### 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: DESCRIPTION:	Land off Hereford Road, Bromyard, Herefordshire, HR7 4ES Demolition of existing buildings, structures and hardstanding and erection of 57 dwellings (including affordable housing) and drainage attenuation, open space and associated landscaping and infrastructure works.
APPLICATION NO:	182239
GRID REFERENCE:	OS 364756, 254217
APPLICANT:	Keepmoat Homes
AGENT:	Mr Rob Riding, Pegasus Group
DATE OF THIS RESPONSE:	16 August 2018

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

- Application for planning permission
- Location Plan drawing (Ref: D02)

Site location and extract of flood map(s)

- Street Elevations drawing (Ref: D200)
- Street Elevations drawing (Ref: D201)
- Design and Access Statement (July 2018)
- Flood Risk Assessment & Drainage Strategy (April 2018/C-06403-C)
- Planning Statement (July 2018/P17-2873)
- EA online flood maps (Accessed August 2018)

## Figure 1: Environment Agency Flood Map for Planning (Rivers and Sea), August 2018



Development description







The Applicant proposes to demolish the existing onsite buildings and hardstanding areas to make way for the construction of 57 dwellings, public open spaces and associated infrastructure including drainage attenuation and vehicular and pedestrian access from Hereford Road. The site occupies an area of 1.42ha and is split between two current uses. Currently the northern half of the site is used for agricultural grazing and the southern half of the site is a former Council depot. Elevations through the site range from around 175m AOD to 167m AOD across the northern boundary and around 170.5m AOD to 166.5m AOD across the south-eastern section of the site.

### 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 1.42ha
Identification of all main rivers within 20m of the site boundary	There are no main rivers within 20m of the site boundary
Identification of all ordinary watercourses and land drains within 20m of the site boundary	There are no ordinary watercourses within 20m of the site boundary
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 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	Review the EA's Flood Risk from Surface Water maps show a small area at low risk of surface water flooding due to a small flow route through the approximate centre of the site.

### 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<sup>1</sup>.
- 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.

The following information should be provided within the FRA:

✓ Information provided is considered sufficient

<sup>&</sup>lt;sup>1</sup> 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 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 in 100 and 1 in 1000 annual probability events	The FRA states that the development is located in Flood Zone 1 and due to its location and elevation in comparison to the closest Flood Zone 2 extent the risk from fluvial flooding is considered to be Low.	~
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 development is not in an area benefitting from flood defences.	~
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 other watercourses in close proximity to the site.	•
Assessment of mapped surface water flood risk	Whilst the site is predominantly classified as being at very low risk of surface water flooding a small area of low risk is identified in the centre of the site with potential predicted depths of less than 300mm. This area of increased risk is shown at the existing boundary between the Highways depot and the agricultural field and is considered as being representative of either a local low point or an existing drainage feature (i.e. field ditch). This flow route only affects a localised section of the site and as no inflow is predicted from upstream of the site it isn't considered to pose any significant risk to the site. As such, the site is concluded as being at low risk from surface water flooding.	*
Assessment of flood risk associated with potential overland flow from adjacent steeply sloping land	The position of the site at the highpoint of the surrounding topography makes it unlikely that there would be issues with overland flows from adjacent sites. This risk is considered to be negligible.	✓
Assessment of groundwater flood risk	The Herefordshire Council Strategic Flood Risk Assessment confirms that there are no recorded incidents of groundwater flooding within the area. The SFRA concludes that study area is generally at low risk of flooding from this source. The site is concluded to be at low risk from groundwater flooding.	✓
Assessment of flooding from surface water, foul water and highway sewers	Owing to the generally urbanised nature of the surrounding area it is considered that there will be by an existing sewer network (both surface and foul drainage systems) within the vicinity of the site. In the event of the surcharging of any of this network, overland flows will be conveyed by topography and directed across and away from/around the site in an easterly direction and are considered not pose any significant risk to the site.	*





Information required	Reviewer comments	√ x
Assessment of flood risk from any other manmade sources, including reservoirs, ponds, detention basins etc.	A review of the EA's Flooding from Reservoirs map confirms that the site is not within the maximum extent of flooding in the event of reservoir failure. There are also no raised large waterbodies identified in the near vicinity of the site. The site is therefore concluded to be at negligible risk of flooding from reservoirs and other manmade sources.	✓
Summary of historic flooding records and anecdotal evidence	There are no recorded incidents of flooding within the area.	✓
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 other works identified that would put the development or elsewhere at an increased risk of flooding.	✓
Sequential approach		
Assessment of the acceptability of the development within the identified Flood Zone, in accordance with the Sequential Test outlined in the NPPF	The proposed development is classified as "More Vulnerable" under the NPPF. The NPPF Flood Risk Vulnerability and Flood Zone Compatibility matrix (Table 3) indicates that "More Vulnerable" development is appropriate in Flood Zone 1	✓
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	Due to the low risk of flooding across the entirety of the site the proposed layout has not been influenced by Flood Risk.	✓
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 states that no specific measures are considered necessary to protect the proposed development from flooding as no significant sources of potential flood risk have been identified. However as stated in the submitted FRA it is recommended that proposed development accommodate the identified surface water flow route.	✓
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	Safe / dry access is demonstrated to be possible in all directions via the proposed access onto Hereford Road.	✓
Assessment of how the development will ensure no increased risk to people, property or infrastructure elsewhere, for example through the displacement of floodplain compensation or failure of flood defence structures, and demonstration of how mitigation will be incorporated into the design, with supporting calculations	The development will ensure no increased risk to people and property elsewhere through the implementation of an effective surface water and foul water management strategies. These points are discussed further below.	*







Information required	Reviewer comments	√ x
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 roguized	Pariouar commonte	√×
Strategy		
Summary of likely ground conditions including permeability and contamination risks	BGS and Soilscapes mapping indicate that the soil onsite consists of loamy and clayey soils with impeded drainage. This has been confirmed by soakaway testing conducted onsite in accordance with BRE Digest 365. Testing indicated soakaways would not be appropriate.	✓
Confirmation of whether the site is located in a Source Protection Zone or Principal Aquifer	The development is not within a Source Protection Zone or Principle Aquifer.	✓
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	It is proposed that surface water will be directed into gullies and then gravity drained through pipes into a combined sewer to the north of the site (Welsh Water Manhole 17/27a SO64549402). This existing combined sewer is located approximately 350m to the north of the site, therefore requiring a new sewer to be laid within the public highway (Hereford Road). It is proposed that this new sewer receives combined surface water and foul discharge. The FRA identifies that there may be an existing highway sewer located in Hereford Road that currently receives discharge from the site, but this has not yet been confirmed. There has been no known CCTV survey completed to date. We recommend that the construction of a new sewer within Hereford Road is discussed and agreed in principle with the local highways authority and Welsh Water prior to granting planning approval. It is usually expected that separate surface water and foul water drainage systems are provided up to the point of connection to the existing public combined sewer. However in this case it is considered likely that Welsh Water would consider a new combined sewer within the public highway, subject to confirmation of the existing drainage arrangements serving the site and highway. We recommend that the construction and adoption of a new combined sewer is discussed and agreed in principle with Welsh Water prior to granting planning approval. It is proposed that discharge rates will be limited to the existing QBAR rate for the site with excess volumes of water being stored in oversized pipes and offline cellular storage. A layout drawing of the proposed drainage design has been included with the drainage strategy.	*





Information required	Reviewer comments	√x
Demonstration that the SuDS hierarchy has been considered in accordance with NPPF and justification for the proposed method of surface water discharge	The SuDS hierarchy has been considered in the development of the drainage strategy. As infiltration was shown to be unviable through testing and there are no watercourses within the vicinity of the site a controlled discharge to the local sewer is stated to be the only viable option.	✓
Demonstration that best practice SuDS have been promoted, appropriate to the size and nature of development	All surface water runoff will be managed via below ground pipes and storage. We recommend that further consideration is given to on- ground vegetative conveyance and storage features that can reduce runoff during smaller rainfall events, thus reducing the burden on the receiving network. We recommend that opportunities to incorporate best practice SuDS are discussed with Welsh Water during the detailed design of the scheme.	¥ (with note)
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	No pump systems are 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	A preliminary drainage network has been modelled in MicroDrainage and run for the 1 in 1 year, 1 in 30 year and 1 in 100 year + 40% storm events for all critical durations. The results of these calculations are included within the drainage strategy and demonstrate that there will be no flooding of the system for up to the 1 in 100 year + 40% storm event.	✓
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 FRA has confirmed that consent will be required from Welsh Water in order to discharge to the local sewer. This consent has not yet been received. This can be requested as part of suitably worded planning conditions.	~
For discharge to a watercourse, sewer or local authority asset, detailed calculations 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, 1 in 30 and 1 in 100 year events	Calculations of the existing runoff rate have been completed in MicroDrainage and presented within the appendix of the FRA. These runoff rates are summarised below: QBar $- 3.4 \text{ I/s}$ 1 in 1 yr $- 3.0 \text{ I/s}$ 1 in 30 yr $- 5.2 \text{ I/s}$ 1 in 100 yr $- 5.7 \text{ I/s}$ These runoff rates have been calculated using an impermeable area of 0.64ha rather than the 0.7ha stated in the FRA. We recommend that the correct impermeable areas are used in the detailed design of the proposed scheme.	★ (with note)
For discharge to a watercourse, sewer or local authority asset, detailed calculations of proposed discharge rates and volumes calculated using the methods outlined in The SuDS Manual 2015 for the 1 in 1 year, Qbar, 1 in 30 and 1 in 100 year events	It is proposed that the surface water discharge rate to the combined local sewer will be restricted to the existing QBar runoff rate for the site. As discussed above, we recommend that the runoff rates are confirmed during the detailed design of the proposed scheme.	¥ (with note)







Information required	Reviewer comments	√×
For discharge to a watercourse, sewer or local authority asset, detailed calculations 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	The proposed onsite cellular storage has been calculated to provide sufficient storage up to and including the 1 in 100 yr event with 40% climate change allowance. This results in a total volume of 486.96m3. As discussed above, we recommend that the required volume is confirmed during the detailed design of the proposed scheme.	¥ (with note)
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	Onsite attenuation will be provided by underground cellular storage.	•
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	All features are located wholly within Flood Zone 1.	•
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 drainage strategy proposes the construction of a new combined sewer within Hereford Road that will connect to the existing Welsh Water combined sewer approximately 350m to the north of the site. At the time of writing the surface water drainage strategy a developers enquiry had been made to Welsh water regarding the capacity and level of the existing combined sewer CWS Manhole SO64549402. This information has not yet been received and hence the viability of a connection to this sewer is not confirmed. <u>Given the significance of the design and approval of the proposed</u> <u>connection and adoption of a new combined sewer, we recommend</u> <u>that an agreement in principle from Welsh Water is received prior to the council providing planning permission.</u>	×





Information required	Reviewer comments	√x
For discharge to a watercourse, sewer or local authority asset, consideration of the risk of water backing up the drainage system from any proposed outfall and how this risk will be managed without increasing flood risk to the site or to people, property and infrastructure elsewhere, noting that this also includes failure of flap valves	The surface water drainage strategy has not provided detail on how this risk would be managed. However given the restricted outfall to the proposed sewer and the apparent gradient of the proposed sewer, this is not considered to be a risk.	•
Pollution		
Demonstration of how the first 5mm of rainfall (or 'first flush') will be managed to promote infiltration/evaporation/evapotra nspiration, and with focus on the removal of pollutants	In accordance with the forthcoming Herefordshire SuDS handbook, no treatment is required prior to discharge to a combined sewer. However, the use of trapped gullies and catchpit upstream of the proposed attenuation to reduce sediment is required.	~
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	See above	•
General		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	The development is not proposed to be delivered 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	The position of the site at the highpoint of the surrounding topography makes it unlikely that there would be issues with overland flows from adjacent sites. This risk of overland flows overwhelming the capacity of the proposed drainage system is considered to be negligible.	✓





Information required	Pouiower comments	√x
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	No information has been provided on how this risk will be managed. Whilst the piped system may have capacity for the 1 in 100 yr event, the inlet structures will become surcharged during much smaller events. This information should be provided prior to the council providing planning permission.	×
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	As above	×
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	Access to third party land is not likely to be required	✓
Confirmation of agreement in principle of proposed adoption and maintenance arrangements for the surface water drainage system	The drainage strategy states that all new surface water drainage systems will be offered to Welsh Water for adoption with the exception of the onsite attenuation that will remain private, to be adopted by a maintenance company that will be appointed by the developer. This adoption has however not been agreed in principle with Welsh Water. <u>Agreement for adoption in principle should be gained prior to the</u> granting of planning permission.	×
Demonstration that appropriate access is available to maintain SuDS features (including pumping stations)	The surface water drainage pipes will be situated below the carriageway and parking areas within the development to enable access for maintenance. The cellular storage areas are situated below parking areas and greenspace.	•

### 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	<b>√</b> X
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 FRA states that it is understood that foul drainage from the existing site discharges to a cesspit that is shared with a neighbouring property and that is in poor condition. It is proposed to abandon the cesspit and that foul water from the proposed development (and picking up the adjacent property) will be discharged to a combined sewer to the north of the site (Welsh Water Manhole 17/27a SO64549402). This existing combined sewer is located approximately 350m to the north of the site, therefore requiring a new sewer to be laid within the public highway (Hereford Road). It is proposed that this new sewer receives combined surface water and foul discharge. We recommend that the construction of a new sewer within Hereford Road is discussed and agreed in principle with the local highways authority and Welsh Water prior to granting planning approval. It is usually expected that separate surface water and foul water drainage systems are provided up to the point of connection to the existing public combined sewer. However in this case it is considered likely that Welsh Water would consider a new combined sewer within the public highway, subject to confirmation of the existing drainage arrangements serving the site. We recommend that the construction and adoption of a new combined sewer is discussed and agreed in principle with Welsh Water prior to granting planning approval. The drainage strategy indicates that a section of private foul sewer serving the south-eastern part of the development will be located within the public highway (Hereford Road) and not within the site boundary. It is unclear why the development cannot be altered to enable this sewer to be located within the site boundary and avoid additional works within the public highway. We recommend that the construction granting planning approval.	×
justification for the use of these systems, summary of key design principles and assessment of residual risk, with supporting calculations		
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	The drainage strategy proposes the construction of a new combined sewer within Hereford Road that will connect to the existing Welsh Water combined sewer approximately 350m to the north of the site. At the time of writing the surface water drainage strategy a developers enquiry had been made to Welsh water regarding the capacity and level of the existing combined sewer CWS Manhole SO64549402. This information has not yet been received and hence the viability of a connection to this sewer is not confirmed. <u>Given the significance of the design and approval of the proposed connection and adoption of a new combined sewer, we recommend that an agreement in principle from Welsh Water is received prior to the council providing planning permission.</u>	×
Demonstration that a viable connection can be made	See above	×







Information required	Reviewers comments	√x
General		
If the development is to be delivered in phases, demonstration of proposed delivery and ability to maintain key design criteria	It is not proposed to deliver the development in phases	✓
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	Access to third party land is not likely to be required	✓
Confirmation of agreement in principle of proposed adoption and maintenance arrangements for the foul water drainage system	The drainage strategy states that all new foul water drainage systems will be offered to Welsh Water for adoption. This adoption has however not been agreed in principle by Welsh Water. <u>Agreement for adoption in principle should be gained prior to the granting of planning permission.</u>	×
Demonstration that appropriate access is available to maintain drainage features (including pumping stations)	Sewers will be situated below carriageway and parking areas and enable access for maintenance.	•

### **Overall Comment**

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

- Confirmation of an agreement in principle with Herefordshire Council and Welsh Water for the construction of a new combined sewer within the public highway.
- Confirmation of an agreement in principal from Welsh Water regarding the proposed connection to the existing combined sewer with regards to the capacity and viability of the proposed connection.
- Confirmation of an agreement in principle from Welsh Water regarding the adoption of the proposed foul, surface water and combined drainage systems.
- Assessment and demonstration of the management of exceedance flows to retain water within the site boundary up to the 1 in 100 year event.

Should the Council be minded to grant planning permission, we recommend that the Applicant submits the information requested above in addition to the following information as part of suitably worded planning conditions:

• Updated calculations of existing and proposed runoff rates and attenuation volume for the proposed development using correct impermeable areas.







- Amended 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.
- Amended 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.
- Detailed drawings of the proposed drainage system including details of proposed attenuation structures and flow controls.
- Confirmation of the proposal to abandon and make safe the existing cesspit and redirect flows from the neighbouring property into the proposed drainage system. Note that it is expected that consultation will be undertaken with the Environment Agency regarding the need to remove the cesspit and remediate potentially harmful contamination.
- Detailed drawing demonstrating the management of surface water runoff during events that may temporarily exceed the capacity of the drainage system.
- Operation and maintenance manual for all proposed drainage features that are to be adopted and maintained by a third party management company.

As discussed in our response, we recommend that further consideration is given to on-ground vegetative conveyance and storage features that can reduce runoff during smaller rainfall events, thus reducing the burden on the receiving network. We recommend that opportunities to incorporate best practice SuDS are discussed with Welsh Water during the detailed design of the scheme.

