Outline Planning Applications: Flood Risk and Drainage Checklist

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

Application details

SITE:	Land at The Lakes, Swainshill, Hereford
DESCRIPTION:	Outline approval for plots 2, 3, 4, 5,6, 7 and Design Barn on plot 9.
APPLICATION NO:	191554
GRID REFERENCE:	346008, 241932
APPLICANT:	Mr T Crump
AGENT:	Mrs M Hartland
DATE OF THIS	5/3/20
RESPONSE:	

This response is in regard to flood risk and land drainage aspects. Information obtained from the following sources has been reviewed:

- Surface Water Drainage Strategy Proposed Preliminary Layout (4261-01 Rev C)
- Phone call between Stavros Drakopoulos of Ambiental (Drainage engineer) and Joanna Goodwin of WSP (on behalf of BBLP)

Site location and extract of flood map(s)

Figure 1: Environment Agency Flood Map for Planning (Rivers and Sea), July 2019



Development description

The Applicant proposes the construction of 9 dwellings with associated garages and access roads, and construction of a design studio. The site occupies an area of 1.2ha and the southern section of the site is currently used by the







Applicant as offices, workshop and a yard. The site comprises a mix of brownfield and greenfield land. LiDAR shows there may be an ordinary watercourse flowing along the lower eastern boundary of the site. The topography of the site slopes down from approximately 78.93m AOD in the north-west to approximately 71.68m AOD in the south-east.

Comments

In our previous response we advised that whilst we agreed with the proposed surface water drainage strategy in principle, we recommend that the following information was submitted prior to the Council granting planning permission:

- Resubmission of Drawing 4261-01 in a format to allow notes to be read.
- Clarification of the requirements for road drainage in private land at Plot 9 including how suitable access arrangements for the future maintenance of this drainage feature will be provided.

To assist with providing a clear summary of all comments relevant to flood risk and drainage that can be used to inform the detailed design of the scheme, we have amended our previous response (dated January 2020, copied below) and highlighted where additional information has been provided and/or where our comments have been amended. All changes have been highlighted in red text (and therefore all text in grey has not changed since our previous response).

Completing a Flood Risk Assessment

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

Information required	Reviewer comments	√ x
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	The FRA identifies the site to be at low fluvial flood risk at the site whilst also taking climate change into account.	✓
in 100 and 1 in 1000 annual probability events Assessment of areas protected by	The site is not at risk of flooding in the event of defence breach.	
flood defences and risk of flooding in the event of breach, taking the effects of climate change into account		~
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	There are no minor watercourses shown on OS mapping. A ditch along the lower eastern boundary is mentioned in the FRA. The flood risk associated with this potential watercourse is unlikely to be significant but must be investigated further at detailed design, including consideration of culvert blockage risk if appropriate.	✓ (with note)







Information required	Reviewer comments	√ x
Assessment of mapped surface water flood risk	The EA's surface water flood risk map shows that the south eastern corner of the site is within an overland flow path, flowing from south to north east (as shown in Figure 2 above). An area near the workshop is expected to flood to depths up to 300mm during the 1000 year event. The FRA identifies that this risk and states that management of this risk is to be considered in the detailed design through the design of external ground levels and property threshold levels. We agree with this approach, but stress that consideration must also be given to measures that will ensure protection of the development's drainage system to ensure the drainage system is not overwhelmed / compromised by this flow path. We also stress that the development must not increase flood risk elsewhere – in particular to the road to the A438 to the south of the development, for example by increasing ponding of surface water in the road. We requested that the applicant should identify whether any highway drains discharge into the site as these will need to remain functional as the development proceeds. During the phone call with Stavros Drakopoulos of Ambiental it is understood that there are no highway drains that discharge into the part of the site that is the subject of this application and therefore no further consideration is required. Balfour Beatty have visited the site. Based on the inspection there appears to be a highway drain orifice that spills onto land on the eastern edge of the development plot. The surface water flood maps suggest that water is dispersed onto the field to the east of the site	✓ (with note)
Assessment of flood risk associated with potential overland flow from adjacent steeply sloping land	Overland flow is considered as part of the assessment of surface water flood risk above. There are no other known issues from elsewhere.	~
Assessment of groundwater flood risk	Groundwater flood risk is not considered in the FRA. Our own review of OS mapping suggests no groundwater springs in the vicinity of the site. Our own review of BGS data indicates mudstone bedrock geology overlain by till and alluvial gravels. Groundwater was not encountered during the trail pits that are estimated to extend c.4-5m bgl. Groundwater flood risk is therefore considered to be low.	~
Assessment of flooding from surface water, foul water and highway sewers	Risk of flooding from sewers is not considered in the FRA however our own review indicates that the risk of flooding from sewers is not likely to be significant due to the location and topography of the site and the location of nearby sewers.	~
Assessment of flood risk from any other manmade sources, including reservoirs, ponds, detention basins etc.	The FRA does not consider the risk of flooding from reservoirs. However our own review of EA mapping shows that the site is not likely at risk of manmade sources.	~
Summary of historic flooding records and anecdotal evidence	The FRA states that there are no known risks of historic flooding.	\checkmark
Other works that could pose risk		
Are there any other proposed works that could lead to increase flood risk to the site or elsewhere, for example culverting or diversion of watercourses?	There are no known works that could increase flood risk elsewhere other that the management of surface water runoff and overland flow.	~







Information required	Reviewer comments	√x
Sequential approach		
Assessment of the acceptability of the development within the identified Flood Zone, in accordance with the Sequential Test outlined in the National Planning Policy Framework	The development is considered appropriate within the identified Flood Zone, including climate change allowances. The Exception Test is not required.	~
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 least vulnerable development (offices and design studio) has been located in the areas identified to be greatest risk of flooding – namely the south east corner of the site that is identified to be at risk from surface water flooding and, potentially, the minor ditch.	~
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 FRA suggest several methods which should be adopted to manage flood risk at the site. Firstly, the following methods are suggested for the buildings which are located near the surface water flood extents in the south east corner of the site: Solid ground floors with waterproof membranes; Property thresholds 300mm above ground level; Removal covers for exterior ventilation/utility/airbrick points; External walls to be resistant to flooding at least 900mm above ground level; Anti-syphon fitted to all toilets; Non-return valves to be fitted to all drain and sewer outlets; etc. Secondly, it is suggested that in detailed design, ground levels are raised to suitable levels in order to direct overland flows away from vulnerable receptors. Whilst we agree with the approach considered above, we stress that any measures much demonstrate no increased flood risk elsewhere. 	~
Assessment of how a safe access route(s) to Flood Zone 1 (not including dry islands) would be achieved from the development, taking flood hazard and climate change into account	The site is located in the low risk Flood Zone 1. The A438 to the south of the site (and therefore the proposed development access) is indicated to be at flood risk during the medium risk and low risk surface water flooding events although the depth is not considered to exceed 300mm. The risk is therefore considered to be low.	~
Exception Test		
Justification for the successful application of the Exception Test, if applicable	In accordance with the NPPF, the Exception Test does not apply to this development.	\checkmark

Surface Water Management Strategy

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

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







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Strategy		
Summary of likely ground conditions including permeability and contamination risks	Infiltration testing has been undertaken. A detailed review of the submitted information has not been completed to inform this response but the reports provided by the applicant state this was undertaken in accordance with BRE365. Two sets of tests were completed – the first into shallow geology and the second into deeper geology. The submitted drainage strategy appears to be based only on the shallower pits. The second tests indicate a much more permeable geology in those areas previously considered low. The drainage strategy will therefore need to be revised to account for the full range of results appropriate to the depth of the proposed infiltration feature. No tests appear to have been undertaken in the location of the proposed office and design studio. We recommend these are undertaken to inform the detailed design. Consideration will also need to be given to contamination risks. No groundwater was encountered up to 4.86m bgl. During detailed design the applicant will need to demonstrate that the base of the proposed soakaways is a minimum of 1m above ground level. This may require further excavation and monitoring.	≵ (with note)
Confirmation of whether the site is located in a Source Protection Zone or Principal Aquifer	The site is located in a Zone 3 – Total Catchment groundwater source protection zone. The implications of the SPZ does not seem to have been considered by the applicant. Treatment of runoff prior to discharge will be important. We highlight that the EA may also have requirements that may need to be considered by the applicant.	¥ (with note)
Summary of proposed surface water management strategy with supporting illustration, including location of proposed outfalls, attenuation structures and/or infiltration features	We previously highlighted that the surface water drainage strategy indicated that runoff generated from the main road (A438) serving the new development would be managed in the yard of Plot 8 and that this would not be acceptable. The applicant has since amended the strategy to drain runoff from the road into a separate soakaway that will not be located within the boundary of Plot 8, and the house within Plot 9 will have a separate soakaway located in the garden. This is acceptable in principle. However if the road is to be presented for adoption then a geocellular crate will not meet with Herefordshire Highways adoption criteria. For the road to be adopted, either a concrete ring soakaway or two manholes with a perforated pipe (backfilled with gravel) will be acceptable. Section 8.12 of the SuDS Handbook shows how soakaways can be positioned alongside adoptable highways	x
Demonstration that the SuDS hierarchy has been considered in accordance with NPPF and justification for the proposed method of surface water discharge	The amended drainage strategy states that all site generated surface water runoff will be infiltrated. This is in accordance with the SuDS hierarchy.	~
Demonstration that best practice SuDS have been promoted, appropriate to the size and nature of development	SuDS have been proposed in the surface water drainage strategy. We stress that the detailed design will need to demonstrate full consideration of SuDS measures and give due consideration of risks to the SPZ.	✓
Infiltration systems		







Information required	Reviewer comments	√ X
For infiltration to ground, summary of key design criteria, 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	The drainage strategy indicates that infiltration structures will be sized to cater for the 100 year event plus climate change allowance. We advise that a detailed review of the submitted calculations has not been undertaken at this stage. Calculations should be updated to support the detailed design as necessary.	✓
Assessment of potential failure of any above-ground attenuation features, including assessment of residual risks to downstream receptors, and proposed mitigation and management measures	It is assumed that storage features will not hold water above ground level.	~
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 site is located entirely in Flood Zone 1.	✓
Off-site discharge		
For discharge to a watercourse, sewer or local authority asset, confirmation of the relevant authority from which consent will be required	The amended drainage strategy indicates that the site will be drained via infiltration only	~
For discharge to a watercourse, sewer or local authority asset, confirmation of the relevant authority from which consent will be required For discharge to a watercourse, sewer or local authority asset, summary of greenfield and, if relevant, current runoff rates calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar and 1 in 100 year events	The amended drainage strategy indicates that the site will be drained via infiltration only The amended drainage strategy indicates that the site will be drained via infiltration only	 ✓
For discharge to a watercourse, sewer or local authority asset, confirmation of the relevant authority from which consent will be required For discharge to a watercourse, sewer or local authority asset, summary of greenfield and, if relevant, current runoff rates calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar and 1 in 100 year events For discharge to a watercourse, sewer or local authority asset, summary of proposed discharge rates and volumes calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar and 1 in 100 year events	The amended drainage strategy indicates that the site will be drained via infiltration only The amended drainage strategy indicates that the site will be drained via infiltration only The amended drainage strategy indicates that the site will be drained via infiltration only	 ✓ ✓







Information required	Reviewer comments	√ x
summary of proposed attenuation volume to manage the rate and volume of runoff to greenfield or current rates and volumes, allowing for climate change effects and demonstrating sufficient space within the site		
Assessment of potential failure of any above-ground attenuation features, including assessment of residual risks to downstream receptors, and proposed mitigation and management measures	The amended drainage strategy indicates that the site will be drained via infiltration only	~
For discharge to a watercourse, sewer or local authority asset, demonstration that a viable connection can be made and that the suitability and capacity of the downstream system has been explored in consultation with the relevant authority	The amended drainage strategy states that all site generated runoff will be discharged to ground and not the adjacent watercourse. If during detailed design this changes then the receiving watercourse would need to be investigated to determine if a connection is suitable or that the downstream alignment is appropriate to receive discharge from the site.	✓ (with note)
General		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	Phased construction is not detailed in the planning application.	~
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	We stress that consideration must be given to the mapped overland flow route that passes through the south east of the site to demonstrate that this will not compromise the capacity of the drainage system.	★ (with note)
Demonstration of how surface water that exceeds the capacity of drainage features will be managed within the site up to and including the 1 in 100 annual probability event to ensure no unacceptable flood risk to the development and no increased flood risk to people, property and infrastructure elsewhere	We previously highlighted that the applicant must demonstrate that exceedance flows do not leave the site or pose risk to the development up to the 100 year event. The amended drainage layout clarifies that exceedance flows will be managed by soft landscaping areas and upstands within parking areas to manage all runoff within the site boundary up to the 1 in 100 year event + 40% climate change. During the phone call with Stavros Drakopoulos of Ambiental it was also explained that the mapped overland flow route through the south-east of the site will be managed within soft landscaped areas to prevent flood risk to the development or increase flood risk elsewhere – it is assumed that this is included within the note on the drainage drawing that discusses the management of exceedance flows by landscaped areas. We note that this is indicated as low risk on the EA's indicative	✓ (with note)

Herefordshire Council



Information required	Reviewer comments	√ x
	mapping and therefore agree that this strategy is acceptable. Details of this design should be submitted to support the discharge of conditions.	
Access, adoption and maintenance		
Confirmation if access or works to third party land will be required and, if so, confirmation of the party with which agreement will be required	Access to third party land has not been confirmed.	\checkmark
Confirmation of proposed adoption and maintenance arrangements for the surface water drainage system	All onsite SuDS and drainage systems will be privately maintained. A generic maintenance strategy has been provided. We stress that a more detailed site-specific plan will be required to support the detailed design. We also make reference to our previous comment regarding the unacceptability of locating drainage soakaway features that serve the main road within private property boundaries.	≵ (with note)
Demonstration that appropriate access is available to maintain SuDS features (including pumping stations)	Access to individual features has not been considered. We stress that any soakaway features in private gardens will need to demonstrate appropriate access for maintenance and replacement.	★ (with note)

Foul Water Management Strategy

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

 \checkmark Information provided is considered sufficient

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

Information required	Reviewers comments	√ x
Description of the proposed foul water drainage system including proposed discharge locations	It is proposed that the site will connect to the existing public sewer network in the A438.	~
Identification of the public foul sewerage network within the vicinity of the development and assessment of the viability to connect to this network	The public sewer network drawing is shown in the FRA.	~
Discharge to sewerage network		
Demonstration that the suitability and capacity of the public sewerage system has been explored in consultation with the relevant authority, and that a viable connection can be made	The statutory consultation response from DCWW acknowledges the proposal to provide a new connection to the sewerage network and does not provide any objection.	~
General		

Herefordshire Council **Balfour Beatty**



Information required	Reviewers comments	√ x
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	There is no information provided regarding phasing of the development. It is assumed that the construction is not phased.	~
Access, adoption and maintenance		
Confirmation if access or works to third party land will be required and, if so, confirmation of the party with which agreement will be required	Access to third party land is not likely to be required in order to connect to and maintain the foul discharge arrangements.	~
Confirmation of proposed adoption and maintenance arrangements for the foul water drainage system	No details have been supplied. It is assumed that DCWW will adopt the drainage network if connection to their network is proposed.	✓ (with note)
Demonstration that appropriate access is available to maintain drainage features (including pumping stations)	No details have been supplied but the risk is considered low as no non- mains drainage is proposed.	√ (with note)

Overall Comment

We have no objections to the proposed development. If the applicant wishes the council to adopt the road then the soakaway design will need to be altered.

Should the Council be minded to grant planning permission, we recommend that the following information is included within any subsequent application to discharge conditions:

- Confirmation of the location of the proposed infiltration features and infiltration testing undertaken in accordance with BRE365 at the exact location and depth of the proposed features, or alternative provision of further tests at the exact location and depth of the proposed infiltration features.
- Confirmation that the base of all soakaways/infiltration features will be a minimum of 1m above groundwater levels.
- Consideration of potential flood risks associated with the overland flow route through the south east of the site, and demonstration of appropriate mitigation and management;
- Detailed drawings of proposed features such as infiltration structures, attenuation features and (if required) outfall structures;
- Calculations to demonstrate that the proposed surface water drainage system has been designed to prevent the surcharging of any below ground drainage network elements in all events up to an including the 1 in 2 annual probability storm event, noting that FEH 2013 rainfall data should be used;
- Calculations to demonstrate that the proposed surface water management system will prevent any flooding of the site in all events up to an including the 1 in 30 annual probability storm event, noting that FEH 2013 rainfall data should be used;
- Calculations that demonstrates there will be no increased risk of flooding as a result of development between the 1 in 1 year event and up to the 1 in 100 year event and allowing for the potential effects of climate change, noting that FEH 2013 rainfall data should be used;







- 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;
- Description and drawing demonstrating the management of surface water runoff during events that may temporarily exceed the capacity of the drainage system;
- Operational and maintenance manual for all proposed surface water drainage features that are to be adopted and maintained by a third party management company;
- Demonstration that appropriate access is available to maintain all drainage systems;
- A detailed foul water drainage strategy showing how foul water from the development will be disposed of and illustrating the location of key drainage features.



