North Hertfordshire District Council

Strategic Flood Risk Assessment Update (2016)

September 2016

Report produced by North Hertfordshire District Council

Contents

1 Introduction

1. In 2008 a Strategic Flood Risk Assessment (SFRA) was undertaken by WSP Consulting. The SFRA was both a Level 1 and Level 2 Study and incorporated detailed hydraulic modelling of the area around Hitchin.

2. An update to the SFRA is needed principally as a result of the age and accuracy of the mapping information that accompanies the 2008 document.

3. Additionally since 2008 there have been a number of flood events in the UK which have changed the way in which flood risk is managed and regulated. Whilst Government and the Environment Agency maintain responsibility for the issue overall, Lead Local Flood Authorities (LLFA) have been created through the Floods and Water Management Act (2010). They are required to prepare and maintain a strategy for local flood risk management in their area. In Hertfordshire this is Hertfordshire County Council.

4. Since the previous SFRA was produced the Environment Agency has updated modelling information relating to a number of the watercourses within the study area, which has meant that the outlines of the flood zones are no longer relevant and up-to-date.

5. More detailed information is also now available with regard to surface water and other sources of flooding. This is more of an issue in North Hertfordshire, rather than fluvial flooding, with the majority of recent flood events in the district falling within this category.

6. This update will provide up-to-date maps of flood risk areas and also provide information to accompany the emerging Local Plan by way of a sequential test to be taken forward by developers as potential development sites come forward.

7. This update should be read in conjunction with the 2008 document as much of the information in that document is still relevant. Where appendices have been replaced the same reference is kept from the 2008 study to ensure compatibility.

2 Updated Flood Zones and Flood Zone 3b

8. The flood zones shown in updated **Appendix E** have been taken from the Environment Agency online mapping system[1].

9. The outline of Flood Zone 3b has also been generated using the 1:20 modelled dataset, again, provided by the Environment Agency where it exists, however this information does not exist for the whole of the district. As is illustrated by the maps most of the mapped data is focused around the Hitchin area. This is similar to what was produced in 2008.

10. Where information on 3b doesn't exist (i.e. outside of the Hitchin area), Flood Zone 3a should be taken to illustrate flood plain in the first instance as was set out in the original SFRA.

[1] http://www.geostore.com/environment-agency/

3 Surface Water Flooding

11. Since 2008 information on surface water flooding has improved significantly. This is largely as a result of the floods that occurred in 2007 and the subsequent Pitt Review which was undertaken at the request of the Secretary of State for Environment, Food and Rural Affairs.

12. One of the recommendations of the Pitt Review was the creation of Lead Local Flood Authorities (LLFA) and Surface Water Management Plans (SWMP) which have been brought about through the Flood and Water Management Act (2010) – the Government's response to the Pitt Review.

13. A SWMP is currently being prepared by Hertfordshire County Council for North Hertfordshire and Dacorum Councils, which may provide a more detailed level of information than is currently available from the Environment Agency. It is looking at the accuracy of the Environment Agency's Updated Flood Map for Surface Water and assessing a number of key issues within the district.

14. Hertfordshire County Council has also undertaken a number of Section 19 investigations in North Hertfordshire, which are required under the Flood and Water Act (2010). When a flood occurs, the LLFA must, to the extent that it considered it necessary or appropriate, investigate which risk management authorities have relevant flood risk management functions and whether each of those risk management authorities has exercised or is proposing to exercise those functions in response to the flood. Section 19 investigations have been undertaken in Wymondley, Knebworth and Whitwell. The results of these studies should be used in relation to the development of sites which are affected by the areas in question.

15. The most up-to-date information on surface water is included in this update in **Appendix J.** Previous maps detailed on the SFRA webpage were crude estimations of where surface water flooding occurred based on topography and existing structures. The most recent maps have improved the overall accuracy of this information.

16. Outputs from the SWMP will be used separately to inform planning decisions and this SFRA may be further amended to reflect these changes as and when the work is completed.

17. Additionally it is worth noting that on 24 March 2015, the Government laid a statutory instrument making the Lead Local Flood Authority a statutory consultee by adding the consultation requirement to Schedule 4 of the Development Management Procedure Order. This came into effect from 15 April 2015 and means that Hertfordshire County Council are a statutory consultee on major developments in relation to surface water drainage and the implementation of SuDS (developments of 10+ dwellings and 1,000m^2+ commercial space).

4 The Sequential Test and the Sequential Approach

18. At the time of this update the Proposed Submission (Draft Publication) Local Plan is being completed. The final list of sites has been published for Full Council and it includes residential and commercial allocations.

19. The sequential approach takes into account three sets of flood risk information:
    - modelled fluvial risk and flood zones
    - other fluvial risk (including ordinary watercourses)
    - other types of risk including surface water

20. In the first instance fluvial risk and flood zones are assessed in the form of the Sequential Test in line with the NPPF and PPG as whilst they are not as prevalent, they are the most accurate. Subsequently ordinary watercourses and other types of flooding are assessed together as they are more numerous and less accurate, however the application of the sequential approach is treated consistently across all forms of flood risk.

Fluvial risk

21. The majority of sites identified in the local plan are not affected by fluvial flood risk, only HT2: Land North of Pound Farm, HT11: Churchgate, LS1: Land at Ramerick and WY1: Land south of Little Wymondley come anywhere close to the Flood Zones 2 and 3. These sites are identified in the context of flood risk maps in revised **Appendix G**.

22. The potential impacts of flood risk and associated action necessary for the sequential test is explained in **Figure 1** below.

Figure 1: Sequential Test information (fluvial)

Site ref	Site name	Flood zones / risk	Comments / action
HT2	Land north of Pound Farm	The site adjoins Flood Zone 2 and is approximately 5m from Flood Zone 3. The site is elevated above the Ippollitts Brook channel which explains the definitive line of the flood zones in this area.	No action required as no flood zones present within site boundary.
HT11	Churchgate	The site includes modelled data. Small extents of 1:20, 1:100 and 1:1000 Climate change are within the site boundary although these are limited to the existing channels and there is no risk outside of areas that are contained.	Development of the site should ensure that the river channels are maintained and the flood risk management onsite does not make any issue worse. The site provides the opportunity for improvement of the water environment.
LS1	Land at	The site includes both Flood	Early information from the

	Ramerick	Zone 2 and 3 in a channel to the north of the site. The extents of both are fairly similar representing the topography of the channel. A600 provides culverted flow to the west. Channel joins the River Ivel further downstream.	developer has illustrated that built development will avoid the area at risk from flooding, with the area at risk forming par of the onsite open space. Applying the sequential test within the site means that the area at risk will be avoided.
WY1	Land south of Little Wymondley	Very small extents of the site overlap flood zones 2 and 3 along the northern boundary. These areas stretch along the frontage of Stevenage Road and are also reflected by historic flooding in this area.	Built development will need to avoid areas of flood risk. This should not be an issue as the areas at risk are on the edge of the site boundary. The total site area is 10.36ha; the area of flood risk is 0.11ha. Due to significant flooding in Little Wymondley, there will need to be an FRA to ensure an increase in surface water run-off will be managed to pre-development greenfield run-off rates and provide a betterment to help towards reducing flood risk. See Figure 2 in relation to surface water and other sources of flood risk also.

23. As detailed above the large majority of allocations in the local plan are not adversely affected by fluvial flood risk issues and as a result flood risk has largely been avoided by the allocations process.

24. Only WY1, HT11 and LS1 contain any areas at risk from fluvial flooding and they can deliver development onsite without developing in the areas at risk by applying the sequential test within the site area as detailed in **Figure 1** above.

25. The sites also provide the opportunity for some form of betterment. This is detailed below in combination with surface water as the surface water extents largely illustrate more expansive areas of risk than the fluvial extents which are more refined. .

Surface Water and other sources of flooding

26. Whilst there are only four sites identified as potentially coming anywhere close to areas at risk from fluvial flooding, it is also necessary to take into account flooding from surface water and other sources of flooding (as set out in the Planning Practice Guidance).

27. Additional maps have been added to **Appendix G** to illustrate the sequential approach for other sources of flooding (because of the volume this has been done at settlement scale). The assessment of the final list of sites in the Local Plan is set out in **Figure 2** below as only a few did not contain some form of risk.

28. Most of the sites will contain more than 10 dwellings; therefore any applicant will be required to submit a surface water drainage assessment including the implementation of appropriate SuDS and will be required to manage any existing surface water flood risk issues onsite. These will be referred to the LLFA for their consultation (guidance on what is required within a surface water drainage assessment can be found on the HCC Surface Water Drainage webpage http://www.hertsdirect.org/services/envplan/water/floods/surfacewaterdrainage/). Sites over 1 hectare will be required to carry out a Flood Risk Assessment in accordance with the NPPF. Sites under 10 dwellings will still be required to provide surface water drainage proposals and these will be considered by the LPA. ,. Information in Figure 2 should aid with the production of a surface water drainage assessment in relation to the specific sites listed below.

Ordinary Watercourses

29. In addition to surface water extents that are mapped by the Environment Agency, information relating to ordinary watercourses is also noted in the Table below where they cross the sites. Any works proposed affecting ordinary watercourses will require prior written consent from the LLFA under section 23 of the Land Drainage Act 1991 regardless of any planning permission, therefore early acknowledgement of this issue is made in **Figure 2** below.

30. Maps illustrating the Detailed River Network (DRN) including all known ordinary watercourses has been added to **Appendix C.** This is based on Environment Agency information. Not all ordinary watercourses have been mapped as is clear in places such as Royston where the map does not reflect the extent of watercourses that exist. Whilst Appendix C provides an illustration; the LLFA are currently undertaking inspections of these watercourses across Hertfordshire and will amend the mapping when they become aware of any unmapped information. The LLFA maps of Ordinary Watercourses are available here[2] and will provide a more accurate reflection of the picture on the ground as it develops.

Figure 2: Sequential Test for other forms of flood risk including surface water and ordinary watercourses.

Site ref	Site name	Areas susceptible to surface water flood risk / Ordinary Watercourses	Comments / action	Surface Water Drainage Assessment required

[2] http://www.hertsdirect.org/services/envplan/water/floods/ordwatercourse/

AS1	Land west of Claybush Road	No surface water risk identified	N/A	Y
BA1	Blackhorse Farm	Site contains 1:1000, 100 and 30 year extents	Flow appears to enter site from the south and flow west, although this assumes the flow passes through culverts under the Baldock bypass and the railway line. Attenuation and mitigation is possible through use of permeable (subject to infiltration tests) materials and use of open space. Possible opportunity to connect to Ivel Springs? Flow passes through BA3, BA4 and BA10 on route to BA1. Opportunity for joint investigation and prevention earlier on – Baldock area being investigated through SWMP process.	Y
BA2	Land west of Clothall Road	No surface water risk identified	N/A – Baldock area being investigated through SWMP process.	Y
BA3	Land south of Clothall Common	Site contains 1:1000, 100 and 30 year extents Site includes ordinary watercourse	Flows through the northern part of the site, assuming the flow passes through a culvert under the Baldock bypass. Attenuation here may have added benefit to BA1, BA4 and BA10 – Baldock area being investigated through SWMP process. Any works to the ordinary watercourse will require written consent from the LLFA.	Y
BA4	Land East of Clothall Common	Site contains 1:1000, 100 and 30 year extents. Site includes ordinary watercourse	Flow passes through the middle of the site along a drain; again this assumes a flow passes through a culvert under the Baldock Bypass. Attenuation here will also have added benefit for BA1 and BA10 – Baldock area being investigated through SWMP process. Any works to the ordinary watercourse will require written consent from the LLFA.	Y
BA5	Land off Yeomanry Drive	Site contains small area of 1:1000 extent	Potentially managed by drainage measures, may not represent actual risk as it does not relate to any discernible features – Baldock area being investigated through SWMP process.	Y
BA6	Land at Icknield Way	Site entirely covered by 1:1000, 100 and 30 extents	Maps seem to suggest that there is no culvert through the railway embankment to the north of the site meaning this area has the potential to pond. Any scheme should seek to manage this ponding or investigate a	Y

			link through to Ivel Springs – Baldock area being investigated through SWMP process.	
BA7	Land rear of Clare Crescent	Site contains areas of 1:1000 extent	Several flows heading NW across site, possibly reflecting topography. Recent flood event at St Marys School, which this site could help mitigate as flows could potentially contribute. Use of appropriate drainage and storage onsite – Baldock area being investigated through SWMP process.	N
BA8	Works, Station Road	Eastern extent includes some of 1:1000 extents	Extents reflect the flow along the adjacent roads – Baldock area being investigated through SWMP process.	Y
BA9	Adjoining Raban Court	Southern extent includes some of 1:1000 and 1:100 extents	Extents reflect the flow along the adjacent roads and pooling at the proximate road junction. Pooling occurs further north at BA6, this site has potential to help manage this – Baldock area being investigated through SWMP process.	N
BA10	Royston Road	Site contains 1:1000, 100 and 30 year extents	Flood water would appear to pool in the site, although this assumes the flow passes through a culvert under the Baldock bypass. Attenuation and mitigation is possible through use of permeable materials and use of open space. Flow passes through BA3 and BA4 before BA10 – Baldock area being investigated through SWMP process.	Y
BA11	Deans Yard South Road	Site contains 1:1000, 100 and 30 year extents	Water would appear to pool along South Road and the A505 in this area. Small extents onsite reflecting existing impermeable surfaces, site has potential to control flows out of site onto adjoining roads, offering potential betterment.	Y
BK1	Land west of Cambridge Road	Site contains some small 1:1000 and 1:100 year extents	The flow illustrates the location at top of catchment – mitigatable through design and use of materials onsite.	Y
BK2	Land off Windmill Close	Site contains some small 1:1000 and 1:100 year extents	The flow illustrates location at top of catchment – mitigatable through design and use of materials onsite.	Y
BK3	Land between Cambridge	Site contains some small 1:1000 extents	Very small area, possibly reflecting onsite topography. Easy mitigated through design	Y

	Road and Royston Road			
CD1	Land south of Cowards Lane	Site includes 1:1000 and 1:100 extents	The flood extents are reflective of the topography, Cowards Lane appears to join flow further east. The design should ensure no additional flows from this site contribute to this issue.	Y
CD2	Codicote Garden Centre	Site includes 1:1000 and 1:100 extents	The flood extents reflect the topography, although it could reflect the top of a flow heading west. Potential for storage through design.	Y
CD3	Land north of The Close	Site includes 1:1000, 1:100 and 1:30 extents	The flow appears to arise from north flowing south towards Welwyn joining with the River Mimram flow to the south. Potential for storage / management onsite to mitigate issues further south.	Y
CD4	Land at Pulmore Water	No surface water risk identified	N/A	N
CD5	Land south of Heath Lane	Site contains some small 1:1000 extents	Very small area. Easy mitigated through design	Y
GA1	Land at Roundwood	No surface water risk identified	N/A	Y
GA2	Land off Mendip Way	Site includes 1:1000, 1:100 and 1:30 extents	The flood extents appear to flow through the site, although the ordinary watercourse is located to the southeast of the site. Storage could be part of design – area would appear to flow to Ashbrook, Hitchin.	Y
GR1	Land at Milksey Lane	No surface water risk identified	N/A	N
HT1	Land at Highover Farm	No surface water risk identified	N/A	Y
HT2	Land north of Pound Farm	Site includes 1:1000 extent	Flood extents are based on topography and flow from the adjacent development. Easily mitigated through design.	Y
HT3	Land south of Oughtonhead Way	Site includes 1:1000 extent	Flood extents are based on topography and flow from adjacent development. Easily mitigated through design.	Y
HT4	Land off	Site includes	Flood extents are based on topography and flow from adjacent	Y

	Lucas Lane	1:1000 extent	development. Easily mitigated through design.	
HT5	Land at junction of Grays Lane and Lucas Lane	No surface water risk identified	N/A	Y
HT6	Land at junction of Grays Lane and Crow Furlong	No surface water risk identified	N/A	Y
HT8	Cooks Way	Site contains small area of 1:1000 and 100 year extents	Pooling located to the east of the site. Flows from site contribute to this pooling. Site provides opportunity to manage existing situation. Should be incorporated into design	Y
HT10	Former B&Q	Site includes a small extent of 1:1000, 1:100 and 1:30 extents	Pooling located to the west of the site, potentially relating to topography. Should be incorporated into design	
HT11	Churchgate	Site contains areas of 1:1000, 100 and 30 year extents, Site includes ordinary watercourse (River Hiz)	The areas largely reflect the fluvial risk that occurs in the area, although the surface water risk is wider than the modelled extent. This reflects the impermeable surfaces that exist and the less accurate information. Some pooling is mapped to the north of the site where the River Hiz passes underneath Hermitage Road, however the modelled extents provide a more accurate picture of flood risk. As the site includes the river frontage, there is the potential for improvement of flood risk management in the area. Specification required in policy that river channels will be maintained.	Y
HT12	Paynes Park	Site contains small area of 1:1000 and 100 year extents	Pooling located to the east of the site. Flows from the site contribute to this pooling. Site provides opportunity to manage existing situation. Should be incorporated into design.	Y
IC1	Duncots Close	Site contains small area of 1:1000, 100 and 30 year extents	The area of risk is site slightly detached from main river flow and possibly incorporates flow arising from Laurel Way. Site provides opportunity to mitigate flow through design.	N
IC2	Burford Grange, Bedford	Site contains small area of 1:1000, 100 and	Area of risk located to the south of the site slightly detached from main River Oughton flow, possibly a depression in the ground. Mitigatable through	Y

	Road	30 year extents	design, possible contribution to wider risk area.	
IC3	Land at Bedford Road	Site contains small area of 1:1000, 100 and 30 year extents	Small extents of flood risk, potentially reflecting topography. Mitigatable through design	Y
KB1	Land at Deards End	Site contains small areas of 1:1000, 100 and 30 year extents	Sporadic areas of risk, possibly reflecting topography, would seem largely mitigatable through design.	Y
KB2	Land off Gypsy Lane	Site contains 1:1000, 100 and 30 year extents	Known surface water issue arising from balancing pond on A1(M). Site provides opportunity to deal with issue. Section 19 report produced Scheme should include storage to prevent flow east into village.	Y
KB3	Chas Lowe, London Road	Site contains 1:1000, 100 and 30 year extents	Area appears to illustrate pooling on the site or a flow through the site into High Street. Current use includes many impermeable surfaces, which would explain extents. Mitigatable through design.	Y
KB4	Land east of Knebworth	Site contains 1:1000, 100 and 30 year extents	Maps seem to show flows associated with topography to the north west and south of the site. Main flows appear to gather in the High Street / Old Lane, therefore, site provides opportunity for betterment.	Y
KM3	Land north of High Street	Site contains 1:1000, 100 and 30 year extents	Groundwater flooding has occurred in Kimpton historically. Flows occur along High Street. Southern part of site is within this area. Possible to mitigate some of issue through design although it is a wider problem, but future development should contribute to managing this issue. Developer should refer to the Section 19 Flood Investigation.	Y
KW1	Land west of The Heath, Breachwood Green	No surface water risk identified	N/A	Y
LG1	Land north of Letchworth	Site contains 1:1000, 100 and 30 year extents Site includes network of ordinary watercourses	Extents show small flows heading west and north. Mitigatable through design although some storage onsite may be preferable to prevent issues downstream. Any works to the ordinary watercourse will require written consent from the LLFA.	Y

LG3	Land east of Kristiansand Way and Talbot Way	Site contains small area of 1:1000 year extents	Area not reflective of flows or known feature. Should be mitigatable through design.	Y
LG4	Land north of former Norton School, Norton Road	Site contains 1:1000, 100 and 30 year extents	Area concentrated to the west of the site running along neighbouring properties. Some form of ditch possibly. Consideration through design for mitigation.	Y
LG5	Land at Birds Hill	No surface water risk identified	N/A	Y
LG6	Land off Radburn Way	Site contains small amount of 1:1000 extent	Small area, not reflecting any known feature. Mitigatable through design.	Y
LG7	Former Gates Garage, Station Road	No surface water risk identified	N/A	Y
LG8	Pixmore Centre, Pixmore Avenue	Site contains 1:1000 and 1:100 year extents	Area reflects existing features onsite. If redeveloped consider through design if converted may	Y
LG9	Former Lannock School	Site contains 1:1000, 100 and 30 year extents	Flow appears to gather adjacent to the site. Design of scheme provides opportunity to manage issue.	Y
LG10	Former playing field, Croft Lane	Site contains small amount of 1:1000 extent	Small area, not reflecting any known feature.	Y
LG12	Former Powerstation	Site contains 1:1000, 100 and 30 year extents	Extent seems to reflect pooling in a certain area. Site already being built.	Permission granted
LG13	Glebe Road industrial estate	Site contains small areas of 1:1000	Extent reflects adjacent roads.	Y
LG14	Nursery, Icknield Way	Site contains 1:1000, 100 and 30 year extents	Extent reflects adjacent roads. Mitigatable through design.	N
LG15	Garages, Icknield Way	Site contains 1:1000, 100 and 30 year extents	Potential start of pooling in western section of the site, which reflects a potential flow from Redhoods Way West. Mitigatable through design –	Y

			possibility for betterment.	
LG16	Foundation House	Site contains 1:1000, 100 and 30 year extents	Extent reflects adjacent roads. Mitigatable through design	Y
LG17	Hamonte	No surface water risk identified	N/A	Y
LG18	Former Depot, Icknield Way	Site contains 1:1000, 100 and 30 year extents	Site contains pooling reflecting topography onsite. Mitigatable through design.	
LG19	The Wynd	Site contains small areas of 1:1000 and 1:100 year extents	Area reflects existing features onsite. If redeveloped consider through design. Area could contribute towards management of Howard Park where there is a known issue.	Y
LG20	Gernon Road	No surface water risk identified	N/A	Y
LG21	Arena Parade	Site contains small areas of 1:1000 and 1:100 year extents	Area reflects existing features onsite. If redeveloped consider through design.	Y
LS1	Land at Ramerick	Site contains 1:1000, 100 and 30 year extents Site includes ordinary watercourses	Site largely reflects fluvial extent, although slightly less extensive. Development onsite will avoid areas at risk from flooding. Areas at risk will provide open space. Ordinary watercourse joins with River Hiz to the east.	Y
NS1	North Stevenage	No surface water risk identified	N/A	Y
PR1	Land off Templars Lane	Site contains small amount of 1:1000 extent	Small area, not reflecting any known feature. Mitigatable through design and materials.	Y
RD1	Land at Blacksmiths Lane	No surface water risk identified	N/A	Y
RY1	Land west of Ivy Farm	Site contains small area of 1:1000, 100 and 30 year extents	Area adjoins railway line, possibly reflecting a depression in the ground. Should be managed through design.	Y
RY2	Land north	Site contains	Known to be some issue along north and western boundary, based on	Application submitted

	of Newmarket Road	small areas of 1:1000, 100 and 30 year extents concentrated on the western side of the site	topography. Site designed to mitigate flows.	before 15/04/15 – N
RY4	Land north of Lindsay Close	Site contains areas of 1:1000, 100 and 30 year extents	Flows from western side of Royston seem to pass through this site and gather east of RY3. Possible need to consider in design of scheme and take account of RY3 scheme.	Y
RY5	Agricultural supplier, Garden Walk	Site contains areas of 1:1000 and 100 year extents	Areas reflect the roads that exist onsite and along northern extent. Mitigated in design.	Y
RY7	Anglian Business Park, Orchard Road	Site contains areas of 1:1000 and 100 year extents	Areas reflect the roads that exist onsite, although mapping suggests a flow across the railway line from the south. Easily mitigated in design.	Y
RY8	Land at Lumen Road	Site contains small areas of 1:1000, 100 and 30 year extents on the eastern edge	Site is adjacent to town drain, where surface water gathers. Flow appears to gather to the south and so not affecting much of the site. Mitigatable through design.	Y
RY9	Land north of York Way	Site contains small area of 1:1000, 100 and 30 year extents to the north of the site Site includes ordinary watercourses	Area possibly reflects a depression in the ground. Should be easily managed through design. Any works to the ordinary watercourse will require written consent from the LLFA.	Y
RY10	Land south of Newmarket Road	Site contains areas of 1:1000, 100 and 30 year extents	Area of pooling to the north of the site reflecting topography. Should be easily incorporated in design.	Y
RY11	Land at Barkway Road	No surface water risk identified	N/A	Y
RY12	Town Hall Site	Site contains areas of 1:1000, 100 and 30 year extents	Area of pooling to the north west of the site reflecting impermeable surfaces onsite. Should be easily incorporated in design. Flow is in a northerly direction across the town and so the site provides the opportunity for betterment.	Y

SI1	Land south of Waterdell Lane	Site contains 1:1000 year extents	Small area reflecting topography. May contribute to the flow on Half Handkerchief Lane. Further investigation to mitigate through design.	Y
SI2	Land south of Stevenage Road	No surface water risk identified	N/A	Y
SP2	Land between Horn Hill and Bendish Lane	Site contains areas of 1:1000, 100 and 30 year extents	Flow represents known issue associated with topography and catchment and issue with floodwater passing through existing premises to join Mimram. The Section 19 Report for this area provides detail in this area. Potential for betterment through design onsite.	Y
TH1	Land at Police Row	No surface water risk identified	N/A	Y
WE1	Land off Hitchin Road	Site contains 1:1000 year extents	A few risk areas reflecting topography. Flow joins to Ashbrook flow near Hitchin. Mitigatable through design	Y
WY1	Land south of Little Wymondley	Site contains areas of 1:1000, 100 and 30 year extents to the north of the site	Known surface water issue along High Street, parts of site within this area that flows to join Ashbrook near Hitchin. Opportunity to manage flow in this area. Due to significant flooding in Little Wymondley, there will need to be an FRA to ensure an increase in surface water run-off will be managed to pre-development greenfield run-off rates and provide a betterment to help towards reducing flood risk. The applicant should refer to the Little Wymondley Section 19 Flood Investigation carried out by the LLFA.	Y
EL1	Wandon Park	Site contains areas of 1:1000, 100 and 30 year extents largely on the western edge, although other flows across the site	Recognised surface water issue flowing along the eastern edge of the Luton pooling to the south. Opportunity to manage through design	Application submitted before 15/04/15 – N
EL2	Wandon Park extension	Site contains areas of 1:1000, 100 and 30 year	Recognised surface water issue flowing along the eastern edge of the Luton pooling to the south. Opportunity to manage through design	Y

		extents largely on the western edge		
EL3	Land west of Cockernhoe	Site contains areas of 1:1000, 100 and 30 year extents largely on the western edge. Site contains ordinary watercourse.	Recognised surface water issue flowing along the eastern edge of the Luton pooling to the south. Opportunity to manage through design. Any works to the ordinary watercourse will require written consent from the LLFA.	Y

31. There are some questions over the accuracy of the maps associated with surface water and other sources of flood risk as the modelling process is fairly crude. However, recent flood events have shown that where there is a significant concentration of surface water, especially the 1:30 extent layer, it can reflect possible surface water issues in this area.

32. From the table above the following summaries are provided at settlement level:

- **Baldock** – As illustrated on the map a number of the proposed sites contain surface water flooding extents. The flows appear to occur in a south – north direction and gather in two locations; 1) within site BA1 and 2) around site BA6 south of the railway line. Development sites provide the opportunity to manage this issue as additionally the flows pass through a number of them before pooling in these locations. However, historically there doesn't appear to be any evidence of significant flooding in Baldock and with regard to the westernmost area of flood risk, Ivel Springs a nature reserve appears not to contain much of a risk area, which may be an error. The SWMP is assessing the accuracy of the flood map in this location and may provide more detail.
- **Barkway** – The maps illustrate that surface water flows occur in a north east to south west pattern. The three sites only contain small areas of risk and so provide limited opportunity for flood risk management. No history of flooding in this area.
- **Codicote** – Most flows appear to head in a southerly direction. The largest flow appears to pass through Site CD3 heading south to join the flow associated with the River Mimram. There is known flooding on Kimpton Road which runs parallel to the river. CD1 could potentially contribute to a flow joining the Mimram to the west and could include storage areas.
- **Great Ashby** – Only site GA2 contains potential surface water flood risk. This is identified as flowing north to south towards a tributary of the River Beane. Through design it would be possible to store more water onsite if it could have benefits downstream.
- **Hitchin** – Surface water maps largely reflect the river corridors that pass through the town however; fluvial risk associated with these is fairly minimal, surface water risk is much more substantial. Only a small proportion of the sites are affected by surface water. HT9 is close to River Purwell and Purwell Meadows and may provide an opportunity to aid with preventing runoff in this area, although the

meadows do provide this function already. HT8 may also aid with a nearby area of surface water flooding. HT11 contains significant areas of surface water risk although largely linked to the fluvial risk. The flood risk in this area is modelled and the surface water element would appear to be a result of existing impermeable surfaces in the area and the lack of an understanding of where the channel is culveted. Therefore, the surface water flooding in this area is largely representative of the river channel, but the site does provide the opportunity for better management.

- **Ickleford** – Ickleford is located close to the confluence of the River Purwell, Oughton and Hiz. Site IC1 provides the opportunity to manage flows from adjacent roads that may gather in this area. IC2 is slightly detached from the river channels but again may provide an opportunity.
- **Kimpton** – Groundwater flooding is known to be an issue in Kimpton. KM3 includes some of the areas that are potentially affected and provide opportunities for management, however the problem is a much larger issue and future development should be aware of the issue and a response plan has been produced for this area.
- **Knebworth** – The railway line appears to be a barrier in the middle of the village. There is a known issue originating from land to the west of the village, within site KB2. The site provides the opportunity to manage the issue. The SWMP is investigating potential detailed solutions. Development will need to take into account solutions identified through the SWMP and a Section 19 report already exists. The map also appears to show flows on the east of the village, again converging towards the middle of the village, representative of topography. KB4 provides the opportunity to contribute to the flow management if the issue is validated. KB3 within the village provides a further the opportunity for management of the issue, being further downstream of the flow.
- **Letchworth Garden City** – Flows within the town appear to converge in the Norton Common area and then flow north west following the line of Pix Brook. Most of the development sites are not affected by surface water flows on the map. LG1 contains some flows towards both Pix Brook and the River Ivel although not particularly large or significant. LG9 contains some large extents although the land adjacent is lower than the surrounding area and roads.
- **Lower Stondon –** The proposed allocation includes surface water flooding although this follows the fluvial extent associated with the ordinary watercourse. This joins with the River Hiz further east.
- **Preston** – Only a small area of risk associated with the allocation. Eastern side of village appears to drain north into Anglian catchment; the western side appears to flow south to the Thames catchment.
- **Reed** – RD2 contains areas of risk, although the planning application has been approved for this site.
- **Royston** – Surface water in Royston appears to flow north along certain paths to accumulate near the A505 and allocations RY3 and RY4. The flows through the town do affect a number of the proposed sites and there are known instances of surface water flooding in Royston so mitigation will be particularly important in these areas.

- **St Ippolyts** – Within the wider area there are some significant areas of ponding based on the steepness of the local catchment, however the impact on the sites is fairly minimal. SI1 contains some flows which may contribute to the flow on the adjacent road.
- **Weston** – Areas of risk appear to flow east and west away from the village through separate valleys. WE1 contains some areas of risk flowing west, possibility for storage onsite
- **Whitwell (St Pauls Walden)** – The surface water flow in Whitwell follows the fluvial extent of the River Mimram albeit slightly wider than the fluvial extent. There is an additional flow from the west of the village that includes allocation SP2, through existing residential properties and then joins with the main flow. There is a Section 19 report produced in response to a flood event that has occurred in this location previously[3]. The site provides an opportunity to manage the flow in this area.
- **Little Wymondley** – The surface water flow through the centre of the village follows the fluvial extent and also picks up the ordinary watercourse along Priory Lane as well as surface water flows along Priory Lane and overland flows from fields to the north of Stevenage Road and to the west of Priory Lane. Historically there have been instances of flooding in this area relating to blocked culverts. HCC have been investigating potential solutions to rectify this. Future development should ensure that the site contributes to the management and mitigation of flood risk from all sources of flooding in this area. The applicant should refer to the Little Wymondley Section 19 Flood Investigation carried out by the LLFA[4].

33. Sequential testing of surface water issues has identified more numerous occurrences in relation to potential risk as identified in **Appendix G**. Based on the accuracy of the maps only a few of the identified areas at risk can be confirmed as a true reflection of flood risk on the ground. The most serious of which either have Section 19 reports written about them, or are being investigated through the SWMP. However, a precautionary response to flood risk is necessary to ensure that new development is not affected by flood risk or does not have a negative impact further downstream.

34. Historic flood information detailed in the original SFRA and additionally below, has also helped identify those areas where a problem is known to exist.

[3] http://www.hertfordshire.gov.uk/services/envplan/water/floods/floodrisk/investigations/whitwell/
[4] http://www.hertsdirect.org/services/envplan/water/floods/floodrisk/investigations/littlewy/

5 Historic Flooding

35. The 2008 SFRA identified potential occurrences of historic flooding up until it was published in 2008. Since that time additional flooding events have occurred in North Hertfordshire, largely in relation to surface water and storm events. These events are detailed below in the same format as the original SFRA.

Figure 3: Historic Flood Events (post 2008)

Date	Location	Address	Source of Flooding / details	Data source
July 2009	Royston	Melbourn Street	Intense rain	Media
January 2014	Royston	Burns Road	Extended period of rainfall/ blocked drain	
February 2014	Letchworth Garden City	Standalone Farm / Junction 9 A1(M)	Extended period of rainfall	Media
February 2014	Wymondley	Stevenage Road	Extended period of rainfall/blocked trash screens and culvert capacity	Section 19 Report / media
February 2014	Knebworth	Orchard Way / Gypsy Lane / Broom Grove	Succession of storms / overland flow / A1(M) attenuation pond overflowing	Section 19 Report / media
February 2014	Whitwell	Mimram Close / Cresswick / Bendish Lane	Succession of storms / overland flow / lack of capacity in highway drainage system	Section 19 Report / media
February 2014	Ickleford	Ryder Way	Succession of storms / overland flow/ blocked field ditches	Media coverage
July 2015	Letchworth Garden City	Outdoor pool / Howard park and gardens	Intense level rainfall	Media coverage / NHDC
July 2015	Knebworth	Old Knebworth Lane	Intense level rainfall / blocked drain at railway bridge	Media coverage
July 2015	Hitchin	Keats Way, Newtons Way	Intense level rainfall	Media coverage
June 2016	Letchworth Garden City	Various locations including outdoor pool, Howard Park and Gardens, Norton Way South roundabout	Intense level rainfall	Media coverage / NHDC

6 Climate Change

36. New assumptions in relation to climate change have been released in February 2016. These do not affect Level 1 SFRAs based on the fact that Flood Zone 2 provides a fairly accepted assumption with regards to the future extent of Flood Zone 3.

37. As detailed in Figure 1 above only sites WY1, LS1 and HT11 contain any areas at risk from fluvial flooding. With regard to WY1 the extent of Flood Zone 2 and 3 at the points where they cover the site are almost identical, LS1 the extents follow the river valley however, built development is avoiding areas at risk anyway and HT11, detailed modelling shows the risk including climate change to reside within the river channel, therefore, with regards to climate change this does not change the allocations process or the issues that have arisen.

38. With regards to development management, new development will be required to use these updated assumptions within sites at risk from flooding. For more information see the relevant NPPG section[5].

[5] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

7 Conclusions

8 This update provides up-to-date maps in relation to fluvial, surface water and other forms of flood risk and ordinary watercourses as illustrated by Appendices E, J and C respectively.

9 It has also taken the opportunity to update the sequential test information for fluvial flood risk, based on the most recent mapped information. This is illustrated in Appendix G. The majority of the sites have avoided areas at risk from fluvial flooding. Only three sites contain any potential fluvial flood risk and this can easily be avoided through the overall design of the sites in question.

10 Additionally sequential test information is provided in relation to other forms of flood risk including surface water flooding and ordinary watercourses. Again this is illustrated in **Appendix G**. This exercise used the Basic Flood Map for Surface Water as well as additional local knowledge to make the judgements over the extent of the flood risk associated with the sites.

11 From the maps it is clear that a number of the proposed sites do contain some potential areas at risk from flooding, however, only a few are known to contain actual proven flood risk issues. Nevertheless, a precautionary approach is taken that in general risk should be investigated in detail at application stage.

12 Information on surface water may be further amended through the development of the Surface Water Management Plan (SWMP) which is being taken forward by Hertfordshire County Council as the Lead Local Flood Authority (LLFA).

13 The majority of the original SFRA (2008) remains relevant and should be read in conjunction with this update.

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NHDC SFRA Update 2016 Appendix C - Ordinary Watercourses (Central)

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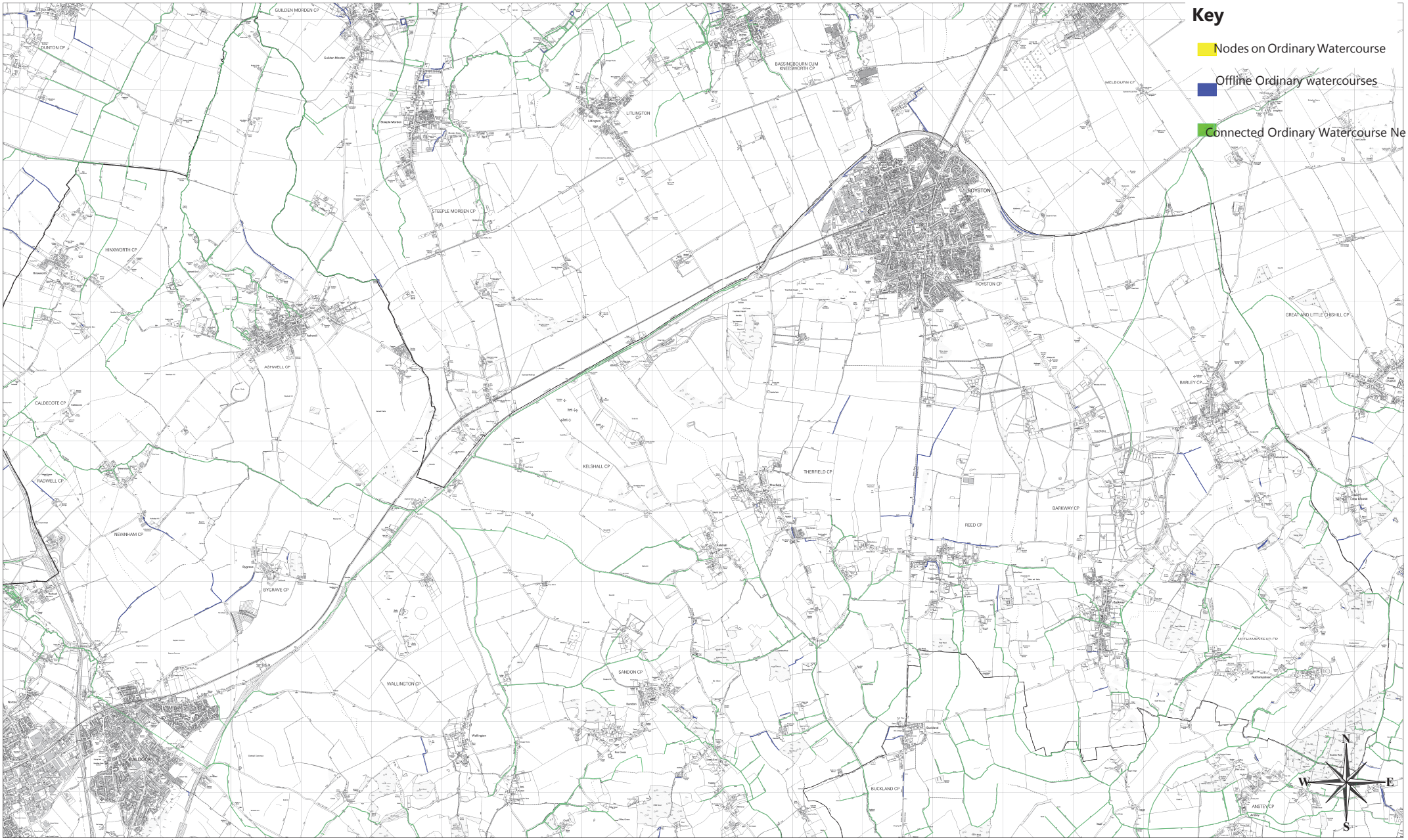
NHDC SFRA Update 2016 Appendix C - Ordinary Watercourses (East)



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NHDC SFRA Update2016 Appendix C - Ordinary Watercourses (Southern)

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