Flood Risk Assessment (FRA) template – guidance

Who is this guidance for?

This guidance is aimed at planning applicants and FRA consultants for development requiring a flood risk assessment. Check Flood risk assessments: applying for planning permission to find out when you need to do a flood risk assessment and how to access the right flood risk data. **It is essential that your FRA is informed by the flood risk data the Environment Agency holds.**

This guidance and associated FRA template are most likely to be appropriate for non-major and major development proposals.

For minor development such as householder development and non-residential extensions creating floor space of less than 250 square metres, they may provide helpful FRA advice. However, there are some aspects which may not be relevant to, or necessary for, very small-scale development.

The Environment Agency publishes Advice for minor extensions as part of its National Flood Risk Standing Advice for Local Planning Authorities.

What is the aim of this guidance?

The aim of this guidance is to help you complete a suitable flood risk assessment (FRA). It should be read in conjunction with other relevant guidance in Flood risk assessments if you're applying for planning permission and the Site-specific flood risk assessment: Checklist from Planning Practice Guidance (PPG). Following this guidance will increase the chances that your FRA includes the right information first time.

What is a proportionate approach?

The level of detail required in a FRA should be proportionate to the nature, scale and complexity of the development.

A proportionate approach does not mean that it is appropriate to disregard important considerations such as residual flood risk or the impacts of climate change when dealing with smaller-scale, lower risk development. It means that the manner of assessing these considerations may involve a simpler approach.

Disclaimer

Completing the template is not a guarantee that your FRA will be considered acceptable by the Environment Agency. What constitutes a suitable FRA will vary from case to case due to the nature, scale and complexity of the proposed development. Whilst we have made reasonable efforts to prepare this template and accompanying guidance notes, we assume no responsibility for its accuracy, or for any consequences of using them, however arising.

Citation

There is no need to repeat national policy or guidance within your FRA. If you wish to refer to specific paragraphs of the National Planning Policy Framework or PPG:

- NPPF - Navigate to the right section such as Flood risk and coastal change, highlight the relevant text, right click on the highlighted text and select 'copy link to highlight'. Use this link in the text of your FRA.

- PPG – To refer to a specific paragraph of the Flood risk and coastal change section of PPG such as paragraph 2, you would use the following hyperlink: https://www.gov.uk/guidance/flood-risk-and-coastal-change#para2.

1 Site and development description

1.1 Site address

Confirm the full postal site address and National Grid Reference.

1.2 Vulnerability classification

Check Annex 3 of the National Planning Policy Framework (NPPF) to confirm the vulnerability classification of the proposed development. For developments containing different elements of vulnerability, the highest vulnerability category should normally be used. See Notes to Table 2 of PPG. Mixed use development may contain several different vulnerability classifications. Where uses are distinct, it may be appropriate to consider the development in its component parts. Where uses are mixed vertically, such as a shop on the ground floor with a flat above, the highest vulnerability category should be used.

You should describe the vulnerability of users/occupants with reference to factors such as mobility and physical impairment. If the development will normally be unstaffed, you should describe why and when access would be required.

Describe when the development will be used or occupied. For example:

- year-round
- seasonally
- 24 hours a day
- 7 days a week
- at certain times

Confirm if the proposal includes sleeping accommodation and on what storey.

If the proposal is for a change of use, you should confirm:

- the existing and proposed vulnerability classification
- if it will result in an intensification of the use

- if it will affect the vulnerability of users/occupants
- if it will create any self-contained dwellings, for example through the subdivision of a house

If the proposed development type is not listed in Annex 3, you should provide justification to support the vulnerability classification chosen.

1.3 Flood Zone incompatibility

Confirm the Flood Zone of the proposed site by checking:

- Flood Map for Planning service which maps Flood Zones 1, 2 and 3
- The local planning authority's (LPA) strategic flood risk assessment (SFRA) which maps Flood Zone 3b (functional floodplain)
- Any detailed hydraulic modelling undertaken for the site as part of your FRA – provided it has been quality assured by the Environment Agency

Check if the proposed development is incompatible with the Flood Zone as per Table 2 of PPG.

Note that development 'should not be permitted' if it is shown as incompatible in Table 2 of PPG. The Environment Agency is likely to OBJECT to the proposal.

1.4 Lifetime of development

Confirm the lifetime of development with reference to PPG – What is considered to be the lifetime of development when applying policies on flood risk and coastal change?

If the lifetime of the development differs significantly from PPG, please provide justification for why a different period should be used.

If a shorter period is proposed, please confirm if a time-limited permission would be considered and associated control measures.

1.5 Local Plan policies and SFRA recommendations

Refer to the LPA's Local Plan and highlight relevant policies on flood risk or SFRA development management recommendations on flood risk mitigation. Confirming whether or not the proposed development will be in accordance with those policies and recommendations.

2 Assess flood risk

2.1 Existing site

Include a red line boundary site plan showing the land subject to the planning application. If applicable, also include a blue line boundary site plan showing any additional land within the applicant's control.

Provide a topographical survey confirming existing site levels to GPS-derived Ordnance Datum. Use the survey to map flood extent for various return periods and including climate change allowances. The Environment Agency National Light Detection and Ranging (LIDAR) data may be sufficient in exceptional circumstances taking into account any limitations.

Include drawings that show:

- Any watercourses on or adjacent to the site (including culverted watercourses) – highlight the banktop of any watercourses
- The designation of any watercourses – use the Flood Map for Planning Service, the Internal Drainage Boards (IDB) Map and, in Cambridgeshire, Watercourse management | Cambridgeshire County Council to find if a watercourse is a main river, ordinary watercourse, IDB drain or an awarded watercourse
- Any flood or sea defence features or structures on or adjacent to the site (getting information from the relevant landowner or risk management authority[1]) - show their above ground and below ground extent
- Any features that may affect flood flows across the site
- Any existing buildings – if existing buildings have been demolished, provide evidence of when demolition took place

If there are any watercourses or existing flood or sea defence structures or features on or adjacent to the site, describe how on your site you have provided sufficient access for their maintenance and operation.

If there are any watercourses or existing flood or sea defence structures or features on or adjacent to the site, consider whether there are plans to improve or decommission these assets in future or consider their sustainability. Refer to the Programme of flood and coastal erosion risk management (FCERM) schemes and relevant flood risk management strategies. Provide details of how you have made space for future structures or features, accounting for their potential need to be taller, wider or in a different location as the climate changes.

2.2 Fluvial flood risk

If your site is not affected by fluvial flood risk, you can skip to section 2.3.

Refer to Flood risk assessments if you're applying for planning permission

[1] Risk Management Authorities (RMA) include the Environment Agency for main rivers, the sea and reservoirs, Internal Drainage Boards for watercourses in internal drainage districts, and Lead Local Flood Authorities for ordinary watercourses, groundwater flooding and surface water flooding.

2.2.1 Design flood event

Use the list below to provide the relevant details:

- Confirm if your proposal is in Flood Zone 3b (functional floodplain) by referring to the LPA's SFRA – if the SFRA does not include information on functional floodplain for your site, or its assessment is out-of-date, you will need to make your own assessment by referring to the 'Functional floodplain' and 'Effect of local defences on functional floodplain' sections of How to prepare a strategic flood risk assessment. Also, refer to Using modelling for flood risk assessments.
- Confirm if your site has been affected by past fluvial flooding by referring to our recorded flood outlines, contacting other risk management authorities, and finding relevant section 19 flood investigation reports from the lead local flood authority website.
- Assess current and future flood risk from rivers, using the correct Flood risk assessments: climate change allowances for the 1% annual exceedance probability (AEP) event. Also, refer to Using modelling for flood risk assessments.
- Show and describe the nature of flooding that would affect the site (including access/escape routes) in a design flood by referring to speed-of-onset, flood depth, velocity, hazard and duration – assume any existing flood defences will operate as intended.
- Confirm the estimated flood level on your site in the design flood - if the watercourse is culverted or there is a bridge adjacent to the development site you will need to consider a standard blockage scenario by referring to the Blockage management guide.
- Confirm the size, location, depth and structural condition of any culvert present within or adjacent to the site.
- Confirm if there will be any loss of floodplain storage because of the development up to and including the design flood, for example through land-raising or the construction of buildings or other infrastructure in areas at risk of fluvial flooding – Refer to PPG How to assess the suitability of development where there is a possibility it will increase flood risk elsewhere.
- Confirm if there will be any deflection or constriction of flood flows up to and including in the design flood as a result of the development.
- Assess whether there will be any increase in flood risk elsewhere (confirming flood speed-of-onset, frequency, extent, depth, velocity, hazard and duration) up to and including the design flood.
- Assess if the site is within an area at reduced flood risk due to the presence of defences. If so, provide information on the defence location, type, standard of protection, condition, ownership and maintenance responsibilities. Provide information on any plans to replace, improve or withdraw flood defences, with reference to relevant flood risk management strategies.

2.2.2 Residual fluvial risk

- Assess whether there will be any increase in flood risk elsewhere in the event of flood defence failure and/or overtopping up to and including in the design flood – refer to flood extent, speed-of-onset, depth, velocity, hazard and duration.
- If there is a bridge or culverted watercourse nearby, assess the flood risk with different blockage scenarios.
- Assess the residual risks from flood risk management infrastructure by referring to flood extent, speed-of-onset, depth, velocity, hazard and duration. Where relevant, this should include assessing the consequences of flood defence breach, overtopping of flood defences, and failure and exceedance of other relevant flood risk management structures or features (for example pumping stations). Assessments should focus on the consequences of failure, not the likelihood, as per paragraph 24 of PPG.
- Confirm the flood level on your site for the 0.1% AEP fluvial flooding event plus an allowance for climate change.

2.3 Tidal flood risk

Refer to Flood risk assessments if you're applying for planning permission and provide the following information:

2.3.1 Design flood event

- Confirm if your proposal is in Flood Zone 3b (functional floodplain) by referring to the LPA's SFRA – if the SFRA does not include information on functional floodplain for your site, or its assessment is out-of-date, you will need to make your own assessment by referring to the 'Functional floodplain' and 'Effect of local defences on functional floodplain' sections of How to prepare a strategic flood risk assessment.
- Confirm if your site has been affected by past tidal flooding by referring to our recorded flood outlines, contacting other risk management authorities, and finding relevant section 19 flood investigation reports from the local authority.
- Assess if the site is within an area at reduced flood risk due to the presence of defences. If so, provide information on the defence location, type, standard of protection, condition, ownership and maintenance responsibilities. Provide information on any plans to replace, improve or withdraw flood defences, with reference to relevant flood and coastal risk management strategies.
- Assess current and future flood risk from the sea (including estuaries and tidal rivers) ensuring to use the correct Flood risk assessments: climate change allowances for the 0.5% AEP event.
- If the proposed development will be in proximity to the source of tidal flood risk, your assessment should consider the impacts of wave action now and throughout the development lifetime.

- Show and describe the nature of flooding that would affect the site (including access/escape routes) in a design flood by referring to flood extent, speed-of-onset, depth, velocity, hazard and duration – assume any existing flood defences will operate as intended.
- Confirm if there will be any loss of floodplain storage because of the development up to and including the design flood, for example through land-raising or the construction of buildings or other infrastructure in areas at risk of tidal flooding – Refer to PPG How to assess the suitability of development where there is a possibility it will increase flood risk elsewhere.
- Confirm if there will be any deflection or constriction of flood flows up to and including in the design flood because of the development.
- Assess whether there will be any increase in flood risk elsewhere up to and including in the design flood by referring to flood extent, frequency, speed-of-onset, depth, hazard and duration.

2.3.2 Residual tidal risk

- Confirm the flood level on your site for the 0.1% AEP tidal flooding event plus an appropriate allowance for climate change.
- Assess the residual risks from flood risk management infrastructure by referring to flood extent, speed-of-onset, depth, velocity, hazard and duration. Where relevant, this should include assessing the consequences of flood defence breach, overtopping of flood defences, and failure and exceedance of other relevant flood risk management structures or features (for example pumping stations). Assessments should focus on the consequences of failure, not the likelihood, as per paragraph 24 of PPG.
- Assess whether there will be any increase in flood risk elsewhere in the event of flood defence failure and exceedance, by referring to flood extent, speed-of-onset, depth, velocity, hazard and duration.

2.4 Surface water flood risk

Additional guidance or local requirements may be available from the Lead Local Flood Authority (LLFA) or in the LPA's SFRA.

Refer to Flood risk assessments if you're applying for planning permission and provide the following information:

2.4.1 Design flood event

- Confirm if your site has been affected by past surface water flooding by contacting the LLFA and finding relevant section 19 flood investigation reports from the local authority.
- Confirm if your site is shown to be at risk of surface water flooding by referring to Flood Map for Planning service.
- Confirm if additional, more detailed information on surface water flood risk is available from the LPA's SFRA or from the LLFA (for example from their local flood risk management strategy)

- Assess current and future flood risk from surface water, making sure you use the correct Flood risk assessments: climate change allowances. Across all assessments, consider the 3.3% AEP and 1% AEP events.
- Show and describe the nature of flooding that would affect the site (including access/escape routes) in a design flood by referring to speed-of-onset, flood depth, flood velocity, flood hazard and duration – assume any existing flood risk management structures and features will operate as intended.
- Assess if the site is within an area at reduced surface water flood risk due to the presence of surface water flood risk management structures or features (for example pumps and storage areas). If so, provide information on their location, type, standard of protection and condition. Provide information on their ownership and maintenance responsibilities. Provide information on any plans to replace, improve or withdraw those structures or features, with reference to relevant local flood risk management strategies.
- Confirm if there will be any loss of surface water storage as a result of the development during the design flood, for example through land-raising or the construction of buildings or other infrastructure in areas at risk of surface water flooding – Refer to PPG How to assess the suitability of development where there is a possibility it will increase flood risk elsewhere.
- Confirm if there will be any deflection or constriction of surface water flows in the design flood as a result of the development.
- Assess whether there will be any increase in surface water flood risk elsewhere (confirming flood extents, depths, hazard) in the design flood.

2.4.2 Residual risk

- Confirm the flood level on your site for the 0.1% AEP surface water flooding event plus an appropriate allowance for climate change.
- Assess the residual risks from surface water flood risk management infrastructure by referring to speed-of-onset, flood depth, flood velocity, flood hazard and duration. Where relevant, this should include assessing the consequences of failure and exceedance of relevant surface water flood risk management structures or features. Assessments should focus on the consequences of failure, not the likelihood, as per paragraph 24 of PPG.
- Assess whether there will be any increase in surface water flood risk elsewhere (confirming flood extents, depths, hazard) in the event of surface water flood risk management infrastructure failure and exceedance.

2.5 Sewer flood risk

- Provide evidence regarding past sewer flooding such as records from the DG5 register if available – you may be able to obtain this by writing to the local water and sewerage company

- Refer to the local Drainage and Wastewater Management Plan (DWMP) for information on sewer flooding and sewerage capacity.
- Refer to the LLFA Section 19 reports for additional information.
- Refer to the LPA's SFRA.

2.6 Groundwater flood risk

If you are proposing sub-surface structures as part of your development and/or groundwater is identified as a potential source of flood risk, follow these recommendations:

- Visit Check the long term flood risk for an area in England - GOV.UK (www.gov.uk) to see if data is available for groundwater.
- Refer to the LPA's SFRA and Section 19 reports for information on this source of flooding.
- Additional evidence may be available on groundwater flood risk from the LLFA.
- Other information on groundwater flooding is available such as the British Geological Survey groundwater flooding data, groundwater: current status and flood risk, and the guide on mining and groundwater constraints for development.
- Refer to the Flood Risk Assessment: climate change allowances and assess how changes to peak rainfall intensity and sea level rise may affect groundwater flooding in future.
- Identify any trends in groundwater levels – data is available in the Groundwater Level Archive. Note that British Geological Survey charges for the data.
- Show areas at risk on a map and describe the nature of the risk with reference to flood frequency, speed-of-onset, depth, hazard and duration.

2.7 Reservoir flood risk

Confirm if the proposed development site is at risk of reservoir flooding by referring to Check the long term flood risk for an area in England - GOV.UK (www.gov.uk).

Further guidance on what the reservoir flood maps show, how they were created and how to use them for your assessments, is also available from Reservoir flood maps: when and how to use them.

If the site is in an area at risk of reservoir flooding you will need to contact the reservoir owner and assess the risk:

- To the development.
- Development may pose to the reservoir structure or its operation.
- Development could introduce a new regulatory burden on the reservoir owner, for example by increasing the reservoir risk category.

You will need to describe the nature of flooding that could affect the proposed development in terms of flood speed-of-onset, depth, hazard and duration. Consider how these risks differ in dry day and wet day scenarios. A dry day scenario is when watercourses upstream and downstream of the reservoir are at a normal level. A wet day scenario is when the watercourse downstream of the reservoir is experiencing an extreme flood with an annual exceedance probability of 0.1%.

Provide evidence of correspondence with the reservoir owner confirming whether the proposed development could affect the hazard classification of the reservoir. If you are unable to identify and contact the reservoir owner, ask the LPA who will have access to this information via a system called Resilience Direct.

If the proposed development will introduce a new regulatory burden on the existing reservoir owner, provide details of the developer's financial contributions as required by the NPPF 'agent of change' policy and PPG.

Consider What emergency planning considerations are there in relation to reservoirs and what is needed to ensure safe evacuation and flood response procedures are in place.

Proposals that would create new lakes, ponds or reservoirs which would hold water above natural ground level, will need to consider the flood risks both to and from the development. This will need to consider:

- How the lake, pond or reservoir will affect flood risk in normal operation.
- The residual flood risk in the event of dam failure.
- The residual flood risk in the event of emergency drawdown.
- The Owner and operator requirements if you intend to build, bring back into use, or alter a large raised reservoir - a large raised reservoir holds or has the potential to hold 25,000 cubic metres of water above ground level.

2.8 Canals and other artificial sources of flood risk

- Identify whether there are any other artificial sources of flood risk which could affect the site, including features such as lakes, ponds, canals, docks, mill leats or perched watercourses.
- Refer to the LPA's SFRA and Section 19 reports for information on these sources of flooding.
- Where relevant, provide information on who owns and is responsible for inspecting and maintaining the features – you may need to correspond with the owner to obtain this information.
- Assess the risks from any artificial sources by referring to flood extent, frequency, speed-of-onset, depth, velocity, hazard and duration. Where relevant, this should include assessing the consequences of failure and exceedance. Assessments should focus on the consequences of failure, not the likelihood, as per paragraph 24 of PPG.

2.9 Coastal erosion risk implications on flood risk

- Check if the site may be affected directly or indirectly by coastal erosion by referring to Check coastal erosion risk for an area in England.
- Check relevant Shoreline Management Plans (SMP) to understand the preferred management approach in the area.
- Refer to the LPA's Local Plan and confirm if the proposal is within a Coastal Change Management Area (CCMA) and/or whether there are relevant policies on coastal change.
- Development proposed within a CCMA should be accompanied by a coastal change vulnerability assessment. A coastal change vulnerability assessment may also be advisable for development not included within a CCMA where coastal change is an issue.
- If the site may be affected directly by coastal erosion, more information may be available from the Coast Protection Authority – part of the same council as the LPA.
- Assess whether flood risk could be increased from rivers, estuaries or the sea, as a result of predicted coastal erosion, for example through the erosion of high ground.

2.10 Interactions of various sources

Consider if there are any interactions between the various sources of flooding as per paragraph 1 of the PPG Flood risk and coastal change - GOV.UK (www.gov.uk)

For example, you should consider:

- evidence about past flood events and how the various sources interacted
- how flood locking such as tide locking, affects outfalls, confluences and structures like flap valves and tidal sluices
- the alignment of flood peaks from the various sources of flooding

2.11 Estimated flood level in the design flood according to all the sources identified

Confirm the estimated flood level on your site in the design flood, based on all the sources identified.

2.12 Exception Test

Check Table 2 of PPG to see if your development is subject to the Exception Test. This is determined by the vulnerability classification of the proposed development and the Flood Zone.

You should contact the LPA and refer to local guidance to establish if the proposed development will provide wider sustainability benefits to the community. Also refer to the PPG – How can it be demonstrated that wider sustainability benefits to the community outweigh flood risk?

You should provide the LPA with an assessment, informed by your FRA, of whether any wider sustainability benefits outweigh the flood risk.

You will need to include in the FRA whether you have identified and taken any opportunities to reduce flood risk overall such as through:

- Culvert removal
- River naturalisation
- Natural flood management techniques
- Removing surface water from existing combined sewers
- Providing new blue/green infrastructure
- Providing or contributing to new or improved flood defences which will benefit existing communities

You should refer to PPG Reducing the causes and impacts of flooding for further advice on how to identify such opportunities.

If opportunities are available but you have not taken them, you will need to provide evidence of why this was not possible.

Paragraph 179 of the NPPF is clear that both parts of the Exception Test should be satisfied for development to be permitted.

2.13 Summary of flood risks

Provide a table in this section with the following headings:

- Sources of flooding that apply
- Estimated flood level in the design flood
- Estimated flood level in the residual risk event

3 Avoid flood risk

3.1 Evidence of the Sequential Test

You should refer to Flood risk assessments if you're applying for planning permission to find out if the Sequential Test (ST) applies to your development.

If not, clearly explain why you consider the development to be exempt from the ST with reference to Paragraph 175 of the NPPF and NPPF footnote 62 and guidance in PPG on How should the Sequential Test be applied to planning applications? and What is meant by "minor development" in relation to flood risk?

Note that paragraph 23 of PPG states that "Even where a flood risk assessment shows the development can be made safe throughout its lifetime without increasing risk elsewhere, the Sequential Test still needs to be satisfied".

If the ST does apply, you should refer to PPG How can the Sequential Test be applied to the location of development? You should also contact the LPA and refer to any local guidance for information on how to apply the test. The LPA should provide you with advice on:

- What would be an appropriate area of search for your development type
- Any prospective development sites within the area of search the LPA is aware of through the information it holds on land availability

You should also identify any other prospective development sites within the area of search, which the LPA is not aware of. These could include sites which could be available on the open market.

You should include an assessment of whether the identified sites are:

- At a lower risk of flooding than the proposed site, with reference to the SFRA and any ranking methodology the LPA has produced, accounting for all sources of current and future flood risk
- Suitable for the proposed development
- Reasonably available – see PPG for What is a 'reasonably available site?

If the ST identifies a reasonably available, lower risk site(s), appropriate for the proposed development, you need to assess whether there will be clear reasons why permission would be refused for development on the alternative site(s).

If the ST is failed, development should not be permitted as set out in NPPF paragraph 174.

3.2 Sequential Approach

You should demonstrate that you have designed your site in accordance with paragraph 181 of NPPF. This requires that development be laid out within the site so the most vulnerable elements are in areas of lowest flood risk. If doing so is not possible, you will need to provide evidence of your overriding reasons.

Note that paragraph 175 of NPPF exempts your site from the sequential test if your FRA can demonstrate that development is laid out to avoid all built development in areas at risk of any source of current or future flood risk. Built development can include access or escape routes, land raising or other potentially vulnerable elements.

If vulnerable elements of the development cannot wholly avoid areas at risk of flooding, you should substitute lower vulnerability uses for higher vulnerability uses if possible. For example, include a 'less vulnerable' commercial unit instead of a 'more vulnerable' dwelling. You should do this:

- Horizontally – by steering buildings and other vulnerable elements to the lowest risk parts of the site
- Vertically – if horizontal avoidance is not possible, by pushing vulnerable elements to upper floors

Work with a landscape architect to safely incorporate low vulnerability elements such as: flood storage areas, public open space and biodiversity and amenity areas within areas at risk of flooding.

You should include evidence to show how you have followed the sequential approach.

If any buildings or vulnerable infrastructure still need to be located in areas at risk of flooding, try to exclude flood water by raising finished floor levels above estimated flood levels. Some localised land-raising may be acceptable to facilitate level access, provided any associated impact on flood risk elsewhere is assessed and mitigated.

You will need to pair floor raising with flood resistant materials and design. Refer to the CIRIA Code of practice for property flood resilience.

Note that if your mitigation strategy is looking to exclude more than 600mm of flood water, you should provide evidence from a structural engineer that the building would remain structurally sound and safe in the event of flooding.

4 Control flood risk

4.1 Proposed site levels

Confirm the proposed finished floor levels including the road frontage levels and if you propose any ground level raising or lowering.

Finished floor levels should normally be set a minimum of whichever is higher of 600mm above the:

- Average ground level of the site
- Adjacent road level to the building(s)
- Estimated river or sea flood level for the site

Where there is a high level of certainty about your estimated flood level, you may be able to reduce this to 300mm. If there is a particularly high level of uncertainty it may need to be increased.

Provide drawings clearly showing where levels have increased or decreased. All levels should be shown in metres Above Ordnance Datum.

4.2 Flood flow routes

Confirm if there are opportunities within the site to make space for flood water to safely flow and be stored, for example ground level modification to increase flood storage or create safe flood flow routes. Refer to PPG Reducing the causes and impacts of flooding.

Demonstrate how the proposed development will control flood flow routes (conveyance of flood water) within and across the site.

4.3 Existing or proposed flood risk management infrastructure

You should confirm if the development's safety, resilience, compatibility or appropriateness relies on existing or proposed flood risk management infrastructure. If so, identify the need for contributions by referring to the LPA's SFRA and the programme of flood and coastal erosion risk management schemes.

Provide evidence of discussions with the relevant Risk Management Authority for any financial contributions, cash or in-kind, needed for its:

- Maintenance
- Operation
- Upgrade

Provide evidence on the certainty of any capital or maintenance investment in infrastructure on which the development will rely. If future changes are uncertain, you should not assume that they will take place.

5 Mitigate flood risk

5.1 Risk to people

After avoiding and controlling flood risk as much as possible, describe the remaining flood risks and explain how you will mitigate each source of flood risk to people:

- In buildings
- Around buildings
- In adjacent areas
- On access and escape routes

5.2 Risk to property/building

Describe how buildings will be designed and constructed so that in the event of the design flood, they can be brought quickly back into use.

If internal flooding is still expected in the design flood following the use of avoidance and control measures, describe what passive resistance measures will be used to exclude flood water.

If internal flooding is still expected in the design flood following the use of avoidance, control and passive resistance measures, describe:

- The remaining flood risk
- What passive resilience measures will be included

Follow the guidance in PPG on What is flood resistance and resilience? and What needs to be considered in the use of appropriate flood resistance and resilience?

Follow the guidance in the CIRIA Code of practice for property flood resilience.

Note that if your mitigation strategy is looking to exclude more than 600mm of flood water, you should provide evidence from a structural engineer that the building would remain structurally sound and safe in the event of flooding.

Resistance and resilience measures should be clearly detailed and identified on relevant drawings.

5.3 Risk to essential services

Demonstrate how essential services such as electricity supply and sewerage have been designed to be resilient to flooding. List any extra flood resistance and resilience measures that will be included.

Confirm whether the proposed development will provide essential services for others, for example:

- Medical
- Educational or social care
- Energy supply or transmission
- Other critical public services

Assess the impact of flooding on such services and set out the measures that will be included to ensure they are appropriately flood resistant and resilient.

Consider the guidance in PPG on What to consider when determining whether a proposed development will be safe for its lifetime? and How can you ensure acceptable emergency planning provision?

5.4 Floodplain storage and conveyance compensation

Follow these steps to demonstrate you have appropriately addressed any impact the proposed development will have on flood risk elsewhere:

1) If development will result in the loss of flood storage from any source, set out your proposal for on-site level-for-level compensatory storage, including climate change impacts over the lifetime of the development.
2) If it is not possible to provide on-site compensatory storage, provide detailed justification and set out your proposals to provide off-site level-for-level compensatory storage – you will need to show that proposals are hydrologically

and hydraulically linked and that the applicant has sufficient control over the land being used.

3) If it is not possible to provide on-site or off-site compensatory storage, fully assess the effect on flood risk elsewhere and set out your proposals for addressing this risk.

Refer to PPG What to consider when determining whether a proposed development will be safe for its lifetime? which provides further details on various factors to consider.

5.5 Surface water management

- Prepare a Sustainable Drainage Strategy with reference to What information on sustainable drainage needs to be submitted with a planning application?
- Refer to your LLFA for any local guidance.
- Refer to the CIRIA SuDS manual.

6. Manage flood risk

6.1 Safe access and escape

Provide details to demonstrate that you have provided free and voluntary movement during a design flood, through the provision of a safe access route to an area at low risk of flooding. Follow guidance in PPG on How can you ensure acceptable emergency planning provision?

If buildings or the access and escape route will not be dry during the design flood event, demonstrate how you would make it safe to ensure people are not exposed to hazardous flooding. For example, by providing a raised route, clear signposting and by managing other hazards.

Hazardous flooding is defined in the Flood Hazard table FD2320 (accessible from Flood risk assessment guidance for new development - GOV.UK (www.gov.uk)). Include emergency services access confirming the safety of the users throughout the development lifetime. The LPA's Local Plan policies and SFRA may have additional information.

Confirm the depth, velocity, hazard, speed-of-onset and duration of flooding in this section to enable the Local Authority emergency planning team to make appropriate recommendations on your proposals.

6.2 Evacuation plan

Provide details of the emergency evacuation plan as per When are emergency plans needed? and What are the important considerations for emergency plans?

Refer to ADEPT/EA Flood Risk Emergency Plans for New Development | ADEPT (adeptnet.org.uk) for more details on what to include in an emergency evacuation plan.

6.3 Residual flood risk

You will need to show how any residual risk has been safely managed to make sure people are not exposed to hazardous flooding.

Using your assessment of residual flood risk, you should set out your proposals for safely managing residual risk in the event of:

- Flood risk management infrastructure failure
- A more extreme flood event, such as the 0.1% AEP plus climate change event

If buildings and access/escape routes will not be dry in the event of flood risk management infrastructure failure, demonstrate how you will ensure people are not exposed to hazardous flooding. Measures may include:

- Additional raising of floor levels and access/escape routes
- Provision of an internally accessible place of safety above anticipated flood levels
- Changes to design to ensure the structural integrity of buildings

Provide details of how people will be warned in advance of a more extreme flood event. Set out plans to ensure the development will be evacuated so people are not exposed to hazardous flooding.

Assess whether a flood warning is likely to provide sufficient forewarning of a more extreme flood event in order for an evacuation to be able to take place. Check if you can get flood warnings for your address. If a flood warning is not available for your site, set out your proposals for providing an alternative warning system.

Assess any additional burden the proposed development will place on emergency planning provision and provide details of how this burden will be mitigated.

Consider the need for additional resistance and resilience measures to further reduce residual flood risk. Guidance can be found in Code of practice for property flood resilience C790 (ciria.org)

6.4 Betterment provision

If your development requires the Exception Test, refer to section 2.12 of this guidance and refer to paragraph 178 of the NPPF.

If your development does not require the Exception Test, check your LPA's Local Plan to see if it includes policies requiring flood risk betterment on development in areas at risk of flooding.

If so, you may need to show how you have identified and taken opportunities to reduce the causes and impacts of flooding through your development.

This could be through:

- Culvert removal
- River naturalisation
- Natural flood management techniques
- Removing surface water from existing combined sewers
- Providing new blue/green infrastructure, or by
- Providing flood defences which will benefit existing communities

7. Summary of measures

In this section provide a clear summary of measures you are including in the design of the proposed development with a clear indication where the measures meet one or more of the following criteria:

- Avoid
- Control
- Mitigate
- Manage flood risk

You should avoid vague or imprecise commitments to ensure the LPA is able to secure these measures in any planning permission granted.