Full Planning Applications: Flood Risk and Drainage Checklist

This document provides a list of the information that, in general, must be submitted to support full planning applications in relation to flood risk and drainage.

Application details

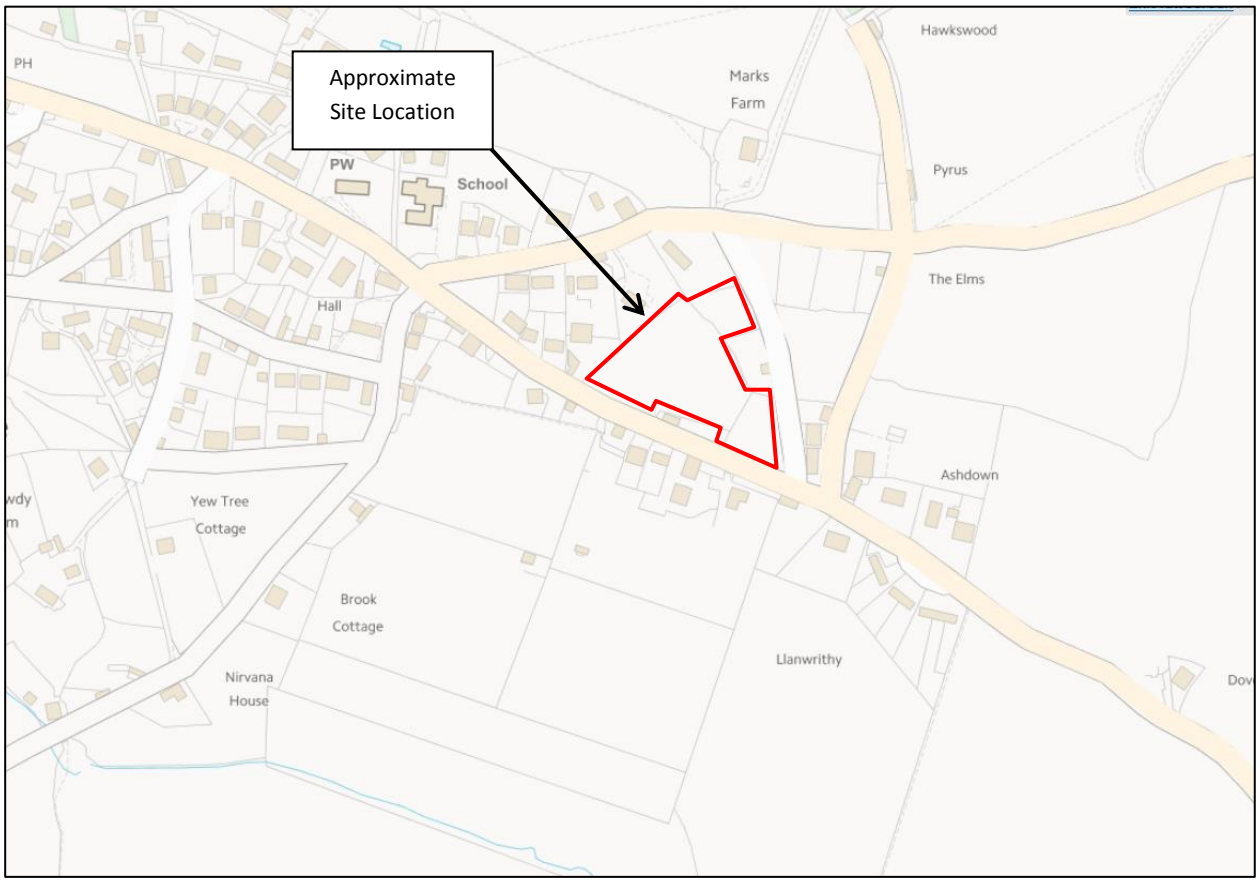
SITE:	Land adjacent to Jessamine Cottage off Main Street, Llangrove, Ross on Wye, Herefordshire, HR9 6ET
DESCRIPTION:	Proposed erection of 18 new homes with new access off Main Street, Llangrove
APPLICATION NO:	172905
GRID REFERENCE:	OS 352902, 219124
APPLICANT:	Mr Tom Aylmer
AGENT:	Mr Geoffrey Prince
DATE OF THIS RESPONSE:	1/12/2017

This response is in regard to flood risk and land drainage aspects, with information obtained from the following sources:

- Application for full planning permission
- Site Location Plan drawing (28.07.2017)
- Site Plan (June 2017)
- Flood Risk Assessment and Drainage Strategy (16053/FRA/DS/28.07.2017)

Site location and extract of flood map(s)

Figure 1: Environment Agency Flood Map for Planning (Rivers and Sea), May 2017



Development description

The Applicant proposes the construction of 18 dwellings with associated parking and access roads. The site occupies an area of 1.12 ha and is currently used for agricultural purposes. The topography of the site slopes down from approximately 139.5 m AOD in the south west to approximately 136.0 m AOD in the north.

Identifying the need for a Flood Risk Assessment

All Applicants must provide sufficient information to address the points listed below to enable an accurate assessment of flood risk and the need for a flood risk assessment to be made.

Information required	Reviewers comments
Confirmation of the site area in hectares or square metres	Site area confirmed as 1.12 ha.
Identification of all main rivers within 20m of the site boundary	There are no main rivers within 20m.
Identification of all ordinary watercourses and land drains within 20m of the site boundary	There are no ordinary watercourses or mapped drains within 20m.
Confirmation of the site's location in Flood Zone 1, Flood Zone 2 or Flood Zone 3, and taking climate change effects into account	Review of the EA's Flood Map for Planning and submitted FRA confirms the location of the site in Flood Zone 1.
Confirmation and supporting justification of whether the site is at significant risk of flooding from other sources, including surface water flood risk or flood risk from minor watercourses with unmapped flood extents	The EA's Flood Risk from Surface Water map indicates that the site and access roads are at low risk of flooding from surface water.

Completing a Flood Risk Assessment

A Flood Risk Assessment (prepared in accordance with NPPF and EA Standing Advice) must support the planning application for any development:

- Located in Flood Zone 2 or Flood Zone 3[1].
- With a site area greater than 1 hectare.
- Located in an area identified to be at significant risk of flooding from other sources, including surface water flood risk or flood risk from minor watercourses with unmapped flood extents.

Review of the information summarised in Section 1 indicates that a FRA is required to support the planning application for this development as the site is greater than 1 hectare.

The following information should be provided within the FRA:

✓ Information provided is considered sufficient

✘ Information provided is not considered sufficient and further information will be required

[1] Note that the Council may also request an assessment of flood risk where the development is indicated to be at risk of flooding when the potential effects of climate change are taken into account.

Information required	Reviewer comments	✓✖
Sources of risk		
Assessment of Flood Zone 2 and 3 taking the effects of climate change into account, including predicted flood depths for the 1 in 100 and 1 in 1000 annual probability events	Review of the EA's Flood Map for Planning and submitted FRA confirms the location of the site in Flood Zone 1.	✓
Assessment of areas protected by flood defences and risk of flooding in the event of breach, taking the effects of climate change into account	The site is located in Flood Zone 1 and therefore not at risk of flooding in the event of defence breach.	✓
Assessment of fluvial flood risk from other watercourses in close proximity (c.20m) to the site including those with no mapped flood extent, and taking the effects of climate change into account	Review of OS mapping indicates that there are no ordinary watercourses in close proximity to the proposed development.	✓
Assessment of mapped surface water flood risk	Review of the EA's Flood Risk from Surface Water map indicates that the site and access roads are not at risk of flooding from surface water.	✓
Assessment of flood risk associated with potential overland flow from adjacent steeply sloping land	Overview of OS mapping, included below, indicates that the site is unlikely to be at risk of overland flow due to the intercepting road alignments. 	✓
Assessment of groundwater flood risk	A review of OS mapping indicates that there are no springs in close proximity to the proposed development. The applicant additionally carried out soakaway testing, and no groundwater was encountered in any of the trial pits.	✓
Assessment of flooding from surface water, foul water and highway sewers	The submitted FRA states that the risk of flooding from these sources can be discounted based on no sewers in close proximity to the site. Based on OS Mapping and the topography of the site, the risk of flooding is likely to be low.	✓
Assessment of flood risk from any other manmade sources, including reservoirs, ponds, detention basins etc.	The submitted FRA states that the site is not at risk of flooding from reservoirs. Review of OS mapping indicates no other manmade features that are likely to pose risk to the site.	✓
Summary of historic flooding records and anecdotal evidence	No information has been provided regarding historic flooding, but the risk is likely to be low, but review of historic flood records indicates that the risk is likely to be low.	✓
Sequential Approach		
Assessment of the acceptability of the development within the	The proposed development is considered appropriate within Flood Zone 1 including climate change allowances.	✓

Information required	Reviewer comments	✓✗
identified Flood Zone, in accordance with the Sequential Test outlined in the NPPF		
Demonstration of how a sequential approach has been taken to locate development in the lowest risk areas of the site, including the risk of flooding from other sources	The risk of flooding to the site is low and a sequential approach to the site layout is not considered necessary.	✓
Mitigation		
Summary of how the development has addressed the identified flood risks and incorporated appropriate mitigation into the layout and operation of the development	The submitted FRA states that due to the low flood risk to the proposed development, the only mitigation measures proposed are that finished floor levels of the development should be elevated above surrounding ground levels by 150mm.	✓
Assessment of availability of safe access and egress routes, and consideration of dry islands	Safe access and egress routes will remain dry.	✓
Exception Test		
Justification for the successful application of the Sequential Test, if applicable	In accordance with the NPPF, the Exception Test does not apply to this development.	✓

Surface Water Management Strategy

A surface water management strategy should be submitted that includes the following information:

✓ Information provided is considered sufficient

✗ Information provided is not considered sufficient and further information will be required

Information required	Reviewer comments	✓✗
Strategy		
Summary of likely ground conditions including permeability and contamination risks	The FRA states that on-site soakaway testing was undertaken on the site, and no groundwater was encountered in any of the pits. The report states that the results of the soakaway testing indicate infiltration of surface water runoff may be viable with an indicative infiltration rate of 10^{-6} m/s. However, the report also states that half drain times were in excess of 24 hours and that the site cannot be drained through one single soakaway, and that multiple soakaways would have to be provided. Only one test per trial pit was undertaken. Infiltration rates should be confirmed with testing undertaken in accordance with BRE365 prior to construction to inform the detailed design of the drainage system.	✓
Confirmation of whether the site is located in a Source Protection Zone or Principal Aquifer	Review of the EA's groundwater mapping indicates that the proposed development is not located within a Source Protection Zone or Principal aquifer.	✓

Information required	Reviewer comments	✓✘
Summary and illustration of the proposed surface water drainage system including location of SuDS features, manholes, external pipework, attenuation features, pumping stations (if required) and discharge locations	The surface water drainage strategy comprises surface water infiltrating to ground through soakaways, swales and permeable paving. Each property is proposed to have an individual soakaway. Two attenuation tanks are indicated to the north and south-east of the site although it is not clear what these will drain if the intension is to use permeable paving, and the structures appear to be located within property boundaries which is not acceptable. A large pond-like structure is indicated within the centre of the site; it is not clear what the function of this area is for but it is assumed that this is an infiltration basin. The assessment of the suitability of this strategy is provided below, noting that we have a large number of concerns regarding the information submitted to date.	✘
Demonstration that the SuDS hierarchy has been considered in accordance with NPPF and justification for the proposed method of surface water discharge	The applicant has demonstrated compliance with the NPPF by promoting infiltration to ground. Whilst we fully support the Applicant's strategy, we are concerned that the Applicant's FRA suggests that infiltration levels may be calculated to be less than the estimated 10^{-6} m/s when the tests are undertaken in accordance with BRE 365 (i.e. 3 tests are completed in close succession, rather than just 1). We therefore recommend that the Applicant confirms that a viable alternative system is available should infiltration prove unfeasible. The Applicant has highlighted no watercourses in close proximity of the site, therefore we recommend that the Applicant explores the availability and capacity of the highway drainage network. <u>We recommend that this is confirmed prior to granting planning permission.</u>	✘
Demonstration that best practice SuDS have been promoted, appropriate to the size and nature of development	The submitted FRA demonstrates that best practice SuDS have been promoted.	✓
If pumped systems are proposed, justification for the use of these systems, summary of key design principles and assessment of residual risk, with supporting calculations	Pumps are not proposed	✓
Confirmation that the system will be designed to prevent any flooding of the site in all events up to an including the 1 in 30 annual probability storm event with supporting preliminary calculations	The Applicant has not confirmed that no surface water flooding will occur from the network during a 30 year event. <u>We recommend that this is confirmed prior to granting planning permission.</u>	✘
Infiltration systems		

Information required	Reviewer comments	✓✘
For infiltration to ground, detailed calculations of proposed soakaway and attenuation sizing demonstrating sufficient space within the site to ensure no increased flood risk up to the 1 in 100 year event and allowing for climate change effects	Infiltration testing will need to be undertaken in accordance with BRE365 to inform the detailed design of the drainage system. Note that calculations will need to be resubmitted once results of infiltration testing known. The FRA proposes a drainage strategy of individual property soakaways, filter trench and swales – although the illustrated drainage strategy does not match the description in the FRA and does clearly demonstrate where these structures will be provided. The Applicant states that the drainage strategy is designed for the 1% +30%CC level, which is welcomed, but as part of the detailed design the Applicant needs to demonstrate that site can manage events up to the 1% + 40% CC event without increasing discharge offsite. The drainage strategy indicates attenuation tanks located in what appears to be private property boundaries. This is not acceptable and will need to be confirmed / addressed. The drainage strategy also indicates a large pond-like structure in the centre of the site. It is assumed this is an infiltration basin but we recommend this is confirmed. The FRA includes a number of MicroDrainage calculations. It is not clear how these calculations relate to the assets illustrated on the drainage plan and we require for this to be confirmed. We also note that the calculations have been undertaken using FSR rainfall data and we recommend that this is amended to use FEH 2013 rainfall data to inform detailed calculations. The calculations include the use of a hydrobrake as part of a number of the soakaway calculations. We require the applicant to explain why this is provided. The calculations also indicate that the soakaways will overflow, but we are unclear where they will overflow to and in which return period. The FRA also states that a cascade system will be promoted within the permeable paving access road. We require further clarification of how this arrangement would work (with illustration). We also require further clarification of other services that are proposed within the access road, as we would not usually accept permeable paving that is also required to convey water, electric, gas and telecoms due to the likelihood of future works to these services and the likelihood of detrimental effect to the permeable paving. The drainage strategy for this development is currently very confusing. We recommend that this information is provided prior to the Council granting planning permission.	✘
Clarification if attenuation structures are to be provided partly or wholly above adjacent ground level (i.e. above ground storage), and assessment of potential failure of above-ground attenuation features, including assessment of residual risks to downstream receptors, and proposed mitigation and management measures	The drainage strategy indicates a large pond-like structure in the centre of the site. We recommend that the Applicant confirms if this structure is intended to hold water above adjacent ground level.	✘

Information required	Reviewer comments	✓✘
Drawing to illustrate that attenuation structures are not located within an area at risk of fluvial flooding up to the 1 in 100 annual probability event and taking the effects of climate change into account, unless it can be demonstrated that the capacity of the drainage system will not be reduced and that any loss of fluvial flood storage can be compensated for elsewhere without increasing risk to people, property or infrastructure	The infiltration storage features are outside of the Flood Zones taking climate change into account.	✓
Pollution		
Demonstration of how the first 5mm of rainfall (or 'first flush') will be managed to promote infiltration/evaporation/evapotranspiration, and with focus on the removal of pollutants	The FRA states that surface water will be managed through soakaways, filter drains, permeable paving and swales.	✓
Confirmation of the proposed methods of treating surface water runoff to ensure no risk of pollution is introduced to groundwater or watercourses both locally and downstream of the site, especially from proposed parking and vehicular areas	The Applicant is providing soakaways, filter drains, permeable paving and swales; this approach is considered to be appropriate.	✓
General		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	It is assumed that the development will not be developed in phases.	✓
Exceedance		
Assessment of natural surface water flow paths through the site, noting that natural flow paths should be retained as far as practicable within a development layout, and demonstration that consideration has been given to the potential for overland flow to overwhelm the capacity of the proposed drainage system	No overland flows have been identified on the EA's surface water flood map and it is considered that the site is not likely to be at risk of overland flows.	✓

Information required	Reviewer comments	✓✘
Description and drawing demonstrating the management of surface water runoff during events that may temporarily exceed the capacity of the drainage system, such as temporary exceedance of gullies during events greater than the 1 in 5 annual probability event, up to the 1 in 30 annual probability event	The Applicant has not demonstrated how water that temporarily exceeds the capacity of the drainage system will be managed. The information currently provided does not provide sufficient confidence that overland flows will be retained within the site until such a time that surface water can be discharged to the below ground system. As the Applicant's intended use of a cascade system suggests sloping topography within the site, it is recommended that the Applicant demonstrates how flows which temporarily exceed the capacity of the drainage system will be managed.	✘
Description and drawings demonstrating the management of surface water runoff during events greater than the 1 in 30 annual probability event that may exceed the capacity of the drainage system up to the 1 in 100 annual probability event with climate change (including assessment of where water is likely to emerge) and noting that surface water should be retained within the site boundary and not pose risk to the development	The Applicant has not demonstrated the management of exceedance flows and temporary storage of surface water for events greater than the 30yr event up to the 1% + CC event. The Applicant needs to consider flow routes and areas likely to pond around the development. As the Applicant's intended use of a cascade system suggests sloping topography within the site, it is recommended that this information is provided prior to granting planning permission.	✘
Access, adoption and maintenance		
If access or works to third party land is required, details of these works and agreement in principal with necessary landowners/consenting authorities to cross third party land and/or make a connection to the proposed watercourse/sewer	It is assumed that there will be no connections crossing third party land.	✓
Confirmation of agreement in principle of proposed adoption and maintenance arrangements for the surface water drainage system	The Applicant needs to confirm the adoption of all surface water features that serve this proposed development.	✘
Demonstration that appropriate access is available to maintain SuDS features (including pumping stations)	The below ground individual property soakaways and proposed crate soakaways are located within individual property boundaries; it is unclear how access to these features will be achieved and we recommend that this is clarified by the Applicant. Other features appear to be located in the public open space, so it is assumed that appropriate access can be provided here.	✘

Foul Water Management Strategy

A foul water management strategy should be submitted that includes the following information:

✓ Information provided is considered sufficient

✘ Information provided is not considered sufficient and further information will be required

Information required	Reviewers comments	✓✘
Description and illustration of the proposed foul water drainage system including location of manholes, external pipework, package treatment plants, drainage fields, pumping stations and discharge locations	The submitted FRA states that the proposed foul water drainage strategy is to discharge foul water via on-site gravity sewers to the existing Welsh Water foul sewers located to the north, east and south of the site.	✓
If pumped systems are proposed, justification for the use of these systems, summary of key design principles and assessment of residual risk, with supporting calculations	There are no pumped systems proposed.	✓
Discharge to sewerage network		
Demonstration that the availability, suitability and capacity of the public sewerage system has been explored in consultation with the relevant authority and that connection to this system is promoted above any other management methods	There are existing Welsh Water foul water sewers located to the north-east, east and south of the site boundary. The Applicant has confirmed that the existing Welsh Water system has sufficient capacity to receive additional discharge and that a gravity connection can be achieved.	✓
Access, adoption and maintenance		
If access or works to third party land is required, details of these works and agreement in principal with necessary landowners/consenting authorities to cross third party land and/or make a connection to the proposed watercourse/sewer	The proposed connection to the south appears to be within the public highway which is acceptable. Review of OS mapping indicates that the proposed connection to the north may be located within a private access road and not the public highway. We recommend that this is clarified prior to granting planning permission.	✘
Confirmation of agreement in principle of proposed adoption and maintenance arrangements for the foul water drainage system	The Applicant has contacted Welsh Water regarding the foul water drainage proposals who approved an initial design.	✓
Demonstration that appropriate access is available to maintain drainage features (including pumping stations)	Review of the drainage strategy indicates that access for future maintenance is achievable.	✓

Overall Comment

As discussed above, we recommend the following information is provided prior to the Council granting planning permission for this development:

- Clarification of the proposed surface water drainage strategy, the location of proposed features, how the cascaded permeable paving will operate, and how the submitted calculations relate to this proposed strategy.
- Consideration of exceedance flows for events up to the 30 year and 100 year events.
- Confirmation of the authority responsible for the adoption and maintenance of the surface water and foul water drainage systems.
- Confirmation of whether the proposed foul water connections are located in pubic or private land.

We also strongly recommend that the Applicant confirms that an alternative surface water drainage disposal option is available should infiltration prove to be an unviable method of disposing of surface water runoff.