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Guidance

Flood risk assessment: flood zones 1, 2, 3 and 3b

How to carry out a flood risk assessment so that you can complete your planning application

From: **Environment Agency (/government/organisations/environment-agency)**

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Applies to England

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This guidance is for planning applicants for development in flood zones 1, 2, 3 or 3b not covered by:

- advice for minor extensions (https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#advice-for-minor-extensions) or

- standing advice for vulnerable developments (https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#standing-advice-for-vulnerable-developments)

You should always read the flood risk assessments if you're applying for planning permission (https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications) guidance before following this guidance. It tells you:

- when you need a flood risk assessment
- when you need a sustainable drainage systems (SuDS) strategy
- which advice to follow
- how to access flood risk information from the Environment Agency.

Local planning authorities (LPAs) should use the National flood risk standing advice for local planning authorities (https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities) when reviewing flood risk assessments.

Check if your development needs to satisfy the sequential and exception tests

Before you start a FRA, check if your development needs to satisfy the sequential test (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para27).

The sequential test steers development to areas with the lowest flood risk. It compares your proposed site with other available sites to show which one has the lowest flood risk. The LPA may refuse planning permission if other, lower risk sites are identified.

When the sequential test is needed

A sequential test (https://www.gov.uk/guidance/flood-risk-and-coastal-change#sequential-approach) is required for major and non-major development (refer to check the development class (https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities#check-the-development-class)) if any proposed building, access and escape route, land-raising or other vulnerable element will be:

- in flood zone 2 or 3
- in flood zone 1 and the LPA's SFRA shows it will be at increased risk of flooding during its lifetime
- subject to sources of flooding other than rivers or sea

A development is not exempt from the sequential test just because a FRA shows it can be made safe throughout its lifetime without increasing

risk elsewhere. See What is the aim of the sequential approach? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para23)

When development is exempt from the sequential test

Development is exempt from the sequential test if it is a:

- householder development like residential extensions, conservatories or loft conversions
- small non-domestic extensions with a footprint of less than 250 square metres
- change of use - except changes of use to a caravan, camping or chalet site, or to a mobile home or park home site

Development is also exempt from the sequential test if it is a development on a site allocated in the development plan through the sequential test and:

- the proposal is consistent with site's allocated use
- there have been no significant changes to the known level of flood risk to the site, now or in the future, which would have affected the outcome of the test

You may not need a sequential test if development can be laid out so that only elements such as public open space, biodiversity and amenity areas are in areas at risk of any source of current or future flooding.

How to apply the sequential test

You should speak to the LPA early to discuss the sequential test and to determine an appropriate area of search for the test. The LPA should consider whether the test is passed, with reference to the information it holds on land availability.

You should also include information with your application to identify any other 'reasonably available (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para28)' sites not already identified by the LPA within the area of search. This should include sites such as those currently available on the open market. The LPA may also require you to check on the status of alternative sites to determine if they can be considered 'reasonably available'. Refer to guidance on Applying the sequential test to individual planning applications. (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para27) Speak to the LPA to find out what further information may be needed on the sequential test.

If the sequential test is satisfied you need to check if the exception test (https://www.gov.uk/guidance/flood-risk-and-coastal-change#the-exception-

test) also needs doing. Refer to What is the exception test? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para31)

When the exception test is needed

The exception test is needed for development with a vulnerability classification (https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification) of:

- 'highly vulnerable' in flood zone 2
- 'more vulnerable' in flood zone 3a
- 'essential infrastructure' in flood zone 3a or 3b

If the sequential test is satisfied, you need to satisfy both elements of the exception test before the LPA can permit the development

How to apply the exception test

Refer to:

- what is the exception test? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para31)
- when should the Exception Test be applied to planning applications? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para35)
- how can it be demonstrated that wider sustainability benefits to the community outweigh flood risk? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para36)
- how can it be demonstrated that development will reduce flood risk overall? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para37)

You need to provide the LPA with the evidence they need to check if both parts of the exception test have been satisfied.

The LPA may refuse permission if the sequential and exception tests, where relevant, are not done or not satisfied.

Check if you need any other permissions or consents

You may need a separate permit or consent if the development or any associated works such as site preparation or construction:

- are within 20 metres of a main river (including culverted main rivers), a flood defence or flow control structure
- directly affect a watercourse that is not a main river

- involve activity in the floodplain of a main river which could divert or obstruct floodwaters, damage any river control works or affect drainage, and potential impacts are not controlled by a planning permission
- are covered by regional flood defence and land drainage byelaws, where these are applicable

Check if you need permission to do work on a river, flood defence or sea defence (https://www.gov.uk/permission-work-on-river-flood-sea-defence). Do this as soon as possible to make sure you can get the necessary permissions.

Check if your development activity and location are covered by regional flood defence and land drainage byelaws by referring to this statutory guidance (https://www.gov.uk/government/publications/regional-flood-defence-and-land-drainage-byelaws/regional-flood-defence-and-land-drainage-byelaws-activities-and-locations-covered-by-the-byelaws).

Flood risk permits or consents are often needed as well as planning permission. Getting planning permission does not guarantee you'll also get a flood risk permit or consent.

If there is a watercourse (including culverted watercourses) on or next to your development site, you should also read owning a watercourse (https://www.gov.uk/guidance/owning-a-watercourse) and your watercourse: rights and roles (https://ehq-production-europe.s3.eu-west-1.amazonaws.com/60be7028d088638be2b813145cd8aec822f22f8d/original/1720791975/586663e4b3b42af9f54a7a2841b93c0f_Your_watercourse_rights_and_roles.pdf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIA4KKNQAKICO37GBEP%2F20240722%2Feu-west-1%2Fs3%2Faws4_request&X-Amz-Date=20240722T134013Z&X-Amz-Expires=300&X-Amz-SignedHeaders=host&X-Amz-Signature=c65b1229b73ccc2f38daa6960b3f9949edf4f2b46e9fd438eb665c497725d323). These will help you understand your responsibilities and the rules you need to follow.

What to include in the flood risk assessment

Your FRA should be:

- appropriate to the scale, nature and location of the development
- proportionate to the degree of flood risk

You should include everything listed on the site-specific flood risk assessment: checklist (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para80) and all of the following.

Locations and site plans

You need to provide a location plan showing:

- street names
- any rivers, streams, ponds, wetlands or other bodies of water
- other geographical features, for example railway lines or local landmarks such as schools or churches

You can buy a location plan from the Ordnance Survey (http://www.ordnancesurvey.co.uk/).

You also need to provide a site plan showing:

- the existing site
- your development proposal
- how you have laid out your development to avoid areas of flood risk, make space for water and retain access for any watercourses or flood defences
- site drainage arrangements, including the location of any SuDS, where relevant
- any new or existing structures that could affect water flow for example bridges, embankments, culverts

Survey of site and development levels

You need to provide a survey and cross-section showing existing and proposed:

- site levels
- average site level
- ground level of the access road(s) next to your building(s)
- finished floor levels of the lowest room(s) in your building(s)

Check with your LPA to find out if you also need to show your site in relation to its surroundings.

You should also show estimated flood levels for your site in the design flood (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para2), and any watercourses on or next to the site. Show all levels in metres above Ordnance Datum (the height above average sea level). You may be able to find Ordnance Datum information from the Ordnance Survey (http://www.ordnancesurvey.co.uk/). If not, you will need to pay for a land survey by a qualified surveyor.

Information on past floods

You should also include details of past floods where this information is available. To find out about past floods:

- view the Environment Agency's recorded flood outlines (https://data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines)
- contact the Internal Drainage Board (https://www.ada.org.uk/member_type/idbs/) if you are in an internal drainage district
- contact your lead local flood authority (LLFA) - your local council (https://www.gov.uk/find-your-local-council) will help you find out who this is
- contact your LPA (https://www.planningportal.co.uk/find-your-local-planning-authority) about any relevant flood investigation reports (also known as section 19 (https://www.legislation.gov.uk/ukpga/2010/29/section/19) reports)

Details on the frequency, extent and severity of any past flooding should be included where available, including how it affected your development site. Where changes to flood risk management structures and features have happened since past flooding, explain how these may affect flood risk to your site.

Assess all sources of flood risk

Assess all sources of flood risk and how those risks may change over the anticipated lifetime of the proposed development. (https://www.gov.uk/guidance/flood-risk-and-coastal-change#what-is-lifetime-of-development) You need to account for climate change in your assessment (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

FRAs for large scale or vulnerable development in high-risk areas are likely to need to include a high level of detailed information. In some cases, this will need to include detailed hydraulic modelling. This is to make sure the flood risk to and from the development is understood in a proportionate way. The Environment Agency and LLFAs often have hydraulic modelling which can help you assess flood risk.

You should follow guidance in Using modelling for flood risk assessments (https://www.gov.uk/guidance/using-modelling-for-flood-risk-assessments) to check:

- when you may need to use modelling
- what standards to follow
- how to get modelling advice
- what information you need to provide

See flood risk assessments if you're applying for planning permission (https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications) for

guidance on how to request any relevant Environment Agency hydraulic models.

You should describe all sources of current and future flood risk, including residual flood risk, with reference to:

- likelihood
- extent
- speed of onset
- depth
- velocity
- hazard
- duration
- the availability and suitability of flood warnings
- past flooding

For information about how to calculate flood hazard, check Flood Risk Assessment Guidance for New Development (https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/flood-risk-assessment-guidance-for-new-development) particularly table 13.1 of phase 2 full technical report.

Refer to What is residual flood risk? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para41) Ask the Environment Agency for the information they hold on flood defence breach (https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#get-information-to-complete-an-assessment). If breach models are not available, you will need to assess the potential effect and reach of flood water if a defence is breached. Refer to Flood Risk Assessment Guidance for New Development (http://sciencesearch.defra.gov.uk/Document.aspx?Document=FD2320_3364_TRP.pdf), particularly section 12 of phase 2 full technical report, for guidance on how to do this.

Your FRA should:

- consider the safety of people in buildings, in the areas around buildings and in adjacent areas
- demonstrate how the development will stay safe throughout its lifetime, without increasing flood risk elsewhere - this should include people who are less mobile or who have a physical impairment
- consider the structural safety of buildings
- the impact of a flood on the essential services provided to and by a development

Refer to guidance on What to consider when determining whether a proposed development will be safe for its lifetime? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para5)

By considering finished floor levels and any other proposed measures, you should assess:

- the likely damages in the event of a flood
- an estimate of the likely speed of recovery following a flood

The assessment should consider whether the development may increase flood risk elsewhere through:

- loss of flood storage
- the deflection or constriction of flood flow routes
- inadequate management of surface water

The assessment needs to show how mitigation measures have addressed these issues. For example, you may need to provide compensatory flood storage.

Refer to guidance How to assess the suitability of development where there is a possibility it will increase flood risk elsewhere. (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para49)

Address the flood risk

Once you have assessed all sources of flood risk, you need to set out how risks will be addressed.

You should follow the approach set out in:

- What are the main steps in assessing flood risk? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para3)
- What process is used in plan or decision-making where flood risk is a consideration? (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para4)

Site layouts

You need to lay out your site to steer the most vulnerable aspects of the development to the lowest risk parts of the site.

Put low vulnerability uses in areas of highest risk, for example:

- amenity open space
- nature conservation areas
- biodiversity areas

If buildings cannot wholly avoid areas at risk of flooding, follow the guidance on floor levels.

Floor levels

Finished floor levels should be 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.

Your FRA should specify the estimated flood level for your site. The estimated flood level is the depth of flooding anticipated on your development site in a:

- river flood with a 1% annual probability - a 1 in 100 chance each year plus an allowance for climate change (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)
- tidal flood with a 0.5% annual probability - a 1 in 200 chance each year plus an allowance for climate change (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

In areas affected by both river and tidal flooding, your FRA should consider a scenario when river and sea flood events combine to create worse flooding.

You may be able to get the estimated flood level and information about residual risks from the Environment Agency or your LPA. If not, you will need a flood risk specialist to calculate this for you.

Your plans need to show how you are going to ensure the development is not flooded by surface water or groundwater. You could do this by:

- diverting water away from buildings but safely managing it within the site
- raising floor levels above the estimated flood levels of surface and groundwater flooding

You should also use construction materials that have low permeability up to at least the same height as finished floor levels.

Standards for the installation and retrofit of resistance measures are available in British Standard 851188-1:2019+A1:2021

(https://shop.bsigroup.com/products/flood-resistance-products-building-products-specification-1/standard).

If you cannot raise floor levels in this way, consider if the development can be made safe and appropriately flood resistant and resilient.

This can be done by:

- raising floor levels as much as possible
- moving vulnerable uses to upper floors
- including extra flood resistance and resilience measures

When considering the height of floor levels, you should:

- consider any additional requirements from the SFRA
- account for any information on past floods

Flood water can put pressure on buildings causing structural issues. If your design aims to keep out a depth of more than 600mm of water, you should get advice from a structural engineer. They will need to check the design is safe.

Extra flood resistance and resilience measures

Follow the guidance in this section:

- for development in areas at risk of flooding where you cannot raise the finished floor levels to the required height
- if your building design should prioritise excluding flood water where possible
- if design should also speed recovery in case water gets in

Make sure your flood resilience plans for the development follow the guidance in the CIRIA Property Flood Resilience Code of Practice (https://www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS). Note that the code of practice uses the term ‘recovery measures’. In this guide we use ‘resilience measures’.

It may not be possible to safely exclude the full estimated flood level. If this is the case, you will need to exclude it to the structural limit then allow additional water to flow through the property. Note that the Environment Agency is unlikely to consider internal flooding of new vulnerable development to be acceptable.

The design should be appropriately flood resistant and resilient by:

- using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
- making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
- using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level
- raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level
- making it easy for water to drain away after flooding such as installing a sump and a pump
- making sure there is access to all spaces to enable drying and cleaning
- making sure that soil pipes are protected from back-flow such as by using non-return valves

Standards are available for:

- the installation and retrofit of resistance measures - British Standard 851188-1:2019+A1:2021 (https://shop.bsigroup.com/products/flood-resistance-products-building-products-specification-1/standard)
- speeding the recovery of buildings after a flood - British Standard 85500:2015 (https://shop.bsigroup.com/products/flood-resistant-and-resilient-construction-guide-to-improving-the-flood-performance-of-buildings/standard)
- dealing with and preventing water from the surrounding ground entering below ground structures such as basements - British Standard 8102:2022 (https://knowledge.bsigroup.com/products/protection-of-below-ground-structures-against-water-ingress-code-of-practice?version=standard)

You also need to comply with relevant Building Regulations in Part P (https://www.gov.uk/government/publications/electrical-safety-approved-document-p). They set minimum and maximum heights for certain electrical infrastructure.

Temporary or demountable flood barriers are not appropriate for new buildings. Only consider them for existing buildings when:

- there is clear evidence that it would be inappropriate to raise floor levels and include passive resistance measures
- an appropriate flood warning or other appropriate trigger is available
- arrangements are in place to ensure such features will be maintained, serviced and replaced in line with manufacturer recommendations

If your proposals involve the development of buildings constructed before 1919, refer to Flooding and Historic Buildings (https://historicengland.org.uk/advice/your-home/flooding-and-older-homes/making-your-home-flood-resistant-and-resilient/) guidance produced by Historic England.

Access and escape

You need to provide details of your emergency access and escape plans if any part of your development is below the estimated flood level. This includes access and escape routes. Follow the Flood Risk Emergency Plans for New Development guidance (https://www.adeptnet.org.uk/floodriskemergencyplan).

Make sure your plans show:

- a safe route of access and escape, set above the estimated flood level and connects the site to an area away from flood risk
- that any single storey buildings or ground floors without access to upper floors can access a safe refuge above the estimated flood level
- that any basement rooms have clear internal access (for example a staircase) to an upper floor above the estimated flood level
- how the development could be evacuated before an extreme flood (0.1% annual probability of flooding with an allowance for climate change)

You need to show that residual risks can also be safely managed, ensuring people will not be exposed to hazardous flooding. This may mean additional mitigation measures are needed such as:

- further floor raising to minimise internal flood depths
- precluding sleeping accommodation on ground floors
- providing an internally-accessible safe refuge

You also need to comply with relevant Building Regulations in Part B (https://www.gov.uk/government/publications/fire-safety-approved-document-b). They require you to provide suitable access for the fire service.

Surface water drainage

You should use SuDS for all:

- development involving surface water drainage in areas at risk of flooding
- major development involving surface water drainage

If you do not include SuDS in these circumstances, you need to provide the LPA with clear evidence of why their use would be inappropriate.

In major development, SuDS should also provide multifunctional benefits where possible.

Even where the national planning policy framework (NPPF) does not require the use of SuDS, we recommend they be considered on all development types. This would include changes of use, wherever appropriate.

You should include all the information set out in:

- section 6 of the site-specific flood risk assessment checklist (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para80)
- what information on sustainable drainage need to be submitted with a planning application (https://www.gov.uk/guidance/flood-risk-and-coastal-change#para59)

Your plans for the management of surface water need to meet any requirements set out in your local authority's:

- local plan or supplementary planning documents
- local flood risk management strategy
- surface water management plan where available
- SuDS guidance where available
- SFRA

You will also need to meet the requirements of the planning practice guidance (https://www.gov.uk/guidance/flood-risk-and-coastal-change#sustainable-drainage-systems) and the approved building regulations Part H: drainage and waste disposal (https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h). Read section H3 rainwater drainage.

Refer to the non-statutory technical standards (https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards) for guidance on the design, maintenance and operation of SuDS. Further guidance on how to design SuDS to maximise their benefits is in the CIRIA Suds Manual (https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91).

You can follow Water UK's Design and Construction Guidance (https://www.water.org.uk/sewerage-sector-guidance-approved-documents/) to design and construct SuDS. This will ensure they qualify for adoption by the relevant water and sewerage company.

You need planning permission (https://www.gov.uk/planning-permission-england-wales) to surface more than 5 square metres of a front garden with a non-porous material.

Sites within the functional flood plain

If your site falls within the functional floodplain you need to state this.

Functional floodplain is defined in Table 1 of Planning Practice Guidance (https://www.gov.uk/guidance/flood-risk-and-coastal-change#table1) and shown in

your LPA's SFRA. If information is not available for your site, you should make your own assessment of whether it is in a functional floodplain.

Refer to the 'Functional floodplain' and 'Effect of local defences on functional floodplain' sections of How to prepare a strategic flood risk assessment (https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment).

Only two vulnerability classifications are not considered incompatible with the functional floodplain. These are:

- water compatible
- essential infrastructure that has met the exception test

Such development will also need to be designed and constructed to:

- stay operational and safe for users during a flood
- avoid impeding water flows or increasing flood risk elsewhere
- make sure there is no net loss of floodplain storage

Getting planning advice on your proposals

The Environment Agency can give a free preliminary opinion (https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion) to applicants. This advice is in addition to the statutory consultation process. They can tell you which climate change allowances to use and how to use them in your assessments.

There is a charge for more detailed pre-application planning advice. This includes reviews of draft FRAs and flood risk modelling. You can find out more about this service in our Planning and marine licence advice: standard terms for our charges (https://www.gov.uk/government/publications/planning-and-marine-licence-advice-standard-terms-for-our-charges).

Many LPAs and LLFAs also provide a pre-planning application advice service. Contact yours to find out.

Submit your flood risk assessments

Your written flood risk assessment can be in any format but should include the relevant:

- plans
- surveys
- assessments

Check with your LPA and LLFA if they have any specific software requirements, for example for producing detailed hydraulic models.

Submit your completed flood risk assessment with your planning application (http://www.planningportal.gov.uk/planning/applications/) to your LPA (https://www.planningportal.co.uk/find-your-local-planning-authority).

Planning applications that do not have a satisfactory flood risk assessment may be refused.

Contact the Environment Agency

> Environment Agency
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> PO Box 544
> Rotherham
> Yorkshire
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