

# Appendix A – Guidance documentation

# Appendix A1 - Guidance for the Completion of Detailed Flood Risk Assessment

## Introduction

In accordance with current planning policy guidance, the planning process discourages development in areas vulnerable to flooding. This SFRA is not intended to be a prescriptive document, but a planning tool to guide future development away from flood risk areas. Once the Sequential Test has been demonstrated, developers should refer to the SFRA and NPPF when considering future planning applications. This appendix, A.1, will present the guidance for the developers on the requirements of a FRA for development in proposals in Flood Zones 1, 2, 3. The following appendices, A.2 and A.3, provide guidance on how specific flood risk management issues can be achieved.

Prior to development, site specific flood risk assessments will need to be undertaken to ensure that all forms of flood risk, at a site, are fully addressed. An initial assessment of flood risk will be required for all proposed developments and change of use to establish that they have met the requirements for FRAs and flood risk reduction set out in Table 1 of NPPF.

A FRA will be required for proposed developments:

- that fall in the medium and high flood risk zones (Flood Zones 2 and 3),
- in Flood Zone 1 which are greater than 1 ha in size,
- In Critical Drainage Areas (CDAs) as defined in the SWMP

It is normally the responsibility of the applicant/developer to prepare a FRA, in consultation with the LPA. The SFRA cannot provide this level of site specific information.

The aim of a Flood Risk Assessment (FRA) is to demonstrate how flood risk to the development and flood risk to others, from all sources, will be managed now and in the future.

Flood Risk Assessments for proposed development in the RBKC should follow the approach recommended by:

- The Environment Agency (see its National Standing Advice to Local Planning Authorities for Planning Applications - Development and Flood Risk in England);
- NPPF and its Technical Guidance

## Flood Risk Assessments for Flood Zones 2, 3 and Critical Drainage Areas

### A.1.1 Householder and Other Minor Extensions

Apart from habitable basements, domestic extensions within the curtilage of the dwelling (see GDPO definition of 'minor development') and non-domestic extensions with a footprint of less than 250 m<sup>2</sup> will not require a detailed FRA.

These applications should demonstrate that the risk of flooding from all sources has been assessed. The main sources of flooding are likely to be tidal, surface water and sewer flooding.

The application should show either:

Floor levels within the proposed development set at no lower than existing levels AND, flood proofing of the proposed development has been incorporated where appropriate

Or;

Floor levels within the extension set at 300mm above the known or modelled 0.5% (1 in 200 chance each year) tidal and coastal flood. See:

[http://www.environment-agency.gov.uk/static/documents/Utility/FRAGuidanceNote2\\_v3.1.pdf](http://www.environment-agency.gov.uk/static/documents/Utility/FRAGuidanceNote2_v3.1.pdf)

And;

Consideration has been given to reducing the rate of run-off from the proposed development and/or from the site as a whole. The Council's "SuDS for small development" tool should be used where applicable. The tool can be accessed through the webpage:

<http://www.rbkc.gov.uk/planningandconservation/planningpolicy/sudstool-smalldevelopment.aspx>

#### **A.1.1.2 Change of use from a less to a more vulnerable use**

Table 2 in NPPF classifies uses by their vulnerability to flooding. For example, most commercial buildings are less vulnerable than residential buildings and basement dwellings are more vulnerable than other residential uses. Therefore a FRA will be required where the ground floor and/or basement of a building in Flood Zone 2 or 3 changes from a use that is less vulnerable to one that is classified as 'more vulnerable' or 'highly vulnerable'. Similarly, an FRA will also be required in Flood Zone 3 where a use changes from a 'water compatible' use to a 'less vulnerable' use.

The FRA will need to show how any increase in vulnerability will be dealt with and in some cases the change of use may not be permitted.

#### **A.1.1.3 Non Major Development**

Non-major developments are where the number of additional dwellings to be constructed, or to be created as a result of a conversion, is less than 10 and/or the site is less than 0.5ha, and for all other uses, where the floorspace to be built is less than 1000sqm and/or where the site area is less than 1ha.

Most developments in RBKC that fall into this category are small infill developments where the proposed development is constrained by the adjoining buildings and by the streetscape in the surrounding area. The FRA needs to balance the benefits of development against the flood risk to the development and should be appropriate to the scale of development and to the constraints of an infill site in relation to the mitigation measures that may be possible. The FRA must be undertaken by a suitably qualified professional.

Prior to undertaking a FRA the developer needs to address the requirements of the Sequential Test and parts A of the Exception Test (if applicable).

Evidence that the Sequential Test (A.1.5.4), and if required the Exception Test, have been passed will need to be included in the FRA. The sequential test has to demonstrate that there are no alternative sites within areas of low flood risk. The FRA should:

- Determine whether the development is at flood risk from any source (e.g. surface water, sewer, and groundwater), not just tidal flood risk. (The details and maps provided in the SFRA identify possible areas at risk from all sources of flooding, these are not definitive. Thames Water should be contacted to determine the risk of surface water and sewer flooding in the vicinity and to determine whether the proposed development will increase flood risk elsewhere. Each source of flooding will need further detailed investigation specific to the location being developed - see Section A.1.3 and A.1.4).
- Determine whether the development will be at flood risk from any source in the future as a result of climate change. (The effect of climate change on flooding from the Thames was not found to be significant in this SFRA (see Sections 5.4 and 6.4); therefore it will be the effect of climate change of rainfall events which will be the primary focus).
- Assess the level of residual flood risk behind the flood defences. The SFRA identifies those areas that are at high and medium residual risk (Maps 8) and also estimates the speed of flooding from a number of possible breach locations. This does not mean that development in this area would necessarily be in an area of high or medium residual risk but rather that a more detailed study needs to be carried out at site specific level to prove that there is an appropriate level of understanding of flood risk related to the site. The site specific FRA should assess whether a detailed breach analysis is required. Where a detailed breach analysis is required see advice in Section A.1.3.
- Demonstrate that the development will be safe (see Section A.2.1.1 and A.2.4.2), without increasing flood risk elsewhere (A.2.1.2), and, where possible, will reduce flood risk overall (see Section A.2.1.3). Determine whether the development will increase flood risk elsewhere.
- Demonstrate the ability of the development to avoid increasing flood risk elsewhere (see Section A.2.1):
- Demonstrate how flood risk will be managed (see sections A.2 and A.3) and ensure any proposed flood risk management measures will be sufficiently funded so the site can be developed and occupied safely throughout its proposed lifetime.
- Demonstrate that where proposed developments are adjacent to the River Thames they have been set back by 16m to allow for the future maintenance, replacement or repair of the Thames Tidal Defences. Where this is not feasible and setback is less than 16m the FRA must prove that the EA have been consulted and agree on the reduced set back distance.
- Demonstrate that the development is compliant with national, regional and local policy.
- Demonstrate, where possible, that the developer has contributed to reducing flood risk over a wider area.

- The Council's "SuDS for small development" tool should be used where applicable. The tool can be accessed through the webpage:  
<http://www.rbkc.gov.uk/planningandconservation/planningpolicy/sudstool-smalldevelopment.aspx>

Further information on the details to be provided within the FRA can be found in the Environment Agency's FRA Guidance Note 3:-

[http://www.environment-agency.gov.uk/static/documents/Utility/FRAGuidanceNote3\\_v3.1.pdf](http://www.environment-agency.gov.uk/static/documents/Utility/FRAGuidanceNote3_v3.1.pdf)

Advice on making development safe, avoiding increase to flood risk elsewhere, and reducing flood risk overall are given in the following sections.

#### **A 1.1.4 Major Development**

Major developments will need to carry out a FRA in accordance with the advice in relation to non major developments above, but in addition the FRA will need to consider the potential for more mitigation measures. All major developments within the high and medium residual risk zones should carry out a breach analysis, see advice in Section A.1.3. 3.

## **Flood Risk Assessments for Flood Zone 1**

Flood Risk Assessments are required where proposed developments within flood zone 1 are greater than 1ha in size. The FRA must be undertaken by a suitably qualified professional and should be appropriate for the scale of development. The potential impact upon areas and receiving drainage systems, following the increase in runoff as a result of increase in impermeable area, needs careful consideration.

The FRA should:

- Determine whether the development is at flood risk from other sources now and in the future (e.g. surface water, sewer, and groundwater). (The details and maps provided in the SFRA identify possible areas at risk from all sources of flooding, these are not definitive. Each source of flooding will need further detailed investigation specific to the location being developed - see Section A.1.3 and A.1.4).
- Where flood risk from other sources is identified:
  - Demonstrate how flood risk will be managed.
  - Ensure that development is safe (see Section A.2.4.2);
  - Ensure that where possible flood risk is reduced overall; through sequential design, flood resilience, mitigation measures and the use of SuDS (see Sections A.2 and A.3).
  - Assess the impact of a proposed development upon surface water drainage following an increase in impermeable area, including the potential impact upon surrounding areas, and ensure that flood risk is not increased elsewhere (see section A.2.1 and A.3)
  - Recommend the approach to control surface water discharge
  - Ensure any proposed SuDS techniques and flood risk management measures will be sufficiently funded to enable them to be maintained and the site occupied safely throughout its proposed lifetime.

- The FRA should then conclude with an assessment of the scale of the impact, and the recommended approach to controlling surface water discharge from a proposed development.
- Further Information on the details to be provided within the FRA can be found in the Environment Agency's FRA Guidance Note 1 <http://www.environment-agency.gov.uk/static/documents/Research/FRAGuidanceNote1.pdf> and the NPPF Technical Guidance document.

#### **A.1.2.1 Developments <1ha**

Proposed developments should include the appropriate application of sustainable drainage techniques so as to maintain, or preferably reduce the existing runoff and flood risk in the area.

Further Information on the best practice advice with regards sustainable drainage can be found in the Environment Agency's Guidance.

[http://www.environment-agency.gov.uk/static/documents/Utility/AdvisoryCommentsfz1\\_v3.1.pdf](http://www.environment-agency.gov.uk/static/documents/Utility/AdvisoryCommentsfz1_v3.1.pdf)

#### **How to Assess Tidal Flood Risk from a Breach**

Where a site specific breach analysis is required (see Section A.1.1 above) the following information should be assessed.

Extreme tide levels in RBKC from the Tidal Thames model should be obtained from the Environment Agency. The SFRA has shown using these water levels that RBKC is protected by well-maintained defences that will not overtop.

Consultation with the Environment Agency will be required to agree what breach location would cause the greatest water levels at the site. A detailed site-specific analysis should be carried out by a qualified professional and will involve:

- Locating appropriate breach locations and determining the relative dimensions to be modelled. The Environment Agency will be able to offer guidance on location of a breach, defence heights and proposed breach widths.
- 2D modelling of a breach in a defence for the tidal flood event with a 0.5% annual probability, including the impact of climate change. The breach should occur for a duration of two tide cycles.
- Extraction of detailed site specific data including depths, velocities, UK flood hazard index and speed of onset.

The depths, velocities and speed of onset can then be used to assess the risk to life and test the robustness of mitigation schemes. The FRA also should review the acceptability of the proposed access using the 'Flood Risk to People' FD 2320 calculator.

*NB: Although a breach analysis has been undertaken as part of the SFRA, it was on a broader scale and does not provide the site specific quantitative details required.*

### **A.1.3 How to Assess Flood Risk from Other Sources**

Flood risk from 'other sources' in RBKC is described in Section 5.7 and 5.8 of this SFRA. All developers should refer to Figure 3 and 4 in (Appendix B) prior to submitting a planning application and use this information to assess whether the site may be susceptible to flooding from surface water or sewer flooding.

Guidelines to use should be:

- Within 100m of a known surface water flooding incident or where surface water flooding shown as 0.2m or deeper on Figure 3 in Appendix B.
- Thames Water should be contacted for information relating to the risk of sewer flooding at the site.

Figures 5 and 6 of the main SFRA report should be used for to assess the risk from groundwater flooding.

If the SFRA indicates that the site may be at risk then the level of risk will need to be quantified in greater detail at the site by a qualified flood risk management professional using appropriate local data:

- The capacity of the existing drainage system and any planned improvements
- The nature and behaviour of local aquifers.

After initial scoping, the need for drainage or groundwater modelling using appropriate software should be sensibly assessed depending on the severity of the problem. Any existing surface water flow routes (including routes that groundwater flooding takes overland) must be preserved by the development. Mitigation against the likely depths of flooding should be provided up to the 1% annual probability plus climate change event. Some suggested methods are given in Section A.2.3. The required precautionary climate change allowances for peak rainfall intensity are given in Table 5 of NPPF, and must be modelled for an FRA. These are: 5% added to peak rainfall intensity up to 2025, 10% to 2055, 20% to 2085 and 30% to 2115. The appropriate period for climate change assessment is the designed lifetime of the development.

## **A1.4 Additional Consideration for Flood Risk Assessments**

### **A.1.5.1 Basements**

The content of the FRA will be similar to the above guidance with a specific focus on:

- Whether the site has a history of flooding (including groundwater, surface water and sewer flooding);
- Proposed ground levels, floor levels and threshold levels of any openings to the basement;
- The distance of the proposed site to the Thames, and the subsequent residual risk;

- Flood water levels adjacent to the basement and ground levels at street level;
- Time to onset of flooding and velocities, when assessing the risk to basements. In rapid inundation areas (i.e. low lying and or close to the tidal river (Thames) the onset of flooding can take place rapidly without much notice from a breach in the flood defences. The applicant should be aware of the high risk to life and property in these areas.
- The use of permanent (as speed of onset is fast and flood warning is not realistic) flood resistance measures e.g. secondary flood defences to the basement, barriers on doors etc;
- The use of flood resilient materials and design to aid rapid recovery;
- Evacuation plan to a location within the building, a safe refuge at a level above flood water level.
- Within the medium and high risk areas of Flood Zone 3 it is necessary to define residual risk. This may be determined by comparing proposed floor levels with the 1:200 year water level (including climate change) in the Thames.
- This scenario may be refined by undertaking a site specific breach analysis to determine the flood risk at the site and for use in the design of the proposed development.
- In the case of extensions to basements the propagation of flooding may be ascertained from the 'Individual Breach Extents' shown in the SFRA Appendix B.
- Protection against flooding from sewage system.

It should also be reiterated that under NPPF self contained basements are not permitted within Flood Zone 3.

#### **A1.5.2 Drainage Capacity**

The capacity of drainage infrastructure is often limited and is at or near capacity under existing conditions. Development that leads to increased peak runoff within the drainage catchments may lead to infrastructure capacity being exceeded, with the potential for increased flood risk. Development locations should be assessed to ensure capacity exists within both the on and off site network. Thames Water in response to consultation on the SFRA stated that:

*"To ensure all future development is sustainable detailed computer modelling of development sites will be carried out to identify infrastructure requirements once the exact location and scale of development is known. Development will not be allowed to precede the delivery of essential infrastructure, identified as part of this modelling. Development presents an opportunity to reduce peak run-off rates if sustainable drainage measures are implemented."*

Since the SFRA was prepared Thames Water has carried out an assessment of the Counters Creek Strategic Sewer and concluded that much of RBKC is at risk of flooding if there is an intense storm within the Counters Creek catchment area. The catchment area extends to Camden and Brent.



This reinforces the need for developments to satisfy the drainage requirements outlined in Sections A.1.1 and A.1.2 for surface water management and the use of measures to reduce surface water run-off (Sections A.2.1.2 and A3). Contact should be made with Thames Water regarding foul water capacity and for any evidence of recent flooding.

#### **A.1.5.3 Critical Infrastructure**

Critical infrastructure is infrastructure which would be critical in the event of a flood. If critical infrastructure is to be located in flood risk areas an FRA must demonstrate that it has been designed to remain operational throughout the duration of a flood.

#### **A.1.5.4 Application of Sequential Test to Planning Applications**

Environment Agency guidance on application of the sequential test may be obtained by selecting the appropriate section from the following link;-

[http://www.environment-agency.gov.uk/static/documents/Business/SequentialTestProcess\\_v3.1.pdf](http://www.environment-agency.gov.uk/static/documents/Business/SequentialTestProcess_v3.1.pdf)