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Harrogate Borough Council Level 1
Strategic Flood Risk Assessment

Addendum

January 2018

Harrogate
BOROUGH COUNCIL

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Contract

This report describes work commissioned by Linda Marfitt, on behalf of Harrogate Borough Council, by email dated 21 July 2017. Harrogate Borough Council's representative for the contract was Linda Marfitt. Mike Williamson and Charlotte Lloyd-Randall of JBA Consulting carried out this work.

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Purpose

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1 Introduction

This document is an addendum to the existing Harrogate Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) main report, completed in September 2016. Together with the updated Development Site Assessment spreadsheet, this addendum assesses fluvial and surface water flood risk to an additional 40 potential development sites. This additional assessment will allow Harrogate Borough Council (HBC) to identify the strategic development options that may be applicable to each additional site and to inform on the need for the application of the Sequential Test. HBC should look to steer development away from those potential sites where flood risk is considered greatest, ensuring that areas allocated for development can be developed in a safe, cost effective and sustainable manner.

The Environment Agency (EA) confirmed there had been no updates to flood zones 2 and 3 of the Flood Map for Planning (Rivers and Sea) since September 2016, within the Harrogate Borough. The same flood zones used for the Level 1 SFRA could therefore be used in this additional assessment thus ensuring consistency of approach. These flood zones include:

1.1 Flood Zone 3b (the functional floodplain)

Delineated through the 2016 Level 1 SFRA using the most up-to-date EA fluvial modelling and flood risk datasets.

The functional floodplain forms a very important planning tool in making space for flood waters when flooding occurs. Development should be directed away from these areas.

Table 1, Paragraph 065 of the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) defines Flood Zone 3b as:

"...land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency."

Paragraph 015 of the FRCC-PPG explains that the identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. However, land which would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual probability) flood, should provide a starting point to help identify the functional floodplain.

The area identified as functional floodplain should take into account the effects of all flood risk management infrastructure including defences. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain. If an area is intended to flood, e.g. an upstream flood storage area designed to protect communities further downstream, then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often.

1.2 Flood Zone 3ai

Delineated through the 2016 Level 1 SFRA using the most up-to-date EA fluvial modelling and flood risk datasets.

The Flood Zone 3ai approach has been implemented by HBC. Flood Zone 3ai is defined as developed land within Flood Zone 3b where water would flow or be stored in times of flooding. In National Planning Policy Framework (NPPF) terms this is part of Flood Zone 3a but following discussions with the EA it was agreed that Flood Zone 3a should be subdivided. Identification of zone 3ai allows HBC to assess risk within Flood Zone 3a in more detail showing areas where existing development is likely to be restricting flood flows and water storage that would otherwise be within the functional floodplain. Should sites in Flood Zone 3ai become available for new or further development then both the risk at the sites and their role in managing flood risk in the surrounding area should be carefully considered in line with Local Plan policies. Flood Zone 3ai includes the areas of land that would be in Flood Zone 3b if not already developed and should therefore be used as an indicator of flood risk, from a modelled 1 in 20 / 25 year event, to existing developed sites.

For any potential development sites within Flood Zone 3a that are located in an area where there is no Flood Zone 3ai or functional floodplain, a cautionary approach should be applied whereby 3a could be considered as Flood Zone 3ai or functional floodplain. Site-specific FRAs should

therefore account for this through further detailed investigation and assessment of the actual risk and extent of any possible extensions to Flood Zone 3ai or functional floodplain.

1.3 Flood Zone 3a

This flood zone is Flood Zone 3 of the Flood Map for Planning, not including areas of Flood Zone 3b and 3ai. The FRCC-PPG describes Flood Zone 3a as land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.

1.4 Flood Zone 2

This flood zone is Flood Zone 2 of the Flood Map for Planning, not including areas of Flood Zone 3a, 3b and 3ai. The FRCC-PPG describes Flood Zone 2 as land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

1.5 Flood Zone 1

The FRCC-PPG describes Flood Zone 1 as land having a less than 1 in 1,000 annual probability of river or sea flooding.

2 Development and Flood Risk

2.1 Introduction

In order to inform the Sequential Approach to the allocation of development through HBC's upcoming Local Plan, this review entails a high-level GIS screening exercise overlaying the potential development site allocations against Flood Zones 1, 2, 3a, 3ai and 3b and calculating the area of each site at risk. Flood Zones 1, 2 and 3a are sourced from the EA's Flood Map for Planning (Rivers and Sea) and Flood Zones 3b (functional floodplain) and 3ai were delineated as part of the Level 1 Strategic Flood Risk Assessment (SFRA) (2016). Surface water risk to potential sites is assessed by way of the EA's Risk of Flooding from Surface Water (RoFSW).

The accompanying Development Site Assessment Excel spreadsheet provides a breakdown of each site and the area (in hectares) and percentage coverage of each fluvial flood zone and each surface water flood zone. Fluvial Flood Zones 3b, 3ai, 3a, 2 and 1 are considered in isolation. Any area of a site within the higher risk Flood Zone 3b / 3ai that is also within Flood Zone 3a is excluded from Flood Zone 3a and any area within Flood Zone 3a is excluded from Flood Zone 2. This allows for the sequential assessment of risk at each site by addressing those sites at higher risk first.

It is important to consider that each individual site will require further investigation, following this review, as local circumstances may dictate the outcome of the recommendation. Such local circumstances may include the following:

- Some sites may be able to develop around the flood risk. Planners are best placed to make this judgement i.e. will the site still be deliverable if part of it needs to be retained to make space for flood water?
- Surrounding infrastructure may influence scope for layout redesign or removal of site footprints from risk,
- Current land use. A number of sites may be brownfield thus the existing development could be taken into account as further development may not lead to increased flood risk. However, the Environment Agency may have their own views on this in regard to health warnings as new-build properties in risk areas could be built with flood protection in mind,
- Cumulative effects. New development may result in increased risk to other potential or existing sites. This should be assessed through a Level 2 SFRA, if required.

2.2 Local Plan Potential Development Sites

The identified sites have been considered by this SFRA update. 40 potential sites overall have been assessed and subdivided into several proposed uses including:

- Residential (28 sites)
- Employment (5 sites)
- Educational facilities (4 sites)
- Gypsy and traveller (3 sites)

Development viability is assessed, based on the flood risk vulnerability classification in Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance¹ (FRCC-PPG), and subsequent strategic recommendations are made and discussed in Section 3 of this report.

The following strategic recommendations may apply to the 40 sites:

- Strategic Recommendation A - consider withdrawing the site based on significant level of flood risk;
- Strategic Recommendation B - Exception Test required if site passes Sequential Test;
- Strategic Recommendation C - consider site layout and design if site passes Sequential Test;
- Strategic Recommendation D - site-specific flood risk assessment (FRA) required; and
- Strategic Recommendation E - site permitted on flood risk grounds due to little perceived risk, subject to consultation with the local planning authority (LPA) / lead local flood authority (LLFA).

<https://www.gov.uk/guidance/flood-risk-and-coastal-change>

Table 2-1: Number of sites per Strategic Recommendation

Site/Proposed use	Strategic Recommendation				
	A	B	C	D	E
Residential	1	2	4	21	0
Employment	0	0	2	3	0
Educational Facilities	0	0	0	4	0
Gypsy & Traveller	0	0	0	1	2
Total	1	2	6	29	2

HBC should use the updated Development Site Assessment spreadsheet to identify which sites should be avoided during the Sequential Test. If this is not the case, or where wider strategic objectives require regeneration in areas already at risk of flooding, then HBC should consider the compatibility of vulnerability classifications and Flood Zones (refer to FRCC-PPG) and whether or not the Exception Test will be required before finalising sites. The decision making process on site suitability should be transparent and information from this SFRA should be used to justify decisions to allocate land in areas at high risk of flooding.

3 Flood Risk to Potential Development Sites

The following strategic recommendations provide only a guide, based on the flood risk information used in the Level 1 SFRA. Information regarding local, site specific information is beyond the scope of this addendum. It is HBC's responsibility to carry out sequential testing of each site using the information provided and more specifically using their local, site specific knowledge and advice from the EA. These sections should be read alongside the updated Development Site Assessment

3.1 Strategic Recommendation A – Consider withdrawal of site

This strategic recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a Flood Zone.

Strategic Recommendation A applies to any site where either of the following criteria is true:

- 10% or greater of the site area is within Flood Zone 3b. The FRCC-PPG flood risk vulnerability classification states that only water-compatible uses and essential infrastructure should be permitted in Flood Zone 3b, though any essential infrastructure must pass the Exception Test. Land allocated for housing falls in to the more vulnerable category and sites for employment are in the less vulnerable category. Gypsy and traveller sites fall within the highly vulnerable category. Development should not be permitted for sites within the highly, more or less vulnerable categories that fall within Flood Zone 3b. If the developer is able to avoid 3b however, then part of the site could still be delivered.
- There is a significant risk from surface water flooding i.e. 10% or greater of a site area is within the 1 in 30 or 1 in 100 annual exceedance probability (AEP) surface water flood outlines and the total area of the site may not be large enough to accommodate such surface water flooding on-site. Also consideration of the development vulnerability.

The 10% threshold is not included within any policy, it is merely considered that it would likely prove difficult for developers to deliver a site where 10% or more of the site area is considered as undevelopable, based on the NPPF. This 10% threshold does not account for local circumstances therefore it may be possible to deliver some of the sites included within Strategic Recommendation A upon more detailed investigation. Strategic Recommendation A applies to one potential development site (Site P12). This is based on the site being at significant risk from surface water flooding (43% within 1 in 30 AEP outline); being residential; and the fact that the site is only 0.5 ha in size meaning it is unlikely this site would be able to mitigate surface water on-site whilst still achieving the required housing yields. The majority of the site also falls within either flood zone 2 or flood zone 3a.

Table 3-1: Sites where Strategic Recommendation A applies

Site ID	Site Name	Proposed use	Site Area (ha)	% Area within FZ3a
P12	The Coal Yard, Pateley Bridge	Residential	0.52	69.63

3.2 Strategic Recommendation B – Exception Test

This strategic recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a flood zone.

Strategic Recommendation B applies to sites where it is likely the Exception Test would be required. This does not include any recommendation on the likelihood of a site passing the Exception Test. These sites may need to be examined as part of a more in-depth Level 2 SFRA. The developer / LPA should attempt to avoid the risk area where possible.

Strategic Recommendation B applies to sites where the following criteria is true:

- 10% or greater of any more vulnerable site (residential) that is within Flood Zone 3a. Less vulnerable (employment) uses of land do not require the Exception Test if in Flood Zone 3a and highly vulnerable sites (gypsy and traveller) are not permitted in this zone.

All development proposals in Flood Zone 3a and Flood Zone 3ai must be accompanied by a flood risk assessment.

The 10% threshold is not included within any policy; it is merely considered that it would be very difficult for developers to avoid Flood Zone 3a when 10% or more of the site area is within it. This 10% threshold does not account for local circumstances therefore it may be possible to avoid Flood Zone 3a altogether.

It should be considered that, based on climate change, the 1 in 20 and 1 in 25 year flood event outlines used to create the functional floodplain, may increase in extent in 100 years' time meaning a larger number of sites or a larger percentage area of these sites may be at risk from the 1 in 20 / 25 year flood events. Table 3-2 lists those sites where Strategic Recommendation B should apply based on the 10% threshold of site area within Flood Zone 3a. The updated Development Site Assessment spreadsheet lists those sites where Strategic Recommendation B should apply, encompassing two sites.

Table 3-2 Sites where application of the Exception Test would be required

Site ID	Site Name	Proposed use	Site Area (ha)	% Area within FZ3a
M11	Land at Westholme Road, Masham	Residential	2.66	17.08
PN19	Land to the west of Leeds Road, Pannal	Residential	16.81	21.68

3.3 Strategic Recommendation C – Consider site layout and design

This recommends a review of site layout and / or design at the development planning stage in order for development to proceed. A Level 2 SFRA or site-specific FRA would be required to inform on site layout and design.

This recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a Flood Zone.

Strategic Recommendation C applies to sites where either of the following criteria is true:

- Less than 10% of the area of any site type is within Flood Zone 3b.
- Less than 10% of any residential site is within Flood Zone 3a.

The 10% threshold is not included within any policy, it is merely considered that it may be possible for developers to avoid Flood Zone 3b and Flood Zone 3a when less than 10% of the site area is at risk. This 10% threshold does not account for local circumstances.

Overall there are 6 potential sites to which Strategic Recommendation C applies, listed in Table 3-3.

Where Strategic Recommendation C applies to a potential site, the developer should consider the site layout with a view to removing the site footprint from the flood zone that is obstructing development. If this is not possible then the alternative would be to investigate the incorporation of on-site storage of water into the site design. Depending on local circumstances, if it is not possible to adjust the site boundary to remove the site footprint to a lower risk zone then this part of the development should not be permitted (for any site in Flood Zone 3b), or the Exception Test should be undertaken and passed as part of a site-specific FRA (for residential sites in Flood Zone 3a).

Any site layout and design should take account of the 8 metre easement buffer along watercourses, from the top of the bank or the landward toe of a defence on main rivers, where

development is not permitted. This easement buffer is recommended by the EA to allow ease of access to watercourses for maintenance works. Any site redesign, where Flood Zone 3a is included within the site footprint, should allow water to flow naturally or be stored in times of flood through application of suitable sustainable drainage systems (SuDS).

Table 3-3 Sites to consider layout and design to avoid risk areas

Site ID	Site Name	Proposed use	Site Area (ha)	FZ3a %	FZ3b %
MK8	Land to the south of high Mill Farm, Markington	Residential	1.71	0.11	0.00
R27	Laver banks, Clothierholme Road, Ripon	Residential	8.45	0.20	0.00
PN18	Employment site south of Almsford, Pannal	Employment	17.93	0.00	0.21
FX5	Extension employment site to the south of the A59, Flaxy	Employment	16.20	10.24	0.00
H2	Land north of Know Lane, Harrogate	Residential	3.15	0.96	0.41
PN17	Land adjoining Spring Lane Farm, Pannal	Residential	3.23	1.76	0.00

3.4 Strategic Recommendation D – site could be allocated for development subject to requiring a site specific FRA at the planning application stage

This recommends that development could be allocated, assuming that a site-specific FRA is required to be undertaken at the planning application stage and that the FRA shows the site can be safe and it is demonstrated that the site is sequentially preferable. A site within Flood Zone 2 could still be rejected if the conclusions of the FRA decide development is unsafe or inappropriate.

This strategic recommendation DOES NOT take account of local circumstances, only that part of a site area falls within a Flood Zone.

Strategic Recommendation D applies to sites where the following criteria is true:

- Any site within Flood Zone 2 that does not have any part of its footprint within Flood Zone 3a, with the exception of highly vulnerable developments (such as gypsy and traveller sites) which would be subject to, and have to pass, the Exception Test.
- Employment sites within Flood Zone 3a assuming the site use falls within the less vulnerable or water-compatible category of the flood risk vulnerability classification of the FRCC-PPG. No part of the site can be within Flood Zone 3b.
- Any site within Flood Zone 3ai that does not fall under the constraints of strategic recommendations A, B or C. Risk at such sites should be carefully considered through a FRA in line with Local Plan policies.
- Any site 100% within Flood Zone 1 where surface water flood risk is considered to be significant enough so as to require investigation through a site-specific FRA.
- Any site 100% within Flood Zone 1 that is greater than or equal to 1 hectare in area.

Strategic Recommendation D applies to 29 potential sites overall.

As discussed previously for other strategic recommendations, a precautionary approach to accounting for climate change should be considered by assuming that Flood Zone 2 will become Flood Zone 3a in 100 years' time.

All development proposals within Flood Zone 2 or Flood Zone 3a must be accompanied by a site-specific Flood Risk Assessment. Any sites 100% within Flood Zone 1 that are equal to or greater than 1 hectare in area must be accompanied by a site-specific Flood Risk Assessment to determine vulnerability to flooding from other sources as well as fluvial and surface water. The FRA should determine the potential of increased flood risk elsewhere as a result of the addition of hard surfaces on-site and the effect of new development on surface water runoff.

Table 3-4: Sites where Strategic Recommendation D applies

Site ID	Site Name	Proposed use	Site Area (ha)	% Area within 1 in 30 Year Outline (RoFSW)	% Area within 1 in 100 Year Outline (RoFSW)	% Area within 1 in 1000 Year Outline (RoFSW)	Flood Zone 2 %
B10	Old Hall Caravan Park, Langthorpe	Residential	3.02	1.27	0.28	0.83	0.00
B12	Land at Stump Cross, Boroughbridge	Residential	24.07	2.75	1.45	3.96	0.00
B18	Old Poultry Farm, Leeming Lane, Langthorpe	Residential	1.04	0.00	0.00	0.00	0.00
B21	Land at Aldborough Gate, Boroughbridge	Residential	10.80	0.10	0.13	1.45	0.00
B22	Educational facilities for Boroughbridge High School	Educational Facilities	2.31	0.00	0.00	1.74	0.00
BL9	Alfred Hymas site, Burton Leonard	Residential	1.55	0.00	0.00	1.19	0.00
BM4	Land at Knaresborough Road, Bishop Monkton	Residential	1.72	0.00	0.00	1.81	0.00
GB4	Land adjacent to cricket ground, Goldsborough	Residential	1.62	0.00	0.84	2.99	0.00
H22	Land at Granby Farm, Harrogate	Residential	4.01	0.00	0.90	3.54	0.00
H23	Land north of Kingsley Farm, Harrogate	Residential	7.23	0.00	0.10	1.79	0.00
H27	Showground car park, Wetherby Road, Harrogate	Employment	1.85	0.00	0.00	0.23	0.00
H49	Windmill Farm, Otley Road, Harrogate	Residential	47.07	0.09	0.27	3.94	0.00
H69	Land to the east of Knox Hill, Harrogate	Residential	3.25	0.00	0.00	2.29	0.00
H70	Land east of Whinney Lane, Harrogate	Residential	11.80	1.64	1.21	3.06	0.00
H87	Land adjacent to Knox Saw Mills, Knox Lane, Harrogate	Residential	2.25	0.00	0.00	0.00	0.00

Site ID	Site Name	Proposed use	Site Area (ha)	% Area within 1 in 30 Year Outline (RoFSW)	% Area within 1 in 100 Year Outline (RoFSW)	% Area within 1 in 1000 Year Outline (RoFSW)	Flood Zone 2 %
HM9	Land to the north of Meadow Close, Hampsthwaite	Residential	4.49	1.08	0.51	1.93	7.57
K23	Land north of Bar Lane and east of Boroughbridge Road, Knaresborough	Residential	0.68	1.49	5.89	25.57	0.00
K24	Land at Halfpenny Lane and south of Water Lane, Knaresborough	Residential	7.61	13.12	11.54	21.37	0.00
K37	Land at Boroughbridge Road, Knaresborough	Residential	7.50	1.75	1.25	2.97	0.00
K41	The Paddocks, Cass Lane, Knaresborough	Gypsy & Traveller	0.09	0.00	0.00	12.58	0.00
KL20	Educational facilities for Killinghall Primary School	Educational Facilities	0.40	0.00	0.00	0.81	0.00
KM1	Wensleydale Dairy Products Limited, Kirkby Malzeard	Residential	1.23	0.00	0.00	0.00	0.00
MB6	Land at Melmerby Industrial Estate	Employment	5.16	0.00	0.00	0.06	0.00
MB8	Land west of Barker Business Park (larger site), Melmerby	Employment	12.14	0.00	0.49	3.74	0.00
MG8	Yew Tree Farm, (smaller site), Marton cum Grafton	Residential	1.20	0.00	0.00	0.00	0.00
NS7	Educational facilities at North Stainley	Educational Facilities	2.01	11.51	7.42	19.84	0.00
PN20	Educational facilities for Pannal Primary School	Educational Facilities	0.42	0.32	7.37	11.91	0.00
R5	Land north of King's Mead, Ripon	Residential	2.37	1.81	1.00	4.34	1.41
TW3	Church Farm, Tockwith	Residential	2.40	0.11	1.38	5.31	0.00

3.5 Strategic Recommendation E - could be allocated subject to consultation with the local planning authority (LPA) / lead local flood authority (LLFA)



This recommends that development could be allocated, based on the evidence provided within this addendum. Further investigation may be required by the developer and an FRA may be required to assess further or new information that may not have been included within this addendum to the SFRA. Table 3-5 illustrates the two sites that Strategic Recommendation E applies to.

As discussed previously for other recommendations, a precautionary approach to accounting for climate change should be considered.

Table 3-5: Sites that could be allocated subject to consultation

Site ID	Site Name	Proposed use	Site Area (ha)
K40	Green Acres Lane, Knaresborough	Gypsy & Traveller	0.08
K42	Thistle Hill Stables, Knaresborough	Gypsy & Traveller	0.06

3.6 Surface Water Risk to Potential Sites

This section assesses surface water risk to each site according to the Risk of Flooding from Surface Water (RoFSW) dataset. The updated Development Site Assessment spreadsheet isolates each of the surface water outlines so that any area of a site within the higher risk 1 in 30 year outline is excluded from the medium risk 1 in 100 year outline and any area within the 1 in 100 year outline is excluded from the lower risk 1 in 1000 year outline. This allows a sequential assessment of risk at each site.

NOTE: This assessment of surface water risk to sites DOES NOT take account of local circumstances, only that part of a site area falls within a surface water flood outline of the Risk of Flooding from Surface Water dataset.

Table 3-6 states the number of sites at risk from surface water and also those considered to be at significant risk. For the 2016 SFRA and this addendum, significant risk to a site includes any site with 10% or more of its area within the 30 or 100 year surface water flood outlines or 20% or more within the 1000 year outline. Note that a number of these sites may also be at risk from fluvial flooding. A site-specific FRA should be carried out for the sites at surface water risk to investigate possible mitigation measures for flood storage or infiltration techniques through appropriate sustainable drainage systems (SuDS).

Table 3-6 Number of sites at risk from surface water flooding

RoFSW event outline	Number of sites at risk	Number of sites at significant risk	Site Reference
1 in 30 year	21	3	K24, NS7, P12
1 in 100 year	27	1	K24
1 in 1000 year	34	3	Fx5, K23, K24
In reality, sites within the 1 in 30 year outline will also be in the 1 in 100 year outline and those within the 1 in 100 year outline will also be in the 1000 year outline.			

Of the 21 sites at risk from the higher risk 1 in 30 year event, three have 10% or more of their site area at risk and are therefore considered to be at significant risk. One of these three sites, Site P12, is recommended for withdrawal as discussed in Section 3.1. Only one site has 10% or more

of their area at risk from the medium risk 1 in 100 year event and for the lower risk 1 in 1000 year extreme event, three sites has 20% or more of its area at risk.

Table 3-6 lists the sites at significant surface water flood risk.

Table 3-6 Sites at significant surface water risk

Site ID	Proposed use	Site Area (ha)	% Area within 1 in 30 Year Outline (RoFSW)	% Area within 1 in 100 Year Outline (RoFSW)	% Area within 1 in 1000 Year Outline (RoFSW)
K24	Residential	7.61	13.12	11.54	21.37
P12	Residential	0.52	43.31	2.47	10.12
FX5	Employment	16.20	3.62	1.72	22.12
NS7	Educational facilities	2.01	11.51	7.42	19.84
K23	Residential	0.68	0.49	5.89	25.57

For sites at surface water flood risk the following should be considered:

- Possible withdrawal, redesign or relocation of the site for those sites at significant risk. This applies to the sites listed in Table 3-6;
- A site-specific Flood Risk Assessment incorporating surface water flood risk management;
- A FRA may want to consider detailed surface water modelling, particularly for the larger sites which may influence sites elsewhere;
- The size of development and the possibility of increased surface water flood risk caused by development on current Greenfield land (where applicable), and cumulative impacts of this within specific areas;
- Management and re-use of surface water on-site, assuming the site is large enough to facilitate this and achieve effective mitigation;
- Larger sites could leave surface water flood prone areas as open greenspace, incorporating social and environmental benefits;
- Effective surface water management should ensure risks on and off site are controlled;
- SuDS should be used where possible. Appropriate SuDS may offer opportunities to control runoff to Greenfield rates. Developers should refer to the NYCC SuDS Design Guidance². Restrictions on surface water runoff from new development should be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of Greenfield rates, unless it can be demonstrated that this is unachievable or hydraulically impractical;
- Whether the delineation of areas of critical drainage may be appropriate for areas particularly prone to surface water flooding. Detailed analysis and consultation with the LLFA, Yorkshire Water, the relevant Internal Drainage Board and the EA would be required. It may then be beneficial to carry out a Surface Water Management Plan (SWMP) or drainage strategy for targeted locations with any such areas of critical drainage. Investigation into the capacity of existing sewer systems would be required in order to identify critical parts of the system. Drainage model outputs could be obtained to confirm the critical parts of the drainage network and subsequent recommendations could then be made for future development i.e. strategic SuDS sites, parts of the drainage system where any new connections should be avoided, and parts of the system that may have any additional capacity and recommended runoff rates.

² <https://www.northyorks.gov.uk/>

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Summary Table

Harrogate Borough Council
Additional Local Plan Sites Assessment

03 January 2018

Proposed Use	Number of Sites	Area (ha)	Flood Zone Coverage										Risk of Flooding from Surface Water					
			Flood Zone 1		Flood Zone 2		Flood Zone 3a		Flood Zone 3ai (from 2016 SFRA)		Flood Zone 3b (from 2016 SFRA)		1 in 30 year		1 in 100 year		1 in 1000 year	
			Area (ha)	No. 100%	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.
Residential	29	183.46	175.31	19	2.74	9	4.57	7	0.01	1	0.83	2	3.87	17	2.94	21	9.96	24
Employment	5	63.29	48.16	3	3.43	2	1.66	2	0.00	0	0.04	1	0.91	2	0.68	3	6.14	5
Educational Facilities	4	5.13	5.13	4	0.00	0	0.00	0	0.00	0	0.00	0	0.23	2	0.18	3	0.49	4
Gypsy & Traveller	3	0.23	0.23	3	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.01	1
TOTAL	40	242	229	29	6	11	6	9	0	1	1	3	5	21	4	27	17	34

Key

Flood Zone 3b	The colour coding shows the highest risk element of the flood zone that is present on site and is not in itself an indication of whether the site should or shouldn't be developed for flooding reason
Flood Zone 3ai	
Flood Zone 3a	
Flood Zone 2	
Flood Zone 1 + Surface Water	
Flood Zone 1	

Main Table

Site Reference	Site Name	Proposed Use	Area (ha)	Flood Zone Coverage										Risk of Flooding from Surface Water						Surface Water Risk	Flood Risk Vulnerability Classification (NPPF)	Development Viability	Strategic Recommendation (see SFRA addendum report)
				Flood Zone 1		Flood Zone 2		Flood Zone 3a		Flood Zone 3ai (from 2016 SFRA)		Flood Zone 3b (from 2016 SFRA)		1 in 30 year		1 in 100 year		1 in 1000 year					
				Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%				
B10	Old Hall Caravan Park, Langthorpe	Residential	3.02	3.02	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.27	0.01	0.28	0.03	0.83	Low	More Vulnerable	site-specific FRA required	Recommendation D
B12	Land at Stump Cross, Boroughbridge	Residential	24.07	24.07	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	2.75	0.35	1.45	0.95	3.96	Low	More Vulnerable	site-specific FRA required	Recommendation D
B18	Old Poultry Farm, Leeming Lane, Langthorpe	Residential	1.04	1.04	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	More Vulnerable	site-specific FRA required	Recommendation D
B21	Land at Aldborough Gate, Boroughbridge	Residential	10.80	10.80	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.01	0.13	0.16	1.45	Low	More Vulnerable	site-specific FRA required	Recommendation D	
B22	Educational facilities for Boroughbridge High School	Educational Facilities	2.31	2.31	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.74	Low	More Vulnerable	site-specific FRA required	Recommendation D	
BL9	Alfred Hymas site, Burton Leonard	Residential	1.55	1.55	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	1.19	Low	More Vulnerable	site-specific FRA required	Recommendation D
BM4	Land at Knaresborough Road, Bishop Monkton	Residential	1.72	1.72	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.81	Low	More Vulnerable	site-specific FRA required	Recommendation D	
FX5	Extension to employment site to the south of the A59, Flaxby	Employment	16.20	11.12	68.60	3.43	21.16	1.66	10.24	0.00	0.00	0.00	0.59	3.62	0.28	1.72	3.58	22.12	High	Less Vulnerable	Consider site layout and design	Recommendation C	
GB4	Land adjacent to cricket ground, Goldsborough	Residential	1.62	1.62	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.84	0.05	2.99	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H2	Land north of Knox Lane, Harrogate	Residential	3.15	3.09	98.16	0.01	0.47	0.03	0.86	0.00	0.00	0.01	0.41	0.00	0.05	0.03	0.86	0.13	4.08	Low	More Vulnerable	Consider site layout and design	Recommendation C
H22	Land at Granby Farm, Harrogate	Residential	4.01	4.01	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.90	0.14	3.54	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H23	Land north of Kingsley Farm, Harrogate	Residential	7.23	7.23	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.13	1.79	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H27	Showground car park, Wetherby Road, Harrogate	Employment	1.85	1.85	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	Low	Less Vulnerable	site-specific FRA required	Recommendation D	
H49	Windmill Farm, Otley Road, Harrogate	Residential	47.07	47.07	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.09	0.13	0.27	1.85	3.94	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H69	Land to the east of Knox Hill, Harrogate	Residential	3.25	3.25	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.29	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H70	Land east of Whinney Lane, Harrogate	Residential	11.80	11.80	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	1.64	0.14	1.21	0.36	3.06	Low	More Vulnerable	site-specific FRA required	Recommendation D	
H87	Land adjacent to Knox Saw Mills, Knox Lane, Harrogate	Residential	2.25	2.25	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	More Vulnerable	site-specific FRA required	Recommendation D
HM9	Land to the north of Meadow Close, Hampsthwaite	Residential	4.49	4.15	92.43	0.34	7.57	0.00	0.00	0.00	0.00	0.00	0.05	1.08	0.02	0.51	0.09	1.93	Low	More Vulnerable	site-specific FRA required	Recommendation D	
K23	Land north of Bar Lane and east of Boroughbridge Road, Knaresborough	Residential	0.68	0.68	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	1.49	0.04	5.89	0.17	25.57	High	More Vulnerable	site-specific FRA required	Recommendation D	
K24	Land at Halfpenny Lane and south of Water Lane, Knaresborough	Residential	7.61	7.61	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	13.12	0.88	11.54	1.63	21.37	High	More Vulnerable	site-specific FRA required	Recommendation D	
K37	Land at Boroughbridge Road, Knaresborough	Residential	7.50	7.50	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	1.75	0.09	1.25	0.22	2.97	Low	More Vulnerable	site-specific FRA required	Recommendation D	
K40	Green Acres, Cass Lane, Knaresborough	Gypsy & Traveller	0.08	0.08	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	Highly Vulnerable	site permitted on flood risk grounds due to little perceived risk, subject to	Recommendation E
K41	The Paddocks, Cass Lane, Knaresborough	Gypsy & Traveller	0.09	0.09	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	12.58	Low	Highly Vulnerable	site-specific FRA required	Recommendation D	
K42	Thistle Hill Stables, Knaresborough	Gypsy & Traveller	0.06	0.06	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	Highly Vulnerable	site permitted on flood risk grounds due to little perceived risk, subject to	Recommendation E
KL20	Educational facilities for Killinghall Primary School	Educational Facilities	0.40	0.40	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81	Low	More Vulnerable	site-specific FRA required	Recommendation D	
Wensleydale Dairy Products Limited, Kirkby Malzeard	Residential	1.23	1.23	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	More Vulnerable	site-specific FRA required	Recommendation D
KM1	Land at Westholme Road, Masham	Residential	2.66	1.01	38.13	1.19	44.79	0.45	17.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	4.34	Low	More Vulnerable	Exception Test	Recommendation B	
MB6	Land at Melmerby Industrial Estate	Employment	5.16	5.16	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	Low	Less Vulnerable	site-specific FRA required	Recommendation D	
MB8	Land west of Barker Business Park (larger site), Melmerby	Employment	12.14	12.14	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.49	0.45	3.74	Low	Less Vulnerable	site-specific FRA required	Recommendation D	
MG8	Yew Tree Farm, (smaller site), Marton cum Grafton	Residential	1.20	1.20	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Low	More Vulnerable	site-specific FRA required	Recommendation D
MK8	Land to the south of High Mill Farm, Markington	Residential	1.71	1.70	99.78	0.00	0.12	0.00	0.11	0.00	0.00	0.00	0.07	4.29	0.05	2.96	0.22	13.18	Low	More Vulnerable	Consider site layout and design	Recommendation C	
NS7	Educational facilities at North Stainley	Educational Facilities	2.01	2.01	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	11.51	0.15	7.42	0.40	19.84	High	More Vulnerable	site-specific FRA required	Recommendation D	
P12	The Coal Yard, Pateley Bridge	Residential	0.52	0.13	25.30	0.03	5.07	0.36	69.63	0.00	0.00	0.00	0.23	43.31	0.01	2.47	0.05	10.12	High	More Vulnerable	Consider withdrawal based on surface water flood risk	Recommendation A	
PN17	Land adjoining Spring Lane Farm, Pannal	Residential	3.23	3.16	97.71	0.02	0.53	0.06	1.76	0.00	0.00	0.00	0.03	1.00	0.01	0.31	0.11	3.48	Low	More Vulnerable	Consider site layout and design	Recommendation C	
PN18	Employment site south of Almsford Bridge, Pannal	Employment	17.93	17.89	99.77	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.21	0.32	1.78	0.34	1.90	2.09	11.67	Low	Less Vulnerable	Consider site layout and design	Recommendation C
PN19	Land to the west of Leeds Road, Pannal	Residential	16.81	11.73	69.78	0.62	3.66	3.65	21.68	0.01	0.03	0.82	4.85	1.31	7.81	0.93	5.55	2.68	15.96	Low	More Vulnerable	Exception Test	Recommendation B
PN20	Educational facilities for Pannal Primary School	Educational Facilities	0.42	0.42	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.03	7.37	0.05	11.91	Low	More Vulnerable	site-specific FRA required	Recommendation D	
R27	Laver Banks, Clothholme Road, Ripon	Residential	8.45	7.94	93.87	0.50	5.93	0.02	0.20	0.00	0.00	0.00	0.05	0.55	0.12	1.43	0.51	6.00	Low	More Vulnerable	Consider site layout and design	Recommendation C	
R5	Land north of King's Mead, Ripon	Residential	2.37	2.34	98.59	0.03	1.41	0.00	0.00	0.00	0.00	0.00	0.04	1.81	0.02	1.00	0.10	4.34	Low	More Vulnerable	site-specific FRA required	Recommendation D	
TW3	Church Farm, Tockwith	Residential	2.40	2.40	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.03	1.38	0.13	5.31	Low	More Vulnerable	site-specific FRA required	Recommendation D	