

# Strategic Flood Risk Assessment - Update

February 2015

## **Herefordshire Local Plan – Core Strategy: Strategic Flood Risk Assessment(SFRA) 2015 update**

The primary aim of a Strategic Flood Risk Assessment is to determine whether planning policies or development land allocations will increase the risk of flooding, both within the development and the surrounding area, and to identify and promote measures that will minimise flood-risk and/or enhance flood resilience at all levels, particularly with regard to future development and existing critical infrastructure.

The Environment Agency (EA) made representations regarding the evidence base supporting the Core Strategy during the pre-submission publication period, indicating that elements of the evidence were not up-to-date and suggesting more detailed information was required for the strategic proposals within the Plan. As a result of these representations, and further discussions with the Agency, Herefordshire Council commissioned Parsons Brinkerhoff to prepare an overview of the Core Strategy – strategic housing proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

Schedules for each of the strategic housing proposals have been prepared and have incorporated further comments made by EA upon a draft report.

It is acknowledged that the update relates only to the strategic housing proposals and there will be a need to provide similar evidence in respect of detailed SFRA matters in relation to growth which will be brought forward as part of other development plan documents and Neighbourhood Development Plans.

The timetable for the Hereford Area Plan is set out in the council's Local Development Scheme and the preparation of this document will require detailed SFRA work for the additional sites identified to achieve the housing target for the City, as well as providing an opportunity to undertake further FRA of the strategic housing proposals.

Across much of the County Neighbourhood Development Plans (NDPs) are progressing at a pace. Therefore, Herefordshire Council will help develop evidence upon flood risk in local areas and provide advice for Neighbourhood Plan groups in conjunction with EA in order to update information upon flood risk at a local level. Herefordshire Council's Neighbourhood Plan team will co-ordinate this advice and develop an approach with EA to ensure that flood risk is properly addressed during the preparation of NDPs.

**POLICY :** HD2 Hereford City Centre  
**LOCATION:** Hereford  
**DESCRIPTION:** Mixed use development of around 800 new dwellings  
**GRID REFERENCE:** OS 35100 24050

### **Introduction**

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF);
- Land at Merton Meadows, Flood Risk Assessment, April 2013, Capita Symonds.

### **Overview of the Policy Development Proposals**

Re-development within the City Centre will accommodate around 800 new homes. This will largely be located within the Edgar Street Grid (ESG) redevelopment area.

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

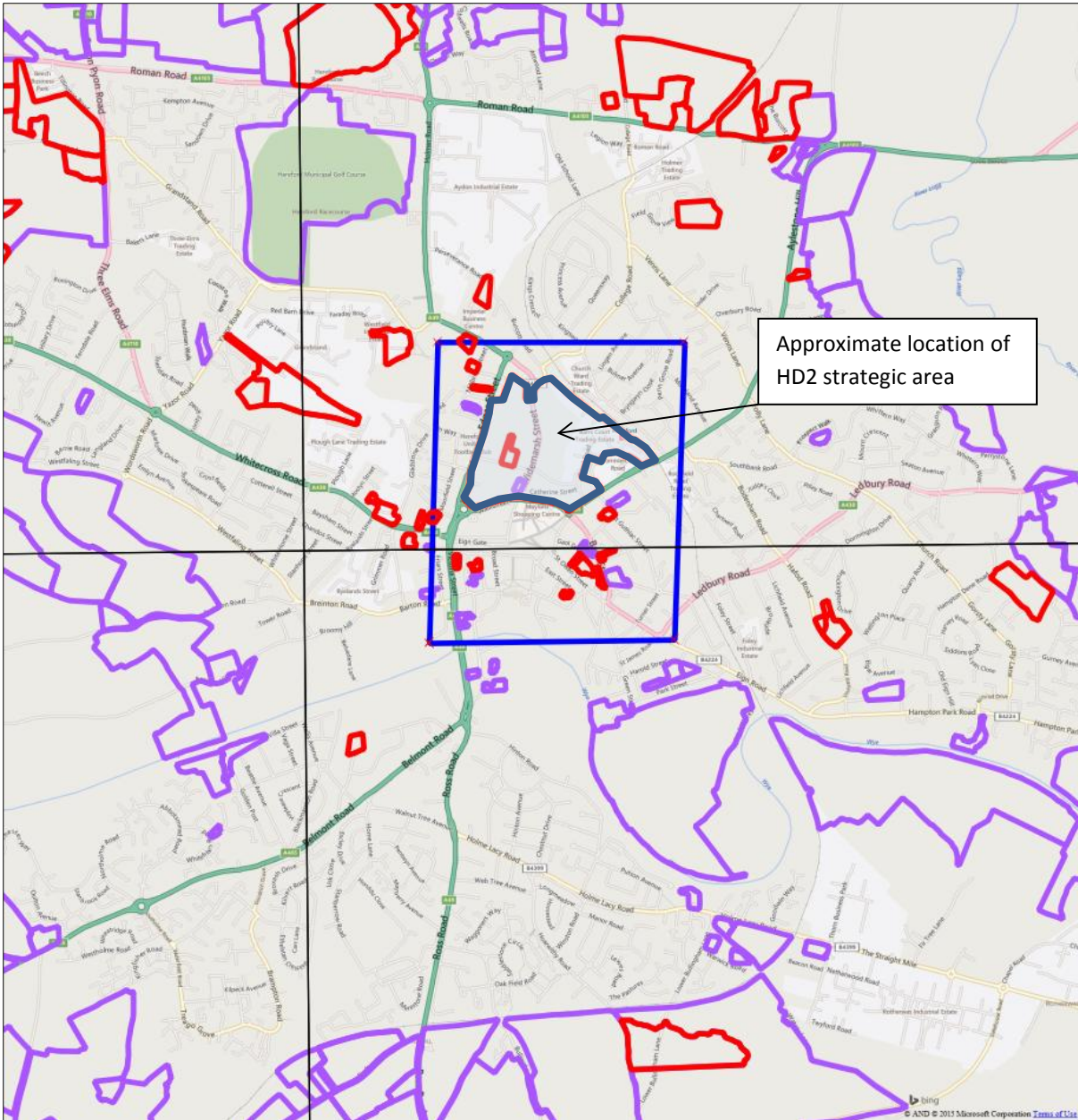


Figure 1: HD2 Hereford City Centre – Strategic Development Area (shaded blue)

**General Description of Strategic Development Area**

The existing area forms a large part of the city centre, with existing development of all classes of flood risk vulnerability.

Widemarsh Brook flows through the city centre and strategic area, partly in open channel and partly in culverts. The brook is a channel fed by Yazor Brook approximately 1.5km to the west of the city centre. Widemarsh Brook becomes Eign Brook to the east of the strategic area. There is a long history of flooding associated with the watercourse.



## Environment Agency Flood Map

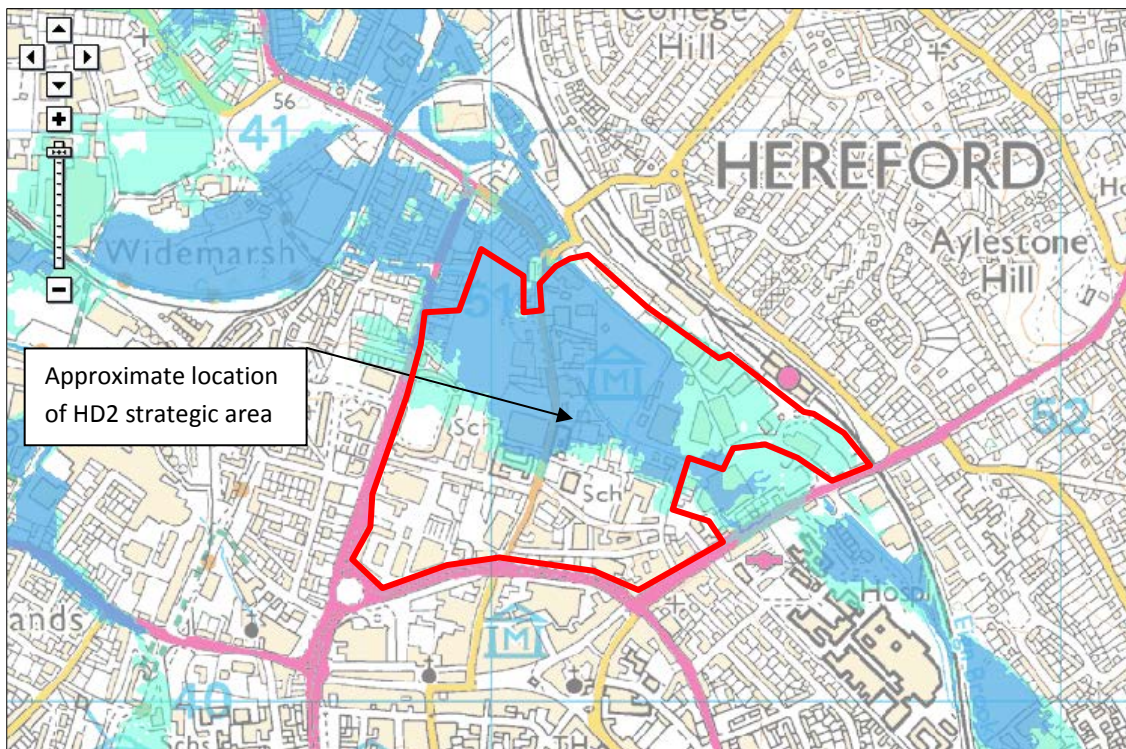


Figure 1: Environment Agency Indicative Flood Map, February 2014

### Fluvial Flood Risk

As shown by the EA Indicative Flood Map in Figure 1, a large part of the city centre, and the Policy HD2 strategic area, is situated in Flood Zone 2 (medium risk) or Flood Zone 3 (high risk) areas. Flood Zone 2 areas comprise land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%), whilst Flood Zone 3 areas comprise land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%). Flood Zone 2 and 3 areas lie in the northern part of the strategic development area. The remainder of the area to the south lies in Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding.

Hydraulic modelling studies of the watercourses in and around Hereford have shown that parts of the Flood Zone 3 areas within the strategic development area would be classified as Flood Zone 3b, functional floodplain.

In accordance with National Planning Policy Framework, all types of development are appropriate in Flood Zone 1. Development classified as 'More Vulnerable' and 'Less Vulnerable' will be appropriate in Flood Zone 2 areas but 'Highly Vulnerable' development will require justification through an Exception Test in these areas. 'Less Vulnerable' development is appropriate in Flood Zone 3a areas but 'More Vulnerable' residential and employment type development will only be justifiable in these areas if the Exception Test can be passed. Only 'Essential Infrastructure' passing the Exception Test can be located in Flood Zone 3b areas.

To alleviate the flood risk in the city centre, and facilitate redevelopment in the Flood Zone 2 and 3 areas, a flood mitigation scheme has been implemented on the Yazor Brook, at Credenhill, upstream of the city centre. The scheme diverts flows from the Yazor Brook to the River Wye, thereby reducing channel flows in Widemarsh Brook in the city centre. It is not possible for the scheme to fully reduce flood risk in the city centre to that equivalent to Flood Zone 1, but the scheme will enable low lying parts of the city centre to be raised sufficiently for development appropriate to the vulnerability classification and flood risk. The current EA Flood

Map does not include the changes to the flooding regime in this area produced as a result of the Yazor Brook FAS. A site-specific flood risk assessment will be required for development within the strategic area that takes account of these changes.

A flood warning area exists for Hereford City Centre.

#### **Other Sources of Flood Risk and Considerations**

EA maps indicate no risk of potential reservoir flooding to the development area.

The EA maps identify that the strategic development area does not lie within a designated groundwater source protection zone (although groundwater source protection zones are located approximately 2km to the north-west). The development area lies within a groundwater vulnerability zone with a 'Minor Aquifer High' designation and is designated as both surface and groundwater Nitrate Vulnerable Zones.

The Aquifer maps indicate the underlying bedrock is designated as a 'Secondary A' aquifer and superficial deposits may be present below the site with a 'Secondary (undifferentiated)' designation.

#### **Strategic Flood Risk Assessment Comments**

There is a long history of flooding in Hereford. Large parts of Hereford are susceptible to flooding from the River Wye but the majority of flooding in this part of the city centre results from Yazor / Widemarsh / Eign brooks. Flooding from the Yazor Brook has been ranked as the second highest fluvial flood risk in the county (behind the Lower Wye). Both of the River Wye and the Yazor Brook catchments have been modelled extensively. In recognition of the pressure on housing accommodation and employment in the city centre, a flood alleviation scheme has been constructed at Credenhill (the Yazor Brook FAS) to divert flows out of Yazor Brook to the River Wye upstream of the city. The scheme was designed to relieve the flows through the city centre and facilitate future development and re-development in the area. Note: the Yazor Brook FAS was completed after the SFRA was published.

#### **Site-specific Flood Risk Assessments: Land at Merton Meadows**

This flood risk assessment was undertaken for proposed re-development of the Merton Meadows car park for residential and care home development in the north-west corner of strategic development area. The FRA confirmed the high flood risk and Flood Zones 2, 3a and 3b within the area. Further modelling demonstrated that ground levels within the Merton Meadows plots could be raised sufficiently for the plots to remain above the 100 year plus climate change fluvial flood level under normal conditions without increasing flood risk downstream. The proposals include minor widening / straightening of the Widemarsh Brook between Edgar Street and Widemarsh Street and the creation of a flood corridor where ground levels remain similar to existing. This was shown to improve flood flows through the area and reduce flood levels.

#### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that large parts of the strategic development area are at medium risk of surface water flooding, particularly those areas in the northern half of the development. It should be noted that Widemarsh Brook flows through the northern part of the area and that a small local diversion of the brook is planned as part of the proposals for the ESG redevelopment. In addition, a flood mitigation scheme has been implemented upstream on the Yazor Brook, at Credenhill, to reduce flows in the watercourses through the city centre and, in doing so, increase the capacity within the watercourse channels to receive surface water runoff from proposed city centre developments / redevelopments. Nevertheless, restrictions will need to be imposed on discharges from new development within the city centre. At present, the Council is imposing a maximum discharge rate to Widemarsh Brook based on a runoff rate of 5 l/s/ha.

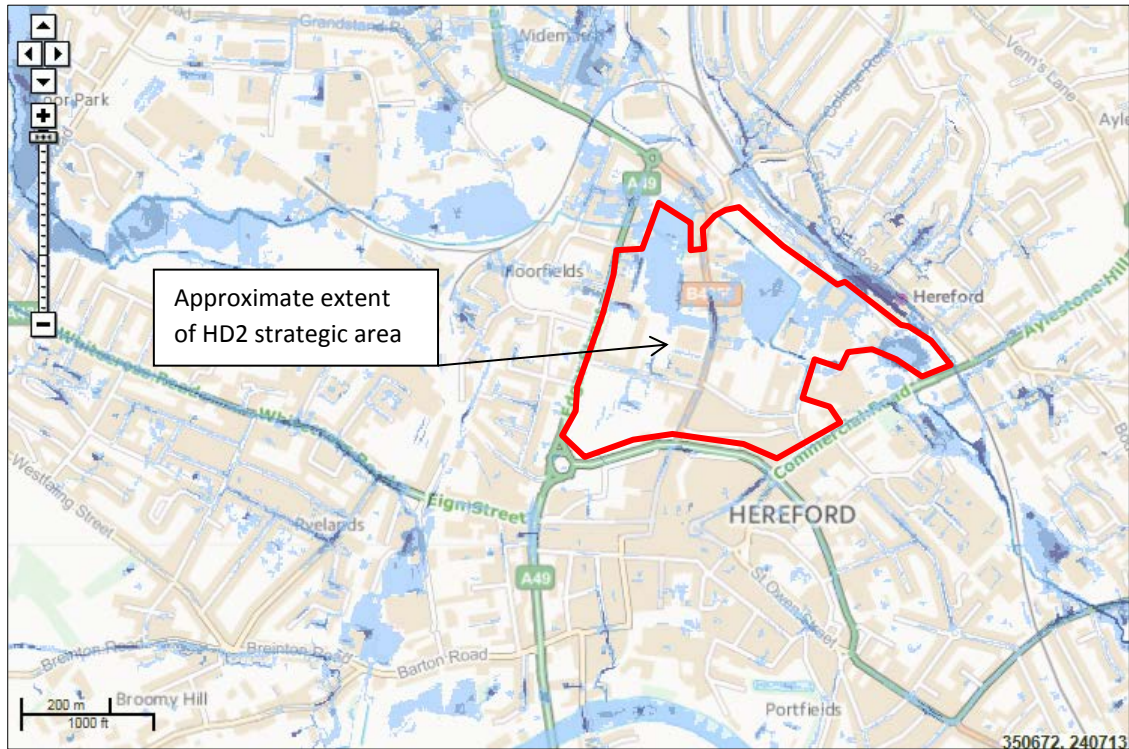


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity). As noted above, plans have been / are being implemented to increase the capacity of watercourse channels through the city centre to receive surface water runoff from future development. In general, there will be a requirement for surface water runoff from all new developments to be limited to a discharge rate agreed with the Lead Local Flood Authority for discharges to watercourses, or with Dwr Cymru Welsh Water for discharges to existing sewers.

Infiltration is unlikely to be feasible in the city centre. However, other SUDS techniques such as rainwater harvesting and green roofs may be feasible. Re-development to date within the strategic area has restricted surface water discharges to a rate of 5 l/s/ha (or a minimum of 5 l/s), this being a rate agreed with Herefordshire Council as appropriate for the area.

### **Foul Water Drainage**

Existing public foul sewers are present in the city centre serving the existing communities. In general, local foul sewer connections will be made to the existing foul sewer infrastructure. In some areas, foul pumping station(s) may be required where insufficient fall is available to facilitate gravity-based sewer connections. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The flood risk in the strategic development area is considered to be high in the northern half of the area and low in the southern half. All types of development will be permissible in the Flood Zone 1 low risk area at the south end of the development area.

The current EA Flood Maps do not take account of changes to the flooding regime resulting from the Yazor Brook FAS. The Yazor Brook FAS has been constructed to enable existing low lying parts of the city centre – which form a significant portion of the existing strategic development area – to be raised to reduce flood risk to levels commensurate with NPPF guidelines for the vulnerability classification. This will enable ‘More Vulnerable’ and ‘Highly Vulnerable’ types of development to form part of the re-development.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy. The FRA must take account of the changes to the flooding regime brought about by the Yazor Brook FAS. The hydraulic modelling for the Yazor Brook FAS is held by Herefordshire Council. At present, the EA operates a precautionary approach to development along the Yazor Brook corridor and requests that all developments in this area use the modelled baseline 1 in 100 year flood level with climate change. The management of surface water runoff from the re-development will require careful consideration. Attenuation in some form is likely to be required. At present, the Council is imposing a maximum discharge rate from developments in this area based on a runoff rate of 5 l/s/ha. Where possible, consideration should be given to SUDS techniques such as rainwater harvesting and green roofs to reduce the impact of surface water runoff.

New foul sewer connections are likely to be made to existing public foul sewers in the city centre. The capacity of existing public sewers, and the need for any sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.



**POLICY :** HD4 – Northern Urban Expansion Area (Holmer West)  
**LOCATION:** Hereford  
**DESCRIPTION:** Residential development of around 500 new dwellings  
**GRID REFERENCE:** OS 35030 24240

### **Introduction**

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### **Overview of the Policy Development Proposals**

The Northern Urban Expansion Area (Holmer West) aims to accommodate around 500 new homes within the plan period

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

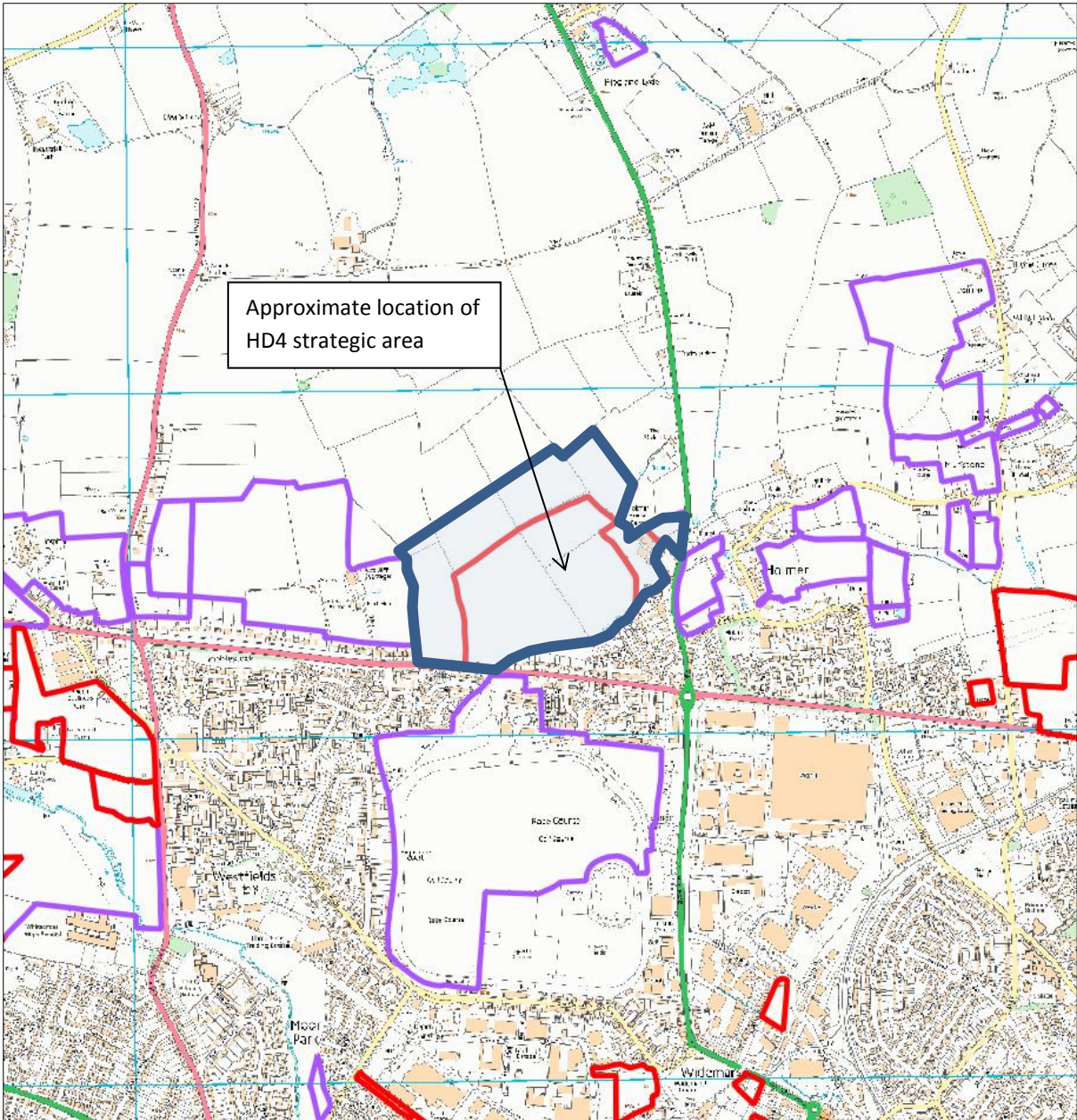


Figure 1: HD4 Northern Urban Expansion Area (Holmer West) – Strategic Development Area (shaded blue)

**General Description of Strategic Development Area**

The existing area is a greenfield area comprising mixed arable and pasture land. The Ayles Brook flows along the southern boundary of the area. The general topography of the area is that land slopes southwards down towards the Ayles Brook. The majority of the area is situated at an elevation of 70 – 80m AOD, which is approximately 4 – 5m above the Ayles Brook.

## Environment Agency Flood Map

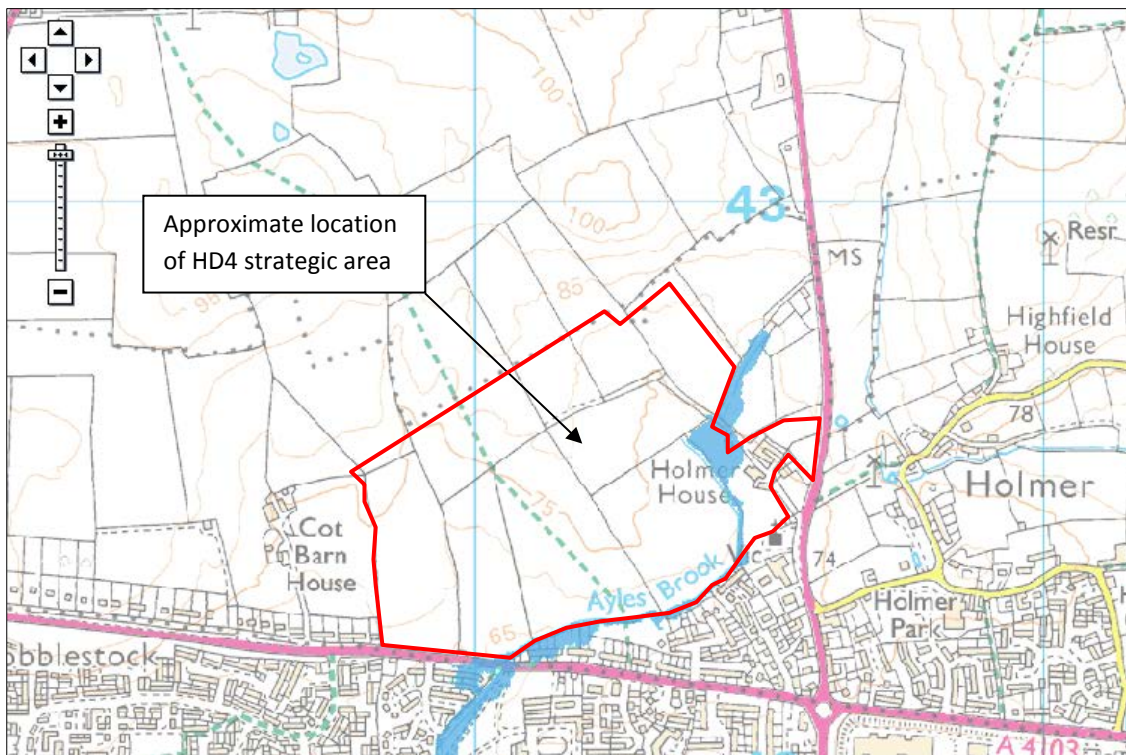


Figure 1: Environment Agency Indicative Flood Map, February 2014

### Fluvial Flood Risk

As shown by the EA Indicative Flood Map in Figure 1, the majority of the Policy HD4 Northern Urban Expansion Area is situated within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. However, an area of Flood Zone 3 – a high risk flood area, with a greater than 1 in 100 annual probability of river flooding (>1%) - associated with Ayles Brook is also present. All types of development are acceptable in Flood Zone 1 areas. Residential development is classified as 'More Vulnerable' development and will require an Exception Test to be passed for residential development in Flood Zone 3.

Ayles Brook is classified as an 'Ordinary Watercourse' at this location.

### Other Sources of Flood Risk and Considerations

EA maps indicate no risk of potential reservoir flooding to the development area.

The EA maps identify that the strategic development area does not lie within a designated groundwater source protection zone (although groundwater source protection zones are located approximately 1km to the south west). The development area lies within a groundwater vulnerability zone with a 'Minor Aquifer Intermediate' designation (with a 'Minor Aquifer High' designation to the south of Ayles Brook) and is designated a groundwater Nitrate Vulnerable Zone.

The Aquifer maps indicate the underlying bedrock is designated as a 'Secondary A' aquifer and superficial deposits may be present below the area with a 'Secondary (undifferentiated)' designation.



### **Strategic Flood Risk Assessment Comments**

Section 5.8.3 of the SFRA states that there are no significant reports of local flooding in the Holmer area. It goes on to state that the most appropriate surface water drainage strategy in this area is likely to be one of unattenuated discharge to the River Lugg (subject to review of downstream channel restrictions and verification of watercourse capacity).

Note: A discharge to the River Lugg may suit development to the east of the A49 but is unlikely to suit development to the west side of the road. The A49 at Holmer effectively sits at the watershed of the River Lugg catchment to the east and Widemarsh Brook (via Ayles Brook) to the west. A discharge to the Ayles Brook would be more appropriate for development on the HD4 Northern Urban Expansion (Holmer West) Area. The flood risk downstream on Widemarsh Brook is known to be high in the city centre. Widemarsh Brook has been modelled extensively. A full review and assessment of the impact on flows in Widemarsh Brook will be required and it is likely that a considerable restriction may be imposed on surface water discharge from this development.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is no significant risk of surface water flooding to the majority of the potential development area. It should be noted that a medium to high surface water flood risk is shown for the Ayles Brook that flows south-westwards through the area and a low surface water flood risk is associated with a small unnamed tributary of Ayles Brook flowing southwards through the western side of the area. Surface water flooding associated with these two watercourses is likely to be confined to the channels and close bank areas. This will need greater assessment in a detailed site-specific flood risk assessment for any development in the area.

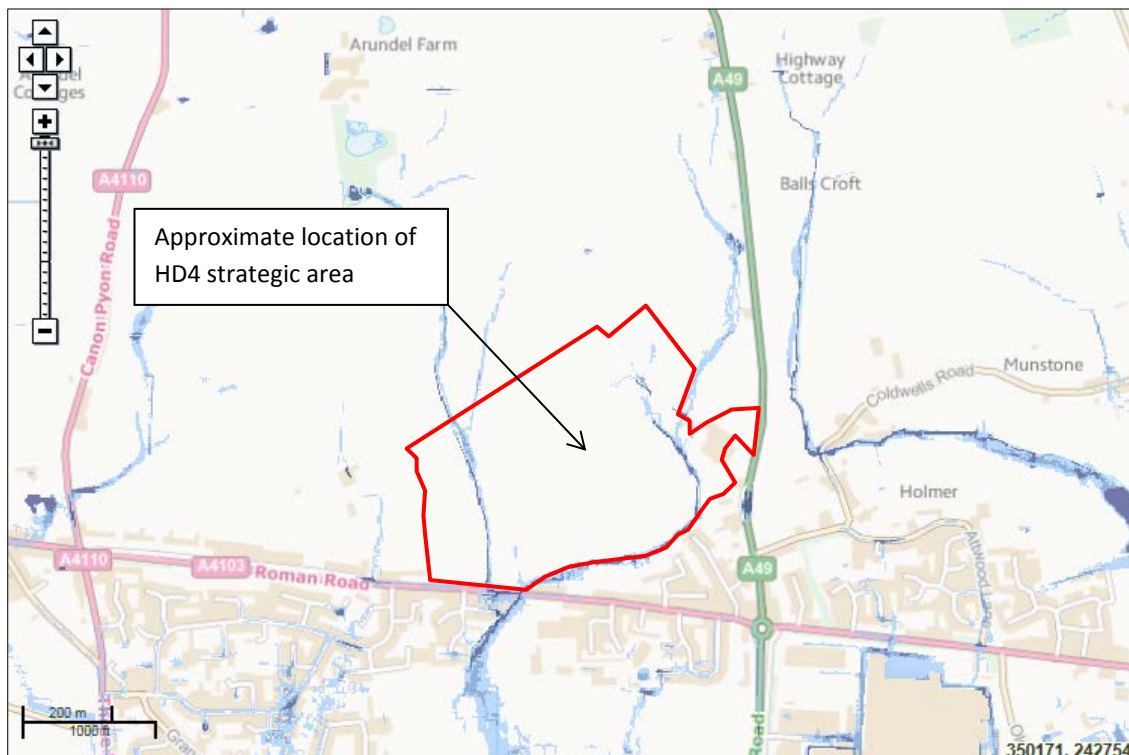


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

Ayles Brook is classified as an 'Ordinary Watercourse' at this location. As such, permissions and approvals for the discharge of surface water to this watercourse will fall to Herefordshire Council as the Lead Local Flood Authority (LLFA).

### **Foul Water Drainage**

Existing public foul sewers are likely to be present nearby serving the local communities along Roman Road (A4103) and residential areas south of Ayles Brook. The topography of the area suggests that a gravity-based foul drainage system may be feasible to serve a development on the strategic area. The location, size, depth and capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The flood risk at this site is considered to be low on the majority of the area. However, a medium to high flood risk has been identified for Ayles Brook which flows along the southern boundary of the development, and a low surface water flood risk is associated with a second small unnamed watercourse flowing from north to south through the area. At this stage, it is likely that all of the proposed residential development (including primary access road and associated infrastructure) can be located in Flood Zone 1 areas. Detailed hydraulic modelling will be required at planning stage to demonstrate that this can be achieved. Buffer zones, green corridors, and public open space can be located within Flood Zone 3a areas and areas of surface water flooding associated with Ayles Brook and the unnamed watercourse.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy at planning application stage. The site specific FRA will need to include detailed hydraulic modelling of Ayles Brook to fully confirm developable areas.

The management of surface water runoff from the re-development will require careful consideration and a surface water drainage strategy will need to be developed in accordance with draft National Standards for Sustainable Drainage. Infiltration should be considered in the first instance. Should a surface water discharge to Ayles Brook or the unnamed watercourse be required, advice should be sought from Herefordshire Council as the LLFA. The discharge of foul effluent may be possible to existing public foul sewers, subject to agreement with Dwr Cymru Welsh Water.



**POLICY :** HD5 – Western Urban Expansion Area (Three Elms)  
**LOCATION:** Hereford  
**DESCRIPTION:** Mixed use development of around 1,000 new dwellings and 10ha of employment land  
**GRID REFERENCE:** OS 34800 24170

### **Introduction**

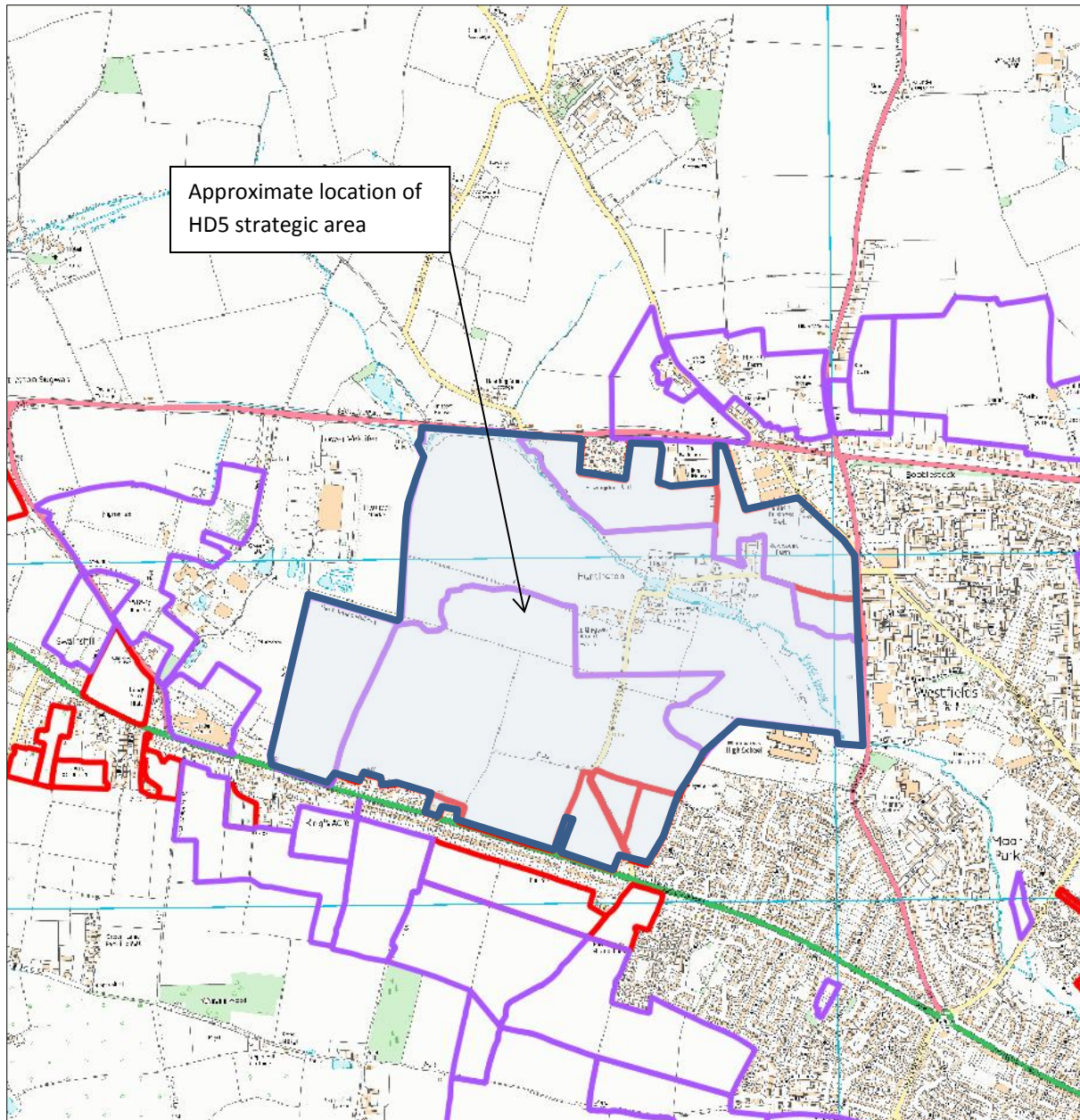
Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### **Overview of the Policy Development Proposals**

The Western Urban Expansion Area (Three Elms) aims to accommodate around 1,000 new homes and 10ha of employment land within the plan period.

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.



*Figure 1: HD5 Western Urban Expansion Area (Three Elms) – Strategic Development Area (shaded blue)*

**General Description of the Strategic Development Area**

The existing area is a greenfield area largely comprising mixed arable land with small areas of pasture land. The Yazor Brook flows from north-west to south-east through the area. The general topography is that land slopes gently towards the Yazor Brook on both sides of the watercourse. The majority of the area is situated at an elevation of about 63 – 65m AOD, which is approximately 2 - 3m above the Yazor Brook.

## Environment Agency Flood Map

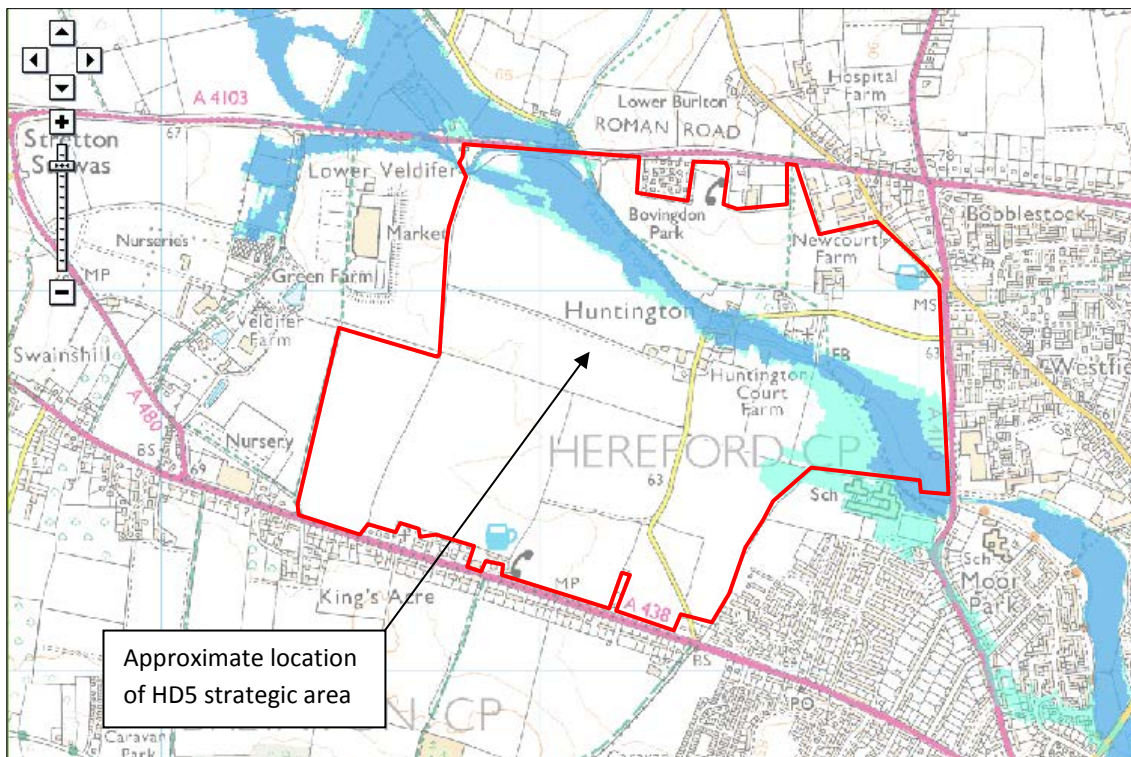


Figure 1: Environment Agency Indicative Flood Map, February 2014

### Fluvial Flood Risk

As shown by the EA Indicative Flood Map in Figure 1, the majority of the Policy HD5 Western Urban Expansion Area is situated within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. However, Yazor Brook flows from north-west to south-east through the area. Within the strategic area, there are areas of Flood Zone 2 and Flood Zone 3 associated with Yazor Brook. Flood Zone 2 is a medium risk flood area, with land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) in any year; Flood Zone 3 is a high risk flood area with land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) in any year. The flood zones are mainly limited to the river corridor but spread out over a wider area in the south-east corner of the area. It should be noted that the current EA Flood Map does not reflect changes to the flooding regime in this area since the completion of the Yazor Brook FAS at Credenhill.

All types of development are acceptable in the Flood Zone 1 areas. Residential and employment development is classified as 'More Vulnerable' development and will require an Exception Test to be passed for residential or employment development in Flood Zone 3 areas.

Note: Extensive hydraulic modelling has been undertaken for the Yazor Brook (and for Widemarsh Brook and Eign Brook further downstream). Therefore, a good knowledge of actual flood levels and extents of flooding will be available. Also, a flood alleviation scheme has been constructed upstream of the area at Credenhill, with the aim of diverting flow from the Yazor Brook in high flows to facilitate future development and re-development within the city areas.

### Other Sources of Flood Risk and Considerations

EA maps indicate no risk of potential reservoir flooding to the development.



The EA maps identify that the strategic development area lies within designated groundwater source protection zones, with zones 1, 2 and 3 located within the strategic development area. The development area lies within a groundwater vulnerability zone with a 'Minor Aquifer Intermediate' designation and is designated a groundwater Nitrate Vulnerable Zone.

The Aquifer maps indicate the underlying bedrock is designated as a 'Secondary A' aquifer and superficial deposits may be present below the area with a 'Secondary (undifferentiated)' designation.

### **Strategic Flood Risk Assessment Comments**

Brief details of the extensive hydraulic modelling are outlined in Section 3 of the SFRA. Section 5.9 of the SFRA comments on HLA site reference HLA/197/004 – Land at Huntingdon, Hereford, and states, “Drainage of this site will substantially increase pressure on the Yazor Brook and increase flood risk downstream” and “Substantial attenuation facilities may be required on the site”.

Note: The flood mitigation scheme at Credenhill has been implemented since the SFRA was published. One of the aims of the scheme is to divert high flows in Yazor Brook upstream of Hereford to relieve the pressure on the brook and facilitate future development and re-development in the city. Nevertheless, a detailed review of the implemented scheme and flows in Yazor Brook, coupled with a site-specific flood risk assessment, will be required for development of this area.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is high risk of surface water flooding in close proximity to the Yazor Brook watercourse. Elsewhere within the area, there are a number of small, isolated pockets of medium and high risk areas, which are likely to be associated with the accumulation of surface water runoff in shallow depressions on the area.



Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

The Yazor Brook is classified as an 'Ordinary Watercourse' at this location. As such, permissions and approvals for the discharge of surface water to this watercourse will fall to Herefordshire Council as the Lead Local Flood Authority.

### **Foul Water Drainage**

Existing public foul sewers are likely to be present in the local communities that surround the area. The exact location, depth, size, and capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The fluvial flood risk at the majority of this area is considered to be low, with the exception of the Yazor Brook river corridor where medium and high risk flood areas may be found. The flood risk is shown to extend over a wider area in the south east corner of the area. It should be noted that the current EA Flood Maps do not take account of changes to the flooding regime resulting from the Yazor Brook FAS. A number of small, isolated pockets of medium to high risk surface water flooding are present on the existing area. These are likely to be found in current low spots within the area, which could be eliminated by re-grading in a development.

All of the proposed built development (residential and employment land, including primary access road and associated infrastructure) can be located in Flood Zone 1 areas. Where necessary, buffer zones, green corridors and open space development can be accommodated within Flood Zone 3a areas. Only 'Essential Infrastructure' that has passed the Exception Test may be located in Flood Zone 3b, the functional floodplain of the Yazor Brook, in this area.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy. The FRA must take account of the changes to the flooding regime brought about by the Yazor Brook FAS. The hydraulic modelling for the Yazor Brook FAS is held by Herefordshire Council. At present, the EA operates a precautionary approach to development along the Yazor Brook corridor and requests that all developments in this area use the modelled baseline 1 in 100 year flood level with climate change.

The management of surface water runoff from the re-development will require careful consideration and a surface water drainage strategy will need to be developed in accordance with draft National Standards for Sustainable Drainage. Infiltration should be considered in the first instance. However, groundwater source protection zones have been identified within this area and proposed infiltration will need to be carefully considered in the context of these to address the potential environmental impacts. SUDS may require multiple levels of treatment to avoid pollution risks and should be designed to maximise recharge to the aquifer and support water levels in the watercourses at times of low flows. Attenuation in some form is likely to be required. It is likely that any discharges to the Yazor Brook will need to be severely restricted to protect properties downstream and in the city centre. At present, the Council is imposing a maximum discharge rate from developments in this area based on a runoff rate of 5 l/s/ha. Suitable foul sewer connection points will need to be identified and agreed to receive foul effluent discharges from a development.



**POLICY :** HD6 – Southern Urban Expansion Area (Lower Bullingham)  
**LOCATION:** Hereford  
**DESCRIPTION:** Mixed use development of around 1,000 new dwellings and 5ha of employment land  
**GRID REFERENCE:** OS 35200 23750

### **Introduction**

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### **Overview of the Policy Development Proposals**

The Southern Urban Expansion Area (Lower Bullingham) will accommodate around 1,000 new homes and 5ha of employment land within the plan period.

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

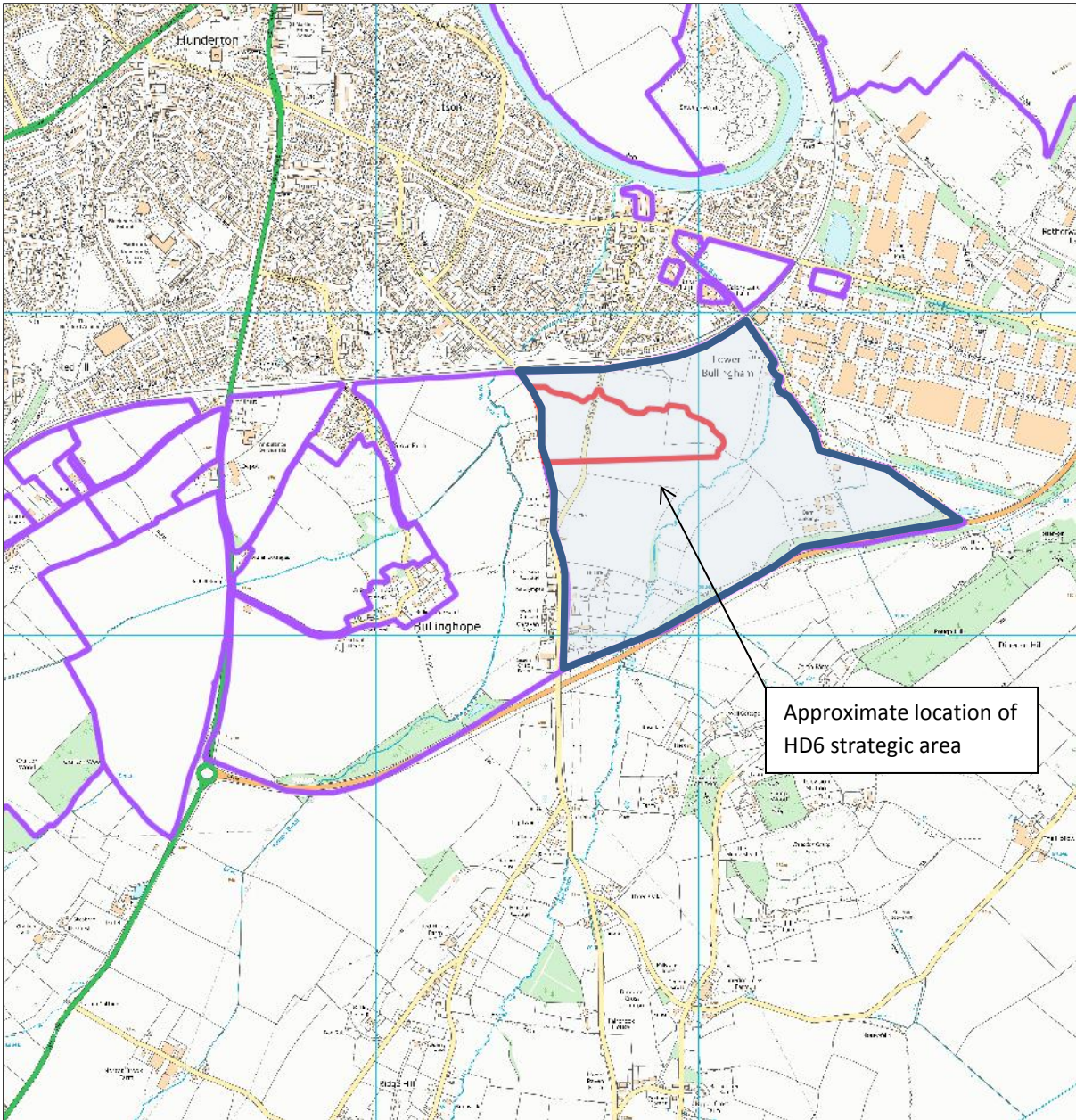


Figure 1: HD6 Southern Urban Expansion Area (Lower Bullingham) – Strategic Development Area (shaded blue)

**General Description of Strategic Development Area**

The existing area is a greenfield area largely comprising mixed arable land and a small area of pasture land. The Red Brook watercourse flows from south-west to north-east through the area. A further unnamed watercourse flows from west to east along the northern boundary of the area. Norton Brook flows from south to north approximately 100m to the west of the area. Norton Brook joins with Withy Brook just outside the north-west corner of the area and continues northwards to the River Wye. The general topography of the strategic area is that land slopes downwards from south-west to north-east across the area, and towards Red Brook running through the area. The majority of the area is situated at an elevation of about 55 – 70m AOD.



## Environment Agency Flood Map

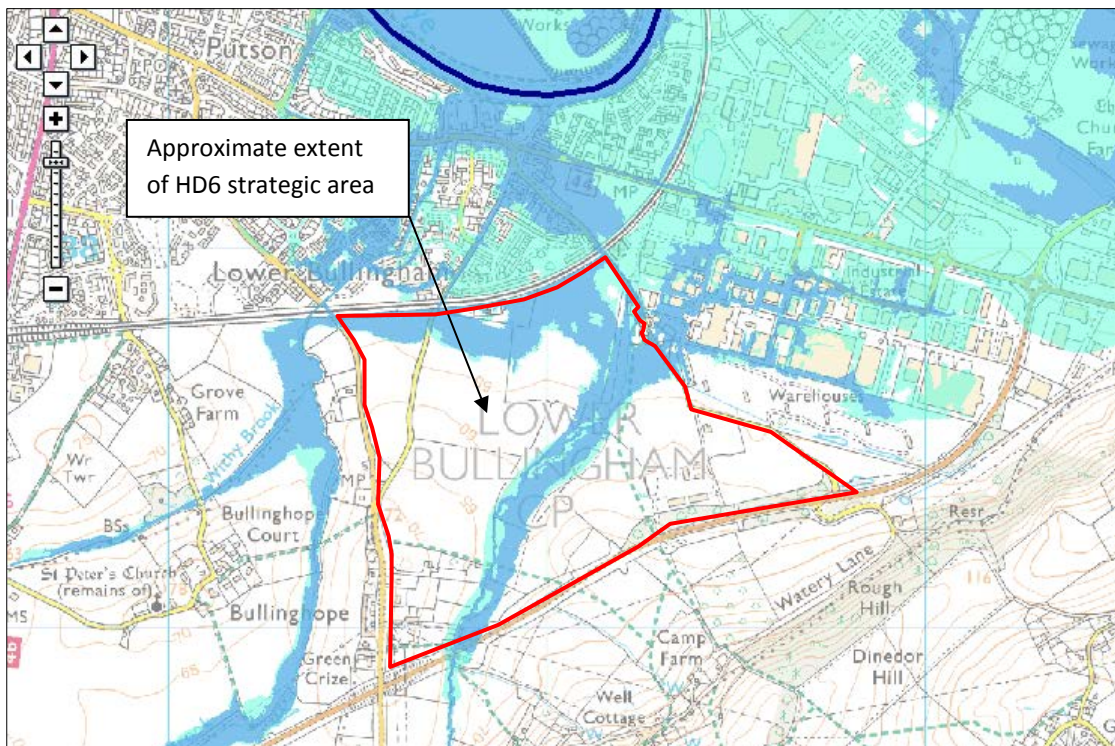


Figure 1: Environment Agency Indicative Flood Map, February 2014

### Fluvial Flood Risk

As shown by the EA Indicative Flood Map in Figure 1, a large part of the Policy HD6 Southern Urban Expansion Area (Lower Bullingham) is situated within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. However, there are areas of greater flood risk located within the area. The river corridor of Red Brook flowing through the area, and the unnamed watercourse along the northern boundary of the area, are associated with Flood Zone 2 and Flood Zone 3 areas, with a large extent of Flood Zone 3 shown in the north-east corner of the area where the two watercourses meet. Flood Zone 2 areas are medium flood risk areas comprising land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%); Flood Zone 3 areas are high risk flood areas where the land is assessed as having a 1 in 100 or greater annual probability of river flooding (>1%). It should also be noted that areas of Flood Zones 2 and 3 are also present to the west of the strategic area.

Residential and employment area types of development are classified as being “More Vulnerable” to flood risk. “More Vulnerable” development is appropriate in Flood Zones 1 and 2 but must pass an Exception Test to justify their development in Flood Zone 3 areas.

Red Brook, Norton Brook and the unnamed watercourse at the northern boundary of the development area are classified as ‘Ordinary Watercourse’.

### Other Sources of Flood Risk and Considerations

EA maps indicate no risk of potential reservoir flooding to the development area.

The EA maps identify that the strategic development area does not lie within a designated groundwater source protection zone (although groundwater source protection zones are located approximately 2km to the north west). The development area lies within a groundwater vulnerability zone with zones of both ‘Minor Aquifer

Intermediate' and 'Minor Aquifer High' designations across the area. The area also lays within designated zones of both surface and groundwater Nitrate Vulnerable Zones.

The Aquifer maps indicate the underlying bedrock is designated as a 'Secondary A' aquifer and superficial deposits may be present below the area with a 'Secondary (undifferentiated)' designation.

### **Strategic Flood Risk Assessment Comments**

There is a history of flooding in the Lower Bullingham area, in particular around Holme Lacy Road and Watery Lane, primarily due to the floodplain of the River Wye. The Lower Wye at Hereford, affecting both Red Brook and Withy Brook, has been ranked No 1 with the highest fluvial flood risk in the county. The River Wye has been extensively modelled. A 1D HEC-RAS hydraulic model exists for Red Brook and Withy Brook, although this is now more than 10 years old.

This potential development area has been reviewed in the SFRA, which concluded that local fluvial flood risks within the area are likely to be manageable but surface water runoff from development has the potential to severely overload the receiving watercourses. Significant attenuation is likely to be required but this must be arranged to empty before peak flows of the River Wye reach the city. This will not be straightforward to arrange and a detailed Surface Water Management Plan was recommended for the development area.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrates that there is no significant risk of surface water flooding across the majority of the area. However, there are medium to high risks of surface water flooding across the area in the vicinity of Red Brook and the unnamed watercourse, and also with Norton and Withy Brooks to the west of the area.

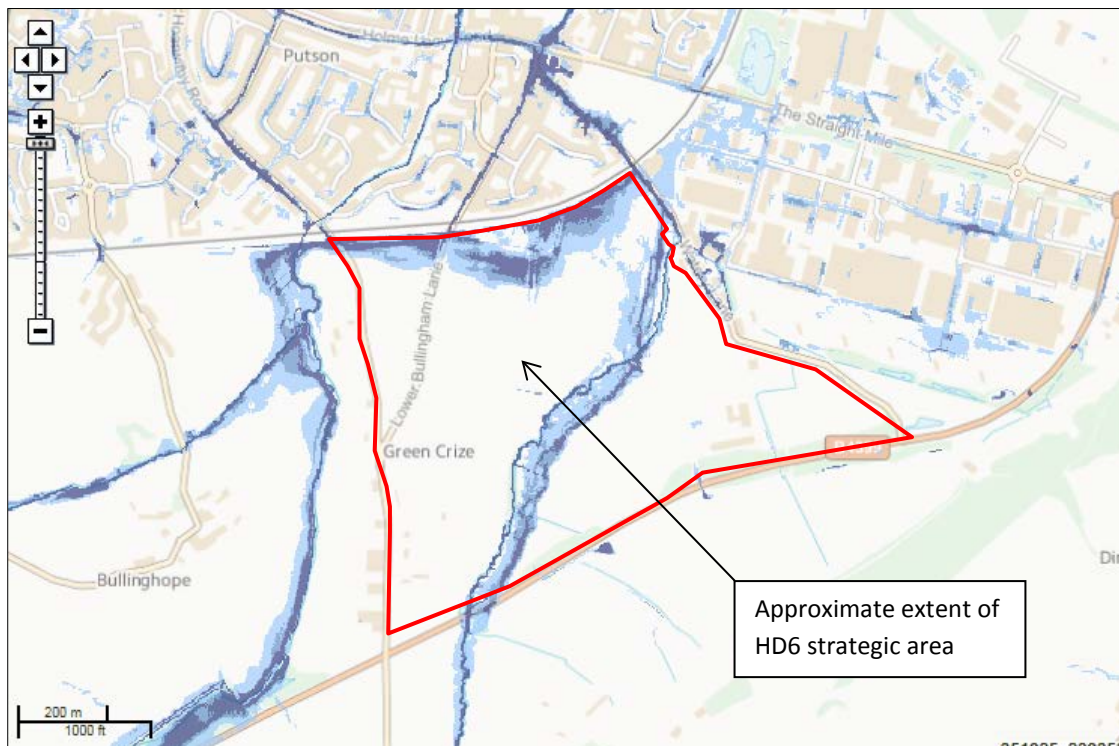


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

As has been highlighted above, the surface water drainage strategy for development of this area will require very careful consideration to avoid increasing the flood risk to properties downstream of the site.

Red Brook, Norton Brook and the unnamed watercourse at the northern boundary of the development area are classified as 'Ordinary Watercourse'. As such, permissions and approvals for the discharge of surface water to these watercourses will fall to Herefordshire Council as the Lead Local Flood Authority (LLFA).

### **Foul Water Drainage**

Existing public foul sewers are likely to be present nearby serving the residential communities to the north of the railway and the employment area to the east of the strategic area. The topography of the strategic area slopes in the general direction towards the existing residential and employment areas, that suggests existing sewerage infrastructure will be at a lower elevation than new development, and that a gravity-based foul drainage system could be developed to serve future development on the strategic area. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The flood risk on this strategic area is considered to be low for the majority of the area but of medium to high risk in the vicinity of Red Brook and the unnamed watercourse flowing through the area, and in the north east corner of the area. Residential and employment type development will be appropriate in Flood Zone 1 for the majority of the area. At this stage, it is likely that the majority of the proposed residential and employment development (including primary access roads and associated infrastructure) could be located in Flood Zone 1 areas. However, the large extent of Flood Zone 3 area in the north-east corner of the site may make continuity difficult of locating new employment development adjacent to the existing employment land. Detailed hydraulic modelling will be required at planning stage for this area to demonstrate that all built development is achievable in areas of the least flood risk. It will be desirable to locate buffer zones, green corridors, and public open space within Flood Zone 3a areas and areas of surface water flooding associated with Red Brook and the unnamed watercourse. Only 'Essential Infrastructure' that has passed the Exception test may be located in Flood Zone 3b, functional floodplain areas.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy at planning application stage. The site specific FRA will need to include detailed hydraulic modelling of Red Brook and the unnamed watercourse to fully confirm developable areas. It may also be necessary to include Norton Brook in the scale of hydraulic modelling in this area.

The management of surface water runoff from the re-development will require careful consideration and a surface water drainage strategy will need to be developed in accordance with draft National Standards for Sustainable Drainage. It has been recommended (in the SFRA) that a detailed Surface Water Management Plan is developed for this area. It is likely that any discharges to Red Brook or the unnamed watercourse flowing through the area will need to be severely restricted and timed to avoid peak flows in the River Wye to protect properties downstream in Lower Bullingham and Rotherwas. Suitable foul sewer connection points will need to be identified and agreed to receive foul effluent discharges from a development.



<b>POLICY :</b>	BY2 – Land at Hardwick Bank
<b>LOCATION:</b>	Bromyard
<b>DESCRIPTION:</b>	Mixed use development of around 250 new residential units, formal green space and play areas, sports facilities, allotments, link road access onto A44 and residential roads
<b>GRID REFERENCE:</b>	OS 361399 2241665

### **Introduction**

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire;
- Herefordshire Unitary Development Plan - March 2007, March 2009;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### **Overview of the Policy Development Proposals**

Development proposals at Land at Hardwick Bank, Bromyard, are expected to achieve a sustainable urban extension of the town comprising:

- a comprehensively planned, mixed use development of around 250 new homes at an average density of up to 35 dwellings per hectare comprising a mix of market and affordable house sizes and types that meet the requirements of Policy H3 and the needs identified in the latest version of the Herefordshire Local Housing Market Assessment;
- a target of 40% of the total number of dwellings shall be affordable housing;
- a new formal park to form part of the residential development complemented by new play and sports facilities and allotments;
- the development areas should be linked by a suitable vehicular access, likely to take the form of a roundabout, onto the A44. The development areas should also be serviced by a residential road which will allow for opportunities to extend development beyond the plan period and serve as a future link road to other parts of the local highway network;
- the residential roads leading off Winslow Road should be utilised to provide sustainable links to the town (including pedestrian and cycle links) as well as public transport links between the area and the town centre;
- the provision of and contributions towards any identified need for new/improved community facilities. This shall include improvements to classroom provision for the local primary school which should incorporate publicly accessible youth facilities;
- a high standard of design and layout which respects the townscape, landscape and green infrastructure of the area;
- sustainable standards of design and construction;
- incorporate significant landscape buffers to mitigate the impacts of the development areas on the wider landscape;
- an evaluation of the archaeological importance of the area in order to ensure appropriate protection of heritage assets and inform the detailed development proposals; and
- a comprehensive sustainable urban drainage system which includes measures such as rain gardens and swales to manage ground and surface water drainage and safeguard against any increased flood risk

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

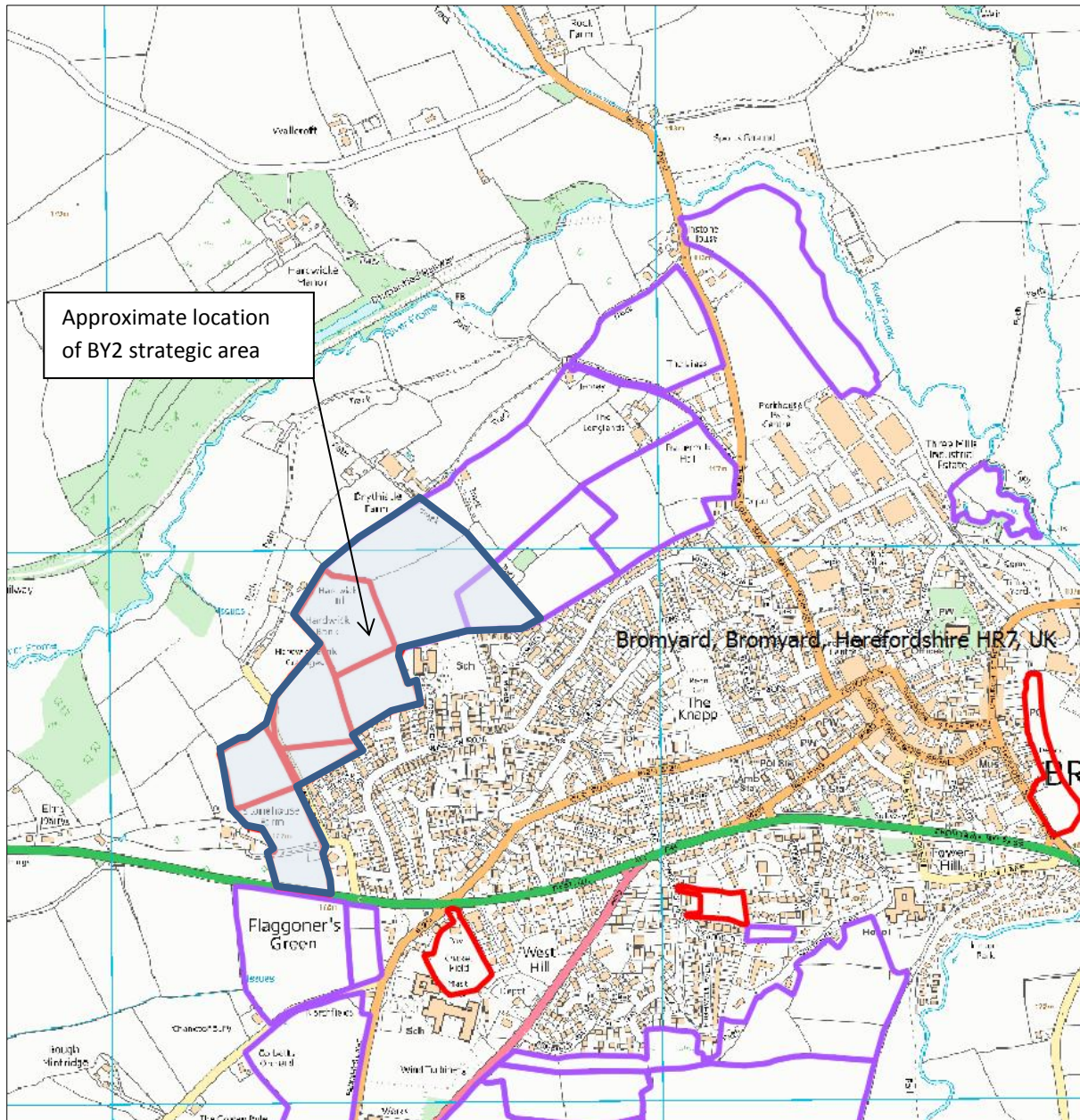


Figure 1: Land at Hardwick Bank – Strategic Development Area (shaded blue)

#### **General Description of Strategic Development Area**

The existing area is a greenfield area comprising mixed arable and pasture land. The natural topography is that land slopes northwards down to the River Frome. The majority of the area is situated at an elevation of 165 – 175m AOD, which is approximately 40 – 50m above the River Frome valley.

## Environment Agency Flood Map

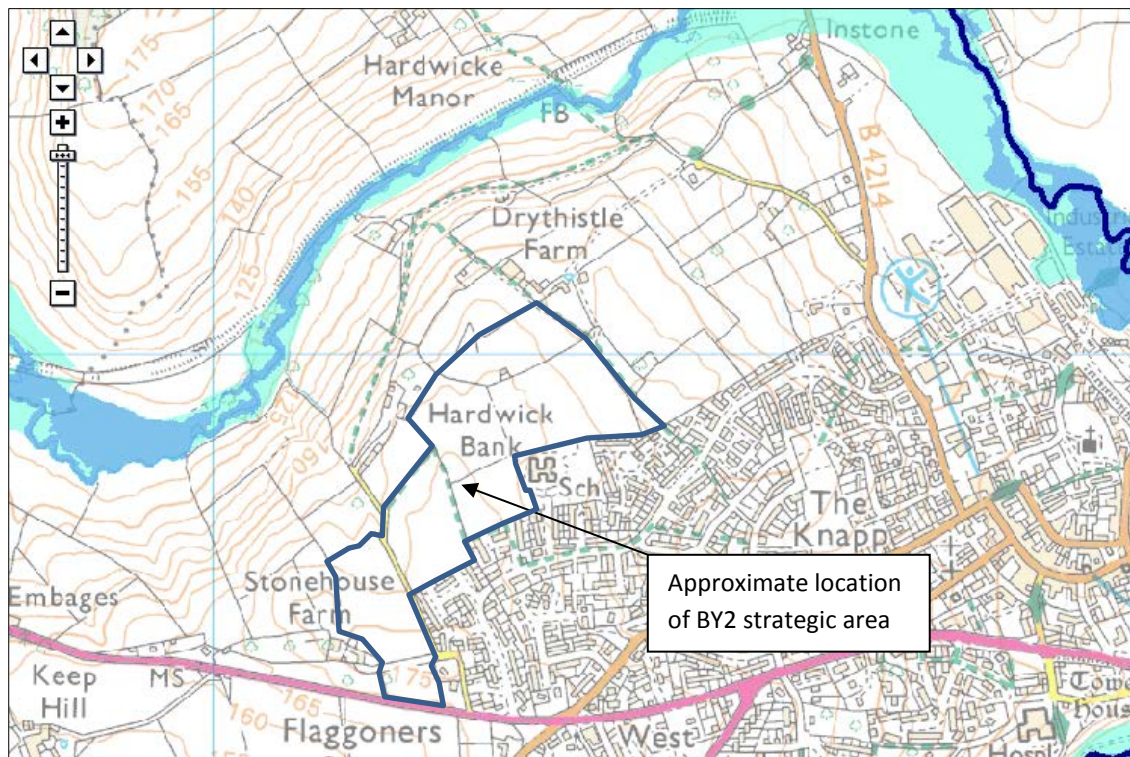


Figure 1: Environment Agency Indicative Flood Map, February 2014

### Fluvial Flood Risk

As shown by the EA Indicative Flood Map in Figure 1, the Policy BY2 Land at Hardwick Bank area is situated entirely within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. In accordance with the National Planning Policy Framework all types of development will be appropriate in Flood Zone 1.

### Other Sources of Flood Risk and Considerations

EA maps indicate no risk of potential reservoir flooding to the development area.

The EA maps identify that there are no groundwater source protection zones within the development area. The EA aquifer maps indicate that the underlying bedrock is designated as a Secondary A aquifer.

The area lies within a groundwater Nitrate Vulnerable Zone (NVZ). NVZs are designated where land drains and contributes to the nitrate levels found in surface or groundwaters.

### Strategic Flood Risk Assessment Comments

Bromyard does not have a significant history of flooding. However, Linton Park Caravan Site was badly affected by the July 2007 event and necessitated the evacuation of residents. The caravan site is lies downstream of the strategic area at Hardwick Bank.

### Surface Water Flood Risk

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is no significant risk of surface water flooding to the potential development area.



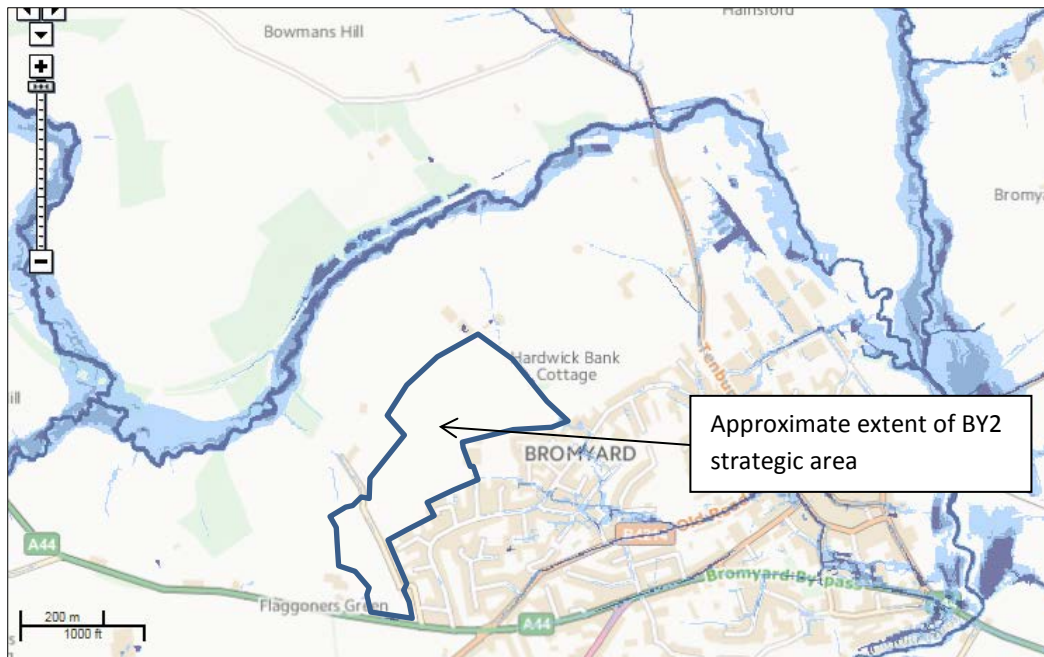


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

### **Foul Water Drainage**

Existing public foul sewers are likely to be present nearby serving the local communities around Winslow Road and West Hill (A44). The topography of the area suggests that existing public sewer infrastructure is likely to be at a higher elevation than the development. Therefore, a foul pumping station(s) will be required to serve a future development on this area. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Conclusions**

The flood risk at this location is considered to be low over the entire development area. All the proposed development can be located in Flood Zone 1, well above the fluvial flood extent of the River Frome. In accordance with NPPF guidance, all types of development will be suitable on this area.

A site-specific flood risk assessment and surface water drainage strategy will be required to support an application for planning consent. This will need to be developed in accordance with draft National Standards for Sustainable Drainage. Infiltration may be feasible on the development area. Alternatively, a discharge to the River Frome may be feasible, subject to agreement of appropriate discharge conditions. The FRA and surface water drainage strategy must demonstrate that there is no increased surface water runoff from the development area. Foul drainage is likely to require one or more pumping stations to develop the area, with connections and discharges subject to agreement with Dwr Cymru Welsh Water.

<b>POLICY :</b>	LB2 – Land North of the Viaduct
<b>LOCATION:</b>	Ledbury
<b>DESCRIPTION:</b>	Mixed use development of around 625 new dwellings, around 3ha of Class B1 employment land, a new 210 place primary school, recreational open space, community facilities and transport links to the town centre
<b>GRID REFERENCE:</b>	OS 37030 23900

### Introduction

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### Overview of the Policy Development Proposals

Development proposals north of the viaduct in Ledbury will be expected to bring forward the following to achieve a sustainable mixed use urban extension of the town:

- a mixed use development of around 625 new homes, at an average density of around 40 dwellings per hectare, comprising a mix of market and affordable house sizes and types that meet the requirements of Policy H3 and the needs identified in the latest version of the Herefordshire Local Housing Market Assessment;
- around 3 hectares of employment land, restricted to Use Class B1, to be located along the northern and eastern boundary adjoining existing businesses;
- a target of 40% of the total number of dwellings to be affordable housing;
- land and contributions to facilitate a restored canal to be delivered in partnership with the Herefordshire and Gloucestershire Canal Trust;
- a new linear informal park to link to the existing town trail, riverside walk, recreational open space and existing allotments;
- the provision of and contributions towards any identified need for new/improved community facilities/infrastructure improvements. This shall include a new 210 place primary school within the development (or an expansion of the existing primary school) and new recreational open space, play, indoor and outdoor sport facilities delivered through developer contributions;
- primary vehicular access to the development will be from the Hereford Road under the viaduct with the option of a secondary access from the Bromyard Road to the north;
- appropriate mitigation to safeguard the amenity of future occupants from unacceptable levels of noise and to safeguard the continued operation of existing businesses adjoining the area;
- development of bespoke, high quality and inclusive design, including accommodation that will meet the needs of older persons and that contributes to the distinctiveness of this part of Ledbury and respects the setting of the listed viaduct and the Malvern Hills Area of Outstanding Natural Beauty;
- safeguards to ensure there is no adverse impact on water quality and quantity in the River Leadon;
- new walking, cycling and bus links from the urban extension directly to the town trail and riverside walk under the viaduct, the railway station and town centre to create linkages to nearby development and existing community facilities;
- sustainable standards of design and construction; and





The River Leadon flows from north to south to the west of the strategic development area. A small unnamed watercourse flows from east to west through the southern end of the area, which joins the River Leadon to the south of the railway viaduct.

### **Environment Agency Flood Map**

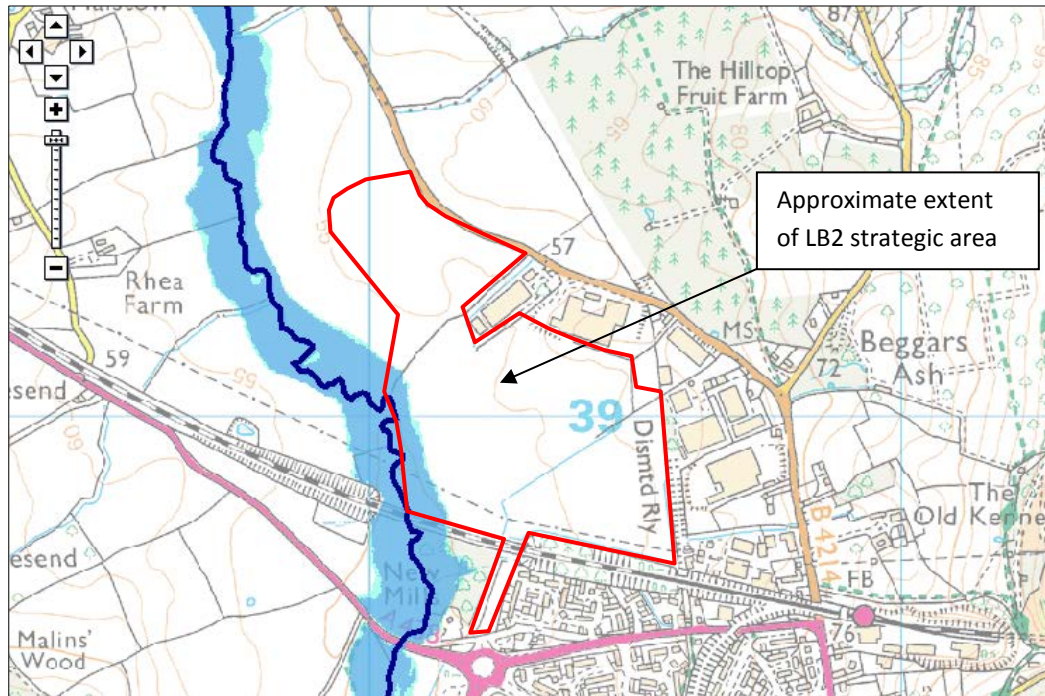


Figure 1: Environment Agency Indicative Flood Map, February 2014

### **Fluvial Flood Risk**

As shown by the EA Indicative Flood Map in Figure 1, the majority of the Policy LB2 Land North of the Viaduct area is situated within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. A small part of the south west corner of the area borders the River Leadon and lies within Flood Zone 3, a high risk flood area with a 1 in 100 or greater annual probability of river flooding (>1%).

The flood risk vulnerability classification of the proposed development will fall into the “More Vulnerable” category. Any type of development will be appropriate in the Flood Zone 1 area; an Exception Test will be required for any “More Vulnerable” development proposed in the Flood Zone 3 area.

The River Leadon is classified as a ‘Main River’ at this location.

### **Other Sources of Flood Risk and Considerations**

EA maps indicate no risk of potential reservoir flooding to the development area.

The EA maps identify that the development does not lie within a designated groundwater source protection zone. The development area lies within a groundwater vulnerability zone with a ‘Minor Aquifer Intermediate’ designation and is designated a surface water Nitrate Vulnerable Zone.

The Aquifer maps indicate the underlying bedrock is designated as a ‘Secondary A’ aquifer and superficial deposits may be present below the area with a ‘Secondary (Undifferentiated)’ designation.



### **Strategic Flood Risk Assessment Comments**

The SFRA notes that, in general, Ledbury is liable to flash flooding, as evidenced by floods in the town centre during July 2007. Numerous reports have been recorded over the years of surface water flooding in the River Leadon catchment. A note in the SFRA indicates this is due to a higher than average soil impermeability. This suggests that local infiltration of surface water runoff may not be feasible within the proposed strategic development and that a controlled discharge to a watercourse will need to be considered. In the analysis of potential development areas under E1-3 Policy in Section 5.9.2 of the SFRA, it is suggested that the preferred policy for the discharge of surface water runoff from development of the land north of the railway viaduct would be direct discharge to the River Leadon without attenuation.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is no significant risk of surface water flooding to the majority of the potential development area. However, it should be noted that a low to medium surface water flood risk is shown for a small unnamed watercourse that flows from east to west through the southern end of the area.

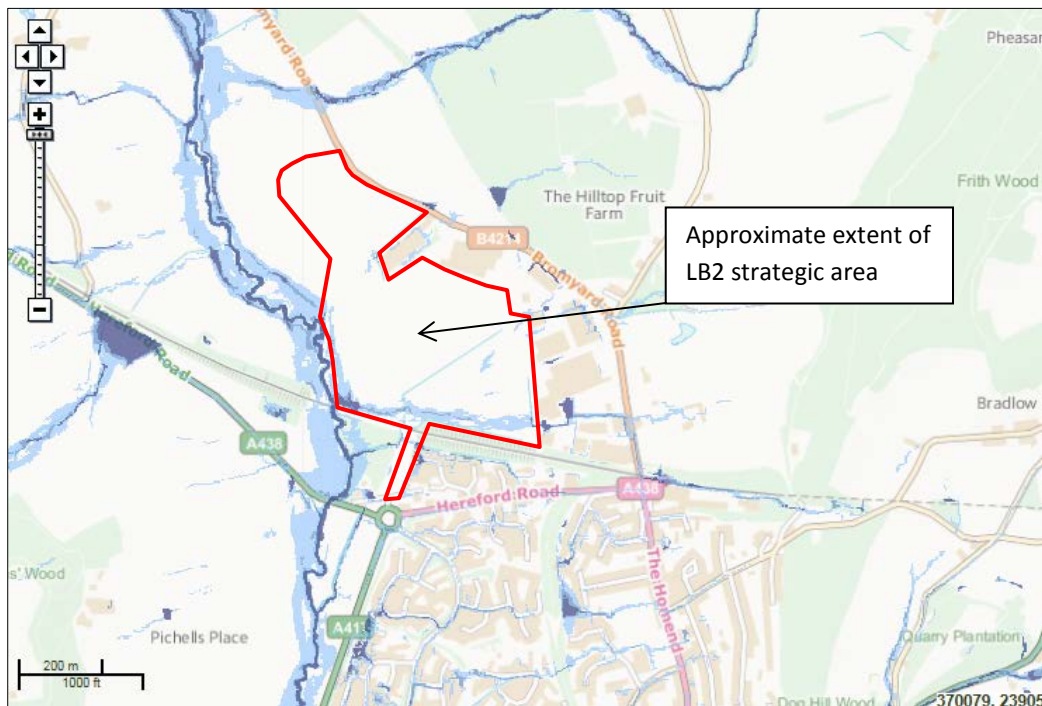


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features offer multiple benefits including reduced flow rate, maximising infiltration, water treatment, biodiversity and amenity benefit. This approach promotes the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

The unnamed watercourse is classified as an 'Ordinary Watercourse' at this location. As such, permissions and approvals for the discharge of surface water to this watercourse will fall to Herefordshire Council as the Lead Local Flood Authority (LLFA).

#### **Foul Water Drainage**

Existing public foul sewers are likely to be present in the residential areas to the south of the viaduct. The topography of the strategic development area suggests that a gravity-based foul drainage system may be feasible to serve a future development on this area. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

#### **Overall Comment**

The flood risk at this location is considered to be low on the majority of the strategic development area. However, a high flood risk has been identified on a small part of the south west corner of the area that borders the River Leadon. In addition, a small, unnamed watercourse flows from east to west across the area with a low to medium risk of surface water flooding. At this stage, development is likely to be located well above the River Leadon and it is likely that all of the proposed development (residential, employment and educational establishment, including primary access roads and associated infrastructure) can be located in Flood Zone 1 areas. Detailed hydraulic modelling of the unnamed watercourse will be required at planning stage to demonstrate that this can be achieved. It will be desirable to locate buffer zones, green corridors, and public open spaces within Flood Zone 3a areas and areas of surface water flooding associated with the River Leadon and the unnamed watercourse.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy at planning application stage. The site specific FRA will need to include detailed hydraulic modelling of the unnamed watercourse to fully confirm developable areas.

The management of surface water runoff from the re-development will require careful consideration and a surface water drainage strategy will need to be developed in accordance with draft National Standards for Sustainable Drainage. Infiltration should be considered in the first instance. Should a surface water discharge to the unnamed watercourse be required, advice should be sought from Herefordshire Council as the LLFA. The discharge of foul effluent may be possible to existing public foul sewers, subject to agreement with Dwr Cymru Welsh Water.



<b>POLICY :</b>	LO2 – Leominster Urban extension
<b>LOCATION:</b>	Leominster
<b>DESCRIPTION:</b>	Mixed use development of around 1,500 new homes, Class B1 employment land, a new 420 place primary school, recreational open space, community facilities and transport links to the town centre
<b>GRID REFERENCE:</b>	OS 34860 25800

### Introduction

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### Overview of the Policy Development Proposals

Development proposals at Leominster urban extension will be expected to bring forward:

- around 1,500 new homes at an average density of up to 35 dwellings per hectare comprising a mix of market and affordable house sizes and types that meet the requirements of Policy H3, and the needs identified in the latest version of the *Herefordshire Local Housing Market Assessment*;
- an affordable housing target of 25% will be required as an opportunity to address
- the range of homes currently available in the town;
- a southern road linking the Worcester Road roundabout directly to the A44, to help relieve traffic congestion within the town and improve air quality in the Bargates area;
- small scale neighbourhood retail facilities;
- potential for employment opportunities as demand arises in the form of use class B1 and live/work units;
- provision of appropriate community and youth facilities within a community hub;
- provision of a new 420 place primary school and pre-school facilities;
- appropriate provision of on-site open space, sports and recreation provision (in addition to Cockcroft Hill). This shall include fully accessible semi-natural and natural greenspace; play provision for all age groups, indoor and outdoor sports provision (some of which may be off site); allotments and new orchard planting;
- new green infrastructure walking and cycling links to the town centre, schools, the Enterprise Park and local public right of way network;
- retention of the highly sensitive landscape areas and geological features of Cockcroft Hill (which encompasses Ryelands Croft) by retaining this site as natural open space;
- sustainable standards of design and construction;
- a comprehensive sustainable urban drainage system which includes measures such as rain gardens and swales to manage ground and surface water drainage and safeguard against any increased flood risk; and
- an evaluation of the archaeological importance of the area in order to ensure appropriate protection of heritage assets and inform the detailed development proposals.

The land available for development to the south-west of Leominster will also enable the housing needs of the town to be met beyond the plan period.

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

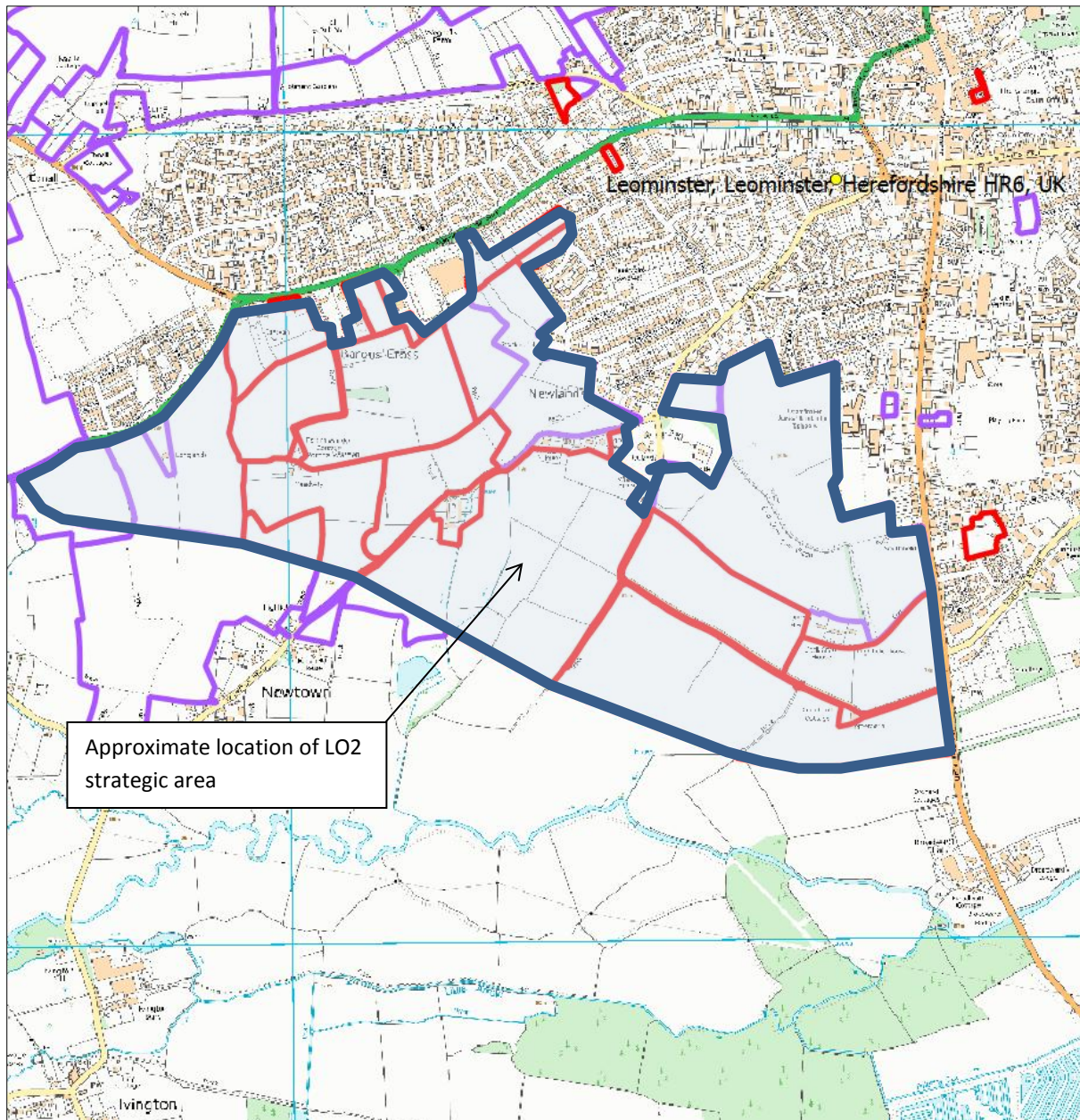


Figure 1: LO2 Leominster Urban Extension – Strategic Development Area (shaded blue)

### **General Site Description**

The existing area is a greenfield area comprising mixed arable and pasture land. The general topography is that land slopes southwards down towards the River Arrow. The majority of the area is situated at an elevation of around 80 – 95m AOD, which is approximately 10 – 15m above the River Arrow valley. A small unnamed watercourse flows southwards through the middle of the area and discharges into the River Arrow via an existing pond east of Bankfield House (outside the strategic development area). A second unnamed watercourse flows southwards at the western boundary of the area.



## **Environment Agency Flood Map**

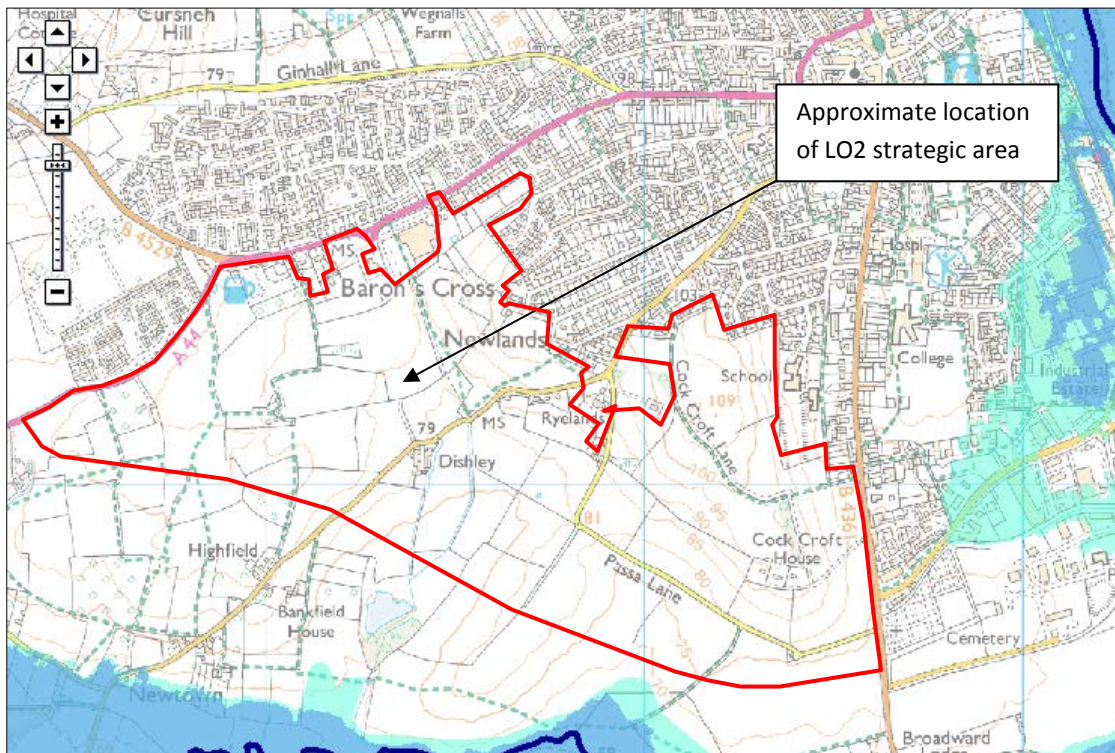


Figure 1: Environment Agency Indicative Flood Map, February 2014

### **Fluvial Flood Risk**

As shown by the EA Indicative Flood Map in Figure 1, the Policy LO2 Leominster Urban Extension area is situated entirely within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding. All types of development are acceptable in Flood Zone 1.

### **Other Sources of Flood Risk and Considerations**

EA maps indicate no risk of potential reservoir flooding to the development.

The EA maps identify that the development area does not lie within a designated groundwater source protection zone (although groundwater protection zones are shown to the north and east of Leominster). The development area lies within a groundwater vulnerability zone with a 'Minor Aquifer Intermediate' designation (and 'Minor Aquifer High' designations to the north and south) and is designated a groundwater Nitrate Vulnerable Zone.

The Aquifer maps indicate the underlying bedrock is designated as a 'Secondary A' aquifer and superficial deposits may be present below the area with a 'Secondary (undifferentiated)' designation.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is no significant risk of surface water flooding to the majority of the potential development area. It should be noted that a low to medium surface water flood risk is shown for a small unnamed watercourse that flows southwards through the centre of the area, and a low surface water flood risk is shown for another small unnamed watercourse flowing southwards along the western boundary of the area.

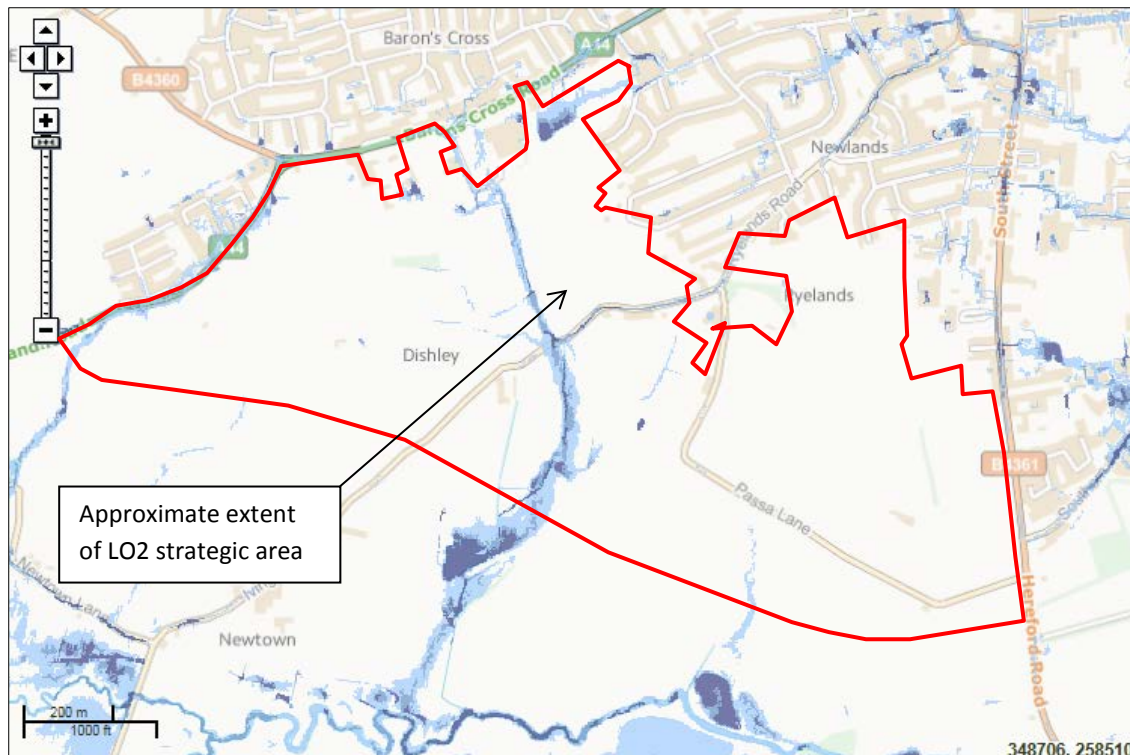


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity).

The unnamed watercourse is classified as an 'Ordinary Watercourse' at this location. As such, permissions and approvals for the discharge of surface water to this watercourse will fall to Herefordshire Council as the Lead Local Flood Authority (LLFA).

### **Foul Water Drainage**

Existing public foul sewers are likely to be present nearby serving the local residential communities around Newlands and Baron's Cross. The topography of the area suggests that a foul pumping station(s) will be required to make connections to these sewers. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The flood risk at this strategic development area is considered to be low and the majority of the area is developable. All forms of development will be appropriate in Flood Zone 1 in accordance with National Planning Policy Framework. At this stage, development is likely to be located well above the extent of any surface water flooding on the unnamed watercourse and the River Arrow flood plain to the south, and it is likely that all of the proposed development (residential, employment and educational establishment, including primary access roads and associated infrastructure) can be located in Flood Zone 1 areas. Detailed hydraulic modelling of the unnamed watercourse will be required at planning stage to demonstrate that this can be



achieved. It will be desirable to locate buffer zones, green corridors, and public open spaces within areas of surface water flooding associated with the the unnamed watercourses.

All proposed development in this area will require a detailed site-specific FRA and surface water drainage strategy at planning application stage. The site specific FRA will need to include detailed hydraulic modelling of the unnamed watercourse flowing through the centre of the area to fully confirm developable areas. The unnamed watercourse on the western edge of th area may need to be included in hydraulic modelling if development is proposed right up to the edge of Monkland Road.

The management of surface water runoff from the re-development will require careful consideration and a surface water drainage system will be required in accordance with draft National Standards for Sustainable Drainage. Use should be made of infiltration wherever possible. If infiltration is not possible, a discharge of surface water runoff to the unnamed watercourse in the centre of the area may be possible, subject to agreement of allowable discharge. Should this be required, advice should be sought from Herefordshire Council as the LLFA.

The discharge of foul effluent may be possible to existing public foul sewers, subject to agreement with Dwr Cymru Welsh Water. This may require one or more foul pumping stations.

<b>POLICY :</b>	RW2 – Land at Hildersley
<b>LOCATION:</b>	Ross-on-Wye
<b>DESCRIPTION:</b>	Residential development of around 200 new homes, including provision of sport/recreation space, green infrastructure and transport links to the town centre
<b>GRID REFERENCE:</b>	OS 36120 22380

### **Introduction**

Herefordshire Council requires an overview of the Core Strategy – strategic housing and employment proposals, with a view to identifying key development constraints in regard to flood risk and land drainage aspects. Information relating to the review of strategic proposals has been obtained from the following sources:

- Environment Agency (EA) indicative flood maps available through the EA website;
- EA groundwater maps available through the EA website;
- Ordnance Survey mapping;
- Strategic Flood Risk Assessment for Herefordshire, March 2009;
- Herefordshire Unitary Development Plan - March 2007;
- Technical Guidance to the National Planning Policy Framework (NPPF).

### **Overview of the Policy Development Proposals**

The strategic residential development proposal on land to the south east of Ross-on-Wye at Hildersley will be required to bring forward the following to achieve a sustainable urban extension of the town:

- around 200 new homes at an average density of up to 35 dwellings per hectare, comprising a mix of market and affordable house sizes and types that meet the requirements of Policy H3 and the needs identified in the latest version of the Herefordshire Local Housing Market Assessment;
- a target of 40% of the total number of dwellings shall be affordable housing;
- the provision of and contributions towards any identified need for new/improved community facilities/infrastructure improvements. This shall include contributions towards the provision of: additional pre-school places; additional classrooms at John Kyrle High School for secondary, post 16 and youth/community infrastructure and further special educational needs provision;
- the provision of a sport/recreation space either on or off site as an alternative to the existing on site John Kyrle High School playing field;
- the creation of new green infrastructure within the development area to benefit residents, local bat populations and other flora and fauna;
- new pedestrian and cycle links from the area towards the town and nearby employment sites, to ease road congestion and limit CO<sub>2</sub> emissions;
- appropriate mitigation measures to be implemented, which ensure that acoustic and safety issues relating to the proximity of the adjacent firing range are satisfactorily addressed;
- adverse impacts on the Water Source Protection Zone should be avoided or mitigated, including through the incorporation of sustainable urban drainage solutions such as rain gardens and swales; and the production by the developer of a Surface Water Management Plan;
- avoid and mitigate adverse impacts from noise and air pollution and vibration (during both construction and occupation of new homes) on the River Wye SAC, Wye Valley Woodlands SAC and the Wye Valley and Forest of Dean Bat Sites; and
- development of bespoke, high quality and inclusive design, including accommodation that will meet the needs of older persons and that contributes to the distinctiveness of this part of Ross-on-Wye and enhances the setting of the adjacent Wye Valley Area of Outstanding Natural Beauty.

The Core Strategy does not identify or allocate specific sites for this area but in undertaking this report a review of the SHLAA database has been used to provide a basis for the assessment. The area assessed is shown below.

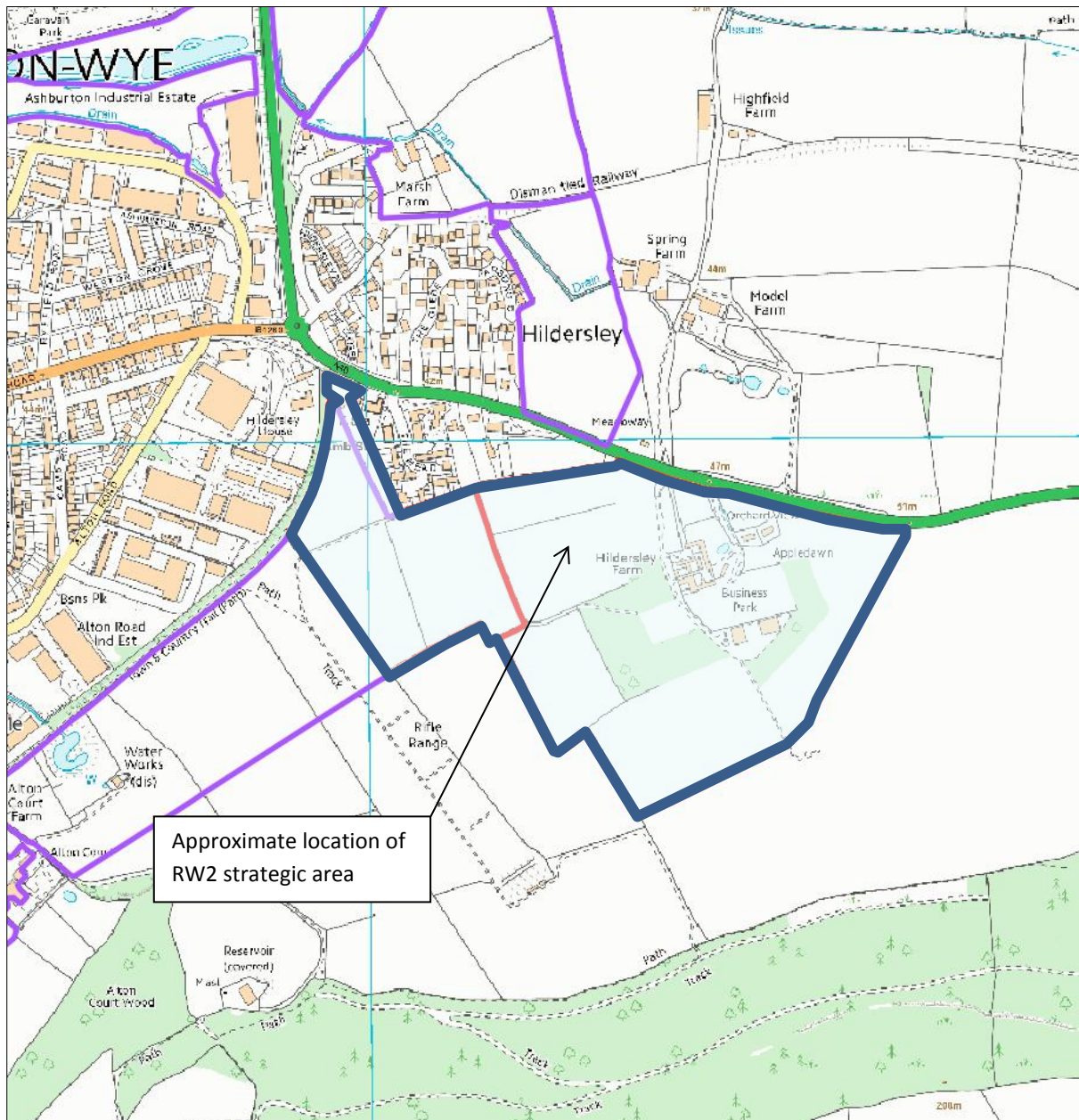


Figure 1: RW2 Land at Hildersley – Strategic Development Area (shaded blue)

### **General Site Description**

The existing area is a greenfield area comprising mixed arable and pasture land. The general topography is that land slopes southwards down towards Ross-on-Wye, with an elevation of 60m AOD at the southern end of the area sloping down to about 45m AOD at the northern end. The strategic development area is bordered by a Rifle Range to the west, residential and employment land to the north and elsewhere by agricultural land. There are no watercourses or other water features on the area.

## **Environment Agency Flood Map**

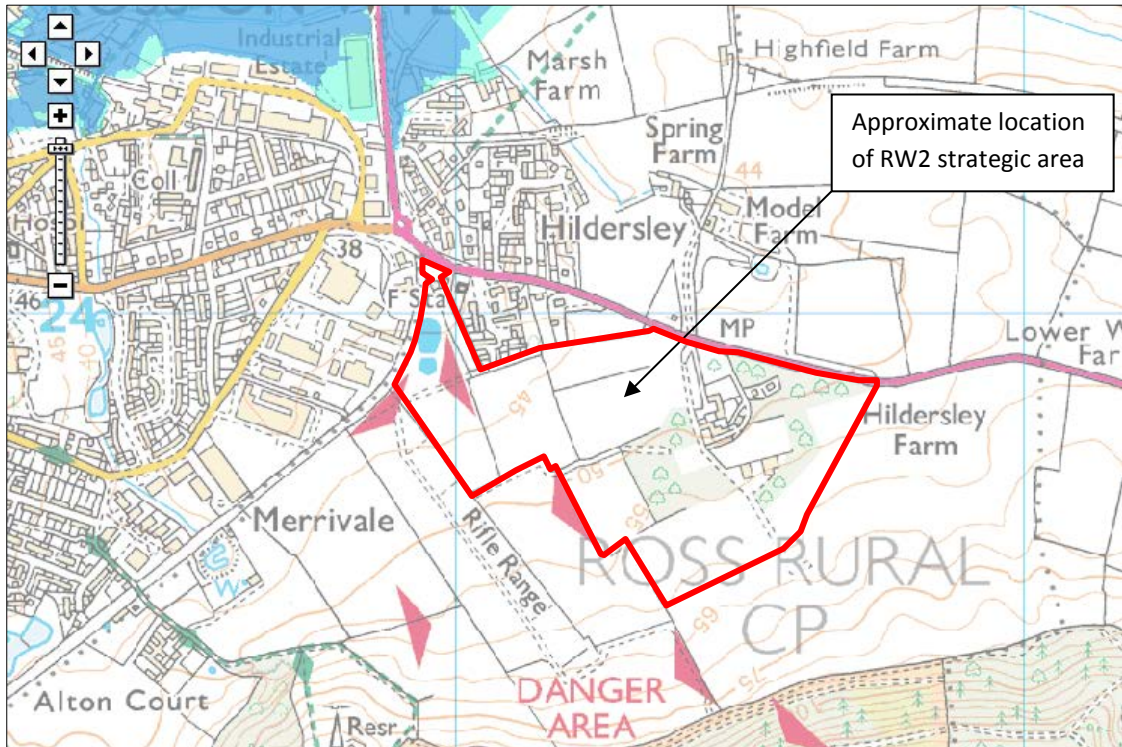


Figure 1: Environment Agency Indicative Flood Map, February 2014

### **Fluvial Flood Risk**

As shown by the EA Indicative Flood Map in Figure 1, the Policy RW2 Land at Hildersley area is situated entirely within Flood Zone 1, a low risk flood area with a less than a 1 in 1000 annual probability of river flooding.

### **Other Sources of Flood Risk and Considerations**

EA maps indicate no risk of potential reservoir flooding to the development.

The EA maps identify that the northern part of the development lies within a designated groundwater source protection zone comprising zones 1, 2 and 3. The development area also lies within a groundwater vulnerability zone with a 'Minor Aquifer High' designation and is designated a groundwater Nitrate Vulnerable Zone.

The EA aquifer maps also show that the area is underlain by bedrock designated as 'Secondary A' aquifer.

### **Strategic Flood Risk Assessment Comments**

Much of Ross-on-Wye is elevated above the River Wye, consequently the Wye has limited flood impact. However, high water levels in the River Wye have resulted in flooding from Rudhall Brook and Chatterley Brook. Following severe flooding in December 2000, the Ross-on-Wye Flood Alleviation Scheme was implemented and completed in 2008. The scheme diverts flows from Rudhall and Chatterley Brooks during high flows and provides temporary storage behind an earth embankment to the east of the town.

### **Surface Water Flood Risk**

The updated EA Flood Maps for Surface Water shown in Figure 2 below illustrate that there is no significant risk of surface water flooding to the potential development area.



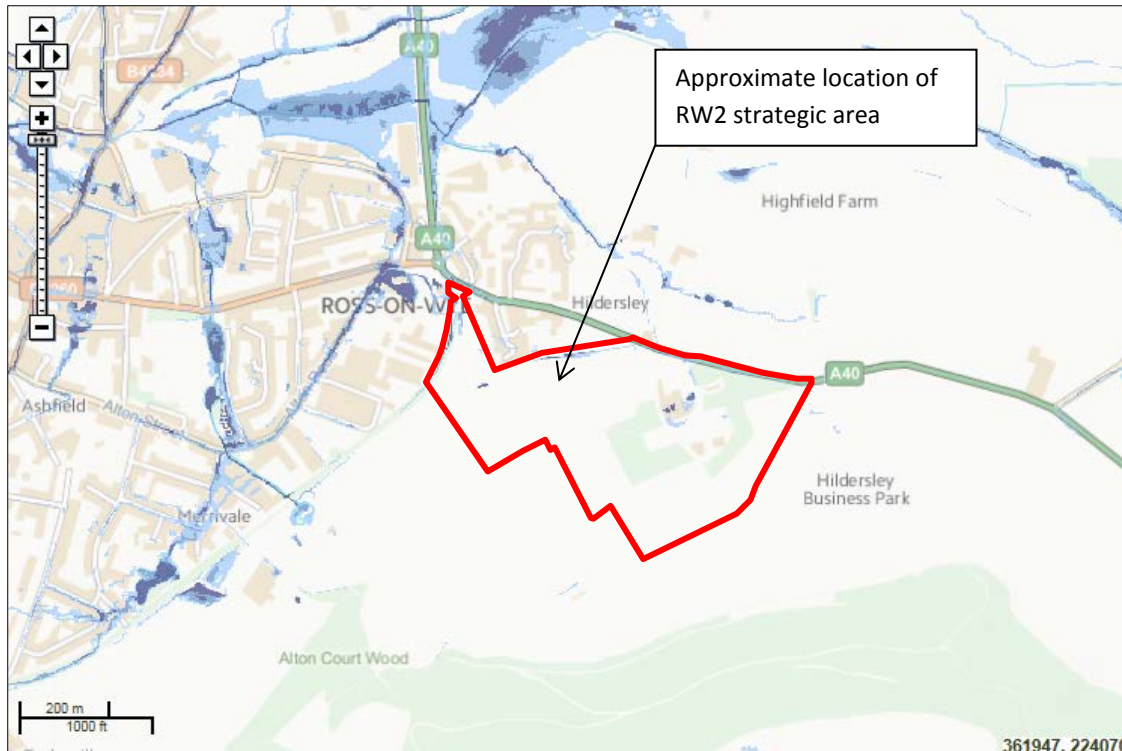


Figure 2: Environment Agency Updated Surface Water Flood Risk Map, February 2014

### **Surface Water Drainage**

In accordance with the draft National Standards for Sustainable Drainage and Policy DR4 of the Unitary Development Plan, a surface water drainage strategy will be required that incorporates the use of Sustainable Drainage (SUDS) where possible. SUDS features promote the use of infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to ground conditions or contamination risks, the preferred options are (in order of preference): (i) a controlled discharge to a local watercourse, or (ii) a controlled discharge into the public sewer network (depending on availability and capacity). There are no watercourses within the development area. If infiltration is not feasible, it is likely that surface water attenuation and a controlled discharge to a public sewer will be required.

### **Foul Water Drainage**

Existing public foul sewers are likely to be present nearby serving the local residential communities to the north of the development area. The topography of the area suggests that a foul pumping station(s) may be required to serve development at this location. The capacity of existing public sewers, and the need for any off-site sewerage upgrades, will need to be confirmed with Dwr Cymru Welsh Water.

### **Overall Comment**

The flood risk for this development area is considered to be low and all types of development will be permissible. All of the proposed residential development (including primary access road and associated infrastructure) can be located in Flood Zone 1 areas.

Although no fluvial or surface water flood risk has been identified at this location, a detailed site-specific flood risk assessment for the area will be required to support an application for planning consent to ensure that surface water runoff is properly managed. A surface water drainage strategy will need to be developed in accordance with draft National Standards for Sustainable Drainage to accompany the FRA. Infiltration should

be considered in the first instance. However, groundwater source protection zones have been identified within this area and proposed infiltration will need to be carefully considered in the context of these to address the potential environmental impacts. SUDS may required multiple levels of treatment to avoid pollution risks and should be designed to maximise recharge to the aquifer. Attenuation in some form may be required. Should infiltration not be possible, there are no watercourses in this area, or nearby, and a discharge to a public surface water sewer may be required. Should this be required, advice should be sought from Dwr Cymru Welsh Water.

The discharge of foul effluent may be possible to existing public foul sewers, subject to agreement with Dwr Cymru Welsh Water.