 1)

Final Report

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I. Introduction

This Strategic Flood Risk Assessment (SFRA) for Halton has been undertaken to provide a detailed and robust assessment of the extent and nature of the risk of flooding in Halton and its implications for spatial planning. The guidance provided by the Environment Agency (EA) to Local Planning Authorities for SFRA sets out the purpose of such assessments as:

“To identify the areas within a development plan that are at risk of flooding. To identify and detail those factors that are relevant to current and future flood risks and to outline polices to be applied to such areas to minimise and manage that risk.”

The main objectives of this SFRA are to:

- Identify land at risk of flooding in Halton and the degree of risk from river, sea and other sources
- Reduce flood risk from and to new development through promotion of appropriate location, design and mitigation measures
- Inform policy formulation and the Sustainability Appraisal for the emerging Local Development Framework concerning land use in flood risk areas
- Provide a framework for development control officers and developers for dealing with the flood risk in development proposals

The principal output from this assessment is a set of maps, which will arrange the Borough into Flood Risk Zones as defined by Halton Borough Council (HBC) in accordance with the definitions given in Planning Policy Statement 25 (PPS25) – Development and Flood Risk. These maps are intended to give Halton Borough Council sufficient information to have an overall view of flood risk areas for strategic planning purposes. There is a series of twelve sets of maps that cover the various stages of the SFRA process from the starting point of the existing EA Flood Map; watercourse location and catchments; historic flood events and flood defences; ground heights and topography; HBC defined flood risk zones; incorporating the effects of climate change; finally the comparison of existing land allocations against the HBC flood risk zones.

Status of the report, maps and the GIS

The Geographical Information System (GIS) is a tool that has been used to search for and enable swift identification of flood risk, flood defences and history of flooding within Halton. The GIS has enabled the production of a series of maps indicating areas where there is risk of flooding, and where proposed developments could be restricted because of this flood risk. The report provides information on how this SFRA was produced in order to meet the objectives listed opposite. The maps and the report will enable consistent and sustainable decisions to be made with respect to flood risk.

The report, maps and GIS are ‘live’ documents and tools. This means that they will be updated as new information becomes available. In particular, this means incorporating the updates of Flood Zones currently provided by the Environment Agency on a quarterly basis. For practical reasons, only very limited print runs of paper copies of the SFRA maps will be produced at key plan-making stages.

Halton Borough Council intends to enable public access to the SFRA by digital / electronic means. Further information of GIS is given is Section 4.
2. Halton Context

Physical Characteristics of Halton

Halton is a unitary authority in the north west of England on the edge of the Merseyside metropolitan area. The borough covers the towns of Widnes and Runcorn. The topography in Widnes is relatively flat. The rural areas of Runcorn are relatively flat and form part of the Cheshire Plains. However the Runcorn urban area is built on and around a sandstone ridge that gives Runcorn an elevated profile.

The Runcorn area lies within the northern part of the Cheshire Basin. The basin fill consists of clastic sedimentary rocks ranging in age from Permian to Jurassic. The Triassic rock sequence consists of a complex assortment of silici-clastic fluvial and Aeolian sandstones of the Sherwood Sandstone Group that are overlain by estuarine deposits of the Mercia Mudstone Group. Between the Sherwood Sandstone Group and the Mercia Mudstone Group is the Keuper Waterstones formation, a transitional lithological unit characterised by interbedding of brown mudstones and siltstones with paler grey sandstones.

Much of southern Runcorn is comprised of Bollin Mudstones and Tarporley Siltstones of the Mercia Mudstone Group. The west part of the Runcorn Peninsula is comprised of combinations of Chester Pebble Beds, Wilmslow Sandstone and Helsby Sandstone of the Sherwood Sandstone Group. Each of these formations are classified as major aquifers by the Environment Agency due to their highly permeable and porous nature and ability to transmit groundwater. The Helsby Sandstone outcrops at the Weston, Runcorn Hill and Stenhills areas of Runcorn, all of which are distinguished areas of quarrying.

The solid geology of Widnes comprises predominantly Chester Pebble Beds of the Sherwood Sandstone Group. The Wilmslow Sandstone formation is present in southern Widnes with small areas of Kinnerton Sandstone in northern and southeastern Widnes.

Quaternary glacial deposits of boulder clay of up to 30m thick overlay the Sherwood Sandstone Group across much of Widnes. With its highly impermeable nature the boulder clay offers protection to the underlying bedrock/ aquifer. Glacial deposits also overlay the sandstones on the fringes of the Runcorn Peninsula. Glacial sands and gravels occur sporadically across Runcorn as irregularly shaped discontinuous bodies of coarse-grained sands with occasional gravel silt and sand horizons. Superficial Alluvial deposits of silty sand occur across both Widnes and Runcorn close to and associated with the River Mersey.

Halton can be categorised as a lowland areas and does not suffer with the flooding problems found in upland areas i.e. 'flashy' catchments where rivers can respond and rise quickly from rain falling on the surrounding hills. All watercourses in Halton eventually drain into the River Mersey.

Land Use and Population

The Borough of Halton covers an area of approximately 90sq km, 9000 hectares or 35 sq miles. Within the Borough are the towns of Widnes and Runcorn. These centres are heavily urbanised. To the edges of the borough are agricultural areas designated as green belt. Specifically these rural areas are Hale and Hale Bank in southwest Widnes, north Widnes, and the Daresbury ward in Runcorn.

On the 12 October 2006 the Office for National Statistics released the 2004 subnational population projections for
England. These projections estimate the population of local authorities for the next twenty-five years, taking into account certain factors such as births, deaths and migration.

Currently these population estimates take the 2004 mid-year population estimate as the starting point and calculate the future population through a number of assumptions. Firstly for each year the current population is aged, with births and deaths calculated using local fertility and mortality rates for the area in question and added onto the projection. Estimates of the number of people migrating and leaving an area are then added on to the total.

The 2004 projection suggests that the population of Halton will rise steadily to a peak of 120,200 in the early 2020’s, before slowly starting to decline. The 2029 projection therefore is 120,000 people (Source – Corporate Research and Intelligence October 2006). There are approximately 63,000 units of land and property in the Borough (Source HBC Local Land and Property Gazetteer - LLPG, July 2006).

Climate in the North West

It is worthwhile setting Halton in the context of the climate experienced in northwest England generally. Halton Borough obviously does not have a unique climate just for the borough so the wider picture has to be examined.

Northwest England has the full range of topography encountered in England and Wales, ranging from the sheltered flat plain of Cheshire, to the exposed uplands of Cumbria. Annual rainfall reflects this variation, with Cumbria being the wettest part of the UK, having an estimated 2000mm or more over the highest points. West Cheshire, on the other hand, in the lee of the Welsh Hills, receives between 600 and 700mm per year. It is clear that Cumbria must have the highest number of occasions of prolonged heavy rain in the UK, a distinction it shares with Snowdonia and parts of the Scottish Highlands. In an average year there are about 15 to 20 occasions on which 30mm or more fall in a day in parts of these upland areas. Over parts of Cheshire, on the other hand, 30mm falls in a day only once every 5 years or so.

The World Meteorological Organisation definition of heavy rain is 4mm per hour or more. Heavy rain is defined as several hours of rain, at a rate that may cause rising river levels. Manchester Weather Centre provides warnings of such heavy rain to the Environment Agency. Traditionally the period of rain in these warnings has been 6 hours or more and the intensity varies from 2.5 to 5mm per hour over Cumbria to 1.5 to 2mm per hour over The Wirral.

There are various meteorological reasons for these heavy rain events, but they can be summarised into four main types:
1) Frontal rain with orographic enhancement
2) Frontal rain with strong warm advection
3) Frontal rain with embedded convection
4) Thunderstorms (usually small scale)

The two requirements for rain of any intensity to occur anywhere on earth are firstly, for humidity to be high within the atmosphere and secondly for upward motion to occur. The upward motion cools the air to saturation and then to condensation and eventually to rain.

The Pennies south of the Forest of Bowland have fewer occasions when orographic enhancement (a vertical motion of winds created by the earth’s undulating surface creating a low level cloud) is sufficient to give heavy rain. This is for two reasons, firstly the hills are not
as high as found in Cumbria and secondly, the range of wind directions that give prolonged heavy rain is more limited. Air blowing from directions further into the south than about 240 degrees will be dried sufficiently by Wales to take rainfall totals below heavy rain warning thresholds. On average there are only 10 occasions per year in these more southern catchments when orographic enhancement plays an important role in heavy rain.

Points 2, 3 and 4 of the main types of meteorological condition described opposite are important for most of the heavy rain events away from Cumbria. Approaching fronts have to be examined closely to see whether associated warm advection will be sufficiently strong to give prolonged rain at rates above 2mm per hour. Strong warm advection needs either a rapid increase in temperature near the front or a strong wind near the front (or both). The temperature of the air as it crosses Northwest England is an important indicator of how heavy the rain will be. Warm air can hold more water vapour than cold air and therefore heavy rain is more likely beneath a relatively warm airstream.

**Convection and Thunderstorms**

Types 3 and 4 (opposite) refer to the strength of the upward motion in the atmosphere. It is the upward speed of the air that determines how heavy the rain will be, coupled with how much moisture is in the air. Convection is the physical process that allows areas of warm fluid to rise and be replaced by cold fluid that has descended. Gravity is the driving mechanism for this process. For convection to occur in the atmosphere, the air at heights above the earth’s surface must not be too warm. Forecasters can determine whether convection will occur to any great depth by studying the routine, measured and vertical temperature profiles of the atmosphere. Standard thermodynamic charts tell forecasters how active the convection will be and to what depth it will occur. Sometimes the convection occurs to over 20,000ft and thunderstorms are likely. When the atmosphere allows convection to occur the air is said to be unstable. Upward motion cools the air to saturation and then to condensation and eventually to rain. Vertical wind speeds of tens of metres per second occur and rainfall rates of over 10mm per hour (sometimes 50mm/hr) result. The nature of convection means that there is a corresponding downward motion near to the rising areas (the showers or thunderstorms) and this will be air that is drying out. Thus thunderstorms usually occur over a relatively small area. The risk of flooding Thunderstorms are one of the main risks of flooding in Halton, this is because they are very difficult to predict and can deposit a large amount of rain in a short period. Catchments can quickly become slowly

**Warm Advection: The ‘Conveyer Belt’**

A special case of warm advection can be found in the air moving northwards or eastwards ahead of cold fronts. These so-called warm conveyer belts carry moisture and warm air upwards near to the front. There will be a corresponding downward motion behind the front and therefore a drying out of the air and the rain will stop. There is also a slight downward motion ahead of the conveyer belt that decreases the rainfall rate in this area. Therefore the heaviest rainfall is to be found beneath the rising, warm, moist air of the conveyer belt.

(Source: Manchester Weather Centre).
3. Policy Context

The structure and operation of the spatial planning system in England is set out in General Principles (ODPM, Feb 2005).

National planning policies are set out in Planning Policy Statements (PPS) and Planning Policy Guidance notes (PPGs), Minerals Policy Statements (MPS) and Minerals Planning Guidance Notes (MPGs), Circulars and Parliamentary Statements.

All existing PPSs and accompanying guidance documents, where these have been prepared, can be downloaded from the DCLG website (www.communities.gov.uk).

The following table, taken from the Comparison Guide to PPS25, explains the relationship between the documents described here.

Table 3.1 - Dovetailing of Plans

![Diagram showing dovetailing of plans]

The most significant of these documents in terms of flood risk are arranged as follows:
- National,
- Regional,
- Sub-Regional and;
- Local

National


The WFD was transposed into English and Welsh law in December 2003. The main objectives of the Water Framework Directive are considered to be:
- Enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands - there is a requirement for nearly all inland and coastal waters to achieve 'good status' by 2015
- Promote the sustainable use of water
- Reduce pollution of water, especially by ‘priority’ and ‘priority hazardous’ substances
- Lessen the effects of floods and droughts;
- Rationalise and update existing water legislation and introduce a co-ordinated approach to water management based on the concept of river basin planning.

WFD demands that headline water issues such as the availability of water supplies, maintaining the quality of water in rivers and managing flood risk are considered as a whole rather than in isolation. Increased flood risk can have a significant impact on water quality with increased run-off reaching the watercourses.

There is also a need to have regard to the River Basin Management Plan (RBMP) for the North West, which is due to be adopted in 2009.
Making Space for Water – DEFRA (2005)

Making Space for Water is the Government’s strategy for flood and coastal erosion risk management in England. The key issues within this document are:

- To assess flood risk in the planning process
- To involve people in the decision making process as well as in the prevention of and protection against risk
- To have a holistic and global approach to the risk and to collect better data
- To test and provide new tools to manage the risk
- To be ready to change land use in order to manage the risk

Planning Policy Statement 1 (PPS1) Delivering Sustainable Development (Feb 2005) sets out the Government’s overarching planning policies on the delivery of sustainable development through the planning system. Issues covered include climate change, sea level rise and the avoidance of flood risk. Key objectives for design policies should include ensuring that developments are sustainable, durable and adaptable (including taking account of natural hazards such as flooding) (paragraph 36).

Planning Policy Statement 3 (PPS3) Housing (Nov 2006) underpins the delivery of the Government’s strategic housing policy objectives and the goal to ensure that everyone has the opportunity to live in a decent home, which they can afford in a community where they want to live. In doing so PPS3 should deliver housing policies that seek to minimise environmental impact, taking account of climate change and flood risk.

Planning Policy Statement 7 (PPS7) Sustainable Development in Rural Areas (Aug 2004) sets out the Government’s planning policies for rural areas.

Planning Policy Statement 9 (PPS9) Biodiversity and Geological Conservation (July 2005) sets out planning policies on protection of biodiversity and geological conservation through the planning system. Many protected sites fall within flood zones (see www.defra.gov.uk/wildlife-countryside/cl/habitats/habitats-list.pdf).

Planning Policy Statement 11 (PPS11) Regional Spatial Strategies (Sept 2004) sets out the procedural policy on RSSs. All RSSs are subject to sustainability appraisal, a key requirement of the Planning and Compulsory Purchase Act, 2004. Core Output Indicators for Regional Planning (March 2005) include an indicator on Flood Protection, which reflects the number of planning applications granted contrary to the advice of the Environment Agency.

Planning Policy Statement 12 (PPS12) Local Development Frameworks (Sept 2004) sets out the requirements for preparing LDDs. Specific issues covered include taking account of climate change (paragraph 1.9 and Annex B) and the need to identify areas at risk from flooding, showing these on the adopted proposals map (paragraph 4.11 and Annex A2). One of the LDD Core Output Indicators (Updated Jan 2005 is the number of planning permissions granted contrary to the advice of the Environment Agency. The Planning and Compulsory Purchase Act also requires that LDDs be subject to sustainability appraisal.

Planning Policy Guidance 20 (PPG 20) Coastal planning (September 1992) states that policies should seek to
minimise development in areas at risk from flooding (paragraph 2.14).

Planning Policy Statement 25 (PPS25) – Development and Flood Risk states that ‘the Sustainability Appraisal of Local Development Documents should incorporate or reflect the planning authority’s SFRA, to ensure that the planning strategies for the area being planned support the Government’s objectives for development and flood risk set out in this PPS.’

PPS25 expects local authorities to apply a risk-based approach to the preparation of development plans and their decisions on development control through a sequential test.

The detailed provisions of the sequential test are essential to the consideration of planning applications and in determining allocations within the Local Development Framework and direct reference should be made to PPS 25 (Annex D, Table D.1)

PPS 25 (Annex E) sets out the minimum requirements for flood risk assessments:

- Consider risk of flooding both from and to a development
- Consider the effects of parts of the flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure
- Consider the vulnerability of those that could occupy the development, taking account of the sequential and exception tests and the vulnerability classification including safe access
- Consider and quantify the different types of flooding and identify flood risk reduction measures so that assessments are fit for the purpose of the decisions being made. Consider the effects of a range of flooding events including extreme events
- Include an assessment of the remaining risk (residual) after risk reduction measures have been taken into account
- Consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of development may affect drainage systems
- Consider the affects of climate change

In brief, the flood risk zones range from zones 1 to 3. They refer to the probability of flooding from rivers, the sea and tidal sources and ignore the presence of existing defences because these can be breached, overtopped and may not be in existence in the lifetime of the development. The basic principles are that preference is given to the development of land in flood risk zone 1, with flood risk zone 3 being the least preferable.

PPS25 also implements an ‘exception test’ approach to certain types of development that is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites.

Table 3.2- Compatibility Matrix (PPS25)

<table>
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<tr>
<th>Flood Risk Vulnerability classification (see Table D2)</th>
<th>Essential Infrastructure</th>
<th>Water compatible</th>
<th>Highly Vulnerable</th>
<th>More Vulnerable</th>
<th>Less Vulnerable</th>
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<tr>
<td>Zone 1</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Zone 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Exception Test required</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3b: Functional Floodplain</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Exception Test required</td>
<td>✓</td>
</tr>
</tbody>
</table>

Key:

✓ Development is appropriate

✗ Development should not be permitted
Different land uses are considered to be more appropriate in different flood risk areas. The types of development, their suitability and the need to apply the exception test is summarised within table D.3 of PPS25 and shown in Table 3.2.

**Regional**

Regional Planning Guidance 13 (RPG13) – Policy ER8 (Development & Flood Risk) sets out the policy for development within flood risk affected areas in the following manner: “In preparing development plans and other relevant strategies and considering individual planning proposals, local authorities should apply the precautionary principle. In accordance with this precautionary principle they will make use of the Environment Agency’s (EA) Flood Maps, Shoreline Management Plans, Estuary Management Plans and Local Environment Agency Plans to develop the information necessary to apply the sequential approach to flood risk set out in PPG25.”

In keeping with the precautionary principle, the methodology recommended within RPG13 is fully consistent with PPS25.

Draft Regional Spatial Strategy (RSS) for the North West – Policy EM5 (Integrated Water Management) states that plans and strategies should “manage flood risk by implementing the ‘Meeting the Sequential Flood Risk Test – Guidelines for the North West Region’; requiring that any development which, exceptionally, must take place in current or future flood risk areas is resilient to flooding; protected to appropriate standards and does not increase the risk of flooding elsewhere; requiring new, and where possible, existing development (including transport infrastructure) to incorporate sustainable drainage systems and water conservation and efficiency measures; and raise people’s awareness of flood risks and the impacts of their behaviours and lifestyles on water consumption.”

**Sub Regional**

Liverpool Bay Shoreline Management Plan (1999): Sub Cell IIa – Great Ormes Head to Formby Point. The Liverpool Bay Shoreline Management Plan is split into sub cells. The map in figure 3.3 shows the sub cell that relates to Halton (sub cell IIa). The main objectives of the Shoreline Management Plan include enhancing and protecting the rural economy and the fishery industry, monitoring, enhancing the landscape quality and the management and maintenance of coastal defences. Where possible, these should be natural defences and should not have adverse impacts on industries, nature conservation and the historic environment. The Shoreline Management Plan does not include any specific details that relate to Halton and that need to form the basis for any recommendations or further investigation within this SFRA. This SFRA should however be in line with the overall aims and objectives of the Plan.

Figure 3.3: The Liverpool Bay Shoreline Management Plan Sub Cell IIa – Great Ormes Head to Formby Point
Local Planning Policy

National planning policy guidance provides the framework within which Local Authorities are required to undertake spatial planning within their respective district boundaries. Robust and stringent policy on a local level is essential therefore to ensure that the key national targets and objectives are achieved.

This is particularly relevant within the flood risk affected areas. Whilst designation at allocation stage (informed by the sequential test) provides a degree of protection against unsustainable development within flood risk areas, it is important to make certain that the local planning policy provides clear direction as to the manner in which the Local Planning Authority (LPA) will ensure effective flood risk management within developing areas. This robust policy foundation provides both Authority and developers with the clarity required to manage a consistent and sustainable approach to development within flood risk affected areas of the district.

Halton Local Development Framework Core Strategy

Practice Guide Companion to PPS25 consultation draft: Para 1.36 states that the Core Strategy Local Development Document (LDD) should include clear, strategic and robust policies for the management of flood risk within the local authority area taking climate change into account. Figure 3.4 shows how flood risk is taken into account in the planning process.

Halton’s Core Strategy is currently at the stage of drafting Preferred Options.
Highways Condition Surveys: Drainage and Flood Defence Asset Management
This document identifies areas at risk of flooding from historic records. All areas identified within this document have been included in this SFRA.

Environment Agency Plans

Catchment Flood Management Plans (CFMP)

There are two CFMP plans relevant to Halton, these are the Weaver / Gowy CFMP and the Mersey Estuary CFMP.

Weaver / Gowy CFMP
Within this document Runcorn falls in to the Lower Weaver sub-catchment. Keckwick Brook in Sandymoor, Runcorn is covered by the Manchester Ship Canal sub-catchment. This CFMP is at the scoping stage, this is a stage prior to the production of the draft report that will define the proposed policy approach.

Mersey Estuary CFMP
The key part of the document for Halton is covered by Policy Unit 10: Widnes. This section describes the policy approach for the Widnes. The preferred policy approach is to take further action to sustain the current scale of flood risk into the future (responding to the potential increases in flood risk from urban development, land use change and climate change).

Catchment Abstraction Management Strategy (CAMS)

Halton is covered by the Lower Mersey CAMS area. This strategy deals with abstraction of water from the catchment so is more relevant to low flow conditions, rather than high flow conditions i.e. flooding. The main reason for including reference to this strategy in the SFRA is awareness that groundwater rebound can occur if abstraction is reduced / stopped. In these circumstances the level of ground water can rise and sometimes appear on the surface causing flooding. Some areas of Widnes are thought to be at risk of ground water rebound if abstraction rates were reduced in the Lower Mersey CAMS area.
4. Data Collection and Data Quality

Data collected from Environment Agency:

1. Environment Agency Flood Map Zone Mapping June 06, Sept 06, Dec 06.
2. Environment Agency NFCDD data on flood defence location and condition. The aim of the National Flood and Coastal Defence Database (NFCDD) project is to provide a single, easily accessible and definitive store for all data on flood and coastal defences, that is made available to all operating authorities to allow them to make better-informed, risk-based decisions on the implementation of flood and coastal erosion management.
4. Flooding Incidents recorded by the Environment Agency.
5. Hydraulic & Hydrological Model location maps.

Data collected by Halton Borough Council:

1. Ordnance Survey mapping at 1:10000 scale.
2. Aerial photographs, Summer 2006
3. Contour mapping from InterMap
4. Flooding incidents recorded by Halton Council.
7. Site specific flood risk assessments (FRAs) submitted by developers with planning applications.


Data Quality and Risk

In considering the information available, the main point to remember is everywhere is potentially subject to flood risk. Nowhere is free of risk, but some areas are potentially at greater risk. The quality of data does not alter actual risk, but could affect the judgement about whether an area is at high risk or not. For that reason the SFRA takes a cautious approach to the use of data.

The quality of the flood-related data collected and produced varies. For example, part of the Environment Agency Main River map does not align with the EA Asset Register for Bowers Brook. The positions of the manholes to the culvert follow a different route to the mapped main river line. The data available comes from different sources, and was produced at different times. The extent of some flood events have been carefully mapped, others are less precise. Very few parts of Halton benefit from hydraulic or hydrogeological modelling, or reliable data sources on flows as most of the streams and river are ungauged.

Some data is the best available and is unlikely to be improved upon. Other data have known deficiencies. The analysis in this SFRA makes use of the best data where available, or on data with deficiencies where it will be replaced as soon as improvements become available (this is one reason why the SFRA GIS, maps and reports are ‘live’ documents, to be updated).

Where data is not available for the SFRA, it has been necessary to make assumptions based on professional experience and recorded literature, applying these to the local area. The least reliance is placed on those cases where
only assumptions based on judgement are available. The latter category should be used with particular caution. For this reason, whilst information is shown on the maps in a relatively precise way, it’s not possible to be completely certain from the outputs from this SFRA that any individual property, particularly those near the boundaries of zones of risk, is definitely within that risk zone.

The SFRA is a strategic tool. It is not meant to provide definitive conclusions about flood risk to any individual property or piece of land. But it is sufficient to guide preparation of robust policies and proposals in the Local Development Framework to a standard that will meet the Environment Agency’s requirements. This will be combined with supplementary analysis at subsequent plan-making stages when considering specific sites. It is also provides enough guidance for use in Development Control as a starting point to provide robust grounds for requesting further detailed Flood Risk Assessments.

The quality and accuracy of information is important. This SFRA uses the best information available at this time, respecting the variation in data accuracy. It is also the reason why users of the outputs of this SFRA should treat them as a ‘live’ document representing the information currently available, and to use the advice given in this document as a guide, which may require further assessments when detailed developments are proposed. Some information is updated more frequently than others when new data is added or re-modelling is undertaken. The Environment Agency Flood Map is re-issued quarterly, but other data is updated less frequently.

If the SFRA indicates that a property is in a flood risk area, the essential point is that in most cases, before a decision is made about the suitability of a site for development in terms of flood risk, more data and detailed investigations will have to be made by the developer in the form of a Flood Risk Assessment. This will highlight if there are areas where data is not accurate and where data can be improved. This information in this SFRA is only as accurate as the data it is based upon. If you are considering development, the SFRA will help you and the Council decide if more information is needed, whether the proposal should be permitted, and if necessary what additional measures are needed to reduce the flood risk, and cope in the event of flooding.

For the individual reader of this report, the SFRA may indicate your property is in a Flood Zone, or could be placed in one at a future date. This is important information you need to know. It provides a warning so that you have the opportunity to get prepared for potential flooding, should it ever happen. Flooding could happen at almost any time, but in any individual year the risk of a flood is low. The advice is – “don’t panic”, but you may need more information. The Environment Agency publishes advice on dealing with flood risk which you can obtain by contacting Floodline on 0845 988 1188 or through the Environment Agency website at www.environment-agency.gov.uk. You should also consider your responsibilities for what you may need to do to reduce the risk to you, your property and the people who use it.
Geographical Information System

A Geographical Information System (GIS) is a computer-based system for using data that is spatially referenced. This means the information can be viewed on electronic maps, where the maps also provide links to the underlying data and details about the information displayed on the maps. The data sets that have been collected to undertake the SFRA have either been supplied in a GIS format, or have been adapted to a GIS format by Halton Council.

By storing information in this way, it means that the data within the system can be easily updated as new or amended information becomes available in the future. In particular, it can be updated with the latest Environment Agency Flood Map Zones. Future development applications can be assessed using the system. This means that Halton Council has the capability to assess development applications for flood risk with the most up-to-date information.

The SFRA reports and maps used as an evidence source for the Local Development Framework will be available for on-line viewing (probably ‘frozen’ in .pdf file formats at the key plan-making stages). The Council will make the HBC Flood Zone Maps available for viewing under controlled public access for development control purposes via the HBC Public GIS on the Council’s Website.

Given the full Borough coverage, the number of maps in the SFRA, their scale, and the cost of colour printing, it is generally not practical to print large numbers of copies of these maps. Provided they are available for viewing electronically, in most cases it will be more effective for this information to be available only electronically, with specific maps printed by the Councils as and when needed.
5. Strategic Flood Risk Assessment

General Guidance

The government aims to reduce the risks to people and the developed and natural environment from flooding by discouraging further built development with floodplain areas. Government guidance has been produced for local planning authorities to help them when allocating land for development in order to meet this aim. This guidance is contained in a document called Planning Policy Statement 25 (PPS25) published December 2006.

The following maps should be viewed as part of this section. These maps can be found at the end of this document.

- Map 1 – Environment Agency Flood Map Zones
- Map 2 – 2a Main Rivers, 2b Critical Ordinary Watercourses, 2c Ordinary Watercourses, 2d Canals
- Map 3 – Historic flooding by all sources: sea, rivers, sewers, surface water runoff and groundwater.
- Map 4 – Defences: 4a Bowers Brook, 4b – Stewards and Ditton Brooks, 4c Keckwick Brook, 4d – Rams Brook.
- Map 5 – Defence Assets in Poor Condition: 5a Bowers Brook, 5b – Ditton Brook, 5c Keckwick Brook, 5d – Rams Brook.
- Map 6 – Land Heights: 6a Indicative Terrain Heights, 6b Flood Pathways Model, 6c Indicative Surface Heights South Widnes.
- Map 7 – United Utilities Drainage Areas and Flood Reports.
- Map 8 – Centre for Ecology and Hydrology defined Catchment Areas
- Map 9 – Halton Borough Council defined Flood Risk Areas
- Map 10 – Comparison of Land Allocations with HBC Flood Risk Areas: 10a Widnes, 10b Runcorn, 10c Action Areas
- Map 11 – Geology: 11a Solid Geology, 11b Superficial Geology.
- Map 12 – Hydrological and Hydraulic Model locations in Halton

Environment Agency Flood Map Zones

Refer to Map 1 with this section.

This mapping shows the zones where the Environment Agency estimate there is high risk (Zone 3) or low-to-medium risk (Zone 2) of flooding from rivers and the sea. These zones do not take into account any flood defences that could reduce the impact of flooding if there was a flood event. The Flood Zones cover the watercourses in the study area that have a catchment area of greater than 3km$^2$. The Flood Zones can be viewed on the Environment Agency website at www.environment-agency.gov.uk.

The Flood Map shows three different kinds of areas:

- Environment Agency Flood Zone 3 is the area that could be affected by flooding, either from rivers and/or the sea, if there were no flood defences. This area could be flooded from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year. This is described as a high-risk area.
• Environment Agency Flood Zone 2 shows the additional extent of an extreme flood from rivers and/or the sea. These areas are likely to be affected by a major flood with up to a 0.1% (1 in 1000) chance of occurring each year. This is described as a low to medium risk area.

• All land not in Environment Agency Flood Zones 2 or 3 are in Flood Zone 1 that has little to no risk of flooding. This is described as little to no risk area.

(See www.environment-agency.gov.uk for more detail).

Nationally most of the Environment Agency Flood Zones have been defined using hydrological and hydraulic models and mapped using detailed information on the topography of the ground. It should be noted that the Flood Map is re-issued by the Environment Agency every quarter. This is to ensure the latest flood maps are being used. The December 2006 issue of the Flood Maps has been used to create the mapping of flood risk in the first published printed maps and the first version of the GIS package.

Table 5.1 opposite shows the number of properties in Halton falling within the Environment Agency’s Indicative Flood Plain Maps. The accuracy of the property numbers is dependent on the precision of the placement of the properties location in the GIS.

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Number of properties in EA Zone 3</th>
<th>Number of properties in EA Zone 2 (includes Zone 3)</th>
<th>Flood defences present?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowers Brook, Widnes</td>
<td>425</td>
<td>601</td>
<td>Brook culverted for most of length</td>
</tr>
<tr>
<td>Ditton Brook, Ditton, Widnes</td>
<td>202</td>
<td>347</td>
<td>Yes - embankments</td>
</tr>
<tr>
<td>Keckwick Brook, Sandymoor, Runcorn</td>
<td>69</td>
<td>147</td>
<td>Yes – flood storage areas</td>
</tr>
<tr>
<td>Rams Brook, Hale, Widnes</td>
<td>4</td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>Stewards Brook, Ditton, Widnes</td>
<td>1</td>
<td>4</td>
<td>Yes - embankments</td>
</tr>
</tbody>
</table>
Historic Flooding in Halton

Refer to Maps 3 and 7 with this section.

These maps indicate where it is thought that flooding has happened in the past. The flooding may have been caused by, the sea, from rivers or from surface water runoff or groundwater.

Where the information is of good quality, the map shows the area that is thought to have flooded. This information has been provided by the Environment Agency.

This information can be used for assessing future flood risk, particularly for small catchments or urban areas where repeat flooding occurs, but there is little mapping or other data to substantiate the risk.

Tidal and Coastal Flooding

The River Mersey originates at the confluence of the River Tame and the River Goyt in the town centre of Stockport. It flows west, towards Liverpool, becoming tidal at Howley Weir (Warrington) and this is where the Upper Estuary starts. It widens to form the Inner Estuary at Runcorn. The Mersey Estuary continues through the ‘Narrows’ a straight narrow channel with depths of up to 30 m driven by a change in geology. It forms the Outer Estuary, a large area of inter-tidal sand and mud banks as it flows into Liverpool Bay on the Irish Sea.

Some areas of Halton are at risk of flooding from high tides because they are on low-lying land near the coast or an estuary. This is called tidal flooding. Areas at risk from tidal flooding include low-lying areas such as some areas of Hale Village and Widnes Warth. If high tides combine with strong winds blowing onshore, then the winds can create waves that can crash against sea defences creating spray. In severe storms waves can crash over defences leading to flooding in nearby low lying land. This is called coastal flooding. It can also cause damage to structures through the force of the waves, and the material (such as sand and rock) and debris carried by the waves. Halton isn’t as susceptible to coastal flooding as it is on the banks of the Mersey Estuary and on a bend in the river. Therefore the wind does not have a long uninterrupted fetch to build up large waves. Nevertheless it is important to acknowledge that some wave action will impact on the shoreline and defences of the estuary. Areas previously affected by tidal flooding are included on Map 3.

Areas sensitive to flooding as highlighted by Halton Borough Council

Due to past flooding incidents certain areas have been highlighted by Halton Borough Council drainage engineers, as areas sensitive to flooding. These areas are shown on the Map 3 indicating areas of historic flooding. Any development in the vicinity of these areas, especially upstream, should be investigated regarding the potential impact of new development on these areas.

Mapping of historic flooding in Halton - caused by historical sewer flooding

Map 3 also shows postcode areas that have properties within them that have experienced internal or external sewer flooding. This is based on information supplied by United Utilities through the DG5 At Risk Register that they are required to keep by OfWat, the Water Services Regulation Authority.

Flooding from sewers and drainage systems occurs when the amount of
rainfall exceeds the capacity of the drainage network. This is true of both the natural and man-made drainage systems. This section deals with the man-made urban drainage network, the sewer system. There are three types of sewer: foul, surface water and combined.

Originally all sewers were combined with both waste and rainwater being merged into a single sewer. Combined systems are very common, especially in older urban areas. The cost of treating rainwater as wastewater resulted in the development of two separate systems, one for waste (foul) water and one for surface (rain) water. New developments and housing estates tend to have separate systems installed with the surface water draining to local watercourses / SUDS and a separate foul sewer transporting wastewater away for treatment.

The capacity of these networks is a key issue when considering the potential of flooding. If the capacity of the sewer is exceeded then water could both back up and spill out of the system. Backing up occurs when no more water will fit into the drain. This can be seen happening on roads where the foul sewer also carries highway drainage. Any water draining from the roads will enter the foul system. During heavy rainfall events the drains can become so full they stop taking water away and so any excess remains on the road and causes flooded roads and occasionally property. When the sewer is full to capacity water can also exit the system via other drainage grids and manholes. This would be an example of ‘spilling out’. Capacity issues will affect all sewer systems including combined and surface water.

United Utilities (UU) has the statutory responsibility for combined and separate sewer systems. UU keep a record of all flooding incidents reported to them.

Internal sewer flooding - For the purposes of DG5, internal flooding is defined as flooding which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

External flooding: For the purposes of DG5, external flooding is defined as flooding which is not classed as internal. For reporting purposes, external areas will be split into curtilages, highways and other external areas.

It is an important distinction that the DG5 register and Map 3 shows the number of properties that have flooded rather than those that are at risk of flooding. Properties within these areas remain at risk of future flooding. However, other areas may still be at risk from future flooding that cannot be identified with the level of detail available for this assessment.

The exact location of the properties within the postcode areas is not known, although United Utilities hold a record. It is also therefore important to note that the areas shown in Map 7 do not represent a true picture of exactly where the flooding has occurred. In most cases, only one property will have been affected within the whole postcode area. The number of properties that have flooded is relatively low and is illustrated by Map 7, which shows the majority of postcode areas have between 0 and 4 properties flooded.

OfWat use risk levels to demonstrate the level of risk within the area as follows: 1 in 20 risk level, 1 in 10 risk level, 2 in 10 risk level. However, this essentially only indicates the number of times properties have flooded. The majority of incidences are in the 1 in 20, which is the lowest incidence of reported flooding. The following table (Table 5.2) shows the total
number of properties that have flooded in each postcode area (using 2006 figures) which is then considered against the Ofwat rating.

Outflows from sewage treatment works

There is concern that new development has the potential to lead to increases in discharges from sewage treatment works, leading to the overloading of receiving watercourses and consequently an increase in flood risk. The potential of this occurring, and mitigating measures, must be assessed in any FRA to meet PPS 25 requirements. This means that for certain developments, where there is likely to be an impact on the existing capacity of the sewage system, the safe discharge of sewerage must be discussed with United Utilities.

Table 5.2

<table>
<thead>
<tr>
<th>Postcode Area</th>
<th>Total Number of properties that have experienced flooding</th>
<th>Internal / External Incidence of flooding</th>
<th>Total Number of properties that have experienced flooding</th>
<th>Internal / External Incidence of flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 in 20</td>
<td>1 in 10</td>
<td>2 in 10</td>
<td></td>
</tr>
<tr>
<td>WA4 5</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA4 6</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA5 2</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA4 7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA7 1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>WA7 2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>WA7 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA7 4</td>
<td>12</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>WA7 5</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>WA7 6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>WA6 7</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>L24 4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Ground Water

In general terms ground water flooding results from three main sources:

- Raised water tables - where rainfall has a direct impact on the level of the water table and this level then emerges at the surface. At the current time in Halton there are no reported problems associated with rainfall raising the local water table and flooding occurring.
- Seepage and percolation – this occurs where embankments above ground level hold water. In these cases water travels through the embankment material and emerges on the opposite side of the embankment. In Halton these issues may arise if defended areas store water at a raised level. The main area where this may happen is the Ditton / Steward Brook Catchment.
- Groundwater recovery / rebound – occurs where the water table has been artificially depressed by abstraction. When the abstraction stops the water table makes a recovery to its original level.

There has been a long history of groundwater abstraction for industrial and public water supply from the major sandstone aquifer that underlies much of
Halton Borough. Recent reductions in abstraction have resulted in gradual recovery (rebound) of groundwater levels in the sandstone. There is the potential for groundwater flooding in low lying areas where groundwater levels have been depressed below their pre-pumping (equilibrium) conditions, where these were at or close to ground level. The actual risk is, to a large degree, controlled by the nature of the superficial deposits that overlie the sandstone bedrock. Where extensive clay cover exists the risk of groundwater flooding from rebound will be much lower than where there are pathways through permeable sandy deposits. As much of south Widnes is low lying this phenomena may become an issue in the future as the amount of abstraction reduces further.

At the present time the Environment Agency is undertaking research in the Mersey Catchment to assess the possibilities of forecasting groundwater recovery. This SFRA will be updated if and when relevant research results become available.

The main risks associated with groundwater flooding are the mobilisation of contaminants in the soil and the inundation of low lying land and building, for example cellars below ground.

Ground water flooding occurs when water stored below ground reaches the surface. It does not have to occur near a river, or even when it is raining, and is often associated with porous ground such as sands, gravels, limestone and chalk.

Overall, ground water flooding within much of the Halton Borough is not a major problem.

It is a PPS 25 requirement that the potential effect of ground water flooding must be assessed in any FRA.

Mapping of Existing Defences

Refer to Maps 4 and 5 with this section.

The SFRA has identified existing flood defences that are maintained by the Environment Agency or the Borough Council. Defences comprise a structure (or system of structures) for the alleviation of flooding from rivers or the sea. The SFRA does not identify privately maintained defences. Private walls may exist in the area but are not ‘flood defences’. Furthermore, not all banks are flood defences. Defences are designed to protect from flooding to a certain level - a standard of protection. However it cannot be assumed that this level of defence is still at the original design standard because of changes to the way floods are estimated and the effects of climate change.

Maps 4a – 4d show the location of existing flood defences. The dots on the map show the approximate location of flood defences that the Environment Agency has recorded as a flood defence. All slopes and embankments have been highlighted to give further indication of features that can restrict or impede flow. This is useful for a number of reasons. Firstly, this allows planners, developers and the general public to put the potential flood risk into context, especially where historic flooding and flood defences are shown in the same location; the historic flooding may have occurred before flood defences were in place. Secondly, knowing where flood defences are is useful as it can indicate areas where flood risk may be reduced due to the presence of flood defences. This may require further investigation of the standard of protection that is currently afforded by the defence. Thirdly, this information on flood defences can be used to identify areas of floodplain that are defended, and can be classed as such, when considering development.
Where there are no defences, the floodplain can often be defined as functional floodplain (HBC Zone 3b). This means the floodplain acts as a natural floodplain in that it can store water that has overtopped riverbanks in times of a flood. This floodwater can then drain away through watercourses. A general principle of PPS 25 is to maintain a constant amount of functional floodplain. Providing defences will therefore reduce the amount of functional floodplain. Occasionally there are realistic opportunities to provide alternative functional floodplain or to remove floodwater more effectively and efficiently to overcome floodplain loss. Sometimes flood defences are overtopped or could fail.

**Development Issues - Defences**

Proposed development in or near areas where there is an existing flood defence must be closely examined in order to ensure that future development does not reduce the standard of protection provided by those defences for existing development. Furthermore, it should not be assumed that the standard of protection provided by that defence is still as quoted when the defences were designed. Changes in flood estimation procedures and allowances for climate change can mean that the standard of protection may have decreased. It is very important that this is investigated during a flood risk assessment to ensure that existing and new development has the appropriate level of protection; for the 1% probability flood (1 in 100 year standard) for protection from river flooding and the 0.5% probability flood (1 in 200 year standard) for protection from flooding from the sea.

**Rapid Inundation Zones**

Fast flowing water or deep flooding that occurs quickly can create a risk of loss of life. This can happen if a flood defence fails or is overtopped, or in steep catchments through ‘flash flooding’. This type of flooding, for the purpose of this SFRA, is referred to as Rapid Inundation. Rapid inundation zones are characterised for this SFRA as a flood of 30 cm depth of water within 30 minutes of overtopping or breaching of raised defences. It is prudent to consider that where raised defences are designed with a standard of protection of greater than 1 in 100 years, the area designated within Environment Agency Flood Zone 3 is regarded as a potential rapid inundation zone. This is because water behind the raised defence can build up to a level higher than the surrounding land. If the raised defence collapsed, or the water spills over the top of the defence, a large amount of flood water could very quickly flood nearby land. The only area in Halton with raised defences is currently at Ditton Brook. These defences have a standard of protection of 1 in 100 years. The height of the defences above ground level is only 500mm.

**Ground and Surface Feature Heights**

Refer to Map 6 with this section.

An important limitation of the Environment Agency’s Flood Map Zones is that they do not consider the impact of flood defences or other structures acting as defences. In order to consider the effects of defences and surface structures like road and rail embankments more fully ground heights have been modelled via a digital elevation models provided by NextMap. These models allow both the bare earth heights and surface feature heights to be mapped and compared. Examining surface feature heights allows slopes and embankments to be considered and key components like railway and road embankments to be identified.
The results of this modelling can be seen in Maps 6a to 6c. Map 6a shows bare earth heights. Map 6b shows a combination of bare earth and surface feature heights. This map allows undefended low-lying areas to be identified. Mapping the height of the ground allows potential flood pathways to be identified. This is especially important for tidal flooding. Map 6c shows South Widnes around Spike Island and West Bank. This is a specific area of focus as the EA Flood Map shows greater extents of land in Zone 2 and 3 in this area than could be expected to flood due to the presence of infrastructure acting as defences, such as road and rail embankments and the St Helens Canal.

The St Helens Canal in south Widnes and the Manchester Ship Canal around Runcorn both act as flood defences from tidal flooding. Before the flooding of land can occur, any freeboard within the canals would have to be utilised. These canals therefore act as significant flood defences. The exact function these canals perform requires further investigation. Any revision to this SFRA should consider this point further.

Other Issues

Managed Coastal Retreat and River Erosion

The idea of Managed Coastal Retreat is about planning for the threat of rising sea levels by looking at the options available to protect the coastline. In some areas it may not be suitable to build bigger flood defences to protect against flood risk. It may even be necessary to remove some defences, especially on eroding cliffs that could provide extra material such as sand and silt for the sea to deposit elsewhere. Managed coastal retreat may also mean setting back sea walls so that beaches, salt marshes and other natural features can help in defending from the sea.

At present there are no plans for managed coastal retreat in Halton and it is unlikely that this will be an option in the foreseeable future due to the nature of the area.

As well as cliffs and beaches eroding, rivers can naturally change their course. Although no specific high-risk areas have been identified in this SFRA, planners and developers should be aware that the course of rivers could change over time. Looking at old Ordnance Survey mapping can help identify where river erosion is a risk, by comparing the course of the river then and now. In a FRA, a developer should demonstrate that the potential for river erosion has been investigated and that if it could cause developed land to become at risk of flooding in the future, mitigation measures have been assessed. Hard defences (defences such as concrete walls) to protect against erosion should be discouraged as this often causes problems elsewhere. Alternatives to hard defences include vegetation planting to reduce erosion risk.

Surface water runoff and Sustainable Urban Drainage Systems (SUDS)

Surface water flooding happens usually from very heavy rain when the water cannot soak into the ground or find its way into drains. This type of flooding can happen away from rivers, such as water flowing off fields or along roads. It can be a particular problem in urban areas where there is little grass and lots of roads, pavements and driveways.

Flood risk from surface water flooding is of concern within the study area. A number of flood incidents have occurred within the area caused by surface water alone, or in combination with river flooding. The Environment Agency Flood Maps do not show flood risk due to surface water flooding.
Any change in land use will result in a change to the runoff that is generated from that site. In order to meet PPS 25 considerations, the effect of this change in runoff must be quantified and investigated in order to gauge any potential affect on flood risk from surface water within the development site itself and in the off-site vicinity. Where surface water runoff could be increased, this must be dealt with using Sustainable Urban Drainage Systems (SUDS). The general principle of PPS 25 is that the amount and rate of water flowing off the site must not change from the situation before it is developed. SUDS are techniques designed to control surface water runoff before it enters the watercourse and to mimic natural drainage processes. In addition they can treat the water to reduce the amount of pollutants entering the watercourse. Although these techniques can be implemented at all scales and in most urban settings there are limitations. The applicability of SUDS depends on the water table and permeability of soils. Clay soils with low permeability and areas with high water table are not suitable for SUDS as natural drainage via the soil is not effective. General Guidance for dealing with surface water is given in AppendixG.

Flood Warning and Evacuation Procedures

Within the study area, as for the rest of England and Wales, the responsibility for flood warning rests with the Environment Agency. The Environment Agency provides flood warnings for designated flood warning areas.

The Environment Agency provides an indirect and direct flood warning system. The indirect system is based around the Floodline dial-up-and-listen service and the internet, where members of the public and other parties can obtain current flood warning information for their area. The Floodline number is 0845 988 1188 and the website address is www.environment-agency.gov.uk/subjects/flood/floodwarning/.

Flood warnings are also broadcast by television and radio services.

The direct warning service requires people in at risk properties to register their telephone number with the Environment Agency. They can then receive automatic warning messages if a flood is likely. There are no formal Environment Agency Flood Warning Zones in Halton at the current time.

Currently there is a limited flood warning provision within Halton's area as follows:

- A tidal flood watch service operates for the Mersey Estuary at Hale Village where road and fields are often flooded in the vicinity of Rams Brook.

- There is a proposal to introduce a flood warning service for Ditton Brook (tidal and fluvial) in future. This is dependant on flood risk mapping issues being resolved and the installation of a river level telemetry outstation.

Flood planning is a function of the Council’s Emergency Planning Department, with input from the Environment Agency and other relevant organisations. A Flood Plan exists for areas in Halton at risk of river flooding or flooding from the sea if flood defences overtop or fail.

Applicants for any proposed development which takes place in Environment Agency Flood Zone 3, which is not in an existing designated flood warning area, should assess the potential for such a service in conjunction with the Environment Agency and make provisions for such within any FRA, in order to meet PPS 25 requirements.
Safety and evacuation procedures should also be addressed for developments within Environment Agency Flood Zone 3 and for civil infrastructure within Flood Zone 2 such as schools and hospitals. Provisions such as refuges, and exit routes out of the site that are above flood levels should be incorporated into the design of such sites. Access for emergency vehicles will also need to be considered.

### Extreme Tidal Levels

For this SFRA extreme tidal level predictions have been drawn from two studies:


This report has been produced by Royal Haskoning, appointed by the EA. The aim of the report was to review and improve confidence in extreme levels for Warrington based on additional data recorded since previous analysis of extreme levels completed by Posford Duviver (2001). The report looked at the combined effect of tidal levels and high river flows measured at Gladstone Dock, Liverpool and 5 sites on the River Mersey in Warrington. This report gives an extreme level for the 1 in 1000 years return period of 7.96mAOD at Fiddlers Ferry (upstream of Halton’s Boundary). The Royal Haskoning Report concludes that the results of the previous assessment of extreme levels for Warrington (Posford Duviver, 2001 study) are 150mm to 200mm lower, across all return periods, than those presented in their research. Royal Haskoning do caveat their results by adding that there is significant uncertainty associated with the analysis due to the statistical method adopted and the translation of extreme levels from Liverpool to Warrington. Wind direction and strength, and fluvial flow appear to affect this translation.


This report presents the methods and calculations used to derive tidal flood risk maps for the Environment Agency North West Region. The study area comprises the north-west English coastline between Scotland and Wales and extends from Gretna on the Solway Firth to Burton Point on the Dee Estuary.

Appendix D of this report presents the extreme water levels of return periods from 1 to 1000 years, at 1km intervals, for the length of the coast and watercourses included in the study. The River Mersey has levels recorded for chainages between 25 and 35. The extreme levels are 7.41mAOD at approximately Hale Light House and 7.72mAOD at approximately Fiddlers Ferry.

### Extreme Tidal Level for Halton

The strategic nature of this document requires a tidal level to be extrapolated for this SFRA that can be applied across the Borough. Given the caveats that accompany the level accuracy this approach is appropriate. This SFRA will use a 1 in 1000 extreme tidal level between 7.72mAOD (provided by Posford Duviver) and 7.67mAOD (derived locally for Halton). The level for Halton will be slightly below the level given for Fiddlers Ferry.

<table>
<thead>
<tr>
<th>Location</th>
<th>1000 Return Period (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gladstone Dock</td>
<td>6.76</td>
</tr>
<tr>
<td>Fiddlers Ferry</td>
<td>7.96</td>
</tr>
<tr>
<td>Howley Weir</td>
<td>8.11</td>
</tr>
<tr>
<td>Westy</td>
<td>8.26</td>
</tr>
<tr>
<td>Woolston Weir</td>
<td>8.47</td>
</tr>
</tbody>
</table>

It can be noted that the levels increase with distance upstream. The appropriate 1 in 1000 year level for Halton will be slightly below the level given for Fiddlers Ferry.
Duviver Study) and 7.96mAOD (provided by the Royal Haskoning Study). In accordance with approach given in PPS25 Annex B a contingency allowance needs to be added to the extreme level to account for net sea level rise to the year 2115. The calculation for this is covered in the section below.

**Climate Change and Sea Level Rise**

Predicting the effects of climate change on river flows and sea levels is uncertain. In the future it is thought there could be increases in the amount of winter rainfall and the intensity of storms. It is also thought that sea levels may rise due to global warming.

Government guidance for taking into account climate change in PPS 25 (Annex B) states that current peak river flows may increase by 20% in 50 years time and that current sea levels could increase by an average 5.5 millimetres per year. This means over a 50-year time span to 2057, sea levels could be 275 millimetres higher than they are now.

It is important to remember that PPS 25 requires applications for development and the development for specific uses proposed in the Local Development Framework to consider the long term ‘flood-risk’ for the lifetime of new buildings. This could extend beyond 2055, depending on the type of use (particularly for residential development). For this reason the SFRA considers Climate Change to 2115 and the HBC defined Flood Zone maps take this into account.

The study has used Environment Agency data contained in the Royal Haskoning 2007 Report and Posford Duvivier Flood Risk Mapping Report Summary July 2001 Appendix D (section covering the Mersey) that estimate extreme sea water levels of return periods to 1 in 1000 years. The highest levels predicted for Halton are 7.96mAOD and 7.72mAOD respectively.

This is a reasonable starting point for strategic analysis. Future SFRAs may need to consider if this research needs revision. An additional value was added to these 1000-year levels, as proposed by PPS25, to take account of climate change up to 2115. The Posford study was undertaken in 2001 and the approach therefore recommends adding 0.96m for sea level rise. The Royal Haskoning study was undertaken in 2007 and therefore the approach recommends adding 0.94m for sea level rise. The two studies therefore give extreme levels adjusted for climate change of:

8.68mAOD (7.72 + 0.96, Posford)
8.9mAOD (7.96 + 0.94 Royal Haskoning)

This SFRA will use an extreme tidal level for the Borough of 8.8mAOD for a 1 in 1000-year return period adjusted for climate change. This level is on the basis that of the Royal Haskoning level being for Fiddlers Ferry (upstream of Halton, giving a slightly higher level) and the inaccuracies in the predictive techniques. The chosen 8.8mAOD level represents a level 0.12m above that predicted by the Posford report. For a strategic document this approach and the derived level of 8.8mAOD is considered sufficient for the purpose of zoning land.

This level has been used to refine the Halton Borough Council Flood Risk Zone maps produced by this study. All undefended land with a height of between 8.8m and 7.5m Above Ordnance Datum (AOD) will be zoned as Zone 2. The figure of 7.5mAOD has been extracted from Coastal Flood Risk Mapping Report Summary July 2001 Appendix D (section
covering the Mersey) as this represents the highest extreme water level at a 1 in 200 return period plus freeboard (no allowance for climate change added). Land below 7.5m has been defined as Zone 3a or 3b within the Halton Borough Council Flood Risk Zones.

The Effect of Climate Change on the Risk of Flooding from Rivers in Halton Borough Council defined Flood Risk Zones

The SFRA recommends a pragmatic but cautious approach to dealing with the impact of climate change in areas of potential flood risk that are outside the Environment Agency’s Flood Zones shown on Flood Map. To take account of this requirement, PPS25 recommendations and the increased information provided by the SFRA, Halton Borough Council (HBC) has defined a separate set of Flood Risk Maps known as HBC Flood Zones.

Land that lies within 15 metres distance of a watercourse should be treated as being within a Halton Borough Council Flood Risk Zone, for the purposes of strategic planning. This width allowance is to take into account the potential increase in the extent of the Flood Risk Zones due to climate change and the large uncertainty in defining the extents of the Flood Risk Zones.

All Ordinary Watercourses, Critical Ordinary Watercourses and Main Rivers have had a minimum 10-metre radius (Zone 3b) and a further minimum 5-metre radius (Zone 2) applied. In the absence of any better data to allow more scientific methods to be employed, this minimum buffering has been done to ensure any development in close proximity to a watercourse fully considers flood risk.

Halton Borough Council Defined Flood Risk Zones

Refer to Maps 9 and 10 with this section.

PPS25 describes the assessment of flood risk and SFRA process in Annex E and this recommends that the local planning authority should use the SFRA to refine the information on the EA’s Flood Map and determine the variations in flood risk from all sources of flooding across their area. To meet this requirement Halton Borough Council (HBC) have created their own flood zones that build on the information contained in the EA Flood Map. The mapping of flood risk is helpful in the SFRA process as it shows where flooding could occur, and therefore where potential new developments should be carefully considered before giving planning permission.

All the information within this section and the section on Halton’s watercourses has been aggregated into a series of maps that define flood risk for the Borough in accordance with PPS25.

Four Flood Zones have been created for the Borough. These zones reflect the PPS25 guidance summarised in Appendix D of PPS25.

The process of refining the EA Flood Map begins with establishing the location of all watercourses in the borough.

Where the Environment Agency’s Flood Map has not given a flood zone for a watercourse in the study area, for the purposes of this SFRA, an estimate of the 1% probability (or 1 in 100 years) flood extent for the watercourse has been undertaken. This has been done solely using engineering judgement, without the
benefit of sophisticated modelling techniques. In some areas the HBC Flood Risk Zones are therefore of poorer quality than the Environment Agency Flood Zones and should be treated as a guide to indicating flood risk only.

All watercourses have had a functional floodplain defined (Zone 3b) of a minimum 20-metre width unless other information indicates a more appropriate measure. A floodplain is an area that would naturally be affected by flooding if a river rises above its banks, or high tides and rough seas cause flooding in coastal areas. Over hundreds of years, many natural floodplains have been built on and so today some towns and cities exist on floodplains. Some places have flood defences in place to reduce the risk of flooding. It should be noted however that in these areas there will always be some risk (however low) of flooding if defences were ever breached.

Zone 3a, High Risk, has been defined by reference to the EA Flood Map Zone 3 mapping. Historic flooding records have then been examined to designate areas that are at high risk. Topographical information has also been examined to identify any low-lying areas with either no defence or areas with a low standard of protection.

Zone 2 refines the EA Zone 2 Flood Map. For land at risk of tidal flooding various information sources have been aggregated to establish extreme levels at 1000-year return period. All land between this level and Zone 3a has been included in Zone 2. Zone 2 includes an appropriate measure to take account of climate change as described in section 5 under Climate Change. In addition, all watercourses have an additional 5-metre Zone 2 defined beyond their functional flood plain to take account of climate change and predicted increase in channel flow.

Zone 1 contains all other land in the Borough. This is on the basis that everywhere is at risk of flooding. Even the highest areas will be at risk from heavy thunderstorms that can produce sufficient rainfall to exceed the drainage capacities of both natural and manmade systems. In addition, restrictions on watercourses can be placed without the relevant authorities permission and debris can block culverts and bridges. In these circumstances flooding can arise that would not normally happen if the watercourse was clear of obstructions.

**Watercourses in Halton**

This section deals with the key watercourses within Halton’s Borough boundary, together with those that have catchments that overlap the Borough. A watercourse is defined by section 113 of the Water Resources Act 1991 as including all rivers, streams, ditches, drains, cuts, culverts, dykes, sluices, sewers and passages through which water flows except public sewers. This SFRA does not extend to every ditch, drain and cut in the borough however it does include all of the significant watercourses. This can be defined as those watercourses that are known to have flooding issues or their presence can be traced on Ordnance Survey maps at 1:1250 scale for a reasonable distance. This section reviews the Main Rivers, Critical Ordinary Watercourses and finally the Ordinary Watercourses. Definitions of these terms are given at the beginning of each section.

With the exception of the River Mersey the Borough doesn’t have any large ‘rivers’ most of the land is drained by ‘brooks’ and ‘streams’. Due to their size and the fact that there are few problems beyond general maintenance issues little information has been recorded or published. For these reasons other
sources of information have been utilised to draw on the research they contain. A primary example is the use of planning applications back to the year 2000 and the information submitted with them about flooding. It was in this year that the ‘October Floods’ caused widespread flooding and policies such as PPG25 were drafted. The year 2000 was chosen as a baseline as this represents the timeframe that flooding issues returned to the planning agenda.

**Main River**

A Main River is a watercourse shown as Main River on the Main River map prepared by DEFRA (Department for Environment, Food and Rural Affairs). Copies of the main river maps are held at Environment Agency Regional Offices and distributed to local planning authorities as part of the Flood Map initiative. The River Mersey is only classified as Main River above Irlam Weir.
MAIN RIVERS IN 
WIDNES

Main Rivers are watercourses designated as such on main river maps and are generally the larger arterial watercourses.

It is important to note that where height levels quoted here they do not include any increase for climate change. The levels given here are from applications processed prior to PPS25 and therefore reflect the policies in place at the time, rather than position in 2007. Following the publication of PPS25 any proposed floor levels will now require an allowance for climate change to be incorporated.

Rams Brook
Catchment

Maps showing river location in the Rams Brook catchment can be found at the end of this section.

Watercourse Location and Description

Rams Brook is located in the west of the borough close to the village of Hale. It flows south from the culvert opening by the A561 through woodland and open farmland until it discharges into the River Mersey. There are no major tributaries that join Rams Brook along the length of the watercourse. The source of Rams Brook as shown on Ordnance Survey mapping is grid reference 345360 383750. Local knowledge suggests that the brook issues from under the Jaguar factory on Speke Road and the brook receives flow from the factory.

Catchment Description

The catchment consists of undeveloped woodland and farmland. The only development on the watercourse is the sewerage works on Ramsbrook Lane. The majority of the land is low lying, especially to the south of Marsh Bridge on Town Lane.

Derived Flood Risk and Level Review

No evidence of previous studies that examined flood risk in this catchment could be found at the time of preparation of the SFRA.

Defences, Location, Condition and Standard of Defence

Map 4d shows the location of the defences owned and maintained by the Environment Agency (EA). Map 5b shows the location of defences that have been ranked as grades 4 or 5. This score reflects defences in poor condition. This information has been provided by NFCDD. The EA state that it is policy not to maintain defences that protect only farmland, as water should be able to make use of its natural flood plain.

Environment Agency Flood Map

Maps showing the Flood Map for Rams Brook can be found at the end of this section. Zone 3 is dark blue. Zone 2 is light blue.

Past Flood Events

The farmland in the vicinity of Marsh Bridge is regularly subjected to tidal flooding. EA records show that Town Lane was flooded to a depth of 300mm over the period 31/1/2002 to 01/02/2002. Over the same period the road was flooded around Carr Lane Bridge on Carr Lane.
Land Use Issues / Development Pressures

Land adjacent to Rams Brook is not suitable for development due to the low lying nature of the site. The following policies cover land in this catchment: restrictive planning policies; green belt; area of special landscape value; land south of Town Lane is also covered by policies on undeveloped costal zones and is a Site of Special Scientific Interest. There are currently no allocated sites in the development plan for this area.

Summary of Issues

Flooding and policy constraints restrict development options on sites adjacent to Rams Brook.

Local Recommendations

Flood defences could be considered to prevent road flooding, however with four roads into Hale there are alternative routes if some become impassable. Flood defences carry a long-term liability for inspection and maintenance. At the current time the best policy is to leave this catchment in its current state and not develop land within the areas designated as Zone 2 or 3.
Maps showing river location in the Dog Clog & Alder Brook catchment can be found at the end of this section.

**Watercourse Location and Description**

The Dog Clog Brook catchment is located just outside the borough boundary in the north west corner of the borough close to the village of Cronton. There are two tributaries worthy of mention. These are named Dog Clog Brook, which runs through Cronton and is entirely outside the borough, and Alder Brook, that runs from Widnes Sixth Form College. Both flow west.

The source of Dog Clog Brook is close to grid reference 350410 389440.

The source of Alder Brook is close to grid reference 350360 388370. Alder Brook forms part of the boundary of the borough. From OS maps the source is close to Widnes Sixth Form College on Cronton Road (A5080). It flows through farmland and passes under Sandy Lane and Chapel Lane. It then skirts the edge of the housing estate known as Cherry Sutton in the Upton / Hough Green area of the borough. The two tributaries converge at a point outside the borough (grid reference 347840, 387810) to form Dog Clog Brook. This brook eventually becomes Mill Brook, then Netherley Brook and finally becomes Ditton Brook. Although the majority of the brook’s catchment is outside Halton the drainage network discharges into the River Mersey at Ditton in Halton.

**Catchment Description**

These tributaries drain farmland in the north west of the borough. The village of Cronton is located within the catchment. The catchment therefore drains land under a mixture of urban and rural land uses. The land in the catchment is relatively flat in topographic terms. The Environmental Statement accompanying application 06/00469/OUTEIA indicates that the Triassic Pebble Beds below the catchment are classified as Major Aquifer. There are public water supply ground water abstraction comprising two boreholes and two covered reservoirs located on Pex Hill.

**Derived Flood Risk and Level Review**

All of the above mentioned brooks have no level recording equipment and are ungauged. Therefore there is little factual information on flows. It must be remembered that both of the tributaries eventually drain into Ditton Brook, which does have flood risk issues, any increased flows can potentially lead to flooding downstream.

**Defences, Location, Condition and Standard of Defence**

Inspection of the EA NFCDD Flood Defence Asset Register shows that there are no sections rated as being grade 4 and 5 (poor condition rating) within Halton’s boundary.

**Environment Agency Flood Map**

There are no areas of land covered by the IFM within Halton.
Past Flood Events

As Dog Clog Brook is outside Halton there are no records available that highlight particular episodes of flooding.

Records from the Environment Agency show that two flooding events have been recorded in the year 2000 on Alder Brook. The first event was on 3 June 2000 and lasted until the 4 June 2000. The impact of the event was reported as the property at 146 Cherry Sutton, Hough Green, Widnes being flooded. The second event is recorded as garden flooding from overland flow at 4 Telford Close, Widnes. The date has been recorded as 10 October 2000 to 11 October 2000. Both events are attributed to the channel capacity being exceeded. The EA suggests that a flood event in 2004 resulted in the flooding of approximately 30 properties in Cherry Sutton. The cause of this flood event was the installation of a footbridge that restricted channel capacity and caused the stream to back up. A site visit on 2 November 2006 noted the presence of recent works on the embankment adjoining the brook. These have been confirmed as improvements to the flood defences.

Land Use Issues / Development Pressures

The land in Halton adjacent to the Dog Clog Brook tributary is relatively stable as it is zoned as green belt. The situation is different in the catchment of the Alder Brook tributary. In the upper catchment there is a current proposal to establish a golf course (06/00469/OUTEIA). The Environmental Statement Non-Technical Summary (pg 95) deals with discharge of surface waters. It is anticipated that any increase in total discharge rate to Alder Brook from the course drainage systems will be compensated for by the creation of the new water bodies along the course of the brook and drainage ditches. The other major recent development has been the construction of the allocated housing sites in the Upton Rocks area of Widnes. All sites apart from 933/2, which is under construction, have been completed.

Summary of Issues

The two tributaries are relatively minor watercourses. In development terms the catchment is stable within Halton. There are no Zone 2 or 3 areas within Halton designated on the IFM. The flooding incidents on Alder Brook recorded by the EA are an obvious concern, however channel improvements and flood defences have been installed following the recorded event. It is unlikely that any development would suffer regular flooding from the brook. The main concern that potential development presents is an increased discharge into the brook resulting in flooding downstream.

Local Recommendations

These are no particular issues of immediate concern, provided that the improved flood defences on Alder Brook have been provided to current standards. Any development in the catchment needs to deal effectively with discharges from drainage systems to avoid increasing the volume of water carried by the channel over channel capacity during periods of high flows. Obstruction of the channel should be avoided and the existing flood plain preserved.
Stonehough Brook Catchment

Maps showing river location in the Stonehough Brook catchment can be found at the end of this section.

Watercourse Location and Description

Stonehough Brook is located in the west of the Borough just outside the Halton Boundary in the Hough Green area of Widnes. It flows west from a point close to St Basil’s Catholic Primary School. There are no major tributaries that join Stonehough Brook along the length of the watercourse. From Ordnance Survey maps the source of Stonehough Brook appears to be on the very edge of Halton’s boundary at grid reference 348300 387010. The brook runs west and joins the main Netherley Brook channel that becomes Ditton Brook.

Catchment Description

The catchment is mostly outside of Halton’s boundary and consists of flat farmland.

Derived Flood Risk and Level Review

The brook has no level recording equipment and is ungauged. Therefore there is little factual information on flows. There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

Defences, Location, Condition and Standard of Defence

Inspection of the EA NFCDD Flood Defence Asset Register shows that there are no sections rated as being grade 4 and 5 (poor condition rating).

Environment Agency Flood Map

There are no sections of land designated as being within the Zone 2 or 3 areas for this tributary.

Past Flood Events

No sources of information have shown any history of flooding for this tributary.

Land Use Issues / Development Pressures

The part of the catchment in Halton is very stable and is unlikely to undergo significant restructuring or development.

Summary of Issues

There are no issues to report. This tributary is included here for awareness of the impact development can have lower in the catchment (Ditton Brook).

Local Recommendations

Any future development within this catchment needs to take account of run off speed and volume. The current levels should not be exceeded to avoid contributing to flooding problems lower in the catchment. Any development in Halton is extremely unlikely to suffer flooding from this tributary.
Ditton Brook Catchment

Maps showing river location in the Ditton Brook catchment can be found at the end of this section.

Watercourse Location and Description

Ditton Brook drains land in the north east corner of the Borough. It flows south and drains a large area of land outside of the Borough’s boundary. There are a large number of tributaries that join Ditton Brook along its entire length until it discharges into the Mersey. Ditton Brook enters the Mersey at Grid Reference 349590 383890.

Catchment Description

In comparison with other watercourses in Halton, Ditton Brook drains a significant catchment area. Upper parts of the catchment are urbanised, lower parts pass through undeveloped farmland. Part of the catchment falls within Knowsley MBC administrative area. A small proportion of the upper extent is within St Helens MBC administrative area. Within Halton, north of the Speke Road, the land is a mixture of residential and industrial development. Between the railway and Speke Road, the land use is undeveloped farmland, a newly constructed business park on raised ground, and open space provided by a former domestic tip. The land to the south of the railway consists of a mixture of existing residential and industrial development.

For the purposes of analysis the land within the Ditton Catchment has been divided into three distinct areas for review. These areas are the land north of Speke Road, the land between Speke Road and the Railway, the land south of the railway.

Derived Flood Risk and Level Review

It is important to note that all the levels quoted here do not include any increase for climate change. The levels given here are from applications processed prior to PPS25 and therefore reflect the policies in place at the time, rather than position in 2007. Following the publication of PPS25 levels will now require an allowance for climate change.

- Land North of Speke Road

Correspondence from the EA on application 01/00445/FUL at the location of the corner of Turnall Road and Everite Road, Widnes specifies that floor levels for a warehouse development should be set above 7.20mAOD as this is the calculated flood level at 1 in 200 year tidal flood plain. This was the only application within this area in the last five years that considered flood risk.

<table>
<thead>
<tr>
<th>App Number</th>
<th>Location</th>
<th>EA Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/00445/FUL</td>
<td>Turnall Road /</td>
<td>Min floor levels of</td>
</tr>
<tr>
<td></td>
<td>Everite Road,</td>
<td>7.20mAOD</td>
</tr>
<tr>
<td></td>
<td>Widnes</td>
<td></td>
</tr>
</tbody>
</table>

- Land Between Speke Road and the Railway

The only applications received in this area are for the business park on Newstead Road. The area of the business park is not within the IFM boundary and has subsequently received consent for development. The construction of the road access to this development has included a culvert to allow water to pass into the fields on the southern side of this site.
• Land South of the Railway

Generally, the land to the south of the railway is within the IFM boundary. The land around Hale Road is in an area at risk of flooding should the flood defences on Ditton Brook be overtopped or breached and from surface water flooding if the surface water sewers are unable to accept the flow from a heavy rainstorm. A further risk of flooding is if the rainstorm coincides with high tide and sewers become tide locked.

<table>
<thead>
<tr>
<th>App Number</th>
<th>Location</th>
<th>EA Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/00636/FUL</td>
<td>Foundry Lane, Widnes</td>
<td>Min floor levels of 7.78mAOD</td>
</tr>
<tr>
<td>05/00212/FULEIA</td>
<td>AHC Warehousing, Mathieson Road, Widnes</td>
<td>Floor levels at Former Meyers Timber Site set at min of 600mm above existing ground level. Approximately 8.10mAOD</td>
</tr>
<tr>
<td>05/00983/FUL</td>
<td>Foundry Lane, Widnes</td>
<td>Floor levels at 7.90mAOD</td>
</tr>
<tr>
<td>06/00461/FUL</td>
<td>Hale Road, Widnes</td>
<td>Living accommodation at 8mAOD. This is calculated from the 1 in 200 years return period tidal flood level plus 600mm freeboard plus 200mm allowance for increases in tidal depth.</td>
</tr>
<tr>
<td>06/00571/FUL</td>
<td>Hale Road, Widnes</td>
<td>Living accommodation at 8mAOD</td>
</tr>
</tbody>
</table>

EA advice states that the 1 in 100 year floodplain at Foundry Lane is 7.18mAOD. Site at Foundry Lane are protected to a level 600mm above the 1 in 100 years return period flood level. Should the defences be overtopped the property will be at risk of flooding. Floor levels should be set above this.

The Flood Risk Assessment submitted with application 06/00571/FUL by Michael Lambert Associates states that the land opposite Lovell Terrace is low lying. Public sewer records show manhole cover levels of 5.83mAOD for covers numbered 8301 and 8302. This area flooded in 1990. Anecdotal evidence from the owners of the Haulage firm by Ditton Brook indicates that their yard has not flooded since 1990. Attention was also drawn to the public drainage pumping station next to their yard that is believed to have prevented flooding from inland sources to date.

Defences, Location, Condition and Standard of Defence

A flood alleviation scheme to increase the level of protection against both tidal and fluvial flooding was carried out in response to the February 1990 flood event by the EA (then the National Rivers Authority). This scheme raised the level of protection to 1 in 100 years for those lengths of Ditton Brook within the Halebank area. Current standards are for defences to provide protection to the 1:200 year standard plus a climate change allowance (approximately 500mm) (decision notice for application 05/00212/FULEIA).

Environment Agency Flood Map

A map showing the Environment Agency Flood Map for Ditton Brook catchment can be found at the end of this section.

Past Flood Events

EA flood event data records two separate incidents. The first was on 26 Feb 1990, the second between 31/1/2002 and 1/2/2002. The 1990 event is recorded as a tidal event with water coming out of the banks as a result of a high tide. Correspondence from the EA on application 06/00461/FUL states that the site at Cameron Industrial Services at Hale...
Road was affected by tidal flooding in February 1990 and a water depth of 0.75 to 1.0 metres was recorded. The 2002 event is recorded as a tidal event, there is no evidence showing the actual location of the flooding.

Land Use Issues / Development Pressures

1. Land North of Speke Road

This area is relatively stable as an area of existing employment use. There are no allocated sites within this area.

2. Land Between Speke Road and the Railway

Land between the railway and the expressway is largely above flood level. The land between the railway and Ditton Brook has permission for industrial units for B1, B2 and B8. Land between Ditton Brook and Speke Road is raised landfill, being an old tip. These areas are excluded from the EA Flood Map and are considered to fall within Zone 1, low probability of flooding.

3. Land South of the Railway

These areas are primarily industrial or vacant sites. The major land allocation in this area is the proposed Ditton Strategic Rail Freight Park. This covers sites 253/0 and 256/0 and 255/0. Proposals for the area relate to the Mersey Multi-Modal Gateway that will provide a large rail freight handling and storage facility for the North West.

Summary of Issues

Defences to the 1 in 100 flood level protect the areas of Ditton Brook Catchment within Halton. This standard is now considered inadequate. Any development needs to consider the consequences of the defences being breached or overtopped. Surface water systems also need careful consideration so that high intensity rainfall does not lead to flooding. A major issue will be the outfalls for surface water to Ditton Brook becoming blocked during high tides. Generally the area is not suitable for soak away drainage systems due to clay soils and a high water table. The extent of existing development suggests that no increase in run-off would result from regeneration of the area.

Local Recommendations

At the present time although the area benefits from flood defences these are now considered sub standard and the area is at risk of flooding from the following sources: defence being overtopped or breached by tidal or fluvial flows; from surface water flooding if the surface water sewers are unable to accept the flow from a heavy rainstorm; if a heavy rainstorm coincides with high tide and surface water outfalls and sewers become tide locked. Past events indicate that tidal inundation represents the main risk of flooding to the land in the Ditton Catchment.

The low-lying areas within the area covered by the Flood Risk Maps are relatively small. These areas could be raised to facilitate appropriate floor levels for re-development, subject to detailed flood risk assessment. An alternative to the raising of ground levels to enable development within the risk area could be the provision of a tidal barrier at the confluence of the watercourse with the estuary.

Due to the extent of existing development it is likely that no increase in run-off would result from the regeneration / development of the areas within Ditton Brook Catchment. However the runoff that does result from the developments will require effective management. This should be addressed when the FRA is
undertaken as part of the planning application process. It is recommended that appropriately qualified persons investigate the flooding implications of rainwater being trapped behind flood defences during extreme storm conditions at the design stage of any development. Furthermore, this investigation should look at the impact of runoff from any new development onto surrounding land. Raising land levels may result in runoff flowing onto other land that would have previously not been subject to receiving runoff. Raising levels may protect property from flooding but a means of escape and evacuation must be considered and a dry route out of the site must be maintained for access and egress at all times.

Any development falling within the boundary of the HBC Flood Risk Zone maps in this area should be the subject of a site specific flood risk assessment. This assessment should consider the risk of flooding to the development, the risk of flooding to adjacent land as a result of the development, and the run-off amounts that will be contributed to the watercourse network and / or sewers. The assessment will consider site topography and the potential locations of flood flow routes i.e. pathways water could take from the watercourse(s) to the development.

The Council recognise that this catchment is one were regeneration schemes are required. Any development within the areas designated at risk of flooding will be required to pass the Sequential Test and the Exception Test contained in Annex D of PPS25.

Section 106 agreements should be explored as a method of placing the costs of enhancing, constructing and maintaining defences upon the development.

Where development is proposed within the flood plain flood resilient and resistant design should be incorporated. In practical terms this means that at times of flood occupants would be on upper floors and the lower levels of the building will recover quickly from inundation e.g. garaging on lower levels, stone floors, unplastered walls, electric sockets high on the walls, floor drains etc. Access and egress during flood events should be considered fully at the design stages and practical solutions to allow access and egress during flood events must be provided in the completed development.
Ditton Brook Catchment
Indicative Flood Plain Map

- Main River
- Zone 3 Flood Risk
- Zone 2 Flood Risk
Stewards Brook
Catchment

Maps showing river location in the Stewards Brook catchment can be found at the end of this section.

Watercourse Location and Description

Stewards Brook is located in the north of the borough and flows through the centre of the Widnes urban area. From Ordnance Survey mapping the source of the brook appears to be at grid reference 350280 386840. The brook flows south from the railway line close to Lynton Crescent and crosses Widnes Golf Course before crossing Liverpool Road, through a small valley and across St Michaels Jubilee Golf Course. It then passes through the industrial areas at Ditton Road / Ditton Marsh and discharges into Ditton Brook and into the River Mersey.

Catchment Description

The catchment is urbanised, though the land immediate adjoining the brook is undeveloped. The upper parts of the catchment are residential and the lower parts industrial. Historically, the St Michaels Golf Course and Ditton Road areas of Widnes were formerly marshland that were drained before being filled with alkali, copper, slag, aluminium, and other heavy chemical wastes. The extensive landfilling took place from 1860-1940 after which the existing industrial land uses developed. The fill material is thought to be of a significant depth and any development in such adverse ground conditions requires rigorous assessment to protect people and environmental receptors. At the current time leachates from the ground are known to be contaminating the brook at the southern end of this watercourse.

Derived Flood Risk and Level Review

Advice contained in correspondence on previous planning applications from the Environment Agency is that floor levels in developments falling within the Zone 2 and 3 boundaries should be set at high levels.

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<td>AHC Warehousing, Mathieson Road, Widnes</td>
<td>Floor levels at Former Meyers Timber Site set at min of 600mm above existing ground level, at 8.10mAOD</td>
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<tr>
<td>05/00093/FUL</td>
<td>FERALCO, Ditton Road</td>
<td>Site within 1 in 200 yr tidal flood plain. All floor levels set at minimum of 8.10mAOD</td>
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Defences, Location, Condition and Standard of Defence

Map 4b shows the type and location of flood defences from the EA’s NFCDD system. Interrogation of these assets shows that none have been graded as condition 4 or 5 which indicates poor condition.

Environment Agency Flood Map

The Flood Map only covers a short section of Stewards Brook. The areas designated at risk of flooding stretch from the River Mersey upstream to the bridge at Speke Road. A map of these areas can be found at the end of this section.

Past Flood Events

There are no records of past flood events in this area.
**Land Use Issues / Development Pressures**

At the current time all development pressures are in the lower catchment on the south side of the Ditton Road area. This area is designated a Priority Employment Redevelopment Area and also a Regional Investment Site of strategic importance. Proposals for the area relate to the Mersey Multi-Modal Gateway that will provide a large rail freight handling and storage facility for the North West.

In the upstream sections the land immediately adjacent to the brook is zoned for green use (e.g. open space and golf courses). Surrounding these green areas are established residential areas. There are no development pressures in these areas.

**Summary of Issues**

The cause of the main flood risk in Stewards Brook is from tidal flooding. This can be directly from either high tides or where the brook becomes tide locked and the brook is carrying large flows from heavy rain. The key area of land at risk is the Regional Investment Site. The site already has a granted planning consent (24/3/06) for the proposed redevelopment of freight terminal to provide 78,308 sq.m of new distribution warehousing with improved road and rail access. Any development of land falling within Zones 2 and 3 will need to consider flood risk to buildings and occupants.

**Local Recommendations**

In addition to the standard best practice recommendations for dealing with the drainage aspects of development it is necessary to deal with the potential flooding from high tides. Past development has dealt with this by raising floor levels to a minimum of 8.10mAOD. It is important to consider that future development would require floor levels to be higher than this to counter climate change. Raising land levels may result in runoff flowing onto other land that would have previously not been subject to receiving runoff and this must be covered within a site specific FRA for any proposed development. Raising levels may protect property from flooding but a means of escape and evacuation must be considered and a dry route out of the site must be maintained for access and egress at all times.

Where development is proposed within the flood plain flood resilient and resistant design should be incorporated. In practical terms this means that at times of flood occupants would be on upper floors and the lower levels of the building will recover quickly from inundation e.g. garaging on lower levels, stone floors, unplastered walls, electric sockets high on the walls, floor drains etc. Access and egress during flood events should be considered.
Main River
Stewards Brook Catchment
Watercourse Location

Reproduced from the Ordnance Survey mapping with the permission of the controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings.

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**Bower’s Brook Catchment**

Maps showing river location in the Bower’s Brook catchment can be found at the end of this section.

**Watercourse Location and Description**

Bower’s Brook is located in the north east of the borough and flows through the centre of the Widnes urban area. From Ordnance Survey mapping the source of the brook appears to be at grid reference 351820, 388640. The brook flows south from a point adjacent to Cranshaw Hall, Cranshaw Lane through residential, green space and industrial areas, beneath the retail area of Green Oaks and Morrisons and into the River Mersey. The watercourse is culverted for large sections of its length. The largest sections are from Derby Road (352192, 387822) under the Eternit / Motor Nation sites and Watkinson Way (A557) to the south side of the railway (352484, 387349). The other long culverted section runs from Halton View Road (352353, 386412) under Watkinson Way and the Green Oaks Centre / Morrisons, crosses back under Watkinson Way close to the junction with Fiddlers Ferry Road, then passes beneath Bowers Business Park and the St Helens Canal and into the Mersey at grid reference 352000, 384839 on Widnes Warth. The Environment Agency maps show a second route flowing from a junction near the Thermphos industrial site at grid reference 351998, 384877 to an outfall in West Bank at grid reference 351390, 384133. This route runs adjacent to the St Helens Canal under the northern bank. Information suggests that this route was abandoned when engineering works took the main channel under the canal and across Widnes Warth. It is not clear if the West Bank arm was blocked up entirely or whether it still carries flow.

The maps produced from the EA’s National Flood and Coastal Defence Database (NFCDD) of defence assets do not accord with the mapped line showing the course of the brook within the culverted sections. The flood defence assets record manholes and are probably more accurate than the mapped line indicating the watercourse.

**Catchment Description**

The Bower’s Brook catchment is heavily urbanised for the majority of its length. From the source, a short length drains agricultural land designated as green belt in north Widnes. The brook then passes beneath Lunt’s Heath Road and through a section of open space before entering a culvert at Derby Road. Residential areas surround the open space and employment sites overlie the culvert, though there are no buildings directly over the culvert. On emerging from is culvert the brook follows a straight course through an area of green space known locally as ‘The Bongs’, some short sections are culverted along this section. Residential areas surround the open space. The brook then discharges into a culvert at Halton View Road and does not emerge until it has passed beneath the St Helens Canal. The culvert is overlain by retail uses, with some industrial land adjacent to the Canal. The only building directly over the culvert is part of the Green Oaks Shopping Centre. The maps produced from the NFCDD assets do not accord with the mapped line showing the course of the brook within the culverted sections. The flood defence assets record manholes and are probably more accurate than the mapped line indicating the watercourse.

For the purposes of analysis the land within the Bower’s Brook Catchment has
been divided into five distinct areas for review:

- **North of Liverpool / Manchester Rail Link** – this area covers from the source by Cranshaw Hall to the railway line that runs west – east through north Widnes.
- **Upper East of Watkinson Way** – this area covers from the south side of the railway through ‘The Bongs’ to the culvert entrance by Halton View Road.
- **West of Watkinson Way** – is the area of culverted brook from Halton View Road, under the Green Oaks / Morrisons Area to the junction of Watkinson Way and Fiddlers Ferry Road.
- **Lower East of Watkinson Way** – this area stretches from the Watkinson Way / Fiddlers Ferry Road junction, under the Bowers Business Park and stretches to the point of discharge into the River Mersey.
- **West Bank Branch** – this area covers the section that is thought to be the old course of Bower’s Brook that runs adjacent to the St Helens Canal and discharges to the Mersey at West Bank.

**Derived Flood Risk and Level Review**

Each section of Bower’s Brook as described above is dealt with discreetly in this section. The brook has no level recording equipment and is ungauged. Therefore there is little factual information on flows.

- **North of Liverpool / Manchester Rail Link**

There is very little information published on the upper most sections of Ditton Brook. There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

- **Upper East of Watkinson Way**

There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

- **West of Watkinson Way**

The culvert under the Green Oaks / Morrisons site was replaced in part by the North West Water Authority Rivers Division in the 1970’s and in part during the Green Oaks / Widnes Eastern Bypass development. (Source EA commentary on applications 06/00009/FUL and 06/00242/FUL). The EA does not have any records of whether the two sections of culverting were joined up or whether there is a section of the original culvert between them. The Bower’s Brook Culvert is approximately 5.5 metres deep (EA letter ref M/105/BOW1/13015/DTA). There is no information on flood risk and levels.

- **Lower East of Watkinson Way**

There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

- **West Bank Branch**

There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

In summary, fluvial flood risk in the upper catchment is not currently a threat to property. There is sufficient natural flood plain within the unculverted sections to accommodate any out of bank flows. The main risk of flooding will results from potential blockages or collapse of the
culverted sections that allow the brook to pass beneath roads and land. Most of the culverted sections are protected by debris screens to prevent debris being washed into the culvert and causing blockages. If blockage was to occur the cause would likely be full or partial collapse of the culvert itself or sedimentation of the culvert over time. Another form of blockage that has been found in other boroughs are service and utility pipes being accidentally laid through the culvert at right angles. In the event of a blockage the water in the brook will back up on the upstream side of the obstruction. If the water level reached the culvert top it would then flow out of the manholes on the upstream side of the obstruction. Depending on location this could cause flooding to property.

The capacity of culverted sections is not known and as flows are not recorded it is difficult to calculate the probability of the culvert’s capacity being exceeded.

Defences, Location, Condition and Standard of Defence

Inspection of the EA NFCDD Flood Defence Asset Register shows that the main watercourse sections of concern are the open channel sections that run through the open space at Finsbury Park and ‘The Bongs’. It is current EA policy not to maintain sections of channel in natural areas unless debris imped flow. In places these sections are rated as being grade 4 and 5 (poor condition rating). No information is given on the condition of the culverted sections. However the section of culvert under Green Oaks and Morrisons was replaced in part in the 1970’s and during the Widnes Bypass

In terms of development pressures, the upper parts of the catchment are relatively stable. The land is zoned as green belt and green space. There has been a planning application on land adjacent to the watercourse at Derby Road (05/00677/FUL) for 58 dwellings. Flood risk to the development and from additional runoff generated was not considered to be an issue. The brook passes beneath the industrial / employment sites in the upper catchment in culvert. Bower’s Brook remains in culvert until it passes beneath the St Helen’s Canal and returns to an open channel across Widnes Warth. There are no allocated sites in this catchment however the Brook passes in culvert beneath a proportion of the Widnes Waterfront Action Area.

Past Flood Events

There are no records of past flood events along the entire length of Bower’s Brook.

Environment Agency Flood Map

Maps showing the Flood Map for Bower’s Brook can be found at the end of this section. Zone 3 is dark blue. Zone 2 is light blue.

Summary of Issues

From the sources of information examined, Bower’s Brook catchment does not suffer from flooding issues. The upper catchment has sufficient natural flood plain to cope with high flows. In sections where the brook is in culvert the EA will recommend an 8 metre wide buffer of undeveloped land between the culvert and nearest building. This will provide sufficient access is available if it is necessary to replace or repair the culvert.

Local Recommendations
At the present time there are no pressing issues and no significant development pressures. The development of the Widnes Waterfront Action Area may require land drainage consent for an outfall to the culverted length of Bowers Brook that crosses the site.
Barrows Green Brook Catchment

Maps showing river location in the Barrows Green Brook catchment can be found at the end of this section.

Watercourse Location and Description
Barrows Green Brook is located in the north eastern corner of the Borough. From the source it only runs for a short 800m length before leaving Halton’s boundary. The brook then drains into the Warrington Borough Council administrative area. The source of the brook as shown on aerial photography appears to be at grid reference 353214, 387806.

Barrows Green Brook flows into Penketh Brook at a point outside Halton at grid reference 355750, 387500. The source on the OS map for Penketh Brook is grid reference 353040, 388960. Penketh Brook does not enter the borough however from a drainage perspective development within Halton may have an impact on the flows and flood risk of this tributary. As the land immediately surrounding this tributary is within St Helen’s administrative area and the land in Halton is green belt no further consideration will be given to this tributary at this time. This may change if development proposals dictate in the future.

Catchment Description
The catchment within Halton consists of undeveloped farmland in the north eastern corner of the Borough. The topology of the catchment is flat.

Derived Flood Risk and Level Review

The brook has no level recording equipment and is ungauged. Therefore there is little factual information on flows. There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

Defenses, Location, Condition and Standard of Defense

Inspection of the EA NFCDD Flood Defence Asset Register shows that there are no sections rated as being grade 4 and 5 (poor condition rating) within Halton’s boundary.

Environment Agency Flood Map
Maps showing the Flood Map for Barrows Green Brook can be found at the end of this section. Zone 3 is dark blue. Zone 2 is light blue. The maps appear to show that there are flooding issues lower in the catchment within Warrington Borough Council’s administrative area. It will be important to attenuate any run off from proposed developments in Halton’s area to avoid contributing to flooding downstream.

Past Flood Events

There are no records of past flood events along the length of Barrows Green Brook within Halton.

Land Use Issues / Development Pressures

There is an allocated housing site directly adjacent to the brook on Barrows Green Lane. This site is allocated in the UDP and is reference number 961. This site falls with Phase 3 of the housing allocations (to be released 2011 – 2016). The site hasn’t yet got planning permission but is allocated for 155 dwellings at a density of 30 dwellings per hectare. All of the other
land in the catchment is zoned as green belt.

**Summary of Issues**

There are no flooding issues that result from Barrows Green Brook in Halton, however there are issues lower in the catchment. Run off attenuation via SUDS or flood storage areas will be required for any new developments draining to the Penketh Brook catchment. This is because of existing flooding problems elsewhere within the downstream catchment that lies outside the Halton Borough boundary in Warrington.

**Local Recommendations**

It will be necessary for the developer of housing site 961 to undertake a Flood Risk Assessment to assess both the risk to the development from Barrows Green Brook itself and also the likely contribution to flows in the brook from run off from any impermeable areas. This will allow the impact on downstream areas to be modelled.
Whittle Brook – Widnes

Maps showing river location in the Whittle Brook catchment can be found at the end of this section.

Whittle Brook is located outside of the Halton Borough boundary. It is included in this report for awareness. The land within Halton is zoned as green belt so is relatively stable in development terms. Any major development in the future would need to be assessed to ensure that flooding problems in the downstream catchment are not exacerbated.

Watercourse Location and Description

Whittle Brook is located outside of the Halton Borough boundary. It is included in this report for awareness and consideration should land come forward for development. Source point approximately Grid Reference 352160, 390190.

Catchment Description

The section of relevance drains farmland in St. Helens district. The land surrounding the brook is zoned as green belt, as is the adjoining land in Halton.

Environment Agency Flood Map

Maps showing the Flood Map for Whittle Brook can be found at the end of this section. Zone 3 is dark blue. Zone 2 is light blue. The maps appear to show that there are flooding issues lower in the catchment within Warrington Borough Council’s administrative area. It will be important to attenuate any run off from proposed developments in Halton’s area to avoid contributing to flooding downstream.

Local Recommendations

There are no recommendations for this brook as it falls within St. Helen’s administrative area. Whittle Brook has been included here for awareness in the event of major development allocations close to the catchment in the future.

Where any development proposals are considered for this area attenuation of run-off flows and volumes will be required.
MAIN RIVERS IN RUNCORN

Keckwick Brook / Rose Brook Catchment

Maps showing river location in the Keckwick Brook catchment can be found at the end of this section.

Watercourse Location and Description

Keckwick Brook drains land in the south east corner of the Borough. It flows from south to north and passes under the M56 and through Sandymoor until it discharges into the Manchester Ship Canal. At a point close to the M56 bridge the tributary Rose Brook joins Keckwick Brook. The source of Keckwick Brook is at grid reference 358240 379860 close to ‘Turfland’ in Daresbury. The source of Rose Brook is at 355365 380405 in Murdishaw Valley / Murdishaw Wood. Rose Brook was enmained by the Environment Agency on 31st March 2005. Previously Rose Brook was a Critical Ordinary Watercourse (COW).

Catchment Description

The catchment consists mainly of undeveloped farmland although it does pass close to residential and business premises in both Sandymoor and Preston Brook.

Derived Flood Risk and Level Review

Advice from the EA given on various planning applications in the Manor Park areas that fall within the indicative flood plain maps indicates that floor levels of the proposed units should be set at a minimum level of 5.80mAOD. The reason for this is to reduce the danger to the occupants of the buildings from potential flooding.

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<td>00/00373/OUT</td>
<td>Manor Park, Runcorn</td>
<td>Min floor level of 5.8mAOD</td>
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Defences, Location, Condition and Standard of Defence

Keckwick Brook is Main River and was improved by the New Town Development Corporation to accommodate increased run-off resulting from the development of Runcorn. These improvements included the provision of Flood Storage Areas (FSA) at Wharford Farm\(^1\) in the upper catchment, and Chancellor Road Pumping Station / Oxmoor storage area adjacent to the outfall arrangements to the Manchester Ship Canal.

These flood storage areas appear to be under utilised and space capacity should therefore be available within the overall system to accommodate additional runoff from further development within the upper catchment, upstream of Wharford Farm FSA provided additional works are carried out to improve the effectiveness.

Wharford Farm Flood Basin
This is located to the south of Sandymoor and was constructed in the late 1980’s. It was designed to divert and store flood

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flows from Keckwick Brook to provide protection from flooding to proposed residential development in the Sandymoor area. There have been concerns over the effectiveness of the Flood Basin. About 4/5 years ago there was a proposal from Halton BC, who are the owners of the Flood Basin, to alter the main control structure however the proposed works were not carried out.

The flood basin, control structure and outlet structure are in a fairly remote location with difficult access, in addition there is no on-site lighting. These issues could cause problems when operating the basin during flood events. There is no telemetry at the site meaning basin operation must be done manually. Site visits are required to detect vandalism or blockages. At times of high flows in the brook, should problems occur, the Flood Basin may not operate as it was designed to and may not provide the designed standard of flood protection.

Chancellor Road Pumping Station (PS)
This pumping station is owned, operated and maintained by United Utilities for both foul and surface water. The discharge of surface water from the Sandymoor and Manor Park areas leads to the pumping station which pumps the water into the Manchester Ship Canal. Keckwick Brook flows fairly close to the pumping station before discharging into the Canal through culverts set in the Canal embankment. During high water levels in Keckwick Brook, water is able to flow into balancing ponds adjacent to the pumping station at Oxmoor storage area. Once the water level in these balancing ponds reaches a certain level, the floodwater is able to discharge to the pumping station that then pumps it into the Canal.

The culverts through which Keckwick Brook flows into the Canal have flap gates at the discharge point. The Canal used to be tidally affected to a certain degree and the flap gates would prevent high water levels in the Canal backflowing through the culverts and into Keckwick Brook. Improvements to the Manchester Ship Canal at Eastham Locks have reduced the tidal effect on the Canal, but the flap gates remain. Debris accumulates at the flap gates that could restrict their operation during fluvial flows affecting water levels in Keckwick Brook. It is not clear who is responsible for the maintenance of the flap gates.

In the winter of 2000 the Sandymoor and Manor Park 3 areas were affected by flooding. There were problems with the Chancellor Road pumping station that were considered to have contributed to the flooding problems. After the flooding, steps were taken (at that time by Halton BC who were the drainage authority on behalf of United Utilities (UU)) to ensure that the pumping station (PS) problems were resolved.

The Chancellor Road PS has telemetry for the foul pumping systems, but not for the surface water pumping systems, although power failure at the PS is soon acted on. At a recent meeting with UU (May/June 2007), it was explained that improvements at the PS were to be carried out that included installing telemetry to the surface water system. As part of the Flood Risk assessment for the Sandymoor residential development area, carried out by consultants for English Partnerships, reports from UU have been provided to the Environment Agency that explain the inspection and maintenance schedules for the PS.

Environment Agency Flood Map
This map shows the Flood Map areas for Keckwick Brook. Zone 3 is dark blue. Zone 2 is light blue.

Past Flood Events
Flooding has been recorded of property at 6 and 8 Furness Court and 20, 22, 24 and 26 Glastonbury Close. The cause of this flooding is attributable to the watercourse exceeding channel capacity and therefore not draining land effectively at periods of high flows. The high flows in the main watercourse prevent water from smaller brooks entering the brook with the effect of backing up water levels in these smaller tributaries. The source of this information is historical information held by HBC Highways Department.

Land Use Issues / Development Pressures

There are significant development pressures in this catchment. Much of the land has been allocated for development, either for dwellings or employment uses.

English Partnerships are the majority land owner in this area. A “Master Plan” for the area has been created in conjunction with the Environment Agency and Halton Borough Council. Elements of the proposed development fall into Flood Zones 2 and 3a.

Jacobs Consultants have been commissioned by English Partnerships in August 2006 to carry out a detailed flood risk assessment. The findings of the FRA are contained in the report titled “Sandymoor – Proposed New Residential Development. Detailed Flood Risk Assessment” published May 2007.

The Jacobs report concludes that the proposed development site will be defended against flooding by implementing a series of on-line and off-line storage areas and by physically raising vulnerable residential development areas above the 1% (1 in 100 year) flood level. Specifically, the on-line works proposed involve widening the channel of Keckwick Brook and the off-line works will see the creation of 2 additional excavated storage basins just upstream of the existing housing areas.

Summary of Issues

Residential development has been going in this area since the 1980's and some houses have been affected by flooding on several occasions. There is a proposal to construct a flood wall/embankment to provide a 1 in 100 years standard of flood protection to the areas that have been identified as being at high risk of flooding. Further proposed development will be subject to detailed Flood Risk Assessments.

Isolated flooding has occurred at locations in the lower catchment. These flooding incidents are attributed to high flows in the main watercourse. The EA are currently investigating a set of flood defences to protect the residential properties affected by past flood events.

It will be necessary to demonstrate that further development will not cause or exacerbate flooding issues elsewhere within the catchment. A key issue is the determination of the capacity of the existing system upstream of Wharford Farm. This FSA is designed to store water during periods of high flows and therefore release capacity in the main channel.

Further study work is needed to investigate the effectiveness of the FSA facility at times of high flows and also the spare capacity in the system. Spare capacity can be determined by determining the amount of run off that is contributed to the watercourse system from the existing developed areas within this catchment.

Local Recommendations

All developments within this catchment should utilise sustainable urban drainage systems (SUDS) to maintain run-off at
levels equal to the site in an undeveloped state. Any development falling within the boundary of the HBC Flood Zone Maps should be the subject of a site specific flood risk assessment. This assessment should consider the risk of flooding to the development, the risk of flooding to adjacent land as a result of the development, and the run-off amounts that will be contributed to the watercourse network and/or sewers. The assessment will consider site topography and the potential locations of flood flow routes i.e. pathways water could take from the watercourse(s) to the development.
**Whitley Brook Catchment**

Maps showing river location in the Whitley Brook catchment can be found at the end of this section.

**Watercourse Location and Description**

Whitley Brook is located in the south eastern corner of the Borough. It forms part of the boundary between Halton and Vale Royal in the Daresbury area of Runcorn. From the source it only runs for a 1500m length before leaving Halton’s boundary. The brook then drains into the Vale Royal Borough Council administrative area. The source of the brook as shown on aerial photography appears to be at grid reference 360429, 380611.

**Catchment Description**

The catchment consists of farmland designated as green belt and area of special landscape value.

**Derived Flood Risk and Level Review**

The brook has no level recording equipment and is ungauged. Therefore there is little factual information on flows. There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

**Defences, Location, Condition and Standard of Defence**

Inspection of the EA NFCDD Flood Defence Asset Register shows that there are no sections rated as being grade 4 and 5 (poor condition rating) within Halton’s boundary.

**Environment Agency Flood Map**

The indicative maps appear to show that there are flooding issues lower in the catchment within Vale Royal Borough Council’s administrative area. It will be important to attenuate any run off from proposed development in Halton’s area to avoid contributing to flooding down stream.

**Past Flood Events**

There are no records of past flood events along the length of Whitley Brook within Halton.

**Land Use Issues / Development Pressures**

At the current time there are no development pressures in this area. The land uses in this area are agricultural and land policy designations are green belt.

**Summary of Issues**

There are no flooding issues that result from Whitley Brook in Halton, however there are issues lower in the catchment. Run off attenuation via SUDS or flood storage areas will be required for any new developments draining to the Whitley Brook catchment. This is because of existing flooding problems elsewhere within the downstream catchment that lies outside the Halton Borough boundary in Vale Royal.

**Local Recommendations**

There are no additional recommendations for this catchment beyond the standing advice that relates to development. It would be unlikely that any development within Halton would be at risk from flooding from Whitley Brook due to the small volumes of water carried by the channel this high in the catchment.
The main risk that development in this catchment would present would be the exacerbation of flood risk lower in the catchment due to loss of permeable surfaces that allow water to soak away. Impermeable surfaces and efficient drainage systems enable water to reach rivers far faster than natural drainage pathways. This is why development can cause or contribute to flooding downstream.
Critical Ordinary Water Courses

Map 2b should be viewed in connection with this section.

Critical ordinary watercourses are ordinary watercourses that the Environment Agency and other operating authorities agree are critical because they have the potential to put at risk from flooding large numbers of people and property. There are three Critical Ordinary Watercourse (COWs) in the borough.

Willow Brook, Grange, Runcorn
The section of Willow Brook designated, as COW is a 250m open section that can cause the flooding of 3 properties situated in a hollow through which the watercourse flows. The cause of the flooding is the Ivy Street culvert that needs regular maintenance to remove debris build up. The location of this COW is opposite Runcorn Town Hall adjacent to Heath Road. The section of watercourse designated as COW is that between the SJ51768209 (upstream location) and SJ51748255 (downstream location). The properties that get flooded are in Pool Hollow. The location can be seen indicated on Map 2b. The length of the watercourse downstream from the COW section is 510m including pond and eventually discharges into the Bridgewater Canal.

Marsh Brook, West Bank Dock Estate, Widnes
The section of Marsh Brook designated as COW is approximately 500m in length. The upstream point is at SJ50528445 and the downstream location is SJ50428398. From historic Ordnance Survey maps the brook can be seen to run from north of Ditton Road however following construction of the West Bank Dock Industrial Estate the only open section shown on modern maps is the section between Desoto Road roundabout and the Mersey outfall. The brook discharges directly into the River Mersey so there is no downstream watercourse length. Marsh Brook is designated as a COW as it has the potential to flood a major chemical site due to a silted outfall and channel.

Halton Brook, Astmoor, Runcorn
The section of Halton Brook designated as COW is 70m in length. This brook has the potential to flood factory units in an important industrial area if not maintained. The brook is located on Astmoor Industrial Estate and flows between SJ53398308 (upstream) and SJ53408314 (downstream). The length of the watercourse downstream of the COW section is 350m before it discharges into the Manchester Ship Canal.

Ordinary Watercourses

Map 2c should be viewed in connection with this section.

Ordinary watercourses (non-main rivers) are all those watercourses that are not designated as main river. The upper extents of some main rivers will only be classified as ordinary watercourse i.e. not main river.

All those watercourses that can be distinguished from the Ordnance Survey 1:1250 maps have been included within the SFRA HBC Flood Risk Maps. They can be seen on Map 2c. Only one of these is described here because of the significant risk of flooding lower down in the catchment (outside the borough boundary).
The following ordinary watercourses can be seen on Map 2c:

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beech Wood Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Flood Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Keckwick Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Manor Park Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Morphany Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Rose Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Town Park Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Walton Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Whitley Brook</td>
<td>Runcorn</td>
</tr>
<tr>
<td>Alder Brook</td>
<td>Widnes</td>
</tr>
<tr>
<td>Bower’s Brook</td>
<td>Widnes</td>
</tr>
<tr>
<td>Lady Pool</td>
<td>Widnes</td>
</tr>
<tr>
<td>Penketh Brook</td>
<td>Widnes</td>
</tr>
<tr>
<td>Stewards Brook</td>
<td>Widnes</td>
</tr>
</tbody>
</table>

Alder Brook Widnes

The catchment is mostly outside of Halton’s boundary and consists mainly of flat farmland designated as greenbelt. There is a slope in the catchment as the land drains towards Higher Walton in Warrington Borough.

**Derived Flood Risk and Level Review**

The brook has no level recording equipment and is ungauged. Therefore there is little factual information on flows. There have been few planning applications that have been in close proximity to the brook and none have dealt with flood risk issues.

**Defences, Location, Condition and Standard of Defence**

This brook is not shown as main river and it is therefore not the responsibility of the EA for maintenance.

**Environment Agency Indicative Flood Plain Maps**

There are no sections of land designated as being within the Zone 2 or 3 areas for this tributary.

**Past Flood Events**

No sources of information have shown any history of flooding for this tributary.

**Land Use Issues / Development Pressures**

The part of the catchment in Halton is very stable and is unlikely to undergo significant restructuring or development.

**Summary of Issues**

There are no issues to report. This tributary is included here for awareness.

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**Walton Brook in Daresbury**

Walton Brook has been included here in more detail for completeness. It is the only ordinary watercourse to have areas designated on the EA’s Flood Map showing an indicative flood plain. As a Zone 2 and 3 have been designated for this watercourse and it issues from within the borough it is included here in more detail.

**Watercourse Location and Description**

This watercourse is an open section of ditch between Runcorn Road and Manchester Ship Canal. It is located in the south east of the Borough just outside the Halton Boundary in the Daresbury area of Runcorn. It flows north from a point east of Daresbury Hall on Daresbury lane. There are no major tributaries that join this ditch along the length of the watercourse. From Ordnance Survey maps the source of ditch appears to be at grid reference 358631 382130. The brook drains into the Manchester Ship Canal.

**Catchment Description**
Local Recommendations
Any future development within this catchment needs to take account of run off speeds and volumes. The current levels should not be exceeded to avoid contributing to flooding problems lower in the catchment. Any development in Halton is extremely unlikely to suffer flooding from this tributary.

Other Water Bodies
This section covers all other water bodies present in the borough from which flooding may arise.

Manchester Ship Canal
The Manchester Ship Canal loops around Runcorn Town and its associated settlements from a point North of Moore Village and follows the south bank of the River Mersey, at some points forming the bank itself. There is significant freeboard between the surface water level and the top of bank.

Water levels in the Manchester Ship Canal within Halton are affected by four factors:

- Water flowing down the River Mersey from the upper reaches of the canal, above Latchford Locks.
- Water flowing down the canal from Latchford Locks.
- Water flowing down the River Weaver.
- Tidal events.

Generally speaking fluvial water coming down the canal above Latchford, apart from that used to allow ships to lock through Latchford Locks, discharges from the canal via Woolston Weir. In the event of a flood event over 140 cumecs will be discharged through the flood sluices at Latchford Locks. This is an automatic operation, the sluices being controlled by water level sensors. Once the capacity at Latchford is reached the additional flow will then discharge over Woolston Weir (located just west of the Thelwall Viaduct on the River Mersey at grid reference 365390 388670). Woolston Weir has a modelled maximum capacity of 240 cumecs during the highest astronomical tides. There are three flood sluices at Latchford each with a maximum capacity of approximately 150 cumecs. All the water from Latchford discharges into the canal immediately downstream of Latchford Locks. It discharges directly into the Canal and does not go via a spillway.

Apart from that required for the operation of Eastham Locks all water flowing down the River Weaver and from Latchford Locks discharges from the canal via the Weaver Sluices into the River Mersey (the Weaver Sluices are located opposite the Ineos (ICI) plant at Runcorn grid reference 349910 380250). In the event of a flood event above Latchford these sluices will also discharge the fluvial water discharging through Latchford Flood Sluices. There are eight gates in use at Weaver and their capacity varies depending on the height of tide. At the maximum normal opening of the gate the capacity will vary between 28 cumecs and a head of 300mm and 98 cumecs with a head of 3660mm. It should be noted that the sluices will close when the head difference across the sluice gate drops below 300mm. As with the Latchford Sluices the gate operation is automatic. It is possible that one sluice at each location could be unavailable due to maintenance. If failure of the sluices to operate correctly coincides with a fluvial flood event and / or tidal flood event there is a risk of flooding. This would depend very much on the nature of the failure, the length of time the sluices are out of action and the nature of the flood events. The MSC Company has call out procedures to enable these situations to be managed.
The Manchester Ship Canal Company confirm that there are no known procedures undertaken by the MSC Company that could create a risk of flooding as far as is known. The MSC Company have no records of flooding from any source in Halton or of any other flood events within the Borough.

St Helens Canal

St Helens Canal runs along the estuarine edge of Widnes from the locks into the River Mersey then following a course along the banks of the river towards Warrington. Halton Borough Council owns the Canal.

The Canal is at a lower level to the surrounding land and therefore embankment breaches do not pose a risk of flooding. There are also no under bridges along the length within the Borough. These are sections of raised canal where the canal passes over another feature e.g. a road.

The Canal acts as a flood defence for South Widnes as it effectively forms a large moat between the River Mersey with its tidal influences and the urban area. The capacity of this ‘moat’ is unknown and modelling would have to be undertaken to predict the height of the tide required to cause the Canal to fill with seawater. It is important to note that there is a substantial strip of salt marsh / open space between the River Mersey and the Canal.

Bridgewater Canal

The Bridgewater Canal intersects the Borough between Moore Village, Runcorn and Preston Brook, Runcorn. There is also a spur that runs into Runcorn Old Town. The Canal is essentially a 47-mile long reservoir, as it has no locks. An Act of Parliament gives rights to the Canal Engineer to take any water within a half-mile of the Canal to fill the Canal or remove water from the Canal into adjacent watercourses. The Bridgewater is filled from the Rochdale Canal and up to 1.5 million gallons can be drawn per day from this source. In addition, waste water from the Trent and Mersey Canal, and the Leeds and Liverpool Canal goes into the Bridgewater. The Canal can also take water from the River Medlock, via overflows in Manchester. This source is not frequently used due to the poor quality of the water in the Medlock.

There is approximately 225 – 250mm of freeboard along the length of the Canal (this is the difference between the normal water surface level and the top of bank). The top water level of the Canal is 25.26mAOD +/- 75mm depending upon the weather. Water levels in the Canal are controlled by several telemetry warning installations that continuously monitor water levels, both high and low levels. The continuous level monitoring and freeboard combine to give a reasonable degree of control over water levels. When circumstances dictate a necessity the level of the Canal can be drained via a number of let-offs. There are two discharge points within Halton, the Penstock in Runcorn Old Town at the end of the spur that consists of a 600mm culvert with sluice gates that drains into the Manchester Ship Canal and a discharge into Keckwick Brook. The discharge point into Keckwick is located at the intersection of the Canal with Keckwick Brook. At the present time the Keckwick discharge is not utilised as it does not drain sufficient volumes of water and has the impact of causing flooding in the Keckwick catchment when it is used. It has only been used on one occasion in memory and its use did not have the required effect on the water levels in the Canal. The preferred method is the sluice in Runcorn Old Town as this is significantly more effective. If the sluices at Runcorn Old Town fail there are huge sluices at Barton and Manchester that can be used to release water into the Mersey.
To date there are no records of flooding caused by the Canal in Halton. However, flooding could be caused by the Canal through:

- Collapse or blockage of the sluice in Runcorn Old Town when in use.
- Draining water into Keckwick Brook (flooding caused at usual locations – see section on Keckwick Brook).
- Collapse of the embankments supporting the Canal.
- Failure of under-bridges where the Canal passes above roads.

The infrastructure of the Canal is inspected regularly and remedial action taken to correct any problems. Maintenance staff and the many users of the Canal (fishermen, walkers, boaters and land owners) report potential problems on a regular basis. Where it is necessary to carry out repairs there are various points along the Bridgewater where stop logs can be installed. These form a dam at right angles to the canal. As the canal walls are supported by the weight of water, draining sections of the canal is not a common occurrence, as the walls will collapse inwards. Stop log positions are located close to the underbridge at Red Lane Daresbury to allow repairs to be carried out should the need arise. The embankments supporting the Canal were built in 1770 and have been in situ since this time. The main cause of embankment failure is unauthorised engineering and building works. In the past this has taken the form of excavating the toe of the embankment slope leading to instability and building on the embankment leading to an excessive weight to be supported. As no design plans exist for the embankments it is difficult to calculate load bearing capacities and slope stability. The best method of managing this situation is to avoid interference with the embankments unless absolutely necessary.

**River Weaver Navigation**

The River Weaver Navigation is owned and operated by British Waterways. Just outside the Borough boundary in Vale Royal’s area, the River Weaver splits to form a canalised section running into Weston Docks and a separate channel draining over sluices into a natural river section that joins the Manchester Ship Canal.

Neither of these water bodies are known to cause flooding in Halton. In both cases land is above the level of the canal with substantial freeboard. During flood events water in the Weaver discharges over sluice gates on the outskirts of Frodsham into the Manchester Ship Canal where it discharges via sluices into the River Mersey.
6. Spatial Development and Flood Risk

The following maps should be viewed as part of this section:

- Map 10a: Widnes UDP Allocations and Halton Borough Council Flood Risk Zones
- Map 10b: Runcorn UDP Allocations and Halton Borough Council Flood Risk Zones
- Map 10c: Action Areas and Halton Borough Council Flood Risk Zones

Allocated Sites in Halton UDP which are yet to be implemented

As part of the LDF process, the existing UDP allocations which have not been implemented will be assessed to determine whether they are still appropriate and required, and therefore taken forward into the LDF. In the transitional period between the UDP and the production of the LDF, the UDP and policies are saved until 2008 and may be extended further. These sites could come forward in this transitional period. The following sites have been identified in areas of flood risk.

Comparison of UDP Allocations and Halton Flood Risk Areas

Any site that is in whole or in part within a flood risk zone is listed in that zone. This means that sites covered by more than one zone will appear multiple times in the tables below.

Sites identified in Flood Risk Zone 3b

It is recommended that the following sites be subject to the sequential test and if there is no alternative location for the development the exception test must be applied. All sites in this zone require a site specific FRA which should accompany any development proposal.
<table>
<thead>
<tr>
<th>Allocation</th>
<th>Part / Whole Site</th>
<th>Site Ref</th>
<th>Sub No</th>
<th>Location</th>
<th>Catchment</th>
<th>Map Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Part of Site 954</td>
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<td></td>
<td>Sandymoor, Runcorn</td>
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<td>Keckwick Brook</td>
<td>10b</td>
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<td>Housing</td>
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<td>Keckwick Brook</td>
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</tr>
<tr>
<td>Housing</td>
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<tr>
<td>Housing</td>
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</tr>
<tr>
<td>Housing</td>
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<td>Sandymoor, Runcorn</td>
<td>Keckwick Brook</td>
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<tr>
<td>Employment</td>
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<td>Keckwick Brook</td>
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<tr>
<td>Employment</td>
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<td>Keckwick Brook</td>
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<tr>
<td>Employment</td>
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<tr>
<td>Employment</td>
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<td>Ditton Brook / Stewards Brook</td>
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<td>Employment</td>
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<td>Widnes</td>
<td>Ditton Brook / River Mersey</td>
<td>10c</td>
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<tr>
<td>Action Area – Southern Widnes</td>
<td>Part of Site</td>
<td>N/A</td>
<td>N/A</td>
<td>Widnes</td>
<td>Bowers Brook / River Mersey</td>
<td>10c</td>
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<td>Action Area – Widnes Waterfront</td>
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<td>Action Area – Weston Docks</td>
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<tr>
<td>Action Area – Castlefields</td>
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<td>Runcorn</td>
<td></td>
<td>10c</td>
</tr>
</tbody>
</table>
Sites identified in Flood Risk Zone 3a

It is recommended that the following sites be subject to the sequential test and if there are no alternative locations for the development the exception test must be applied. All sites in this zone require a site specific FRA which should accompany any development proposal.

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Part / Whole Site</th>
<th>Site Ref</th>
<th>Sub No</th>
<th>Location</th>
<th>Catchment</th>
<th>Map Ref</th>
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</thead>
<tbody>
<tr>
<td>Housing</td>
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<td>Housing</td>
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<td>Sandymoor, Runcorn</td>
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<tr>
<td>Employment</td>
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<tr>
<td>Employment</td>
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Sites identified in Flood Risk Zone 2

It is recommended that the following sites be subject to the sequential test and if there is no alternative locations for the development the exception test must be applied. All sites in this zone require a site specific FRA which should accompany any development proposal.

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<th>Sub No</th>
<th>Location</th>
<th>Catchment</th>
<th>Map Ref</th>
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<td>Ditton Brook</td>
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<tr>
<td>Action Area – Widnes Waterfront</td>
<td>Part of Site</td>
<td>N/A</td>
<td>N/A</td>
<td>Widnes</td>
<td>Bowers Brook / River Mersey</td>
<td>10c</td>
</tr>
<tr>
<td>Action Area - Castlefields</td>
<td>Part of Site</td>
<td>N/A</td>
<td>N/A</td>
<td>Runcorn</td>
<td></td>
<td>10c</td>
</tr>
</tbody>
</table>
Sites identified in Flood Risk Zone 1

All remaining allocations will fall into Zone 1 on the basis that there is no location in the Borough that will have no flood risk. Even the highest areas will be susceptible to isolated thunderstorms that can deposit more rainfall than the drainage systems can cope with. In addition, the blockage of culverts, drains and sewers by debris cannot be predicted and therefore some locations can be impacted by events that are beyond the scope of this SFRA to predict.

Putting the remaining allocations into Zone 1 serves as a reminder to look beyond the site itself and consider the whole catchment and the effects of any runoff generated on both the sewer system and natural drainage systems. Sites not directly affected by flooding have the potential to cause flooding lower in the catchment if hydrology is not correctly managed.

In addition any site over 1 hectare in Zone 1 must be subject to a Site Specific FRA.

Subject to the application of the Sequential Flood Risk Test, PPS 25 specifies suitable types of development in this zone as:

- Essential infrastructure
- More Vulnerable
- Less Vulnerable
- Water compatible development

The purpose of the SFRA is not to assess whether a site will pass parts a. and b. of the exception Test. However, the council must be able to demonstrate the need for development through the spatial planning process. A proactive approach has been adopted by the SFRA in that both less and more vulnerable developments are also subject to the Exceptions Test. A FRA will be required for all developments in this zone.

Proposals for development will need to demonstrate that flood risk can be effectively and safely be managed without increasing flood risk elsewhere and provide an assessment of the current level of flood risk (both existing and following development). Development Plans for the site will need to demonstrate that flood risk can effectively and safely be managed without increasing flood risk elsewhere and; that access and egress to the site can be maintained during an extreme flood event. The site-specific flood risk assessment will need to address part c. of the Exceptions Test.

Other Development/Regeneration Priorities

Transport

The main infrastructure project currently at the planning stage is the Mersey Gateway. This is one of the biggest infrastructure undertakings in the country. A significant amount of work has been undertaken to assess all aspects of environmental impact. At the time of producing this report the actual route of the bridge has yet to be finalised. Until the route is finalised a flood risk assessment cannot be undertaken.
7. The Sequential and Exception Tests

A sequential approach to determining the suitability of land for development in flood risk areas is central to the guidance contained in PPS 25 and should be applied at all levels of the planning process.

Halton Council when allocating land in spatial plans and developers seeking sites for housing and other developments in areas at risk of river and sea flooding will apply the Sequential Test to demonstrate that there are no alternative sites available in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed. The sequential approach should be used in areas known to be at risk from other forms of flooding as set out in Section 5.

In areas at risk of river and sea flooding, preference should be given to locating new development first to land in Flood Zone 1. If there is no reasonably available alternative site in Flood Zone 1, the flood vulnerability of the proposed development can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3. The Flood Zones refer to the probability of flooding from rivers, the sea and tidal sources and ignore the presence of existing defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. (see Map xx)

The risk-based Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding (Zone 1).

Application of the Sequential Test

Application of the sequential approach to spatial planning reinforces the most effective risk management of all – that of avoidance. Annex D of PPS 25 provides clear guidance on the application of the sequential approach.

The Environment Agency’s Flood Zones are the starting point for applying the Sequential Test. Zones 2 and 3 are shown on Environment Agency maps with Flood Zone 1 land falling outside Zones 2 and 3. These Flood Zones refer to the probability of sea and river flooding only.

The overall aim of decision-makers should be to steer all new development to Flood Zone 1.

The preparation and review of Regional Spatial Strategies (RSSs) and Local Development Documents (LDDs) should be used to review existing and proposed...
development patterns and allocations and identify opportunities to allocate land in lower flood risk zones suitable for existing uses already in medium and high flood zones.

Where it is not possible to steer all new development to Flood Zone 1, decision-makers allocating land in spatial plans or determining applications for development at any particular location should demonstrate that there are no reasonable options available in a lower risk category and should take into account the flood risk vulnerability of land uses.
8. Recommendations and Conclusions.

Recommendations

1) Every application for development or change of land use must be considered by planning officers in terms of its potential flood risk. This is because:
   a) There are potential sources of flood risk in the borough. These risks are surface water runoff, rivers and the sea.
   b) All areas within the District have the potential to be at risk of flooding from at least one of these sources or have the potential to increase flood risk elsewhere.
   c) Although a site may already be developed, a proposed change in land use may not be suitable for that site, or may increase flood risk elsewhere.
   d) Climate change may increase areas at risk of flooding over the next decade and beyond. This SFRA attempts to look to 2115. Land should be allocated today in a way that will be sustainable in the future.
   e) Where development is proposed behind existing flood defences it should not be assumed that the standard of protection originally designed for is the same as what would be found today, using updated flood estimation techniques.
   f) The Environment Agency flood risk standing advice available on the Internet at http://www.pipernetworking.com should be accessed to help determine planning applications.

2) Planning officers can consider potential flood risk by using the GIS and maps provided as part of the SFRA study.

3) If the site is located in a HBC Flood Risk Zone, the relevant PPS 25 guidance should then be used to test whether the land is suitable for the development proposed, and if so, whether a specific Flood Risk Assessment, to be completed by the developer, is required to accompany a planning application. The guidance at http://www.pipernetworking.com can help to determine this.

4) If it is found that a site specific Flood Risk Assessment is required, this must be submitted with the planning application. Planning officers, developers and the general public should follow best practice for undertaking site-specific flood risk assessments. The SFRA technical guidance in Section 6 should also be specifically considered in assessing Flood Risk Assessments in Halton Borough.

5) All site specific Flood Risk Assessments must be considered by the Environment Agency as part of the planning consultation process. It is recommended that Environment Agency comment be taken seriously and applied wherever possible.

6) Land that is found to be unsuitable for one type of development due to flood risk, may still be suitable for other types of uses, for example environmental and recreational areas. The PPS 25 guidance can be used to suggest suitable alternative land uses. The data and information contained within this SRFA constitutes the best available data at the time of writing.

7) Some datasets within the GIS package are also periodically updated. Halton Borough Council will update their GIS package accordingly to ensure that decisions are made using the best available data at all times.

8) The Strategic Flood Risk Assessment should be used in testing general locations for strategic growth and site-specific allocations in the Local Development Frameworks. This includes investigating the impact of proposals for new
development in the vicinity of, and particularly upstream of, areas sensitive to flooding (where there have been past flood events).

9) The Local Development Frameworks, through their policies, justification and proposals, should make clear the implications for development and regeneration in areas of high flood risk. This will need to reflect any programmes and proposals, or otherwise, for providing or improving flood defences.

10) The Local Development Framework policies controlling development in flood risk areas should reflect the guidance in this SFRA. They may in future require amendments if the SFRA is updated, reflecting those updates.

11) A project to examine the flood attenuation ability of both the Manchester Ship Canal and the St Helens Canal should be considered to assess the role these features play in flood defence.

12) The possibility of implementing flood warning zones for the Ditton and Keckwick catchments should be explored in conjunction with the Environment Agency.

Conclusion

Leaving space for natural flooding without causing losses to people or property is very important. In the future, it is likely that flooding could occur more frequently and more severely due to climate change.

Flooding is an important issue that must not be ignored. By using this SFRA, in combination with site specific Flood Risk Assessments submitted with planning applications for development or change of use, it is possible to allocate land for development in a sustainable way. This could mean for example, restricting new housing developments in areas at an unacceptable risk of flooding and guiding them towards areas of lower risk. It also means that areas at high risk of flooding can be developed in a way which means that rivers can behave in a natural way, for example by maintaining or improving functional floodplain.

This Strategic Flood Risk Assessment will assist Halton Borough Council in meeting the government guidelines contained within PPS 25 and will contribute towards allocating land for development in a sustainable manner.

Monitoring and Review

Halton Council produce an annual monitoring report (AMR) that contains information on the implementation of policies in the Halton UDP and the extent to which they are being achieved. The AMR also reports on the progress of the LDF.

In October 2005, the Office of the Deputy Prime Minister (ODPM) released a set of Local Development Framework Core Indicators which allow a consistent set of information to be collected at all levels.

Core indicators help to determine whether national objectives for sustainable development are being met and there is a requirement to monitor these core indications annually through the AMR.

There is a Core Indicator at LDD level which seeks to measure flood protection and water quality. The indicator seeks data on the ‘Number of planning permissions, by local authority area, granted contrary to the advice of the Environment Agency on grounds of flood defence or water quality’.

The success of the approaches advocated in PPS25 should be reflected in a reduction in the number of applications...
that the Environment Agency objects to on flood risk grounds. As stated in paragraph 35 of PPS25, this information is reported nationally in the Environment Agency’s High Level Target 5 (HLT5) report produced jointly with Local Government for both Defra and Communities and Local Government.