Harborough District Watercycle Study

December 2015

DISTRICT OF HARBOROUGH

Amendment September 2017:

Page 26 clarification that development should be directed away from flood zones 2 and 3 inserted for options including the Lutterworth East SDA.

Page 30 clarification that development should be directed away from flood zones 2 and 3 inserted for options including the Lutterworth East SDA.

Harborough District Water Cycle Study

Contents

1. Introduction

Harborough District Council is currently producing a new Local Plan. The new Local Plan will allocate sites for housing and employment land. Over the plan period, some 9500 new homes are required. New homes and businesses require access to a range of infrastructure, including water supply and waste water treatment. There is also a need to consider flood risk and the impact of rainwater run-off into local water courses.

In order to understand the impact that development has on water demand and management, it is helpful to consider the full water cycle. The water cycle includes natural and man made processes and systems that are involved in the collection, storage or transportation of water in the environment. This approach helps to identify where the key issues and opportunities arise, not only for effective water supply and treatment infrastructure, but also for natural processes such as rivers and groundwater. It is particularly important to recognise the environmental services that are delivered by natural processes and to preserve these and improve them wherever possible.

The objectives of the Water Cycle Study are:

- To undertake a review of current infrastructure capacity and existing water cycle processes
- Provide a clear understanding of the key issues for the suggested Options for the emerging local plan and inform the selection of a preferred option.
- To recommend any necessary flood risk and environmental infrastructure to accommodate planned growth.

The Water Cycle study will follow guidance from the Environment Agency and produce an outline study, highlighting environmental constraints, infrastructure constraints and sustainability issues. The more detailed information on when infrastructure is needed and how it will be funded will depend upon the preferred option, once that is identified, and be covered by detailed viability work.

2. Harborough District

2.1 Overview

Harborough is a very rural district in South Leicestershire, stretching from Leicester City to the Northamptonshire border. It is an attractive place to live, with gently rolling countryside and small towns and villages. The population has increased by 11.5% from 2001 to 2011, reaching over 85,000. This rise compares to an increase of 10.2% for Leicestershire as a whole (Census 2011). The rural nature of the district means that many people rely on cars for transport, with over 88% of the population having access to one car. However there are good transport links with a rail link to London with half hourly trains from Market Harborough.

The district is seen as a good place to raise a family and the census data (2011) shows an increase of 11% in school aged children, 5 -17, since 2001. However, there is also a growing population of older people, and the number of older people is higher than the national average (18% in Harborough District compared to 16% nationally). The number of households in the district has grown by 18% over the period 2001 to 2011. The price of housing in the district is high, exacerbated by the much higher than average number of detached homes and lower than average number of flats and terrace homes.

Figure 1: Harborough District

2.2 Development to 2031

The attractiveness of the district has led to significant in-migration. This is reflected in house prices and documented in the 2014 Strategic Housing Market Assessment (SHMA). The SHMA has indicated that Harborough District would need to accommodate some 475 homes per year from 2011 to meet its own need. This would involve finding sites for 9500 new homes over the plan period to 2031.

The main town, Market Harborough, lies to the south east of the district. Other important settlements include Lutterworth, to the south west; Broughton Astley, to the West; the villages of Scraptoft, Thurnby and Bushby lie close to the edge of Leicester and form part of the wider urban area. These are the areas where growth has been focussed under policies in the Harborough Core Strategy 2011. These settlements are likely to take a good proportion of the future growth, with some of the larger rural villages, such as the Kibworths, Great Glen, Billesdon, Fleckney, Houghton on the Hill, Ullesthorpe and Husbands Bosworth also seeing significant development. There are a number of options relating to the distribution of future growth, which has been the subject of a recent consultation (*A New Local Plan for Harborough: Options Consultation Paper, September 2015*).

2.3 Main watercourses

The district is unusual in that it is covered by three River Basin Management Plans (RBMP); Humber, Severn and Anglian regions. The district is also covered by Flood Risk Management Plans for the Humber, Severn and Anglian regions, which are due to be published very soon.

- Humber - The Upper Soar – a number of small brooks rise near Broughton Astley becoming the River Soar, which then flows north to Leicester City finally joining the Trent. Main tributaries include the River Sence and the Burton Brook flowing through Great Glen and Fleckney. Other brooks, such as the Willow Brook flow into Leicester joining the Soar in the City (Humber District River Basin Management Plan, 2009 https://www.gov.uk/government/publications/river-basin-management-plan-humber-district)
- Severn - The Upper Avon – the River Avon rises near Stanford Hall and flows south west out of the district into Warwickshire. The River Swift is an important tributary, flowing near Lutterworth, before joining the Avon (Severn District River Basin Management Plan, 2009, https://www.gov.uk/government/publications/river-basin-management-plan-severn-river-basin-district)

- Anglian region - The River Welland – rising near Sibbertoft in Northampton, the Welland flows east through Market Harborough. Main tributaries include the River Jordan, River Chater and the Eyebrook. (Anglian District River Basin Management Plan, 2014, https://www.gov.uk/government/publications/anglian-district-river-basin-management-plan)
- The Grand Union Canal – runs through the district from Leicester south close to Market Harborough and then east leaving the District near Stanford Hall

All of the rivers in the district are young rivers, marked by narrow and shallow river beds.

2.4 Biodiversity

The district is rural agricultural land, mainly grade 2 status. There are many hedges forming field boundaries and numerous small copses of trees. The area is not considered as having a high level of priority habitats, however there are many priority species in evidence including otters, badgers, bats and bullhead and common redstart.

The biodiversity of the district is not well monitored or measured. There are few designated nature sites, none of national significance, but two locally designated sites (LNR) and a handful of Local Wildlife Sites (LWS). There are fourteen sites of Special Scientific Interest (SSSI), seven of which are closely associated with water courses or water bodies, including the Grand Union Canal, the Eyebrook reservoir and Stanford Hall reservoir. SSSIs cover only 1.2% of the district. The majority of these SSSIs are in an unfavourable, recovering state according to Natural England. There are significant opportunities for enhancements to habitats to promote biodiversity.

2.5 Landscape and Geology

The District is characterised by heavy clay soils. These soils are often relatively impermeable, increasing the risk of more rapid run-off. They are also more prone to water-logging after persistent rain.

The Welland Valley is underlain by low permeability Lias clays, marlstone and clay soils, which can be prone to seasonal waterlogging. Diamicton till is present overlying the higher ground, with sand, gravel and silt in the lower valleys.

The upper reaches of the Avon and Swift are dominated by impermeable Lais clays and mudstones. Diamicton till is commonly present over higher ground, with sand, gravel and silt in the lower valleys.

The upper Soar and River Sence are characterised by loamy soils, underlain by carboniferous limestone and triassic mudstone. Limestone found in the upland areas of High Leicestershire is more permeable, but the dominant mudstone has high clay content and is less permeable.

The underlying geology, along with the relatively steep slopes to the rivers mean that often run-off can be rapid, especially during heavy rain.

3. Environmental Framework

The European Water Framework Directive (WFD) (2000/60/EC) promotes an integrated and coordinated approach to water management at the river basin scale. One of its key objectives is the requirement to prevent deterioration in status and achieve at least Good Ecological Status in inland and coastal waters following deadlines ranging from 2015 to 2027. The WFD also requires all Artificial or Heavily Modified Water Bodies to achieve Good Ecological Potential.

The Nitrates Directive (91/676/EEC) aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by the promoting of the use of good farming practices. The Nitrates Directive forms an integral part of the WFD and is one of the key instruments in the protection of waters against agricultural pressures.

The Future Water (2011), the water strategy for England, seeks to achieve a secure supply of water resources whilst protecting the water environment. This means greater efficiency in water use, application of Sustainable Urban Drainage Systems, managing diffuse pollution from agriculture, tackling flood risk and reducing greenhouse gas emissions.

The Flood and Water Management Act 2010 sets out the following approaches to flood risk management:

- Incorporating greater resilience measures into the design of new buildings, and retro-fitting at risk properties (including historic buildings);
- Utilising the environment, such as management of the land to reduce runoff and harnessing the ability of wetlands to store water; and Identifying areas suitable for inundation and water storage.

The Planning Act 2008 requires local plans to include policies that contribute to the mitigation of and adaptation to climate change. This is reflected in NPPF, particularly in Paragraph 94 relating to proactive strategies to mitigate and adapt in line with the Climate Act 2008.

Specific planning guidance on development and flooding is incorporated in National Planning Policy Framework (NPPF) paragraphs 99 to 103. Local Plans are required to take into consideration flood risk and to direct development away from areas of flood risk. The use of the sequential test, to direct development to low risk sites is indicated. In addition flood resilient design is advocated. Further guidance is available in Planning Practice Guidance; Flood Risk and Coastal Change (http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/). This guidance advises on the use of a Strategic Flood Risk Assessment, the sequential test, resilient design and sustainable drainage.

There are a range of public bodies with responsibility for flooding. The Environment Agency (EA) has a leading role, particularly in preparing Flood Risk Management Plans for each river basin. Lead Local Flood Authorities (LLRA) (usually upper tier or unitary councils) have responsibility for producing Flood Risk Management Strategy for local sources of flooding including surface water, groundwater and ordinary watercourses.(See https://www.gov.uk/guidance/flood-risk-management-plans-what-they-are-and-whos-responsible-for-them). Leicestershire County Council are the LLFA for Harborough District and have published their Local Flood Risk Management Study (http://www.leicestershire.gov.uk/sites/default/files/field/pdf/2015/12/8/flooding_strategy_plan.pdf)

Local Planning Authorities are responsible for allowing sustainable drainage systems (SuDS), as part of the wider planning consents. LLFAs are statutory consultees to any schemes that may impact on flood risk and are responsible for assessing SuDS schemes. The Environment Agency are also statutory consultees for any development in Flood Zones 2 and 3. Information on Sustainable drainage consenting is also covered in the NPPF and the companion planning guidance.

4. Water Supply

The water supply for the district comes mainly from Severn Trent Water, with a small part of the east of the district served by Anglian Water. Most of the potable water is brought in from neighbouring catchments. The Soar is a catchment with additional capacity for abstraction (see https://www.gov.uk/government/publications/cams-soar-abstraction-licensing-strategy). There are no significant ground water resources across the majority of district. There are a number of smaller aquifers, particularly in the north west of the district, but no significant aquifers. There are, however, three Groundwater Source Protection Zones (SPZ), in the south west of the district, close to North Kilworth, Husbands Bosworth and Sulby. These areas have been identified as at risk of possible contamination by pollutants.

Currently there are no significant pressures on the potable water system for the majority of the district. The majority of the district is considered to be moderately water-stressed. However, the east of the district is water stressed and there are some issues around water supply in the parts of the district supplies by Anglian Water. In addition the River Welland does drain to the east and there are significant areas outside of the district around Cambridgeshire and East Anglia that are severely water stressed. South of the district in the Thames Valley and Three Valleys water area, water resource is also highly stressed.

The UK Climate Change Impacts Assessments (UKCIP 2009 http://ukclimateprojections.metoffice.gov.uk/21708?projections=23820) do suggest that there will be drier summers in future, with a central estimate of up to 10% less rainfall by 2020 on the low emissions scenario. So it is likely that additional stresses on water resource will be experienced in the future. In addition the area is likely to see further development pressure for the foreseeable future.

In order to ensure that the district is resilient to future conditions, it would be advisable to adopt a higher standard of 110 litres per person per day (lpd), than the normal building regulations standard of 125 lpd. This would also ensure a common standard across the district, rather than attempting to only include it for development in the east of the district.

5. Waste Water Infrastructure

Waste water treatment is carried out by Severn Trent Water in the west and Anglian Water in the east. The capacity of the individual waste treatment sites is very closely linked to the location of future developments. In order to assess the capacity of the waste treatment infrastructure, the two companies were approached with data on all sites put forward for development as part of the Strategic Housing Land Availability Assessment (SHLAA) call for sites 2015 (Technical Consultation Report 2015: http://www.harborough.gov.uk/directory_record/571/strategic_housing_land_availability_assessment_20132014)

The data was delivered as a RAG assessment for each development. Red indicates that there are major constraints to provision of infrastructure and/or treatment to serve proposed growth. Thus any development could be put at risk or delayed. Amber indicates that infrastructure and/or treatment upgrades will be required to serve proposed growth or diversion of assets may be required. Green indicates there is still capacity within the system. The results indicate that there are certain treatment plants that are near or at capacity. Whilst the water company would upgrade any treatment work if planning permission was granted, this could lead to a 12 to 18 month delay in the capacity upgrade. In addition some of the Local Plan options relate to very large Strategic Development Areas (SDAs) and it may be necessary to bring upgrades forward to facilitate a large development once preferred options are chosen.

All of the sewage treatment works are susceptible to disruption by high levels of surface run-off and the capability of the plant may be extended if surface water is well treated. Going forward the separation of foul flows is advisable. Storm water should be treated by SuDs to ensure that any increased flows do not cause Combines Sewer Overflows or pumping stations to be operated more frequently. In addition sites that are susceptible to flooding that might require additional pumping, further reducing capacity, would need to be carefully assessed in a surface water management plan

The results for the treatment works in the district are summarised below:

Water Treatment Plant	Operator	Potential Impact of Development	Comment
Market Harborough	Anglian Water	Medium	Upgrade may be required
Husbands Bosworth	Anglian Water	Medium	Upgrade may be required
Kibworth	Anglian Water	High	Upgrade will be

			required
Foxton	Anglian Water	Medium	Upgrade may be required
Hallaton	Anglian Water	High	Upgrade will be required
Medbourne	Anglian Water	High	Upgrade will be required
Tugby	Anglian Water	Low	
Swinford	Severn Trent	Low	
Billesdon	Severn Trent	Low	
Boughton Astley	Severn Trent	Low	High if large development near Broughton Way envisaged
Hungarton	Severn Trent	Low	
Wanlip	Severn Trent	High	Upgrade required for further Thurnby, Bushby and Scraptoft development
Great Glen	Severn Trent	Low	
Lutterworth	Severn Trent	Low	Rises to High for Lutterworth East SDA option
Houghton-on-the-Hill	Severn Trent	Low	
Arnesby	Severn Trent	Low	
Fleckney	Severn Trent	Low	
Kimcote	Severn Trent	Low	
South Kilworth	Severn Trent	Low	
Swinford	Severn Trent	Low	
Claybrooke Magna	Severn Trent	Low	
Oadby	Severn Trent	Low	
Gaulby	Severn Trent	Low	

Table 1: Capacity of Waste Treatment Plants.

6. Water Quality

The Water Framework Directive (WFD) requires the monitoring of each water body, including artificial or man made water bodies and plans to improve the water quality in each water body. The Environment Agency is the competent authority for the implementation of WFD and local authorities must have "regard to the WFD when considering the potential impacts on the water environment". The WFD requires that there is "no deterioration" in the water body status. In addition to "no deterioration", the WFD requires water bodies to reach an overall designation of good. The status of a water body is measured across a number of elements. All elements must be at good ecological status or potential.

Below is a table of all of the water bodies in Harborough District and their status as of 2014 (Cycle 2). The majority of waterbodies in the district meet at least the moderate status. The main reason for failure to reach good status is identified in the data against each water body. Sources of phosphate are typically via water recycling centres and agricultural activities. It should be notes that not all water recycling discharges occur within the district boundaries (e.g. Sibbertoft on the Welland headwaters), so co-operation with neighbouring authorities is essential.

Catchment	**Watercourse**	**Main settlement SRV or higher)**	**WFD status (2013)**
Welland	Welland (Headwaters to confluence with the Jordan)	Market Harborough	Poor
	Welland (confluence with Jordan to confluence of Langton Brook	Market Harborough	Moderate
	Welland confluence Langton Brook to confluence with Gwash	Medbourne	Moderate
	Jordan	Market Harborough Little Bowden	Moderate
	Upper Chater	Rural (Welham)	Bad
	Langton Brook	Kibworths (and Langtons)	Moderate
	Stonton Brook	Rural (Thorpe Langton)	Bad
	Eye Brook	Tilton on the Hill	Good
	Eyebrook Resevoir	Great Easton	Moderate

	Medbourne Brook	Hallaton and Medbourne	Poor
Soar	Soar (source to Soar Brook)	Claybrooke Magna	Good
	Soar (Soar brook to Thurlaston Brook	Broughton Astley	Moderate
	River Sence (source to Burton Brook)	Billesdon, Great Glen	Moderate
	River Sence Burton Brook to Countesthorpe Brook	Fleckney	Moderate
	Burton brook (source to River Sence)	Great Glen	Poor
	Willow Brook Source to Evington Brook	Houghton on the Hill, Thurnby	Moderate
	Evington Brook Source to Willow Brook	Stoughton	Moderate
	Grand Union Canal (Market Harborough to Leicester)	Market Harborough, Fleckney, Kibworths	Moderate
	Whetstone Brook	Gilmorton	Moderate
	Countesthorpe Brook	Gilmorton (Shearsby)	Moderate
	Melton Brook	Keyham	Moderate
	Syston Brook	Hungarton	Moderate
Avon	Swift Source to confluence with Avon	Lutterworth	Moderate
	Avon source to Yelvertoft Brook	Swinford and N. Kilworth	Moderate
	Grand Union Canal Welford Arm	Husbands Bosworth, North Kilworth	Good
	Grand Union Canal Leicester line Summit pound	Husbands Bosworth, North Kilworth	Good
	Stanford Reservoir	South Kilworth	Moderate

Table 2: WFD status for waterbodies in Harborough District
Source: Environment Agency Catchment Data Search
http://environment.data.gov.uk/catchment-planning/

The WFD requires European member states to produce river basin management plans to describe the status and measures to improves the status of water bodies. The Catchment Based Approach (CaBa) is the preferred approach of DEFRA, to address issues leading to less than good status. This looks at how partners across a catchment can jointly address these issues for mutual benefit. Across Harborough district there are a number of projects on-going to improve water body status. The Welland Valley Partnership was formed in 2011 to embrace the CaBa and produced the “Enhancing the Welland” action plan, through which a number of issues are being addressed. Similarly issues on the Soar are being considered by the Soar Catchment Partnership.

The Welland Rivers Trust has undertaken two large projects, one to reduce the leakage from rural septic tanks into the upper Welland valley and the second; a re-naturalisation of the Welland through the town of Market Harborough, which completed early 2015. The River Welland was returned to a low flow river with a narrower channel being dug out at the bottom of the wide channel that existed. A number of weirs and obstacles were removed to improve the flow and natural river features such as riffles and pools were reinstated. New planting was undertaken in the river channel. The appearance of the river has improved dramatically and initial results suggest an improvement in water quality within the town. (*CRF Final Report: The Welland for People and Wildlife: Market Harborough; Welland Rivers Trust; 2015*)

The Allerton Project at Loddington has investigated a number of ways of using farm practices to improve water quality in rural watercourses, particularly within the Eyebrook catchment (Exploring a Productive Landscape – From a Long History to a Sustainable Future in the Eye Brook Catchment; C. Stoate, 2010: http://www.gwct.org.uk/allerton/catchment-research/eye-brook-community-project/). This research showed that improvements to practices have a very rapid effect on water quality and has identified a number of helpful farm practices and is informing other projects in the area.

A number of brooks in the north east of the district flow into the Willow brook that flows through Leicester and into the Soar. There are a number of issues on the Willow brook that lead to it having poor WFD status in Leicester. A catchment based approach is engaging stakeholders in the rural area and the city to improve issues around water quality, litter and flooding with the aim of improving the status of the brook. Farm based measures and community engagement is underway in the catchment.

7. Flood Risk

Flooding occurs when natural or man-made systems are unable to cope with the amount of rainfall over a period. Rivers have natural flood plains as areas in which to discharge this water, for the flood period. Overall less than 10% of Harborough District can be considered as flood plain, i.e. within Environment Agency defined Flood Zone 3. Flood Zone 3 is defined as a 1 in 100 (1%) chance of flooding in any given year.

When man-made systems are unable to cope, flooding can occur in a less predictable way, depending upon the integrity of the system, which can lead to flooding due to rainwater run-off or pluvial flooding. Appendix A identifies flooding incidents logged since 2011, when Leicestershire County Council became the Lead Local Flood Authority (LLFA).

7.1 Fluvial Flooding

Harborough District is covered by three catchment flood management plans:

- River Trent – upper Soar and rural Leicestershire sub areas
- River Welland – Market Harborough, upper tributaries and Welland and glens sub areas
- River Severn – Upper Avon sub area

All of these areas are considered to be of low to moderate flood risk. The majority of the land is rural agricultural. The Catchment Flood Management Plans identify the importance of joint action to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment (Policy 6). This is particularly important for the tributaries to the Soar in rural Leicestershire that flow into Leicester city and the Upper Avon that flows into Rugby. In other areas of low risk the Catchment Flood Management Plan is looking at the possibility of reducing the maintenance of flood defences (Policy 2) as they are unsustainable in such a low risk area. In some areas, such as Market Harborough flood defences are identified as adequate, but will need maintaining (Policy 3). The implications of climate change have been factored into these approaches.

There are approximately 23 flood defence balancing areas within the district, some of which are maintained by HDC and an annual inspection and condition survey is carried out on all of them. There are also six critical ordinary watercourses that are also inspected on an annual basis. These are located in Billesdon, Fleckney, Foxton, Little Bowden, Lutterworth and Walcote; and are all currently in ‘good condition’ and receiving maintenance to an acceptable or good standard. Appendix D and E show the location of Environment Agency maintained flood defences in Market Harborough and the district..

A Strategic Flood Risk Assessment (SFRA) for Harborough District was completed and published in 2009. This identified historical flooding incidents, including, river, rainwater run-off and sewer flooding. There have been significant policy changes, since the SFRA was published, as highlighted in section 3. The Environment Agency is also currently reviewing its “Climate Change Allowances for Planners” procedures.

The Study identified fluvial flood risk in Market Harborough, Lutterworth, Broughton Astley, Great Glen, with a lower risk at the Leicester fringe (Scraptoft, Thurnby and Bushby), the Kibworths, Lubenham and Foxton. In some areas there is not enough information on the impacts of climate change. The Environment Agency is currently in the process of doing new modelling on the Welland and upper Soar and drawing together data on the Avon. The new modelling of climate change impacts is also planned. Once this data is available an update of the SFRA would be of value.

7.2 Pluvial Flooding

The flood risk from excess rainwater run-off is significant. A number of settlements are prone to surface water flooding events when there is heavy rainfall. Market Harborough suffered major flooding in the town centre in summer of 2013, in addition to the incidents identified by the SFRA. Anglian Water has just completed further sewer works to provide another channel into the retention tank under commons car park, to increase capacity. Previously the infrastructure was designed to deal with a 1 in 30 event; it is now able to cope with a 1 in 100 event. However, with climate change, a current 1 in 100 event, will occur more frequently, so further improvements may be required. Business owners have also been offered individual flood defences, such as flood doors.

Peatling Magna, Dunton Basset, North Kilworth and Kibworth Beauchamp are also particularly susceptible to surface water flooding. With all new developments across the district, it is important to ensure that flood risk is not increased as a result of the additional surface water. All new developments are required to include Sustainable Drainage Systems (SuDS), but it is important that there are well designed and that the performance is monitored to ensure that the risk of flooding from run-off is not increased.

7.3 Sequential Test for development

The SFRA has developed an approach to applying the sequential test, which will form part of the Options evaluation for the new Local Plan for Harborough District, both in this study and in the final choice of a preferred option.

The sequential test directs development away from flood zones with higher risk.

- Flood zone 1 is an area which has less than a 0.1% annual exceedance probability (1 in 1000) of a flood occurring in each year. The majority of England and Wales falls into this are (identified as clear on the flood risk map).
- Flood zone 2 identifies areas likely to be affected by a major flood (between 1% and 0.1% annual exceedance probability(between 1 in 100 and 1 in 1000 year)) of occurring each year (identified by light blue on the flood risk map).
- Flood Zone 3 defines the area which could be flooded by rivers if there were no flood defences. This area could be flooded from a river by a flood that has a 1% (1 in 100) or greater chance of happening every year. Flood Zone 3 includes functional flood plain (identified by dark blue on the flood risk map)

Flood risk can be viewed on the Environment Agency's flood map http://maps.environment-agency.gov.uk/wiyby/wiybyController?lang=_e&topic=floodmap&layer=default&ep=map&layerGroups=default&scale=8&x=473228&y=293147#x=472121&y=291466&lg=1,2,10,&scale=6

The information shown does not take account of the impact of future climate change. In general, all development should take place on flood zone 1. In practice highly vulnerable and vulnerable development, such as hospitals, care homes and emergency command centres should be located in zone 1. Less vulnerable development, such as shops, offices can be sited in zone 2. In this case there needs to be proof that this is the best place for development by using the Exception Test. Flood zone 3 should not have development, except for water compatible development, such as flood controls, water pumping and transmission infrastructure and amenity open space. Table 2 in the National Planning Policy Technical Guidance provides more information on flood risk vulnerability http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/.

8. Assessment of the Options for the Local Plan

The Local Plan will allocate strategic sites for development. In order to develop a preferred location for these sites, Harborough District Council has gone through an Options consultation. Nine different options were identified as possible ways to deliver the housing needed in the district to 2031. These options were put out to public consultation in autumn 2015. The preferred option will be chosen based not only on the consultation but also on the other evidence, including this watercycle study.

The issues relating to water supply and treatment, flooding and climate change for each option are for each of the settlements identified as likely to see development. Settlements are arranged in a hierarchy that corresponds to the access to services, with the area adjacent to Leicester having access to the greatest number of services and the sub-selected rural villages having access to the fewest. Appendix B highlights the flood risk for individual settlements considered in the Local Plan.

- **Principal Urban Area**, adjacent to Leicester City – Scraptoft, Thurnby and Bushby, **Sub-Regional Centre** – Market Harborough
- **Key Centre** – Lutterworth, Broughton Astley
- **Rural Centres** – Billesdon, Fleckney, Great Glen, Houghton on the Hill, Husbands Bosworth, The Kibworths, Ullesthorpe.
- **Selected Rural Villages** - Bitteswell, Church Langton, Claybrooke Magna, Dunton Bassett, Foxton, Gilmorton, Great Bowden, Great Easton, Hallaton, Lubenham, Medbourne, North Kilworth, South Kilworth, Swinford, Tilton, Tugby.

The various options have different scales of impact and there are different issues to consider. Appendix C includes a table to the different numbers of houses expected in each settlement.

Option 1 Rural

This option has the most dispersed form of development, with higher numbers of houses directed to the Selected Rural Villages (SRVs) than in other options. The majority of the development is still in Market Harborough, Scraptoft and Thurnby and the key centres. The smaller water treatment works have capacity, so the more dispersed development may be more easily accommodated, with fewer requirements for upgrades. Many of the smaller villages are very rural and are on small water courses, so water quality is less likely to be affected, however, if sustainable drainage systems are not well designed there may be a greater amount of run-off water from hard surfaces going into the water course, with potential for higher levels of pollution, increasing the risk that the targets for the WFD will not be met. Few of the

very small villages are at high risk of flooding, however, many sit on or close to watercourses that flow into nearby urban areas. Increased flow into the streams due to raised run-off from hard surfaces may lead to increased flood risk in nearby urban areas. The EA has identified that many of the rural upstream areas should be used to increase storage during high rainfall periods. Well designed sustainable drainage systems may be able to enhance the flood risk down stream.

Areas that are perhaps of concern for this option are Great Glen and Broughton Astley. Both are at risk of flooding, with a number of properties at risk. However, Broughton Astley has already committed to building over 600 dwellings and so no further development is proposed in Broughton Astley.

Figure 2: Broughton Astley river flood risk

Great Glen has some flood defences in the area where the River Sence meets the Burton Brook, but this can flow very high during times of flood. As well as sustainable drainage systems on new developments, it is vital that other ways of holding up water from existing development are investigated. This is particularly important for surface water, which could affect any settlement. It is important that resilience is designed in, ensuring there are sufficient areas where water can be stored during periods of heavy rain. In addition the Burton Brook at Great Glen has poor water quality, it would be important to factor in any possibility for improvements.

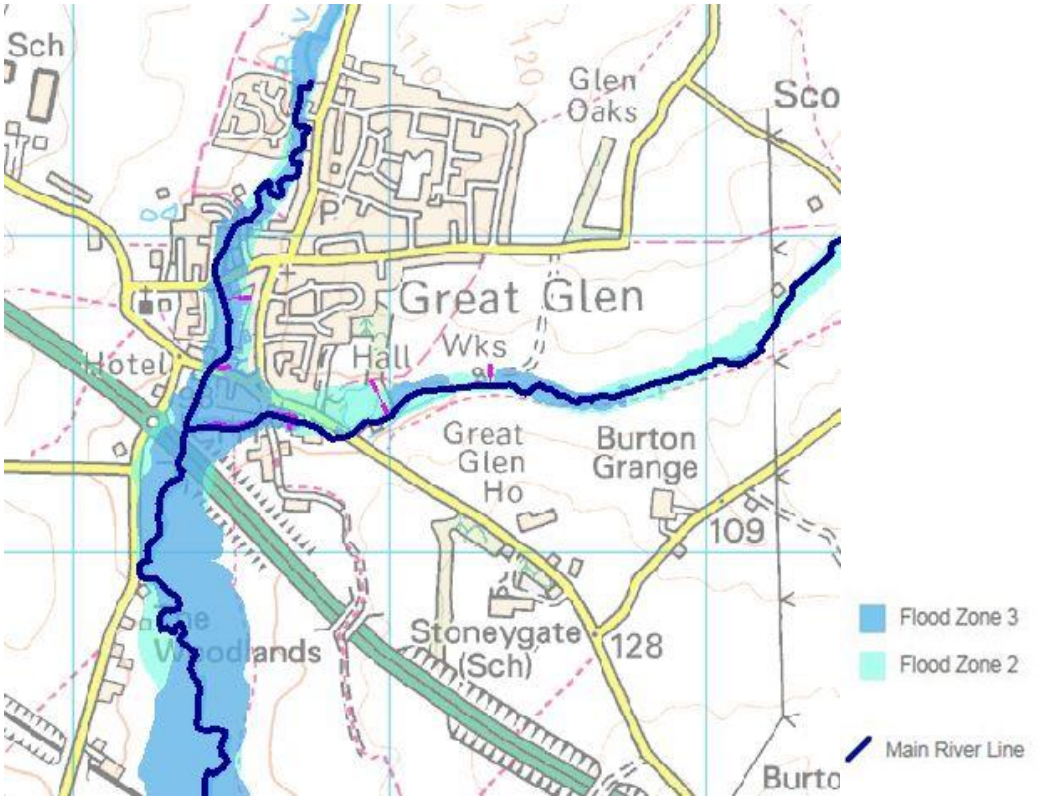

Figure 3: Great Glen river flood risk

Option 2 Core Strategy

This option sees development continue in the pattern we have seen for the last few years. Market Harborough would see a high level of development, along with the Principal urban area of Scraptoft/Thurnby.

Market Harborough's waste treatment works have adequate capacity for new development, however, only permitted capacity for just over 400 homes. Additional upgrades to treatment works may be required. The River Welland has undergone significant improvements that should lead to much improved water quality. Market Harborough's flood defences are designed for a 1:75 year event. The indications from climate projections, together with significant new development, show that this may not be sufficient in future. Improvements to defences may be required late into the Local Plan period. Market Harborough suffers from significant surface water flooding in incidents of heavy rainfall. Anglian Water has instigated some improvements, following the floods in 2013. However, the improvements would still not deal with the level of rainfall experienced in 2013. Market Harborough has seen a very high level of new development. Sustainable drainage schemes will be essential to ensure that these developments do not add to the issue of surface water flooding. The new Local Plan should also ensure that sustainable drainage is included during construction, following the guidelines published by CIRIA

(SuDs Manual C753
http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx) .

The Principal Urban Area of Scraptoft, Thurnby and Bushby have significant capacity issues at the waste treatment plant at Wanlip. Any additional development would require upgrades. The water quality on local brooks is moderate, but opportunities to improve it would help with the issues downstream in Leicester City. There are some local flooding issues on some of the brooks in the area. In general few homes are at risk. However, additional water flowing into the local Scraptoft, Bushby and Thurnby brooks due to new development, could have a very significant impact downstream in Leicester City. These brooks flow into the Willow brook, which is a particularly constrained watercourse, liable to flash flooding. Large numbers of properties are at risk. Any developments in Thurnby and Bushby or Scraptoft, would need to be designed to hold up more water than just to stop local flood issues.

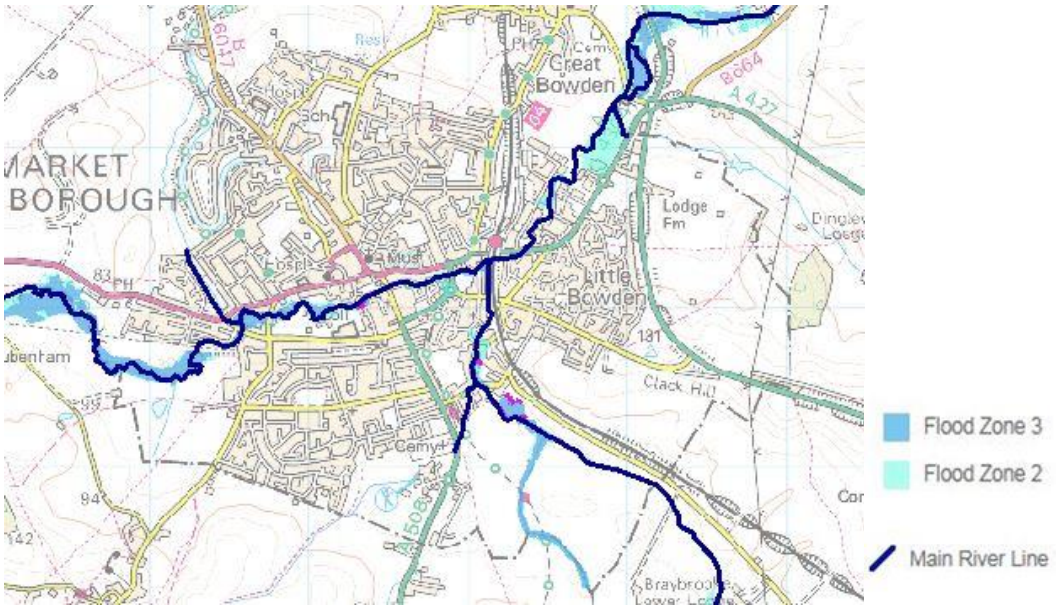

Figure 4: Market Harborough river flood risk

Options 3 Urban

This option would see an even greater concentration on Market Harborough and the PUA. The issues mentioned in Option 2 would be even more relevant in this option.

Option 4 Scraptoft/Thurnby SDA

This option would see over a third of all development take place in the PUA, with over 1000 houses envisaged. Major development at Scraptoft, Thurnby and Bushby would require a substantial upgrade of the waste treatment works at Wanlip. This plant is at capacity already. As stated above, there is some local flood risk from local watercourses and from surface flooding, but of greater import is the potential for additional flood risk downstream in Leicester. Any major development should incorporate sustainable drainage that is designed to hold back a greater amount of rainfall than required just for local flooding and opportunities to improve local water quality should be identified. Scraptoft has a Local Nature Reserve, which should also be improved if feasible.

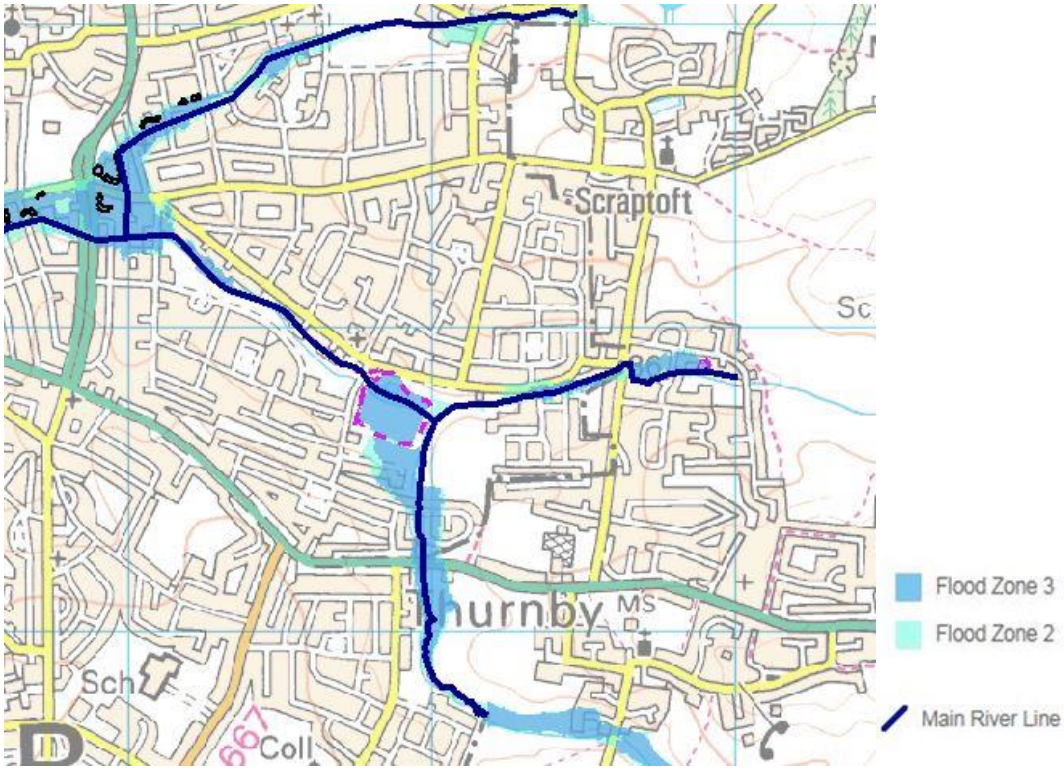

Figure 5: Scraptoft, Thurnby and Bushby SDA river flood risk

Option 5 Kibworth SDA

This option envisages major development at the Kibworths. Around 1200 homes would be built, with additional infrastructure, a school and employment areas. The waste treatment plant at the Kibworths is very close to its capacity, any significant new development would require an upgrade to the facilities. Kibworth does have some low risk of flooding from the Langton Brook and the fields are regularly waterlogged. The Environment Agency have indicated that there is evidence that the flood risk at the Kibworths has been

underestimated. The EA are planning some additional modelling, which will need to inform any decision. Any new developments would need to ensure that rainwater was captured and released slowly into the brook. It is important that flood risk is not increased and where possible reduced. The water quality of the Langton Brook is moderate as is the water quality of the Grand Union Canal that runs near to Kibworth. Opportunities to improve water quality of these water courses should be an important element of new development. There is also a risk of surface water flooding in the Kibworths, again major development and the trends due to climate change are likely to make this worse. Improvements in current drainage and the use of sustainable drainage will be important to reduce the risk of future flooding. Sustainable drainage systems during construction are also important and should be included in policy.

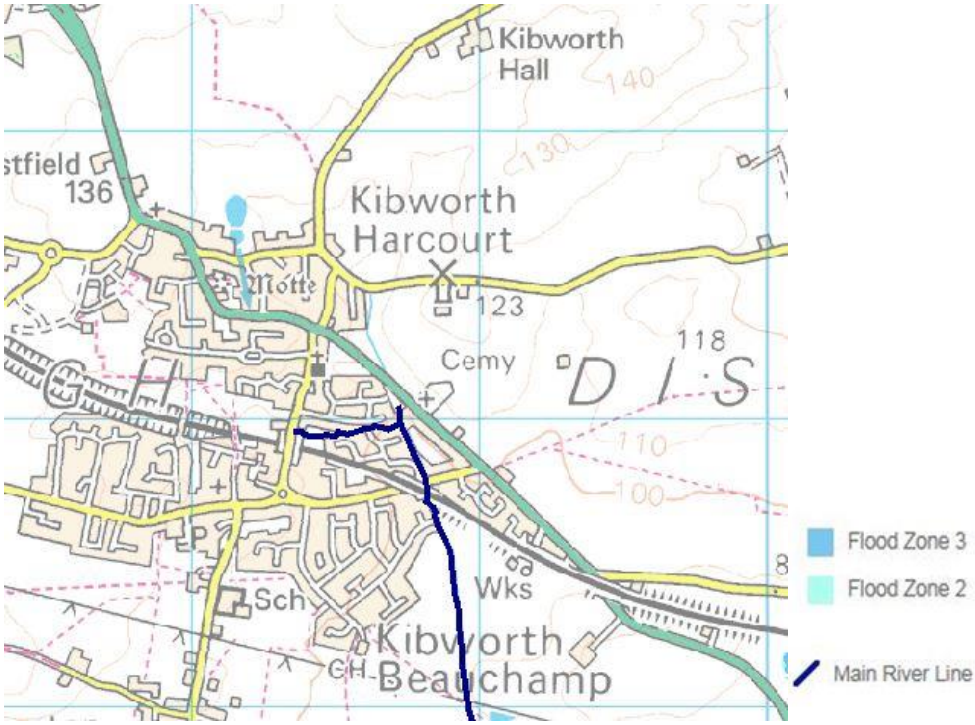

Figure 6: The Kibworths SDA river flood risk

Option 6 Lutterworth SDA

This option would see almost 2000 new homes built near Lutterworth, east of the M1 motorway up to 2031, with additional homes after that period. This would equate to almost a fifth of the development in the district. In addition to the homes, there would also be employment land, new infrastructure, a school and retail. There is currently capacity in the Lutterworth wastewater treatment plant. However, should a very large development of the scale suggested for the Lutterworth East SDA, then improvements would be likely to be needed.

Lutterworth itself, does have some risk of river flooding, however, this development would not contribute to the flow in the River Swift running west of Lutterworth, but would impact on the eastern arm of the Swift, which currently flows through a very rural area. At the heart of this development is the Misterton Marshes SSSI, where a tributary of the Swift runs through. The marshes are a wetland area and have a status of unfavourable recovering. Any development would need to be designed to protect the integrity of the SSSi and if possible bring improvements to the status.

The site for the SDA has a large area of wetland that is prone to flooding and waterlogging. There is a significant area of high flood risk that could not be developed to the south of the site. In addition, increasing the amount of impermeable surfaces could increase the areas at risk of flooding. It is also important that the additional run-off does not impact on urban areas downstream in Rugby, where there is risk of flooding. The EA has indicated this is an area where they would like to see additional storage of water to relieve flood risk downstream. In addition development would need to be designed to improve water quality, if feasible. It is particularly important to ensure that sustainable drainage is in place during construction, as the run-off from construction sites can carry large quantities of silt, which increases flood risk.

The sequential test would suggest that development is directed away from flood zones 2 and 3 that occur in the Lutterworth East SDA site, if possible.

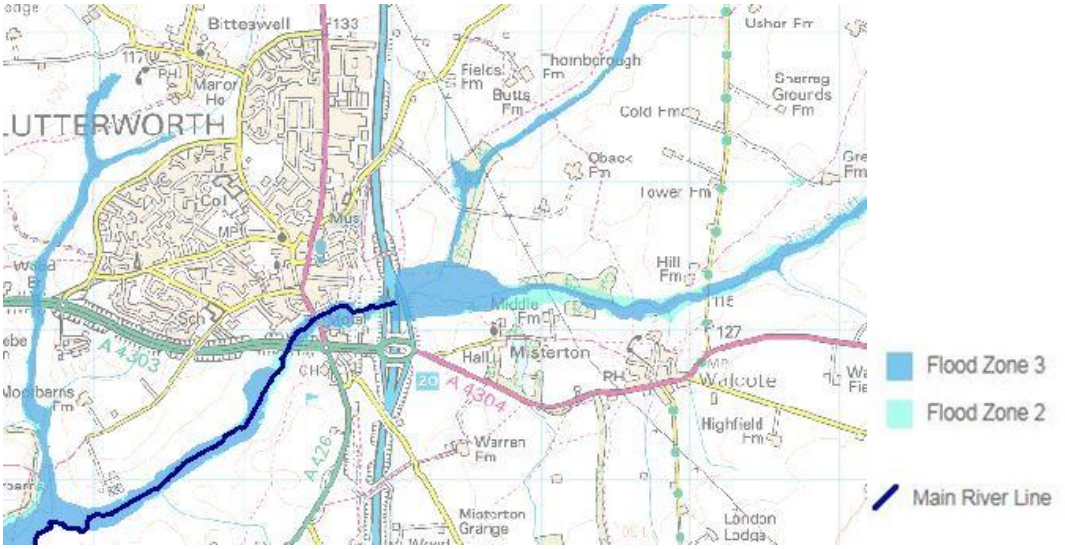

Figure 7: Lutterworth and Lutterworth East SDA river flood risk

Option 7, 8 and 9

These options are amalgams of the previous options and have the same risks identified above. The table below summarises the risks for all options.

Option *(see Appendix C for number allocations)*	**Water Supply and Treatment**	**Water Quality**	**Flood Risk**
Rural	Unlikely to be capacity issues	Burton Brook at Great Glen – status bad, would be an issue	Requirement for storage of rainfall to protect downstream urban areas. Flood risk in Great Glen
Core Strategy	Capacity issues at Scraptoft/ Thurnby	Upstream improvements to support Willow Brook in Leicester	Potential need for enhance flood defences in Market Harborough. Additional capacity for surface water needed.
Urban	Capacity issues at Scraptoft/ Thurnby	Upstream improvements to support Willow Brook in Leicester	Potential need for enhance flood defences in Market Harborough. Additional capacity for surface water needed.
Scraptoft /Thurnby SDA	Capacity issues at Scraptoft/ Thurnby	Upstream improvements to support Willow Brook in Leicester	Requirement for storage of rainfall to protect downstream urban areas.
Kibworth SDA	Capacity Issues at Kibworth	Improvements to Langton Brook and Grand Union canal needed	Additional development could increase risk of surface water flooding in Kibworth
Lutterworth SDA	Capacity currently ok, but upgrade needed with large development	Maintenance and enhancement of Misterton Marshes SSSI vital	Significant area at high risk of flooding. Extensive area of Flood Zone 3. Requirement for storage of rainfall to protect downstream urban areas. Protection of Misterton Marshes SSSI
Scraptoft/ Thurnby SDA and Kibworth SDA	Capacity issues at Scraptoft/ Thurnby	Maintenance and enhancement of Misterton Marshes SSSI vital. Upstream improvements to support Willow Brook in Leicester	Requirement for storage of rainfall to protect downstream urban areas.
Scraptoft/Thurnby SDA and Lutterworth SDA	Capacity issues at Scraptoft/ Thurnby. Capacity Issues at Kibworth	Upstream improvements to support Willow Brook in Leicester. Maintenance and enhancement of Misterton Marshes SSSI vital.	Significant are at high risk of flooding. Requirement for storage of rainfall to protect downstream urban areas. Protection of Misterton Marshes SSSI

Lutterworth SDA and Kibworth SDA	Capacity currently ok at Lutterworth, but upgrade needed. Capacity issues at Kibworth	Maintenance and enhancement of Misterton Marshes SSSI vital. Improvements to Langton Brook and Grand Union canal needed	Significant area at high risk of flooding. Requirement for storage of rainfall to protect downstream urban areas. Protection of Misterton Marshes SSSI.

Table 3: Impact of each of the Consultation Options

9. Conclusions

Harborough District is a mainly rural district. It has a good water supply, mainly brought in from other areas in Severn Trent's area, but with additional capacity in the Soar catchment. Many of the waste water treatment plants do have capacity for additional development, however, some areas, especially Scraptoft/ Thurnby and the Kibworths have low capacity.

The soils are mainly heavy clay, with underlying impermeable rocks, this means that rainfall is slow to drain away leading to surface run-off, which can increase the risk of flooding, either through increasing river levels, or by flowing onto roads. However there are a comparatively low number of homes at risk of flooding. The Environment Agency has identified the opportunities to reduce flooding in downstream urban areas, by holding rainfall in the rural areas of the district. This is particularly important for the Soar and the Avon.

Most water bodies in the district are at a WDF status of moderate, so there is some work to ensure that they are improving to good by 2027. There are two watercourses with status of bad; the Stonton Brook and the Upper Chater, both of these are rural streams, so development will not impact on them. Four waterbodies have a status of good, including parts of the Grand Union Canal. These waterbodies are also mainly rural. Increased flows of treated sewage will have an impact on water quality. Opportunities for improving water quality should be investigated and new development should always use opportunities to improve water quality of nearby waterbodies through the use of good quality SuDS and water retention. The naturalisation of water courses is also an important part of improving water quality with new development.

The risks posed by climate change mean that both surface water flooding and river flooding are likely to increase. Market Harborough is already at risk and is likely to come under increased risk, in spite of improvements that have been put in place. Great Glen, the Kibworths, Broughton Astley also are at risk of increased river flooding. Development in the district can also have an impact on larger urban areas downstream, where many homes are at risk. The EA has identified the need to increase storage in the rural areas upstream of Leicester and Rugby.

The different options for development bring different challenges. There are however some common themes and these are the recommendations for the Local Plan:

- No development should occur on functional flood plain (Zone 3b). Developments in flood zone 2 or 3a should be subject to the sequential test. Flood zone 2 should be included to ensure that any additional risk due to climate change or new development is considered.

- Sustainable drainage systems need to be well designed taking into consideration the soil type. These systems should have capacity to hold up additional rainfall to protect vulnerable areas down stream and should be designed to meet the highest standards as suggested by CIRIA.
- During construction, developers need to ensure that there are suitable sustainable drainage systems in place, to ensure that there is not excessive run-off with high levels of silt from a construction site. This should be a condition on the development of a site.
- Opportunities for improved water quality should be investigated. The main water quality element leading to non compliance is phosphate. The two main contributors are agriculture and water recycling plants. The Local Plan must ensure that the additional phosphate load from new development is taken into consideration in any plan policies. In particular the impact of potentially drier weather and drought due to climate change must be considered.
- Although Harborough District is not in a water stressed area, there are areas downstream that are severely stressed. Climate change scenarios indicate this will get worse, so it is important to try to encourage water efficiency in new development.
- The SFRA should be updated once new climate modelling is completed

In relation to the development options there are various issues that should be considered in the choice of option:

- Options focusing on Market Harborough should consider the need for additional flood defences going forward. Any developments should ensure that they retain all of the water that was previously retained on green fields and more if possible to reduce the surface water flooding risks.
- Options including development in Scraptoft/Thurnby should include specific measures to reduce risk downstream in Leicester and should looks at opportunities to design sustainable drainage systems that improve water quality. Where possible as much or more rainwater should be stored than is the case on green fields.
- Options including development at Kibworth should ensure that additional surface run-off does not increase flood risk, through careful SuDs design.
- Options focussing on Lutterworth are subject to a high flood risk. Application of the sequential test would suggest that development should be directed away from flood zones 2 and 3 of the Lutterworth East SDA. If development does go ahead then careful consideration of water management is essential and any plans should also ensure that the integrity of the Misterton Marshes SSSI is maintained and that the status

of the SSSI is improved as part of the conditions for the development. Opportunities for additional rainwater storage to protect downstream urban areas should be included in the site planning.

- Additional development in Great Glen, Broughton Astley, and other sites with flood risk should be required to reduce run-off to no more that from the undeveloped site.

References

Census; 2011; http://www.ons.gov.uk/ons/guide-method/census/2011/index.html

Leicester and Leicestershire Strategic Housing Market Assessment; G.L. Hearn; 2014; http://www.harborough.gov.uk/directory_record/565/strategic_housing_market_assessment

Harborough District Adopted Core Strategy, 2011; http://www.harborough.gov.uk/core-strategy

"New Local Plan for Harborough: Options Consultation paper"; Harborough District Council; 2015; http://www.harborough.gov.uk/downloads/file/1595/new_local_plan_options_consultation_paper

River Trent Catchment Flood Management Plan; Environment Agency; 2010; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289105/River_Trent_Catchment_Management_Plan.pdf

River Severn Catchment Flood Management Plan; Environment Agency; 2009; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/289103/River_Severn_Catchment_Management_Plan.pdf

River Welland Catchment Flood Management Plan; Environment Agency; 2009; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288870/River_Welland_Catchment_Flood_Management_Plan.pdf

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy; http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060

Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources; http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31991L0676

Future Water: The Governments water strategy for England, DEFRA, 2011, https://www.gov.uk/government/publications/future-water-the-government-s-water-strategy-for-england

Planning Act 2008; http://www.legislation.gov.uk/ukpga/2008/29/contents

Climate Change Act 2008; http://www.legislation.gov.uk/ukpga/2008/27/contents

Flood and Water management Act 2010; http://www.legislation.gov.uk/ukpga/2010/29/contents

National Planning Policy Framework; 2012; https://www.gov.uk/government/publications/national-planning-policy-framework--2

Planning Practice Guidance; Flood Risk and Coastal Change; 2015; (http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/

Flood Risk Management Plans: What they are and Who's responsible for them; 2014; https://www.gov.uk/guidance/flood-risk-management-plans-what-they-are-and-whos-responsible-for-them

Soar Abstraction License Strategy; Environment Agency; 2013; https://www.gov.uk/government/publications/cams-soar-abstraction-licensing-strategy

The UK Climate Change Impacts Assessments: UKCIP; 2009; http://ukclimateprojections.metoffice.gov.uk/21708?projections=23820

Strategic Housing Land Availability Assessment - Technical Consultation Report; Harborough District Council; 2015; http://www.harborough.gov.uk/directory_record/571/strategic_housing_land_availability_assessment_20132014

Environment Agency Catchment Data Search; http://environment.data.gov.uk/catchment-planning/

CRF Final Report: The Welland for People and Wildlife: Market Harborough; Welland Rivers Trust; 2015

Exploring a Productive Landscape – From a Long History to a Sustainable Future in the Eye Brook Catchment; C. Stoate; 2010, http://www.gwct.org.uk/allerton/catchment-research/eye-brook-community-project/

SuDs Manual C753; CIRIA; 2015; http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

Appendix A Flood Events post 2011 (Data from LLFA – Leicestershire County Council)

Incident Date	Parish	Settlement	Street	Description
15-Apr-13	East Langton CP	East Langton	Back Lane	Highway Flooding due to surface water
15-Apr-13	Fleckney CP	Fleckney	Lodge Road	External property flooding from French drains and surface water run off
21-Dec-12	Great Glen CP	Great Glen	Station Road	External property flooding due to poor maintenance of watercourse
	Bringhurst CP	Bringhurst	Drayton Road	Blocked Ditch/Highway gullies
	Lutterworth CP	Gilmorton	Gilmorton Road	Highway flooding and property flooding due to undersized culvert
	Market Harborough	Market Harborough	Northampton Road	rugby club internal flooding - silted ditch and overland flows
28-Jul-13	Market Harborough	Little Bowden	Glebe Road	Flooding from development - surface water run off when top soil stripped
02-Aug-13	Kibworth Beauchamp CP	Kibworth Beauchamp	Springfield Crescent	Property Flooding from sewer network
27-Jul-13	Market Harborough	Market Harborough	The Square	Internal property flooding due to extreme rainfall event see published report (http://www.leics.gov.uk/market_harborough_tc_detailed_flood_investigation_final.pdf)
08-Aug-13	Kibworth Beauchamp CP	Kibworth	Dover Street	Property Flooding due to maintenance of Ordinary Watercourse
27-Jul-13	Fleckney CP	Fleckney	Forge Close	External property flooding from blockage in watercourse and intense rainfall
	Kibworth Beauchamp CP	Kibworth Beauchamp	Weir Road	Property flooded from Anglian water system
29-Jul-13	Theddingworth CP	Theddingworth	Main Street	highway and property flooding due to highway drainage system
	Billesdon CP	Billesdon	Long Lane	Highway and external property flooding due to flows from adjacent land
27-Jul-13	Market Harborough	Market Harborough	Summers Way	highway and property flooded from wildlife area
28-Oct-13	Great Glen CP	Great Glen	Orchard Lane	Internal property and highway flooding from the main river
28-Oct-13	Burton Overy CP	Main Street	Burton Ovary	External property flooding from blocked culverted watercourse
27-Jul-13	Fleckney CP	Manor Road	Fleckney	Internal and external property flooding from surface water sewers

21-Nov-13	Scraptoft CP	Scraptoft	Beeby Road	Highway flooding from development - Extra drains installed
24-Dec-13	Market Harborough	Market Harborough	Rugby Close	highway and property flooded from blocked culvert
04-Jun-14	Burton Overy CP	Main Street	Burton Ovary	Internal property flooding from blocked culverted watercourse
04-Jun-14	Burton Overy CP	Back Lane	Burton Ovary	Internal property flooding from surface water following intense rainfall event
19-Jul-14	Foxton CP	Foxton	North Lane	External Property Flooding from highway System
10-Aug-14	Gumley CP	Gumley	Main Street	Flooding around drain due to excess water on the Highway
	Dunton Bassett CP	Broughton Astley	Dunton Road	Garden Flooding from Surface water run-off
10-Oct-14	Dunton Bassett CP	Broughton Astley	Bridleway W66	Flooding of public Bridleway from culverted watercourse, surface water and highway drainage.
08-Oct-14	Billesdon CP	Billesdon	Church Street	Internal property flooding from Highway Drainage and watercourse
	Broughton Astley CP	Broughton Astley	Geveze Way	External property flooding form surface water run-off and blocked land drain
05-Mar-14	Scraptoft CP	Scraptoft	Beeby Road	Internal property flooding from surface water flowing from adjacent agricultural land
21-Nov-13	Scraptoft CP	Scraptoft	Beeby Road	Flooding / damp from groundwater.
	Scraptoft CP	Scraptoft	Beeby Road	Flooding of gardens from ordinary watercourse
14-Sep-15	Kibworth CP	Kibworth	Granary Close	Flooding of Gardens up to property thresholds, properties protected by san`dbags, flooding from ordinary watercourse due to lack of maintenance

Appendix B Settlement Flood Risk

Settlement type	Settlement	Fluvial	Pluvial	Additional
PUA	Thurnby and Bushby	High/medium risk near Station Rd	High risk near Station Road	High risk downstream in Leicester
	Scraptoft	Low risk north	High risk north	High risk downstream in Leicester
Main town	Market Harborough	High risk near Welland and Jordan.	High risk of surface water flooding through much of town	
Key Centres	Lutterworth	High risk SE High risk over significant portion of Lutterworth East site	High risk to SE and Woodway Rd. Also Magna Park.	High risk of flooding on Lutterworth East site and run-off. Surface water issues in Magna Park
	Broughton Astley	High risk to north, risk through centre	High risk through centre of settlement and on main road	
Rural centre	Billesdon	Medium risk Brook Lane	High risk	Run off to centre of village
	Fleckney	Medium risk	High risk	Significant surface water risk across village
	Great Glen	High risk west of village	Significant high risk	Sence and Burton brook meet
	Houghton on the Hill	Limited very low risk	Medium/high risk west of village	
	Husbands Bosworth	No risk	Limited high risk	
	The Kibworths	Low risk	High risk	Flooding could impact train lines. Significant pooling in fields to SE
	Ullesthorpe	No risk	Low risk	Small area of higher risk in SE
Selected Rural Villages	Bitteswell	No risk	Small areas of high risk	

	Church Langton	No risk	Small area of high risk	
	Claybrooke Magna	No risk	Low risk	
	Dunton Bassett	No risk	Some medium/ low risk	
	Foxton	Some high risk to north	Significant high risk	Water in all surrounding fields also
	Gilmorton	Low risk	High risk west village	Water flowing south
	Great Bowden	Flooding in field east of the village	Some pockets of high risk	
	Great Easton	High risk	High risk	
	Hallaton	No risk	Some high risk in centre	
	Lubenham	Medium risk	High risk	River to south
	Medbourne	High risk	High risk	
	North Kilworth	Low	High risk	
	South Kilworth	No risk	Some high risk	River to south west
	Swinford	No risk	Some high risk	
	Tilton	No risk	Limited high risk edge of village	
	Tugby	No risk	Medium /high in SW	
Sub Selected rural villages	Arnesby	No risk	Limited high risk in west of village	
	Ashby Magna	No risk	Limited medium/low risk	
	Ashby Parva	No risk	Low risk	
	Bruntingthorpe	Low risk	Low risk	
	Burton Overy	Low risk	High risk	
	Catthorpe	No risk	Low risk	
	Claybrooke Parva	No risk	Low risk	
	Cotesbach	No risk	Some areas of high risk in middle of village	
	Drayton	No risk	High risk	
	East Langton	No risk	Some high	

			risk	
	Frolesworth	No risk	Low risk	
	Glen Rise	No risk	High risk	
	Gumley	No risk	Medium risk	High street
	Hungarton	No risk	Low risk	
	Illston on the hill	No risk	Low risk	
	Keyham	No risk	Low risk	
	Leire	No risk	Low risk with limited high risk	
	Mowsley	No risk	Low	
	Newton Harcourt	No risk	Low risk	
	Peatling Magna	No risk	Low	
	Peatling Parva	Low risk	Some high risk	ponds to SE
	Saddington	No risk	Low risk	
	Shawell	Some high risk	Some high risk	
	Shearsby	Low risk	High risk	
	Smeeton Westerby	No risk	Some high risk	
	Stoughton	No risk	No risk	
	Theddingworth	No risk	Limited risk	mainly fields
	Thorpe Langton	No risk	Medium risk on main road	
	Tur Langton	No risk	Low risk	
	Walcote	low risk	High for much of village	
	Walton	No risk	Small amount of high risk top of high street	
	Willoughby Waterleys	No risk	Some limited low risk	

Appendix C: Settlement Housing Number Distribution for each Option

Settlement	Total Completions & Commit.s 1.4.2011 – 31.3.2015	Set A: Variations of the current distribution strategy			Set B: Options with 1 Strategic Development Area			Set C: Options with 2 Strategic Development Areas		
		Option1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
		Rural Focus	Core Strat.	Urban Focus	Scrapt/ Thurn SDA	Kib. SDA	Lutt. SDA	Scrapt/ Thurn & Kib.	Scrapt/ Thurn & Lutt.	Kib. & Lutt.
Principal Urban Area										
Scraptoft, Thurnby, Bushby	761	166	303	478	1182	158	73	1046	1000	0
Sub-Regional Centre										
Market Harborough	2658	807	1329	1983	866	775	440	333	52	0
Key Centres										
Lutterworth	336	388	506	645	398	375	2238	257	2098	2063
Broughton Astley	605	0	0	0	0	0	0	0	0	0
Rural Centres										
Billesdon	75	59	31	0	19	17	8	6	0	0
Fleckney	34	572	440	204	385	370	307	283	185	147
Great Glen	321	166	64	0	25	17	0	0	0	0
Houghton on the Hill	22	172	130	57	112	108	89	81	52	41

Husbands Bosworth	47	99	68	20	55	52	40	36	21	16
Kibworth	524	208	56	0	0	1200	0	1200	0	1200
Ullesthorpe	72	54	27	0	17	15	7	4	0	0
Selected Rural Villages										
Bitteswell	8	53	40	17	34	33	27	25	16	12
Church Langton	4	26	19	8	17	16	13	12	8	6
Claybrooke Magna	1	68	53	25	47	45	37	35	23	18
Dunton Bassett	6	94	72	33	63	61	50	46	30	24
Foxton	9	51	38	16	33	31	25	23	15	12
Gilmorton	30	91	65	23	54	52	41	37	22	17
Great Bowden	27	114	83	33	71	68	54	49	31	24
Great Easton	36	51	32	6	25	23	17	14	7	5
Hallaton	7	68	52	23	45	43	36	33	21	17
Lubenham	11	95	72	32	63	60	49	45	29	23
Medbourne	15	47	34	13	29	27	22	19	12	9
North Kilworth	30	47	31	7	24	23	17	15	8	6
South Kilworth	1	59	46	22	40	39	32	30	20	16
Swinford	4	67	51	24	45	43	36	33	21	17
Tilton	14	32	22	7	18	17	13	12	7	5
Tugby	9	34	24	9	21	20	16	14	9	7

Countryside	146	0	0	0	0	0	0	0	0	0
Commitments and Completions		5813	5813	5813	5813	5813	5813	5813	5813	5813
TOTAL	**5813**	**9500**	**9500**	**9500**	**9500**	**9500**	**9500**	**9500**	**9500**	**9500**