Appendix E

E Local Plan sites assessment

Appendix E provides a strategic assessment of the suitability, relative to flood risk, of the sites to be considered for allocation in the Local Plan.

The information and guidance provided in this Appendix (also supported by the SFRA maps in Appendix B and the development site assessment spreadsheet in Appendix C) can be used by the LPA to inform the Local Plan and provide the basis from which to apply the Sequential Test in the development allocation and the development management process.

The LPA must use Appendix C to record their decisions on how to take each site forward or whether to remove a site from allocation, based on the evidence and strategic recommendations provided in this Level 1 SFRA. Recording decisions in the Sites Assessment Spreadsheet demonstrates that a sequential, sustainable approach to development and flood risk has been adopted.

CDC provided a Geographical Information System (GIS) layer of 103 potential development sites. These included site allocations in the adopted Local Plan, which have been retested against the latest available evidence. In order to inform the Sequential Test to the allocation of development through the Local Plan (as illustrated in Figure 6-2 of the main report), this assessment entails a high-level GIS screening exercise overlaying the potential development sites against Flood Zones 1, 2, 3a and 3b, calculating the area of each site at risk. Flood Zones 1, 2 and 3 are sourced from the Environment Agency (EA) Flood Map for Planning (Rivers and Sea), Flood Zone 3 is split into Flood Zone 3a and Flood Zone 3b (functional floodplain) as part of this Level 1 SFRA, as required by the National Planning Policy Framework (NPPF). The effects of climate change have also been included in the sites screening process. See Section E.2 for details. All flood zones are displayed on the GeoPDF maps in Appendix B.

Surface water risk to assessed sites is analysed by way of the EA's Risk of Flooding from Surface Water (RoFSW) dataset. The EA states that this dataset

is not suitable for identifying whether an individual property will flood. It is recommended that the RoFSW is not displayed on basemapping more detailed than 1:10,000 as the data is open to misinterpretation if used as a more detailed scale. Because of the way the RoFSW has been produced and the fact it is indicative, it is not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

It is important to consider that each individual site will require further investigation, following this assessment, as local circumstances may dictate the outcome of the strategic recommendation. Such local circumstances are discussed in Section E.1.

The outcomes of the site assessments are presented in the Sites Assessment spreadsheet in Appendix C.

E.1 Screening of potential sites

This section of the report draws together the results included in the assessment spreadsheet (Appendix C), produced from the GIS screening exercise. The LPA should use the spreadsheet to identify which sites should be avoided during the Sequential Test. If sites cannot be directed to Flood Zone 1, or where wider strategic objectives require development in areas identified through this Level 1 SFRA to be at risk from flooding, then the LPA should consider the compatibility of vulnerability classifications and Flood Zones and whether or not the Exception Test will be required before finalising sites for allocation in the Local Plan. Strategic recommendations are based on Tables 1, 2 and 3 of the flood risk and vulnerability tables[1] of the Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) (Paragraphs 065 - 067).

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.

[1] Flood Risk and Coastal Change Planning Practice Guidance Vulnerability Tables

The Sites Assessment spreadsheet provides a breakdown of each site and the area (in hectares) and percentage coverage of each fluvial and surface water flood zone. Fluvial Flood Zones 3b, 3a, 2 and 1 are considered in isolation. Any area of a site within the higher risk Flood Zone 3b that is also within Flood Zone 3a is excluded from Flood Zone 3a and any 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. The effects of climate change have been assessed additionally to existing risk. Maps showing the proposed sites categorised by strategic recommendation are in Appendix G.

Table 1 shows the proposed use of the sites and the number of sites within each fluvial flood zone and Table 2 shows the number of sites within each surface water flood zone.

Proposed use	**Number of sites within…**			
	Flood Zone 1*	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
Residential	58	16	10	14
Mixed Use	8	0	0	0
Employment	1	2	1	2
Recreation & Environmental Improvements	0	1	1	1
Residential / Employment	8	2	1	1
Residential / Retail	4	0	0	0
Education	1	0	0	0
Residential / Education	1	0	0	0
TOTAL	**81**	**21**	**13**	**18**
***Sites with 100% area within Flood Zone 1**				

Note: Sites may be in more than one flood zone. In reality, a site in Flood Zone 3a will also be in Flood Zone 2

Table 1: Number of sites at risk from fluvial flooding

Proposed use	Number of sites within…		
	Low risk zone (1 in 1000)	Medium risk zone (1 in 100)	High risk zone (1 in 30)
Residential	58	43	33
Mixed Use	7	3	3
Employment	2	1	1
Recreation & Environmental Improvements	1	1	1
Residential / Employment	8	6	5
Residential / Retail	4	1	0
Education	1	1	1
Residential / Education	1	1	1
TOTAL	**82**	**57**	**45**

***Note: Sites may be in more than one flood zone. In reality, a site in the high risk zone will also be in the medium and low risk zones**

Table 2: Number of sites at risk from surface water flooding

The strategic recommendations are intended to assist the LPA in carrying out the Sequential Test and to highlight those sites at greatest flood risk.

Table 3 shows the number of sites each strategic recommendation applies to:

- Strategic Recommendation A – consider withdrawal due to functional floodplain unless functional floodplain can be included in site design or the site boundary can be redrawn to remove the function floodplain from the site boundary;
- Strategic Recommendation B – Exception Test required if site passes Sequential Test;
- Strategic Recommendation C – progress to FRA stage or carry out Level 2 SFRA to confirm climate change risks; and
- Strategic Recommendation D – development could be allocated on flood risk grounds based on the evidence of this Level 1 SFRA; LPA to make decision on allocation.

Proposed use	Number of sites assigned to Strategic Recommendation…			
	A	B	C	D
Residential	14	0	52	9
Mixed Use	0	0	7	1
Employment	2	0	0	1
Recreation & Environmental Improvements	0	0	1	0
Residential / Employment	1	0	8	1
Residential / Retail	0	0	4	0
Education	0	0	1	0
Residential / Education	0	0	1	0
TOTAL	**17**	**0**	**74**	**12**

Table 3: Number of sites per strategic recommendation

Each individual site will require further investigation before development is allocated, as local circumstances may dictate the outcome of the strategic recommendation. Such local circumstances may include the following:

- Flood depths and hazards will differ locally to each at risk site therefore modelled depth, hazard and velocity data should be assessed for the relevant flood event outlines, including climate change (using the EA's most up to date allowances), as part of a Level 2 SFRA or at the site-specific FRA;

- The RoFSW map is national scale and is not considered suitable for robustly identifying risk at the property level. For sites identified to be at significant risk from surface water based on the RoFSW, more detailed surface water modelling may therefore reveal higher or lower risk to the site. The Lead Local Flood Authority (LLFA) should be consulted when considering development viability at such sites;
- Current surface water drainage infrastructure and SuDS suitability are likely to differ at each site considered to be at risk from surface water flooding. Further investigation would therefore be required for any site at surface water flood risk. The LLFA should require that all planning applications must be accompanied by an appropriate drainage strategy, independent of the requirement for a site-specific FRA;
- If sites have planning permission but construction has not started, the SFRA will only be able to influence the design of the development e.g. finished floor levels. New, more extensive flood extents (from new or updated models) cannot be used to reject development where planning permission has already been granted;
- It may be possible at some sites 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/removal of site footprints from risk;
- Safe access and egress routes must exist at all times during a flood event for emergency response and evacuation. Emergency Planners should be consulted;
- Current land use. A number of sites included in the assessment are likely to be brownfield, thus the existing development structure could be taken into account as further development may not lead to increased flood risk;
- Existing planning permissions may exist on some sites where the EA may have already passed comment and/or agreed to appropriate remedial

works concerning flood risk. Previous flood risk investigations/FRAs may already have been carried out at some sites; and

- Cumulative impacts. New development may result in increased risk to other potential or existing sites. Where the Level 1 cumulative impacts assessment shows this to be the case, a Level 2 SFRA may be required to assess this further ahead of any FRA.

E.1.1 Strategic Recommendation A – consider withdrawal due to functional floodplain unless functional floodplain can be included in site design or site boundary can be redrawn

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

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

Any proportion of the site area is within the functional floodplain. The FRCC-PPG flood risk vulnerability classification states that only water compatible uses and essential infrastructure should be permitted in the functional floodplain, though any essential infrastructure must pass the Exception Test and water compatible uses must be designed and constructed to remain operational and safe for users in times of flood; must result in no net loss of floodplain storage; and must not impede water flows and not increase flood risk elsewhere. Development should not be permitted for sites within the highly vulnerable, more vulnerable or less vulnerable categories that fall within the functional floodplain. If the developer can avoid 3b however, then part of the site could still be delivered.

It may still be possible to deliver a site that has been recommended for withdrawal from allocation upon more detailed investigation through a Level 2 SFRA.

Depending on local circumstances, if it is not possible to adjust the site boundary to remove the developable area from Flood Zone 3b to a lower risk zone then development should not be allocated or permitted.

17 of the 103 potential development sites have been recommended for withdrawal unless functional floodplain can be included in site design or the site boundary can be redrawn to remove the function floodplain from the site boundary.

Any area within Flood Zone 3b must be left as open green space or the site boundary amended to remove the developable area from the risk area. For smaller sites, this approach is unlikely to be achievable compared to larger sites where there may be enough space to limit the impact through effective SuDS. If this is not possible, the site should be withdrawn.

E.1.2 Strategic Recommendation B – Exception Test required due to presence of Flood Zone 3a unless Flood Zone 3a can be included in site design or the site boundary can be redrawn.

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

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

Any proportion of a more vulnerable or essential infrastructure site is within Flood Zone 3a. Less vulnerable (employment) uses of land do not require the Exception Test.

NOTE: All development proposals in Flood Zone 3a must be accompanied by a FRA.

Strategic Recommendation B applies to sites where it is likely the Exception Test would be required, assuming the Sequential Test has been passed in the first instance. This does not include any recommendation on the likelihood of a site passing the Exception Test. A more in-depth investigation such as a Level 2 SFRA would be required to assess this. The developer/LPA should always attempt to avoid the risk area where possible.

Strategic Recommendation B does not apply to any potential development sites assessed.

E.1.3 Strategic Recommendation C – Site to progress to FRA stage or carry out Level 2 SFRA to confirm climate change risks

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

Strategic Recommendation C applies to sites where one or more of the following criteria is true:

- Any proportion of the site is within Flood Zone 2.
- The site is 100% within Flood Zone 1 but at surface water flood risk.
- The site is 100% within Flood Zone 1 but greater than 1 hectare in area.

Strategic Recommendation C applies to 74 of the 103 sites. 69 are 100% within Flood Zone 1, meaning surface water risk is what chiefly needs to be mitigated at these sites, though fluvial risk should still be checked in more detail. For these sites, the developer should consider the site layout with a view to removing the developable area from the flood zone that is obstructing development i.e. the high and medium risk surface water flood risk zones. If this is not possible then the alternative would be to investigate the incorporation of onsite storage of water into the site design through appropriate SuDS.

4 sites are partially within Flood Zone 2. A FRA will be required to confirm the risk. 1 site has 72% of its area within Flood Zone 3b, however, the site is proposed for 'recreation and environmental improvements' so it is assumed the site will be water compatible and Flood Zone 3b will be included within the site design as open greenspace designed to flood. A FRA is required to confirm.

E.1.4 Strategic Recommendation D – development could be allocated on flood risk grounds based on the evidence of this Level 1 SFRA

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

Strategic Recommendation D applies to sites where one or more of the following criteria is true:

Any site 100% within Flood Zone 1 and outside of any surface water flood zone and therefore considered to be at very low risk; and

Any site 100% within Flood Zone 1 with an area less than 1 hectare.

Strategic Recommendation D applies to 12 sites. Further investigation (i.e. FRA) may be required by the developer at the planning application stage if any further or new information becomes available since the publication of this Level 1 SFRA.

E.2 Assessment of climate change

As explained in the main report, up to date modelled climate change information based on the EA's climate change allowances was not available for this Level 1 SFRA. In the absence of this information, a precautionary, worst case scenario approach has therefore been adopted for potential climate change impacts on fluvial risk, whereby:

- Any site at existing risk, i.e. within any flood zone of the Flood Map for Planning, is considered to be at high risk from climate change,
- Any site that is 100% within Flood Zone 1 that is within 20m of Flood Zone 2 is considered to be at medium risk from climate change, topography allowing,
- Any site that is 100% within Flood Zone 1 that is not within 20m of Flood Zone 2 is considered to be at low risk from climate change, topography allowing.

In the absence of up to date modelling, this is considered to be the most pragmatic approach possible. Ideally, climate change modelling would be carried out through a Level 2 SFRA to fully confirm possible impacts. Using this approach, 22 sites are considered to be at high risk from climate change, 4 at medium risk and 77 at low risk.

The effects of climate change on surface water have not been assessed through this Level 1 SFRA. However, it is recommended that any Level 2 SFRA should model the potential impacts.

E.3 Summary of sites assessment outcomes

There are several consequential development considerations which could come out of the site assessment sequential testing process. Each outcome is discussed below. The LPA should refer to Section E.1 and Appendix C for details on the site assessments carried out for this SFRA.

E.3.1 Rejection of site

A site which fails to pass the Sequential Test and/or the Exception Test should be rejected and development not permitted. Rejection would also apply to any sites within the functional floodplain (unless water compatible or essential infrastructure informed by a FRA). However, if the developer can avoid or incorporate the functional floodplain, part of the site could still be delivered.

In terms of surface water flood risk, if risk is considered significant, based on Annual Exceedance Probability (AEP) or development vulnerability, or where the size of the site does not allow for onsite storage or application or appropriate SuDS then such sites could be rejected. The LLFA will be best placed to advise on site-specific surface water flood risk and whether sites can be taken forward or not.

E.3.2 Exception Test required

Applies to those sites that, according to the FRCC-PPG vulnerability tables, would require the Exception Test. Only water-compatible and less vulnerable land uses would not require the Exception Test in Flood Zone 3a. More vulnerable uses and essential infrastructure are only permitted if the Exception Test is passed and all development proposals in Flood Zone 3a must be accompanied by a Flood Risk Assessment at the planning application stage.

E.3.3 Consideration of site layout and design

Site layout and site design is important at the site planning stage where flood risk exists. The site area would have to be large enough to enable any alteration of the developable area of the site to remove development from a risk area, or to leave space for onsite storage of floodwater. Careful layout and design at the site planning stage may apply to such sites where it is considered viable based on the level of risk. Surface water risk and opportunities for SuDS should also be assessed during the planning stage.

Any development within 8 metres of any flood defence structure or culvert on a Main River is likely to be a regulated flood risk activity under Schedule 25 of the Environment Permitting (England and Wales) Regulations 2016. 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 the application of appropriate SuDS techniques (see main report). Similarly, any change or alteration to an ordinary watercourse within a site would need consent from the LLFA under the Land Drainage Act 1991[2].

E.3.4 Site-specific Flood Risk Assessment

A site-specific Flood Risk Assessment should assess whether a potential development is likely to be affected by current or future flooding, accounting for the impacts of climate change, from any source. This should include referencing this SFRA to establish sources of flooding. Further analysis should be performed to improve the understanding of flood risk including agreement with the LPA and the EA on areas of functional floodplain that have not been specified within this SFRA. The LLFA should be consulted on risk from surface water and from ordinary watercourses.

According to the FRCC-PPG (Para 030), a site-specific FRA is:

"…carried out by (or on behalf of) a developer to assess the flood risk to and from a development site. Where necessary (see footnote 50 in the National Planning Policy Framework), the assessment should accompany a planning application

[2] Land Drainage Act

submitted to the local planning authority. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (see Table 2 – Flood Risk Vulnerability of FRCC-PPG)."

The objectives of a site-specific FRA are to establish:

Whether the development will increase flood risk elsewhere;

Whether the mitigation measures proposed to deal with these effects and risks are appropriate;

The evidence for the local planning authority to apply (if necessary) the Sequential Test;

Whether the development will be safe for its lifetime and pass the Exception Test, if applicable; and

That an appropriate Emergency Plan is in place that accounts for the possibility of a flood event and shows the availability of safe access and egress points accessible during times of flood. (FRCC-PPG, Para 030)

Possible mitigation measures for at risk sites include ensuring floor levels are raised a minimum of 600mm above the critical design event flood level (as advised by the EA). However, compensatory storage must be found where the risk is fluvial. If this cannot be achieved, it is for the applicant to identify alternative mitigation measures.

Stilted development is an option whereby floodwaters can still flow naturally though this can be costly. Any site identified to be at residual risk must have suitable site access and egress routes available during times of flood together with a full emergency plan that should accompany the FRA at the application stage. The provisions of suitable flood warning systems should also be investigated.

Detailed mitigation must be agreed through site-specific FRAs or through Level 2 SFRAs where it would be necessary to demonstrate site allocations would be safe for their lifetime.

When is a Site-Specific FRA Required?

According to the NPPF footnote 55, a site-specific FRA should be prepared when the application site is:

Situated in Flood Zone 2 and 3; for all proposals for new development (including minor development and change of use);

1 hectare or greater in size and located in Flood Zone 1;

Located in Flood Zone 1 on land which has been identified by the EA as having critical drainage problems (i.e. within an ACDP);

Land identified in the SFRA as being at increased flood risk in future (i.e. based on RoFSW mapping; sites within Flood Zone 2 that may be within Flood Zone 3 in the longer term (in the absence of modelled climate change outputs));

At risk of flooding from other sources of flooding, such as those identified in this SFRA; or

Subject to a change of use to a higher vulnerability classification which may be subject to other sources of flooding.

Optionally, the LPA may also like to consider further options for stipulating FRA requirements, such as:

Situated in an area currently benefitting from defences;

At residual risk from reservoirs or canals; or

Situated over a culverted watercourse or where development will require controlling the flow of any watercourse, drain or ditch or the development could potentially change structures known to influence flood flow. These further options should be considered during the preparation and development of the Local Plan.

Paragraph 031 of the FRCC-PPG explains the level of detail required in FRAs and indicates that it should always be proportionate to the degree of flood risk

whilst making use of existing information, such as this SFRA. Paragraph 068 of the FRCC-PPG contains an easy to follow FRA checklist for developers to follow.

Together with the information in the FRCC-PPG, there is further detail and support provided for the LPAs and developers via:

- Advice for developers:

  Flood Risk Assessment Standing Advice

- Advice for LPAs:

  Flood Risk Assessment Advice for LPAs

- EA guidance for Flood Risk Assessments for planning applications:

  Flood Risk Assessment Advice for Planning Applications

Section 6.5 of the main report provides further guidance for developers.

E.3.5 Sites passing the Sequential and Exception Tests

Development sites can be allocated or granted planning permission where the Sequential Test and the Exception Test (if required) are passed and agreement is reached between the LPA/LLFA, the EA, the water companies and any ancillary stakeholders. In addition, a site is likely to be allocated without the need to assess flood risk where the indicative use is for open space. Assuming the site is not to include any development and is to be left open then the allocation is likely to be acceptable from a flood risk point of view. However, for sites where there is potential for flood storage, options should be explored as part of a FRA.

In terms of opportunities for reducing flood risk overall as a requirement of the Exception Test, the FRCC-PPG states:

"Local authorities and developers should seek opportunities to reduce the overall level of flood risk in the area and beyond. This can be achieved, for instance, through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems, through safeguarding land for flood risk management, or where appropriate, through designing off-site works required to protect and support development in ways that benefit the area more generally." (Paragraph 50)

E.3.6 Surface water risk to assessed sites

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

- Possible withdrawal, redesign or relocation for those sites considered to be at significant risk. More detailed surface water modelling may reveal increased risk or less risk to a site. The LLFA should be consulted when considering development viability at such sites;
- Outline drainage strategy to ascertain natural flow paths and topographic depressions, particularly for the larger sites which may influence sites elsewhere;
- A detailed site-specific FRA incorporating surface water flood risk management;
- Full drainage strategy encompassing detailed surface water modelling of proposed site layouts, attenuation areas, diversion of flow routes;
- Ensuring future maintenance of surface water and SuDS assets through s106 agreements;
- 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 onsite, assuming the site is large enough to facilitate this and achieve effective mitigation. Effective surface water management should ensure risks on and off site are controlled;
- Larger sites could leave surface water flood-prone areas as open greenspace, incorporating social and environmental benefits;
- SuDS should be incorporated within development and should only not be required in exceptional circumstances. Appropriate SuDS may offer opportunities to control runoff to greenfield rates or better. 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, runoff should attempt to mimic that of greenfield rates unless it can be demonstrated that this is unachievable

or hydraulically impractical. Developers should refer to the national 'non-statutory technical standards for sustainable drainage systems' and other guidance documents cited in the main report;

- Runoff up to and including the 1 in 100 AEP event (1%) should be managed on-site and should only be managed off site in exceptional circumstances;
- Local Plan policies should require development sites to incorporate measures of source control;
- Local Plan policies should require developers to set part of their site aside for surface water management, to contribute to flood risk management in the wider area and supplement green infrastructure networks;
- Local Plan policies should require developers to maximise permeable surfaces;
- Flow routes on new development where the sewerage system surcharges as a consequence of exceedance of the 1 in 30 AEP design event should be retained; and
- It may then be beneficial to carry out a local Surface Water Management Plan (SWMP) or drainage strategy for targeted locations with any known critical drainage problems. Investigation into the capacity of existing sewer systems would be required in order to identify critical parts of the system i.e. pinch points. Drainage model outputs should be obtained from the water company 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. A Water Cycle Study would help to inform this.