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To:	Norfolk Vanguard
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Subject:	Response ExA Question 16.16
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Attachments:	LLFA Guidance.pdf

FAO Examining Authority

Identification No. 20012439

Response to Question 16.16 (Please include in your submissions to the Examining Authority the Guidance Document Version 3, April 2017 published by you as Lead Local Flood Authority LLFA) or any updated version thereof.)

Please find attached Norfolk County Council's Guidance Document as Lead Local Flood Authority (LLFA). I have also provide you with the link to the Guidance Document. Please be aware that it is currently under review.

https://www.norfolk.gov.uk/-/media/norfolk/downloads/rubbish-recycling-planning/flood-and-water-management/guidance-on-norfolk-county-councils-lead-local-flood-authority-role-as-statutory-consultee-to-planning.pdf

Should you have any further queries on this LLFA Guidance please contact Lucy Perry (Flood Risk Officer) on 01603 638087.

Kind regards

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Campaign Logo

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Norfolk County Council

Lead Local Flood Authority

Statutory Consultee for Planning

Guidance Document

Version 3, April 2017

i. Purpose of this document

i.i This guidance document has been drafted to support the development of Norfolk County Council's (NCC's) Lead Local Flood Authority (LLFA) role as a statutory consultee to planning and to inform stakeholders in this process such as Local Planning Authorities (LPAs) and developers. This document is broken into three parts.

Part A aims to;

- Highlight recent changes in planning policy with regard to surface water drainage
- Explain the role of the LPA in determining Sustainable Drainage Systems (SuDS) proposals on new developments
- Outline Norfolk County Council's LLFA role as a statutory consultee to planning.

Part B aims to;

- Explain how the LLFA will fulfil this function and when it should be consulted.

Part C aims to;

- provide guidance for developers on the information required by the LLFA from applicants to enable it to provide responses to major planning applications.

i.ii This document will be periodically reviewed as the service develops to ensure that its contents remain accurate and that it provides an appropriate level of detail. References and links are included within the text of this document to highlight other publications that should be read in conjunction with this guidance. The role the LLFA plays in supporting the development of Local Plans and policies is not currently covered by this document.

ii. What is Sustainable Drainage?

ii.i Surface water drainage systems developed in line with the ideals of sustainable development are collectively referred to as Sustainable Drainage Systems (SuDS). Approaches to manage surface water that takes into account water quantity (flooding), water quality (pollution), amenity and biodiversity issues are collectively referred to as sustainable drainage. The philosophy of SuDS is to replicate, as closely as possible, the natural drainage from a site before development and to use shallow surface structures to mimic the pre development scenario and manage water close to where it falls. SuDS can be designed to slow water down (attenuate) before it enters streams, rivers and other watercourses, they provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground, evaporate from surface water or be transpired from vegetation (known as evapotranspiration).

ii.ii Due to developer concerns of long term maintenance more conventional piped drainage that conveys water to an attenuation tank are often proposed as SuDS. Whilst these systems provide some elements of SuDS and may meet some of the required standards, they frequently do not consider any water quality, amenity or biodiversity benefits. The piped and tanked systems can be put forward for adoption and long term maintenance by Anglian Water but these will be classed as conventional drainage systems and not SuDS.

ii.iii Early engagement with Anglian Water or the Highways Authority mean that shallow surface SuDS structures proposed will be considered for adoption however these need to meet with the appropriate authorities standards. Norfolk County Council Highways Authority will consider adopting SuDS if they are appropriate and only take drainage from the adoptable Highway.

iii. Abbreviations and Definitions

iii.i Abbreviations used in this document are set out below;

EA	Environment Agency
FRA	Flood Risk Assessment
GIS	Geographic Information System
ha	Hectares
IDB	Internal Drainage Board
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NCC	Norfolk County Council
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
RoFSW	Risk of Flooding from Surface Water
RMA	Risk Management Authority
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
100% annual probability flood	Previously referred to as the 1 in 1 year but is an event which is likely to happen every year.
10% annual probability flood	Previously referred to as the 1 in 10 year but is an event which has the probability to happen in any single year and not every 10 years.
3.33% annual probability flood	Previously referred to as the 1 in 30 year but is an event which has the probability to happen in any single year and not every 30 years
1 % annual probability flood	Previously referred to as the 1 in 100 year but is an event which has the probability to happen in any single year and not every 100 years
0.1% annual probability flood	Previously referred to as the 1 in 1000 year but is an event which has the probability to happen in any single year and not every 1000 years

Contents

PART A - National Policy Background and Approach

1. Background

1.1 From April 2010 to late 2014 it had been Government's intention to implement Schedule 3 of the Flood and Water Management Act 2010. The inclusion of SuDS in the Act was seen as essential due to the number of properties flooded from surface water and the overloading of drainage systems in 2007 (as reported in the Pitt Review). Schedule 3 of the legislation would have placed Unitary Local Authorities and County Councils at the centre of a new process, separate from planning, for approving, adopting and maintaining SuDS on new major developments. Subsequent to proposing and delaying the implementation of this Schedule on a number of occasions, Government resolved to deliver SuDS on new developments using the existing Town and County Planning process.

2. Recent changes to planning

2.1 In December 2014 Government set out changes to planning that sought to strengthen planning policy. These changes built on previously existing planning policy and ensure that SuDS will be provided in new major developments where appropriate. These changes came into force from the 6 April 2015.

2.2 At the same time Government also set out new consultation arrangements for planning applications for major developments. These changes made upper tier local authorities statutory consultees to planning in their capacity as LLFAs. This statutory consultee role is for *"major development with surface water drainage"* and came into force from the 15 April 2015. This role is broadly similar to that held by the Environment Agency (EA) prior to this date.

2.3 As part of Government's implementation of these changes to planning a Written Ministerial Statement was laid in the House of Commons on 18 December 2014, the Flood Risk and Coastal Change Section of the Planning Practice Guidance was updated and non-statutory technical standards for SuDS were published.

3. The role of the LPA in determining planning applications

3.1 The role of the LPA is to determine planning applications in accordance with national policy, local policies and relevant guidance whilst taking into account advice from statutory consultees (such as the LLFA and EA) alongside other material considerations. The LPA would also consider advice from other consultees which are none statutory. These include other risk management authorities (RMAs) such as Internal Drainage Boards (IDBs), Anglian Water or the Canals and Rivers Trust.

3.2 Where the planning application falls within the boundary of a IDB, they should be consulted along with the LLFA. The IDB, as a RMA, would have a significant role in managing the risk of flooding and the LLFA would want to avoid duplication of advice. However, the LLFA would, where appropriate, take an overview to ensure that SuDS and other local flood risk issues had been considered in a consistent approach across the county of Norfolk. Where the appropriate information has been submitted and clearly meets NPPF, PPG and the Non-Statutory Technical Standards for Sustainable Drainage, the LLFA would have minimal input to a consultation.

4. National Policy on Flood Risk and SuDS

4.1 In March 2012 Government published the National Planning Policy Framework (NPPF). The framework acts as guidance for LPAs and decision-takers, both in drawing up plans and making decisions about planning applications. Section 10 of this document, "Meeting the challenge of climate change, flooding and coastal change" (paragraphs 93 to 108) contains key information on how flood risk and SuDS should be considered as part of new development. Paragraph 109 also highlights the need to prevent pollution which is integral to a well-designed SuDS scheme.

4.2 Paragraph 103 of the NPPF includes key references to flood risk and SuDS for LPAs considering planning applications. It highlights that when determining planning applications, LPAs should for all types of development;

- Ensure flood risk is not increased elsewhere
- Only consider development appropriate in areas at risk of flooding where it can be demonstrated that within the site;
    - the most vulnerable development is located in areas of lowest flood risk
    - development is appropriately flood resilient and resistant, including safe access and escape routes where required.
    - that any residual risk can be safely managed

- that priority is given to the use of SuDS

4.3 Footnote 20 of the NPPF states that a site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1. This was the reason that the Environment Agency would only comment on developments of this size, however flood risk should still be considered by a developer if below 1 hectare in size.

4.4 The sequential approach to Norfolk County Council's advice is based on current NPPF (2012) and Planning Practice Guidance (PPG) (online version). This uses up-to-date information to advise the Local Planning Authority at an early stage where best to steer development in line with the sequential test (PPG Paragraph: 019 Reference ID: 7-019-20140306 and associated links to Table 2 and 3). As a statutory consultee on surface water drainage we also have a duty to consider our other responsibilities including, local flood risk management and consenting of works which may affect flow within an ordinary watercourse. It is assumed that LPA's have undertaken a sequential test (and exception test where appropriate) for any allocated site within a Local Plan or windfall site.

4.5 The sequential approach is a precautionary one, to avoid the risk of flooding in the first instance. We support this approach as it is the most sustainable form of flood risk management. In accordance with PPG (Paragraph: 018 Reference ID: 7-018-20140306 and Paragraph: 019 Reference ID: 7-019-20140306), development should be steered to Flood Zone 1 (taking into account all sources of flooding), where there is no reasonable alternative sites taking into account flood risk vulnerability of land use (PPG Table 2) sites in Flood Zone 2 can be considered (employing the exception test where required – see NPPF paragraph 101 and 102). Further information can be found in Section 14 of information that can be used to define Flood Zone 1 (in addition to the Environment Agency's river and sea flood maps). It is important to note the following:

- Indicative Environment Agency's Risk of Flooding from Surface Water (RoFSW) maps (extent, depth, velocity and Hazard layers) for both the 1% annual probability of flooding (i.e flooding which can occur in any single year or the 1 in 100 year) and 0.1% annual probability of flooding (which can occur in any single year or the 1 in 1000) **can be used to identify potential risk of flooding from surface water flow paths and / or significant ponding**.
- Indicative Environment Agency (EA) River and Sea Flood Maps for Planning for both Flood Zone 2 and 3 – or up to 1% annual probability of flooding and 0.1% annual probability of flooding **can be used to identify potential risk of flooding from ordinary watercourses**. Where no mapping of fluvial flood risk (watercourses with catchments smaller than 3km^2), or there is uncertainty within the EA mapping, the RoFSW map is used as a proxy and used consistently with river flood mapping probability. To avoid doubt, the 1% annual probability of flooding is deemed equivalent to Flood Zone 3 and 0.1% annual probability of flooding is equivalent to Flood Zone 2 (as per Planning Practice Guidance – Flood Risk And Coastal Change Paragraph: 018 Reference ID: 7-018-20140306).

4.6 It should be noted that the NPPF has other aspirations on sustainability, promoting healthy communities, preventing pollution, green infrastructure and conserving the natural environment for which SuDS are also relevant. The multi benefits of flood management, climate change consideration, treatment of runoff, public open space and wildlife habitat opportunities can be met through a well designed and implemented SuDS scheme. With regard to NPPF Paragraph section 109 an appropriately designed SuDS, impropriating CIRIA SuDS Manual (C753) recommended treatment, is considered to treat the quality of surface water runoff effectively. The Environment Agency has standing advice that states in general they consider pollution of surface water runoff from residential development to be adequately addressed if SuDS have been provided for the runoff. Water quality treatment would not be met if traditional piped drainage schemes are promoted. If piped schemes are promoted as part of a SuDS scheme e.g. pipes connecting to geo-cellular crates or attenuation tanks, other SuDS components, such as permeable paving, swales, filter drains or strips should also be used to treat water prior to the final discharge.

4.7 On the 18 December 2014 the Secretary of State for Communities and Local Government, Eric Pickles made a Written Ministerial Statement on SuDS. This stated that Government **expects** local planning policies and decisions on planning applications relating to major development to ensure that SuDS for the management of run-off are put in place, unless demonstrated to be inappropriate. It was also restated that the current requirement in national policy that all new developments in areas at risk of flooding should give priority to the use of SuDS.

4.8 It was specifically acknowledged that the Written Ministerial Statement on SuDS should be taken into account in the preparation of local and neighbourhood plans and that it may be a material consideration in planning decisions. As such the Written Ministerial Statement on SuDS should be viewed as forming part of national planning policy.

4.9 No changes to the current planning enforcement mechanisms were made as part of the recent amendments to planning policy as any breach of a SuDS related planning condition can be enforced under the existing planning enforcement regime.

5. Planning Practice Guidance

5.1 Government updated its Planning Practice Guidance (PPG) as part of its SuDS and LLFA planning changes. These amendments and additions were made to the Flood Risk and Coastal Change section of the PPG. This section advises on how planning should take account of the risks associated with flooding and coastal change in plan-making and planning application processes.

5.2 The PPG highlights that developers and applicants need to consider flood risk to and from the development site. In doing so the PPG recommends that a broad approach of **assessing**, **avoiding**, **managing and mitigating** all forms of flood risk should be followed. A précis of this approach is set out below.

5.3 LPAs **assess** the flood risk posed to new development by;

- undertaking a Strategic Flood Risk Assessment (SFRA) for their area to inform the preparation of their Local Plan
- requiring developers to undertake a site-specific Flood Risk Assessment (FRA) to support their applications for planning permission for development that meets national and locally set thresholds.

5.4 LPAs **avoid** the flood risk posed to new development by;

- applying the 'Sequential Test' and, if needed, the 'Exception Test' to Local Plans to ensure that when selecting sites development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest.
- applying the Sequential Test and if needed, the Exception Test for specific development proposals to steer development to areas with the lowest probability of flooding.

5.5 LPAs and developers **manage and mitigate** the flood risk posed to new development by;

- ensuring development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall.
- seeking flood risk management opportunities (e.g. safeguarding land) to reduce the causes and impacts of flooding (e.g. through the use of SuDS in developments).

6. Determining SuDS proposals on new developments

6.1 As part of the LPAs role in determining planning applications the LPA makes the final decision about the viability and suitability of the SuDS provision and whether it is proportionate to the level of flood risk affecting the site. Clearly this decision is made in the context of all the other policy and material considerations relating to the proposal.

6.2 In determining the SuDS element of planning applications the LPA will need to satisfy themselves that any SuDS proposals meet national and local policies. In addition, as set out in the Written Ministerial Statement they also need to;

- consult the LLFA on the management of surface water, (where appropriate).
- satisfy themselves that the proposed minimum standards of operation are appropriate.
- ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for on-going maintenance (of SuDS) over the lifetime of the development.
- satisfy themselves that the SuDS are designed to ensure that the maintenance and operation requirements are economically proportionate.

6.3 The PPG states that the information sought by the LPA in answering the above requirements should be no more than necessary, having regard to the nature and scale of the development concerned.

6.4 The LPAs Local Plan also remains a key document in relation to directing development away from areas of high flood risk wherever possible, including areas at risk of flooding from surface water. It is expected that the evidence supporting the SFRA should be used by the LPA to inform their judgement both on the appropriateness of the proposed development and on the suitability of the proposed drainage system.

7. The LLFA role as statutory consultee to planning

7.1 LLFAs are unitary local authorities and County Councils who are responsible for managing flooding from

surface water, groundwater and ordinary watercourses. They were conferred this status by the Flood and Water Management Act 2010 and are required to deliver a strategy for local flood risk management in their areas, to investigate flooding and to maintain a register of flood risk assets. For Norfolk County Council this role is fulfilled by the authority's Flood and Water Management Team.

7.2 The LLFA role as statutory consultee to planning is created by the Town and Country Planning (Development Management Procedure) (England) Order 2015. Specifically Schedule 4 of this statutory instrument sets out the consultations before the grant of permission and paragraph (ze) states that the LLFA should be consulted on "major development with surface water drainage".

7.3 Major development is defined by Article 2(1) in Part 1 (Preliminary) of the Town and Country Planning (Development Management Procedure) (England) Order 2015 as development involving any one or more of the following;

(a) the winning and working of minerals or the use of land for mineral-working deposits;
(b) waste development;
(c) the provision of dwelling-houses where—
  (i) the number of dwelling-houses to be provided is 10 or more; or
  (ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
(d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
(e) development carried out on a site having an area of 1 hectare or more.

7.4 As a statutory consultee, in line with the Code of Practice relating to consultations on planning applications, the LLFA is expected to respond to the LPA within 21 days of receiving a consultation. The LLFA has to make a substantive response which can be one of the following;

(a) states that the consultee has no comment to make;
(b) states that, on the basis of the information available, the consultee is content with the development proposed;
(c) refers the consultor to current standing advice by the consultee on the subject of the consultation; or
(d) provides advice to the consultor.

7.5 For re-consultations following the submission of further information by an applicant, the LLFA will request the LPA to allow a further 21 days to provide bespoke advice to be given. The LLFA will endeavour to reply to statutory consultations within 21 days of being consulted. If the Local Planning Authority requires a reply sooner than this they should inform the LLFA at the point of consultation.

7.6 The LLFA as a statutory consultee also has a duty to report to Government on their performance in providing a substantive response within that deadline. The annual report to the Government should be provided no later than 1st July and must relate to the previous financial year (e.g. starting 1 April in the preceding year).

8. Involving the LLFA when determining planning applications

8.1 Government acknowledged the need for LPAs to access advice from LLFAs as part of its changes to planning. As part of its consultation on further changes to statutory consultee arrangements for the planning application process Government sought to avoid unnecessary over-consultation of the LLFA and to focus their statutory consultation role on development where LPAs require expert advice to determine the application. Governments response to this consultation confirmed it was for this reason that they limited the LLFA statutory consultee role to major development.

8.2 As part of the consultation it was suggested that LPAs may find it helpful to agree with the LLFA the circumstances and locations where LLFA advice should be sought about a planning application which raises surface water or other local flood risk issues on a non-statutory basis. It was noted that the risk of over-consultation could also be managed locally by the LLFA informing the LPA that it does not wish to be consulted in certain instances or through providing standing advice. This was reinforced by Governments New Burdens Assessment that stated it was expected that in the first year of their statutory consultee role the LLFA will develop standing advice. It is against this background that Part B of this document has been developed.

PART B – Norfolk Lead Local Flood Authority Approach

9. When to consult the Lead Local Flood Authority?

9.1 All consultations and correspondence should be directed to the LLFA inbox at llfa@norfolk.gov.uk Please note it is still necessary to consult other departments of the County Council as is current practice (e.g. for Highways matters). The Flood and Water Management Team will respond to any such consultations within 21 days of being consulted (see 7.4 – 7.6 above).

9.2 The thresholds at which we will provide bespoke advice will be periodically reviewed to ensure that the resources of the LLFA are focused where they can make the biggest contribution to mitigating and reducing local flood risk.

9.3 The current LLFA thresholds are:

Residential developments with greater than or equal to	**100 properties**
All developments with an area greater than or equal to	**2 hectares**

However, there are other high risk applications which we will aim to respond to under this general threshold (see Table 1 and text below). The LLFA will currently aim to provide bespoke consultation responses for the following application types:

- All residential development applications where the **number of units is greater than or equal to the LLFA threshold**. This would include individual applications of a multi-phased development that in total would be equivalent to or greater than the LLFA threshold.
- All other development applications with an **area greater than or equal to the LLFA threshold**.
- Any major development applications that have a **local flood risk** and are on an obvious flow route or include extensive surface water or fluvial flooding on the site. Significant ponding of surface water over a large proportion of the site boundary also falls within this category. Further information on screening applications against local flood risk is provided in Section 10.
- Sites adjacent to, or within, areas with **records of local flooding** (as evidenced and provided by the LLFA). Further information on screening applications against local records of flooding is provided in Section 10.

9.4 Standing advice is provided to assist the LPA in determining the remaining developments for which the LLFA would not expect to be consulted, including:

- **STANDING ADVICE 1**: Developments that may require consent for works within ordinary watercourses[1] (as represented by the Detailed River Network or Ordnance Survey mapping) on, or within 5 meters of the development sites[2]. Any applicant would still be required to apply separately to Norfolk County Council LLFA for consent. Further information on this process is available on our website.
- **STANDING ADVICE 2**: Major developments outside of the current LLFA thresholds set out above in 9.3. or developments identified as only having potential isolated shallow areas of surface water ponding on the Environment Agency's maps Risk of Flooding from Surface Water (RoFSW), which indicate local flow points on the site. These are unlikely to be of a depth to cross the threshold of buildings and are usually rationalised during development.
- **STANDING ADVICE 3:** Minor development for which the Lead Local Flood Authority will not be consulted, including domestic extensions, residential developments less than 10 dwellings, basements etc.

9.5 A matrix setting out when the LLFA should be consulted on applications is included as Table 1.

[1] An ordinary watercourse means any watercourse, ditch, stream, culvert or pipe; (except those regulated by IDBs or Main Rivers which are regulated by the EA).
[2] Please note in some instances the watercourse may be culverted or piped.

Table 1: Norfolk County Council LLFA Consultation Matrix

		Local Flood Risk Ranking		
		Local flood risk	**Records of local flooding (internal property flooding only as evidenced by LLFA)**	**No flood records or local flood risk**
Development Category	**Minor development**	No consultation required – standing advice applies	No consultation required – standing advice applies	No consultation required – standing advice applies
	Major development below LLFA thresholds	**Consult LLFA**	**Consult LLFA**	No consultation required – standing advice applies
	Major development above LLFA thresholds	**Consult LLFA**	**Consult LLFA**	**Consult LLFA**

9.6 It is envisaged that in the medium term the LLFA will offer pre-application advice to developers on a chargeable basis. Once resources and charging schedules are in place to support this element of the service, stakeholders will be informed.

9.7 Please note if LPAs determine applications contrary to statutory consultee advice they should inform the LLFA (by email at llfa@norfolk.gov.uk). Reporting these decisions aids the LLFA in monitoring the impact of planning on local flood risk in line with our Local Flood Risk Management Strategy.

9.8 Failing to adequately consider local flood risk or making adequate provision for SuDS within a development site may result in properties within the development being placed in an area at risk of flooding or alternatively may result in an increase in the risk of flooding elsewhere. This is contrary to the requirements of Paragraph 103 of the NPPF. As part of our responsibilities as LLFA, when and where incidences of flooding occur within buildings, we investigate the sources and contributing factors to that flooding incident. As part of this investigation, we would review how flood risk had been considered by the development management process.

10. How to screen applications based on local flood risk and local flood records?

Local flood risk

10.1 There are a number of data sources that are available to LPAs to screen planning applications when determining the need to consult the LLFA. The key datasets are;

- The Environment Agency's Risk of Flooding from Surface Water (RoFSW) maps- specifically the 3.33% annual probability and 1% annual probability extent maps downloadable from http://environment.data.gov.uk/ or online mapping at https://flood-warning-information.service.gov.uk/long-term-flood-risk/.
- Detailed Rivers Network which includes a large number of gravity watercourses but is less

reliable in pumped catchments and is available for LPA's to download at https://data.gov.uk/dataset/detailed-river-network-afa036

10.2 The LLFA should be consulted on development sites that have a current risk of flooding or have the potential to increase local flood risk. Example sites are shown in Figure 1. As a guide, the LLFA expects to be consulted on developments that (a) have a flow path passing though the development, (b) have a risk of surface water flooding along all or part of the development boundary, or (c) where there is a risk of flooding to adjacent properties. The LLFA does not expect to be consulted on applications where there are (d) isolated areas of surface water ponding identified on the site.

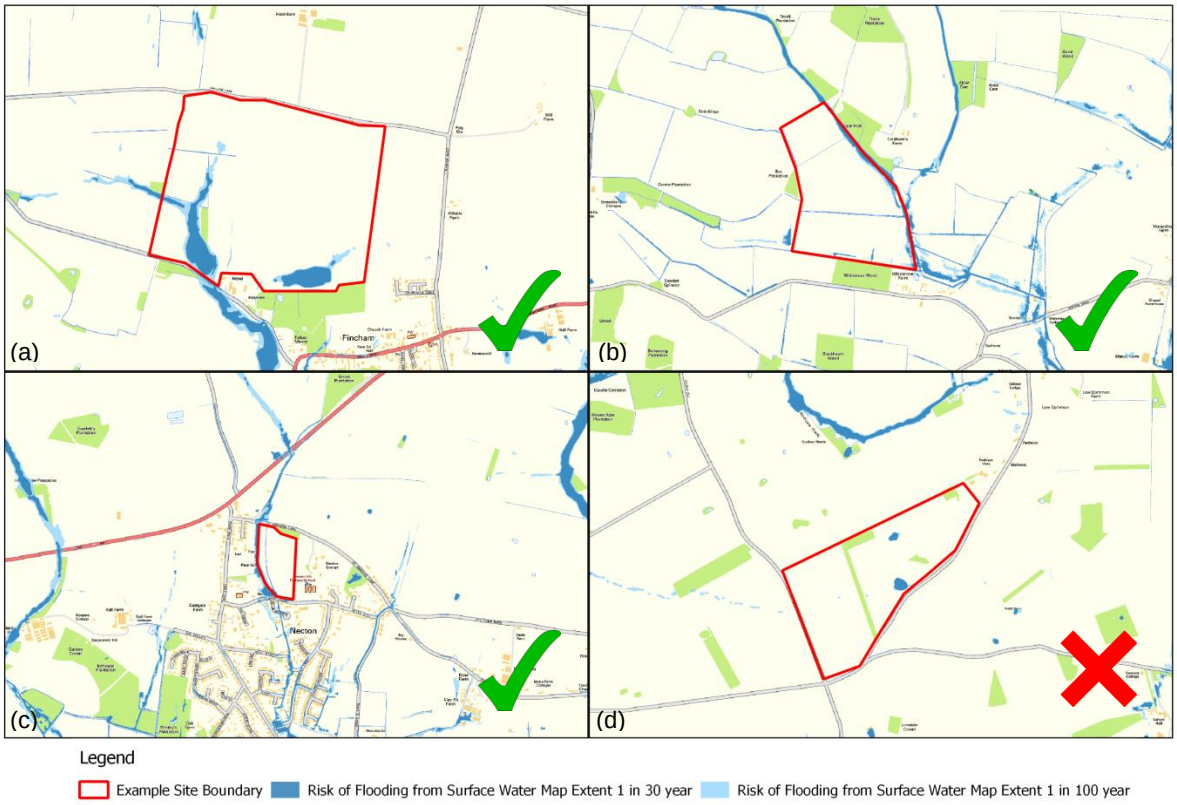

Figure 1: Local flood risk consultation examples

Records of local flooding

10.3 There are areas in Norfolk for which there are historic records of flooding. In these areas, the LLFA would expect to be consulted on applications. The LLFA holds a GIS database of recorded flood incidents in Norfolk which have been investigated and published. These records are restricted to those properties which have been internally flooded and will be made available to LPA's to add to their constraint searches for major developments. It is the intention that this dataset is updated twice a year as a minimum. Ad hoc updates may be circulated, following the collation of data in major flood incident.

10.4 Local representations may be provided alongside development applications that identify historic incidents of flooding on the site or flood risk issues in the vicinity of the site. The LLFA will review and acknowledge anecdotal evidence where surface water flooding has been experienced on the development site or if local representations identify previous incidents of surface water flooding in the highway or in properties adjacent to the development site. We do not, however, have sufficient resources to comment on all applications where there are anecdotal records of flooding but where no internal flood incidents have been investigated and published.

11. Other sources of advice for Local Planning Authorities

11.1 In addition to seeking advice from the LLFA, the National Planning Policy Framework Planning Practice Guidance recommends that LPAs consult the following stakeholders as appropriate;

(a) The relevant sewerage undertaker where a connection with a public sewer is proposed;

(b) The Environment Agency, if the drainage system directly or indirectly involves the discharge of water into a watercourse;
(c) The relevant highway authority for an affected road;
(d) The Canal and River Trust, if the drainage system may directly or indirectly involve the discharge of water into or under a waterway managed by them; and,
(e) An Internal Drainage Board (IDB), if the drainage system may directly or indirectly involve the discharge of water into an ordinary watercourse within a board's district.

12 LLFA Standing Advice

12.1 The standing advice referred to in the matrix included as Table 1 are set out below.

Standing Advice 1: Ordinary Watercourse Consenting

Norfolk County Council as the Lead Local Flood Authority (LLFA) for Norfolk is the drainage authority under the Land Drainage Act 1991 for regulating works on ordinary watercourses for the 80% of Norfolk outside of Internal Drainage Board (IDB) areas. If there are any works proposed as part of this planning application that are likely to affect flows in an ordinary watercourse, then the applicant is likely to need the approval of Norfolk County Council. It should be noted that this approval is separate from the planning process.

In line with good practice, the Council seeks to avoid culverting, and its consent for such works will not normally be granted except as a means of access. This is supported by Council Policy (OW4:Culverting) within Norfolk Local Flood Risk Management Strategy.

Guidance on this process as well as downloadable applications forms can be found on the NCC website page "Consenting works on ordinary watercourses". The web address is https://www.norfolk.gov.uk/rubbish-recycling-and-planning/flood-and-water-management/information-for-homeowners/consent-for-work-on-ordinary-watercourses

Standing Advice 2 : Major Development below LLFA thresholds

To ensure that development is undertaken in line with Paragraph 103 of the National Planning Policy Framework the LLFA recommends that LPAs satisfy themselves of the following considerations prior to granting permission major development below LLFA thresholds:

1. *Is the development site currently at risk of flooding?*
   The risk of flooding on the current site should be acknowledged using national flood risk datasets such as the Environment Agency's Risk of Flooding from Surface Water maps. If any areas at risk of flooding are identified, these should be avoided from development in line with NPPF. Where this cannot be achieved a robust strategy should be provided that includes adequate flood resilience measures incorporated in the design.
2. *How does the site currently drain?*
   The method through which the site currently drains should be described, such as whether there are existing infiltration features, ordinary watercourses within or at the boundary of the development, or existing surface water sewer infrastructure.
3. *How will the site drain?*
   The proposed method for draining the site should be in accordance with the sustainable drainage hierarchy; with a preference for shallow (<2 m deep) infiltration measures, followed by measures to drain to a nearby watercourse, otherwise discharging to a surface water sewer. The last method of draining a site would be to either a combined/foul sewer, or via deep infiltration methods (>2 m below ground level).
4. *What sustainable drainage measures have been incorporated into the design?*
   Surface water drainage systems should replicate natural drainage processes as closely as possible. Sustainable Drainage Systems (SuDS), such as permeable paving, swales, green roofs/walls or attenuation basins should be preferred on all development sites ahead of conventional drainage measures (piped systems). Geocellular storage crates can provide elements of SuDS such as attenuating the amount of water to prevent an increase in flood risk, however without another SuDS component (swales, filter drains or strips) the do not provide any water quality treatment.

At a high level, the following evidence should be submitted by applicants for review by the LPA to demonstrate compliance with Paragraph 103 of the NPPF.

Local flood risk
The application submission should include an assessment of the risk of flooding to the development site from all sources. This should include a review against the national Risk of Flooding from Surface Water maps produced by the Environment Agency and should refer to the Strategic Flood Risk Assessment of the relevant LPA. Further detail is provided in **Section 14 of this guidance**.

Drainage destination
The submission documents should show how preference has been given to shallow (<2 m deep) infiltration drainage ahead of alternative drainage methods. Where infiltration drainage is proposed, infiltration testing should be provided as evidence to demonstrate that the site can drain. After shallow infiltration, preference should be given to discharge to a watercourse ahead of any connection to a sewer. Deep infiltration methods (including borehole soakaways or soakaways greater than 2 m in depth) are considered to be equivalent to a connection to a foul sewer on the drainage hierarchy. Further detail is provided in **Section 15 of this guidance**.

Infiltration testing
Infiltration testing should be undertaken at representative locations and depths across the proposed development site. The results of infiltration testing should be submitted alongside the application for review. Infiltration testing should be undertaken in accordance with BRE Digest 365, whereby three tests are undertaken in each location in quick succession (within 24 hours). A favourable rate for infiltration is better than 1×10^{-6} m/s or 0.0036 m/hr. A rate worse than this would indicate that only partial or no infiltration should be considered at a site. Further detail is provided in **Section 16 of this guidance**.

Runoff rate and volume
Development on greenfield land (i.e. not previously developed) should discharge at rates no greater than the existing greenfield rates for the 100% and the 1 % rainfall events. Development on brownfield land should aim to discharge at rates no greater than the equivalent greenfield rates for the site, but as a minimum should discharge at no greater than the existing rate. Developers should also consider the increase in the volume of runoff from the development where this cannot be used on the site or infiltrated. Further restrictions to the final runoff rates may be necessary to prevent an increase in the risk of flooding downstream from the site as a result of a greater volume of runoff. Further detail is provided in **Section 18 of this guidance**.

Climate change
The frequency and intensity of rainfall is predicted to increase as a result of climate change and an allowance for how this will affect the proposal will need to be factored into design. Applicants should refer to latest guidance published by the Environment Agency at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances . For SuDS both 20% and 40% climate change scenarios should be tested. In addition rising sea levels may put some areas currently not at risk from tidal flooding into an area of risk. These areas should have been identified in the LPA's SFRA. Further detail is provided in **Section 19 of this guidance**.

Management and maintenance
Provision for long-term maintenance should be provided as part of any SuDS scheme submitted to the LPA. Model legal agreements that provide a mechanism for SuDS maintenance can be accessed on the CIRIA website at http://www.ciria.org. Further detail is provided in **Section 20 of this guidance**.

Resistance and resilience
Details of any flood proofing / resilience and resistance techniques that are included in the development should accord with `Improving the flood performance of new buildings' CLG (2007) available on the following link https://www.gov.uk/government/publications/flood-resilient-construction-of-new-buildings. Further detail is provided in **Section 21 of this guidance**.

Standing Advice 3 : Minor Development

To ensure that development is undertaken in line with Paragraph 103 of the National Planning Policy Framework the LLFA recommends that LPAs satisfy themselves of the following considerations prior to granting permission for minor development:

1. *Is the development site currently at risk of flooding?*
   The risk of flooding on the current site should be acknowledged using national flood risk datasets such as the Environment Agency's Risk of Flooding from Surface Water maps. If any areas at risk of flooding are identified, these should be avoided from development or adequate flood resilience measures incorporated in the design.
2. *How does the site currently drain?*
   The method through which the site currently drains should be described, such as whether there are existing infiltration features, ordinary watercourses within or at the boundary of the development, or existing surface water sewer infrastructure.
3. *How will the site drain?*
   The proposed method for draining the site should be in accordance with the sustainable drainage hierarchy; with a preference for shallow (<2 m deep) infiltration measures, followed by measures to drain to a nearby watercourse, otherwise discharging to a surface water sewer. The last method of draining a site would be to either a combined/foul sewer, or via deep infiltration methods (>2 m below ground level).
4. *What sustainable drainage measures have been incorporated into the design?*
   Surface water drainage systems should replicate natural drainage processes as closely as possible. Sustainable Drainage Systems (SuDS), such as permeable paving, swales, green roofs/walls or attenuation basins should be preferred on all development sites ahead of conventional drainage measures (piped systems). Geocellular storage crates can provide elements of SuDS such as attenuating the amount of water to prevent an increase in flood risk, however without another SuDS component (swales, filter drains or strips) the do not provide any water quality treatment.

Minor development commonly includes extensions that may build over existing surface water drainage infrastructure. We recommend that any existing drainage scheme is diverted rather than built over as this can lead to internal property flooding if not adequately designed. If it cannot be diverted a minimum of two inspection / maintenance manhole chambers should be provided at either end of the pipework which will be built over in discussion with the LPA and / or Building Control. If the drainage is Anglian Water Services infrastructure, suitable build-over agreements, in consultation with them, should be in place prior to seeking planning approval or starting construction.

Due to the risk of rapid inundation by floodwater, basements should be avoided in areas at risk of flooding. The LPA may hold additional guidance for basement extensions, e.g. within relevant Strategic Flood Risk Assessments (SFRAs).

13. Documentation to be provided to the LLFA

13.1 To enable Norfolk County Council to provide its response as a statutory consultee the developer should produce a drainage strategy for the development that includes the level of information corresponding to the stage of the application submitted. Table 2 provides a summary of the expected level of information to be submitted with applications. Further information may be requested to support the application where there are complex local issues. This information will draw on other information contained within the Planning Application but is required by the LLFA for all major developments to ensure that the standard of surface water management is appropriate. If a Flood Risk Assessment (FRA) is also required for a site then the surface water management proposals may be incorporated within this document.

13.2 The submitted information should consider how the surface water drainage strategy complies with the requirements of the SuDS Non-statutory Technical Standards.

13.3 It is important that the type of SuDS to be used on a development site is identified at concept design stage of the whole scheme. This information, as well as details of the extent and position of the SuDS, should be provided for both outline and full applications so it is demonstrated that the SuDS can be accommodated within the proposed development. It is not desirable to condition an application and leave the allocation of SuDS to a later application stage as this may preclude certain SuDS elements due to restrictions in the agreed layout. We would recommend that 10-15% of land be set aside within allocations to facilitate the implementation of SuDS and maintenance strips along river (blue) corridors. Whilst

maintaining a neutral or improved benefit to flood risk, SuDS / blue corridors can provide multiple biodiversity, amenity and water quality benefits (NPPF paragraph 99 and 114 and PPG Paragraph: 027 Reference ID: 8-027-2160211 / Paragraph: 028 Reference ID: 8-028-20160211).

Table 2: Level of information required for planning applications (from LASOO Guidance, 2015[3])

Pre-app[4]	Outline	Full	Reserved Matters	Discharge	Document to be Submitted	Link to PART C Technical Guidance
N/A	✓	✓			Flood Risk Assessment/Statement	14
N/A	✓	✓			Drainage Strategy/Statement & sketch layout plan	15
N/A	✓				Preliminary layout drawings	
N/A	✓				Preliminary "Outline" hydraulic calculations	19
N/A	✓				Preliminary landscape proposals	
N/A	✓				Ground investigation report (for infiltration)	18
N/A	✓	✓			Evidence of third party agreement for discharge to their system (in principle/ consent to discharge)	15
N/A		✓		✓	Maintenance program and on-going maintenance responsibilities	20
N/A		✓	✓		Detailed development layout	
N/A		✓	✓	✓	Detailed flood & drainage design drawings showing all dimensions (pipe numbers, gradients, sizes, locations, manhole details etc.) of every element of the proposed drainage system (pipes, swales, storage areas, ponds, etc)	15/18
N/A		✓	✓	✓	Full Structural, hydraulic & ground investigations	16/17
N/A		✓	✓	✓	Geotechnical factual and interpretive reports, including infiltration results	17
N/A		✓	✓	✓	Detailed landscaping details	
N/A		✓	✓	✓	Development Management & Construction Phasing Plan	20

[3] LASOO (2015) Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance
[4] Pre-application advice is not currently available from the LLFA

13.4 The Drainage Strategy should demonstrate how SuDS options have been considered with reference to the SuDS management train and hierarchy. Justification and evidence of how it will be achieved should be provided to document the chosen method(s) of surface water disposal.

13.5 For larger applications where there may be Master Planning or phased development it is particularly important that any submission considers how each phase will be delivered in relation to the surface water drainage strategy as a whole. In particular, highlighting where different phases rely on each another for connection to an infiltration basin or the wider watercourse network and how this will be implemented during construction and operation of the development.

13.6 Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

13.7 An application for **Outline** planning permission should include details of one workable solution for managing surface water. Where infiltration drainage is proposed, and infiltration testing in accordance with BRE 365 has not been undertaken, evidence or agreement in principal of an alternative surface water drainage discharge location proposal will be required. We would expect a Flood Risk Assessment to be provided with the application to consider the risk of flooding from all sources. This should identify any avoidance or mitigation measures to be employed during the detailed design of the site and note any constraints for the development of the site layout.

13.8 An application for **Reserved Matters or Full** planning permission should provide sufficient information to demonstrate that adequate space has been allocated within the development layout for the proposed surface water drainage measures and should include calculations as evidence to support the sizing of drainage infrastructure. For a Full application, we would expect a flood risk assessment be submitted to assess the risk of flooding from all sources. This should identify any avoidance or mitigation measures to be employed during the detailed design of the site and note any constraints for the development of the site layout. For a Reserved Matters application, we would expect the submitted documents to acknowledge any flood risk constraints on the site, such as existing areas at risk of flooding, and demonstrate how the development layout has been designed to avoid and minimise the risk of flooding. Where additional flood risk information has become available since the original planning application flood risk assessment, we would expect any Reserved Matters application to assess the risk of flooding against this updated information.

13.9 Information to **Discharge a Condition** should be submitted as one package in a Drainage Strategy rather than in piecemeal submissions. The summary report should include the methodology applied in the calculations for the scheme such as the global variables and any assumptions used. The report should also include an explanation of how the system operates, such as physical access arrangements for maintenance, establishment of legal rights of access in perpetuity and an appraisal of health and safety considerations for construction, operation and maintenance of the SuDS. In addition, a submission to discharge a drainage condition should include an assessment of the route which the water will take when leaving the site and whether the receiving watercourse or sewer network will be able to convey the proposed discharge. Where additional flood risk information has become available since the original planning application original flood risk assessment, we would expect any Discharge of Conditions application to consider the detailed design of the drainage system against this updated information.

13.10 The LLFA will respond to planning applications where we have been consulted. Where we feel there is no or inappropriate information supplied with a planning application to demonstrate achievable mitigation or advise that appropriate conditions could be set, we will object stating that the FRA or Drainage Strategy is inadequate and does not meet with policy or guidance. A summary of types of responses we will give to the LPA are as follows:

- **No Objection, with advice and recommendations** – This response will be sent if standing advice is provided or depending on the scale of development information has been submitted that has few concerns and conditions are not appropriate
- **Objection** – This response will be submitted where no FRA or drainage strategy has been provided or the documents submitted have significant information absent or is inappropriate to address the risks of flooding and/or to show that the proposed SuDS is achievable.
- **No Objection subject to conditions being attached to a consent** – This response will be submitted if appropriate information has been attached to the application to show that local flood risk has been adequately considered and at least one feasible SuDS scheme has been proposed. Enough information should be available to meet the PPG standards for setting conditions, that are:
    - necessary;
    - relevant to planning and;
    - to the development to be permitted;
    - enforceable;

  - precise and;
  - reasonable in all other respects.
- **Removal of our objection** – This response is likely be submitted where additional information has been submitted to address our concerns. For example, when information shows a condition can be discharged.
- **Objection in principal** – This response will be submitted if we do not see that there is a technical solution to the issues with the proposed development. We will highlight this at an early stage to give an applicant an opportunity to review the commercial viability of the development. We will provide a technical review of the proposal in the understanding that this does not prejudice the outcome.
- The LLFA will provide a "**no comment**" response if we have chosen not provide bespoke comments.

PART C – Technical Guidance

This technical guidance sets out the expectations of Norfolk County Council when reviewing flood risk assessment and surface water drainage submissions. The guidance is aimed at providing developers and their consultants with the locally specific technical knowledge to ensure that any submissions are aligned with the expectations of the LLFA. The technical guidance covers a limited range of areas and is expected to be built upon in further submissions. The technical areas considered in this version are:

- Local Flood Risk
- SuDS surface water drainage disposal destination
- Infiltration testing
- Runoff rate and volume
- Climate Change
- Water Framework Directive and Water Quality
- Management and Maintenance
- Resistance and Resilience

14. Local Flood Risk

14.1 All development should consider the existing risk of flooding from all sources; including main rivers, the sea, ordinary watercourses, surface water, groundwater, sewers and artificial waterbodies.

14.2 The NPPF and associated PPG (see Policy Box 1) sets out the national expectations for the assessment and management of flood risk on the site. The vulnerability of development (Table 2 and 3 of the Flood and Coastal change section of PPG) indicates the type of development that is appropriate according to the level of flood risk.

Policy Box 1: Local Flood Risk Guidance

"When determining planning applications, Local Planning Authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated:

*• Within the site, the **most vulnerable development** is located in areas of **lowest flood risk** unless there is overriding reasons to prefer a different location; and*

*• Development is appropriately **flood resilient and resistant**, including safe access and escape routes where required, and that any **residual risk can be safely managed**, including by emergency planning; and it gives priority to the use of sustainable drainage systems. "*

[Paragraph 103 of the National Planning Policy Framework]

*"Any development proposal should take into account the likelihood of flooding from **other sources**, as well as from rivers and the sea. The **sequential approach** to locating development in areas at lower flood risk should be applied to **all sources of flooding**, including development in an area which has critical drainage problems, as notified to the local planning authority by the Environment Agency, and where the proposed location of the development would **increase flood risk elsewhere**.*

[NPPF Flood Risk PPG Paragraph: 033 Reference ID: 7-033-20140306]

14.3 The sequential approach is a precautionary one, to avoid the risk of flooding in the first instance. We

support this approach as it is the most sustainable form of flood risk management. In accordance with PPG (Paragraph: 018 Reference ID: 7-018-20140306 and Paragraph: 019 Reference ID: 7-019-20140306), development should be steered to Flood Zone 1 (taking into account all sources of flooding). Sites in Flood Zone 2 and 3 should only be considered (employing the exception test where required – see NPPF paragraph 101 and 102) where there are no reasonable alternative sites, taking into account flood risk and the vulnerability of the land use proposed (PPG Table 2). Table 1 of PPG which defines flood zones (only based on river and sea flooding) can be supplemented with the following information.

- Indicative Environment Agency's Risk of Flooding from Surface Water (RoFSW) maps (extent, depth, velocity and Hazard layers) for both the 1% annual probability of flooding and 0.1% annual probability **to identify potential risk of flooding from surface water flow paths and / or significant ponding**.
- Indicative Environment Agency (EA) River and Sea Flood Maps for Planning for both Flood Zone 2 and 3 – or up to 1% annual probability of flooding and 0.1% annual probability **to identify potential risk of flooding from ordinary watercourses**. Where no mapping of fluvial flood risk (watercourses with catchments smaller than $3km^2$), or there is uncertainty within the EA mapping, the RoFSW map is used as a proxy and used consistently with river flood mapping probability. To avoid doubt, the 1% annual probability flood is deemed equivalent to Flood Zone 3 and 0.1% annual probability flood is equivalent to Flood Zone 2 (as per Planning Practice Guidance – Flood Risk And Coastal Change Paragraph: 018 Reference ID: 7-018-20140306).

14.4 For the avoidance of doubt, the LLFA will also use the following sources of information to assist with any review of an application.

- Historical information from the LLFA using published flood investigation report locations which highlight those properties which have already flooded both externally and internally. Reports of flooding that are yet to be investigated and published as well as Anglian Water records of reported locations of sewer flooding will also be reviewed as part of a precautionary approach to reviewing applications.
- Current Strategic Flood Risk Assessments (SFRA), Surface Water Management Plans (SWMP) or previous Flood Risk Assessments (FRA) / Drainage Strategies (DS) which the LLFA has been consulted on through the planning process. This would help with other sources of information such as the location of critical drainage catchments and reported groundwater flooding incidences.
- Other relevant information such as Ordnance Survey current MasterMap; Ordnance Survey Historical Maps (First Edition 1886, Second Edition 1905); Aerial Photography (1988 or 1946); Google Street View or the Detailed River Network (DRN) mapping to highlight surface watercourses or structures; Norfolk County Council produced sub-catchment identification; local officer experience or representations made by the public to the LLFA.

14.6 Three key criteria should be met to protect the public from flooding, both on site and in downstream areas. These are:

1) Protection against flooding from watercourses.
2) Protection against flooding from the drainage system.
3) Protection against flooding from overland flows (from sources within or external to the site).

British Standard BS 8582:2013 Code of Practice for surface water management for development sites also states in section 6.2.2 the following:

- The layout of the development site and drainage system should be designed so that surface water that enters the site from off-site sources is conveyed safely around or through the site, without compromising the level of service of the proposed drainage system or introducing unacceptable additional risk on-site or downstream
- Where run-off from off-site sources is drained together with the site run-off, the contributing catchment should be modelled as part of the drainage system in order to take full account of the additional inflows.
- Where run-off from off-site sources is conveyed separately to the proposed drainage system the flood risk should be managed in accordance with BS8533:2011 Assessing and managing flood risk in development – code of practice.
- The layout of the development site and the drainage system should be designed so that natural low-lying areas and overland conveyance pathways are used to manage surface run-off, where appropriate, where they do not pose and unacceptable risk to the new development or downstream areas.

14.5 If there is a risk of flooding from an ordinary watercourse or a surface water overland flow route, the LLFA

expects that this risk is assessed (and where appropriate modelled) to show how More Vulnerable Development (as per Table 1 of PPG) is placed outside of the risk of surface water flooding for the 1% annual probability rainfall event plus climate change allowance (equivalent to the requirements of fluvial Flood Zone 3). In the case of overland flow routes, if the areas cannot be avoided, sufficient information should be provided to demonstrate how this overland flow route will be managed within the site without creating a risk to people or property and not increasing the risk elsewhere. We would suggest that public open space is the most appropriate land use for this purpose. If roads or car parks are intended to be used, we would request that the hazard of this management be fully considered, the drainage of these impermeable areas be sized to accommodate the additional offsite flows (see section 14.6 above) and flood depths be minimised in line with Table 12.3 of CIRIA Design for Exceedance in Urban Drainage (C635). This states depth of water in flood events greater than 3.33% annual probability should be minimised to 100 mm on minor roads restricted to 30 mph and 200 mm within car parks. We expect that it can be shown that velocities of flood water will be minimised in these instances and do not impede safe access or egress from the area. This would be in line with the DEFRA / Environment Agency Hazard to People Classification/Rating. In addition, we would expect that sufficient mitigation is provided in the form of raised finished ground floor levels on residential properties to account for exceedance routes in rainfall events with a probability greater than 1% annual probability (see section 21 for further information)

14.6 Without early consideration of local flood risk in the planning process the viability for the site can be compromised as the layout (and hence density of housing) may require significant alteration.

14.7 Every opportunity to improve an existing local flood risk issue is encouraged (see LLFA policy within the Local Flood Risk Management Strategy), particularly within those areas defined by the Environment Agency or the LLFA as a Critical Drainage Area or Catchment. These areas have been highlighted as having particular serious existing flood risk problems and new or redevelopment could provide improvements through careful consideration of available land and proposed surface water drainage scheme. Within any critical drainage catchment we expect any brownfield development to limit surface water drainage discharge as close to greenfield rates as possible. Retaining per development 100% runoff from impermeable areas is unlikely to be acceptable.

15. SuDS Disposal Destination

15.1 Surface water drainage should be managed in a way that replicates the natural drainage processes on the site as closely as possible. All sites will have different constraints and varying degrees of existing drainage provision and condition. However, any proposed strategy for the management of surface water should utilise methods as high up the drainage hierarchy as possible.

Policy Box 2: Drainage Hierarchy

National Planning Policy Framework Flood Risk and Coastal Change Planning Practice Guidance

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. Into the ground (infiltration)

2. To a surface water body;

3. To a surface water sewer, highway drain or another drainage system;

4. To a combined sewer."

[Paragraph: 080 Reference ID: 7-080-20150323]

15.2 It should clearly be demonstrated in any submission how the proposals follow the hierarchy. Adequate justification and evidence, will be required should surface water be proposed to be discharged using methods lower down the hierarchy than infiltration. We expect that at least one option is demonstrated to be feasible can be adopted and properly maintained and would not lead to any other environmental problems. This is supported by several documents including, CIRIA SuDS Manual (C753), Building Regulations Part H, British Standard BS8582:2013 and LASSO Practice Guidance.

15.3 At least one feasible proposal for the disposal of surface water drainage should be demonstrated and in all cases supported by the inclusion of appropriate information. Infiltration should be considered first and this should be supported by BRE365 testing or equivalent (see section 16). If infiltration cannot be

undertaken or infiltration results are proven to be unfavourable (worse than 1 x 10-6 m/s or 0.036m/hr), we would expect to see in principal agreements for an alternative solution for the next available discharge location in the hierarchy. If this is connection to a watercourse within the site boundary this should be shown on a plan, however if there is a need to cross third party land evidence e.g. in principal agreement from a landowner to connect across land to a surface watercourse should be provided. We would also require evidence, such as a site walk over or photographs, to illustrate that a watercourse is connected to the wider network and able to convey water away from the development site. In Norfolk, there are many localised drainage soakaway ditches which are cut off from a wider watercourse network (e.g. are "blind"). These watercourses would not be a suitable location to accept the siting of a long term positive surface water drainage connection.

15.4 When no other practicable alternative exists to dispose of surface water other than a public sewer, the Water Company, the Highways Authority or their agents should confirm that there is adequate spare capacity in the existing system taking future development requirements into account.

15.5 NCC as LLFA would not see deep infiltration (greater than 2 m below ground level) or borehole soakaways as infiltration systems that meet the requirements of the first level of the drainage hierarchy. Whilst they can provide important groundwater recharge via infiltration at depth it does not mimic the natural drainage system as would shallow infiltration. We would only expect it to be used as a final option for the location of discharge of surface water on a par with a sewer.

15.6 It is our understanding that the Environment Agency would comment on issues with regard to potential groundwater pollution. They have clear guidance in their published Groundwater Protection Policy GP3 (in particular G1 and G9 or regarding SuDS G10, G11, G12 and G13). They state that the use of deep infiltration systems may be appropriate in some cases if it is clear that there are no other feasible surface water disposal options. The Environment Agency would consider the pollution potential following their risk assessment process. Whilst the Environment Agency may agree to a deep infiltration soakaway, they no longer have the role to advise the LPA on surface water drainage options and so the LLFA, would still require a clear justification to demonstrate why the SuDS hierarchy cannot be followed (see above).

15.7 If a deep infiltration soakaway is proposed, there is no other feasible way to discharge surface water and this is acceptable to the Environment Agency in groundwater pollution prevention terms, the LLFA would still expect that shallow or surface SuDS components be considered in the drainage scheme prior to the borehole being the final discharge point. This design of drainage would be used to provide the necessary protection to the water environment and to incorporate the multi-benefits in line with the SuDS philosophy of surface water attenuation, treatment train, amenity and biodiversity benefits.

15.8 Only clean residential roof water can be directly discharge to the water environment (including any watercourse or soakaway) without treatment.

16. Infiltration Drainage and Testing

16.1 The LLFA would expect all submitted drainage strategies to include an assessment of the suitability of the underlying geology to discharge collected surface water to the ground via infiltration. Information could include a ground investigation report, British Geological Survey (BGS) superficial and bedrock geological mapping, or other available information. Where infiltration drainage considered possible, LLFA would expect additional information to be submitted to provide evidence to support the assumed infiltration rate(s) across the site (see Table 3 for guidance).

16.2 At outline stage, we would prefer the submission of infiltration test results should infiltration drainage be the chosen method for the site. Should infiltration testing not be possible, in line with the CIRIA SuDS Manual (C753) Section 25.2.1, an alternative strategy for drainage the site (a Plan B) should be detailed in the drainage strategy and should include the proposed location of any discharge points, the proposed discharge rate, as well as the volume and location of any required storage.

16.4 For full permission, reserved matters or discharge of conditions applications where infiltration drainage is proposed, we would expect the results of infiltration testing to be provided as evidence to support the calculation assumptions in the detailed design of the drainage system.

16.5 If only indicative infiltration testing is provided, we will expect this undertaken again prior to a detailed design stage, at the location (if large basins are proposed along the length) and depth of the proposed infiltration structures.

16.6 To protect ground water from pollution, any infiltration structure must be shown to be able to be constructed 1.2 m above the anticipated seasonally high groundwater level. Information to support this could include geotechnical trial pits or borehole on site to demonstrate that groundwater is not present at the required depth.

Table 3: Norfolk County Council Infiltration Testing Requirements for Applications

	Application Stage	
	Outline	**Full / Reserved Matters / Discharge of condition**
Strategy promotes infiltration	Indicative infiltration testing required or alternative drainage strategy	Infiltration testing at depth and location of proposed structures required

16.7 Infiltration testing to support surface water drainage strategy calculations should be undertaken in line with BRE365 guidance (see Policy Box 3) or equivalent. We consider the following to be a good practice minimum requirement for infiltration testing in Norfolk:

- A minimum of **three tests** undertaken in quick succession at each location (as a minimum in the same day);
- The **lowest value** obtained across the site, or across representative geology, to be used for calculations;
- The **depth** of testing to be **representative** of drainage proposals (multiple depths may be required to represent different drainage methods i.e. permeable paving and soakaways);
- Any design of infiltration structure should ensure that it can **discharge from full to half-volume within 24 hours** in readiness for subsequent storm inflow (CIRIA SuDS Manual (C753) section 25.7 and BRE365). Where the infiltration storage is designed to accept a storm event greater than 3.33% annual probability, large attenuation may be required. Where there is adequate justification (i.e. not in a high flood risk area), we may accept longer half drain down times if additional freeboard can be provided e.g. enough storage to accept a subsequent 10% annual probability storm event; and
- One uncertainty for the design of infiltration systems is the infiltration rate, which may reduce over time. Particularly if there is no pre-treatment or there is poor maintenance. To account for this we expect a **safety factor** to be incorporated into the design, where the factor used is a judgement based on the consequence of failure of the drainage system. Table 25.2 of CIRIA SuDS Manual (C753) should be consulted and used. If the drainage system within a new development is to be offered to Norfolk County Council Highways Authority to be considered for adoption, the calculations should use the middle column of Table 25.2.

Policy Box 3: Infiltration Testing Guidance

BRE 365: Soakaway Design (2016)

- *Excavate a soakage trial pit to the same depth as anticipated in the full-size soakaway.*
- *The inflow should be rapid so that the pit can be filled to its maximum effective depth in a short time, i.e. to the design invert level of the drain to the soakaway.*
- *Fill the pit and allow it to drain three times to near empty [in quick succession]; each time record the water level and time from filling, at intervals sufficiently close to clearly define water level versus time*
- *Calculate the soil infiltration rate from the time taken for the water level to fall from 75% to 25% effective storage depth in the pit, using the lowest soil infiltration rate value of the three test results for design .*
- *In general, soakage trials should be undertaken where the drain will discharge to the soakaway. The use of full depth and of repeat determinations at locations along the line of trench soakaways is very important when soil conditions vary.*

17. Infiltration constraints

17.1 The scope for using infiltration may be reduced where soils have poor infiltration capacity, where groundwater levels are high (see section 16.6 above), there is a groundwater source protection zone constraint (particularly SPZ1), there is ground contamination where infiltration would mobilise pollutants or where ground conditions present particular risks of subsidence from voids and instability in the underlying geology. Chapter 8 of the CIRIA SuDS Manual (C753) considers how to design SuDS in areas with particular constraints.

17.2 Issues regarding the suitability of development (particularly housing) on a particular geology are for a suitably qualified structural engineer to consider during the design in a particular location. The LLFA are not aware of any widespread subsidence issues across Norfolk except in some parts of Norwich City. It is recognised that areas of Norwich are built on chalk where there have been previous mine workings and some are especially prone to subsidence. We would not generally consider in detail the impact of a proposed surface water drainage system on the ground stability on the site due to potential solution features unless we are aware of particular issues in the area. In general, we do not see that traditional ring (or point) soakaways as suitable in these locations due to the potential for settlement, however, not all SuDS should be automatically precluded but designed in proportion to the level of risk.

17.3 Shallow infiltration, such as permeable surfaces, may be suitable in areas of known subsidence and close to properties. This is because permeable surface infiltration is shallow, infiltrates over a wide area and replicates runoff processes in a similar way as it would prior to development. We would hence encourage any developer to identify the risk of subsidence and propose suitable SuDS features considering the level of risk during detailed design. We highlight that Section 25.2.3 of the CIRIA SuDS Manual (C753, 2015) states that, "*the potential risk of adverse effects from infiltrating water will depend on the volume of water being discharged along with the depth and plan area of the infiltration system. The smaller the area of the system in relation to the drained area, the greater the risk.*" The features which have the potential to cause the greatest impact where the geology is susceptible to solution features can be private dwelling soakaways. A scheme may therefore, during detailed design, need to exclude large or individual private soakaways from the surface water drainage strategy in favour of planar infiltration systems such as permeable paving, wide swales and shallow infiltration basins. Further guidance can be found in CIRA SuDS Manual (C753) chapter 8, section 20.3, chapter 25 and the SUSDrain factsheet, http://www.susdrain.org/files/resources/fact_sheets/09_12_fact_sheet_suds_close_to_buildings.pdf.

17.3 Norwich City Council has development management policies set for surface water flooding and drainage and subsidence (DM5, DM11). These policies state that "where it is demonstrated that permeable surfaces are likely to be unacceptable for these reasons; hard surfaced paving may be accepted. In these cases developers will be encouraged to explore alternative means of managing surface water runoff within the development site. Where soils are well drained, impermeable surfaces will only be permitted where it is demonstrated that there is an overriding need for such a surface." We would expect that an appropriately qualified geotechnical engineer would provide a risk assessment to consider subsidence in high risk areas.

18. Runoff Rate and Volume

18.1 The rate of runoff from a development should be restricted in line with the SuDS Non-Statutory Technical Standards (see Policy Box 4). Brownfield sites are strongly recommended to discharge at the original pre-development (greenfield) runoff rate where possible. If not, a significant reduction in the current rate of discharge should be achieved and agreed with the relevant drainage body (LLFA, IDB or Anglian Water). It is unlikely to be acceptable to maintain 100% runoff when considering sustainable redevelopment. This would be particularly important in areas which have been defined as Critical Drainage Areas (by the Environment Agency) or Critical Drainage Catchments (by the LLFA in conjunction with a District Council).

18.2 Areas of permeable and impermeable land for both the existing site and the proposed development are to be used to assess the change in surface water runoff. The site characteristics such as how surface water management is functioning on the site at present should be investigated.

Policy Box 4: Runoff Rate

SuDS Non-Statutory Technical Standards (2015)

S2. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event [100% annual probability] and the 1 in 100 year rainfall event [1% annual probability] should never exceed the peak greenfield runoff rate for the same event.

S3. For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event [100% annual probability] and the 1 in 100 year rainfall event 1% annual probability] should be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

18.3 Consideration should be given to sub-catchments which may exist on the site. Calculations for greenfield runoff rates for individual watercourses should be based on the proposed area of impermeable land within its sub-catchment. It may be possible to divert water to a different sub-catchment only if the greenfield runoff rate for that watercourse is not exceeded.

18.4 It is unlikely to be acceptable to transfer water from a site which would naturally drain to a different watercourse catchment. If the fall of the site includes part of a catchment which natural drains to another watercourse, we would expect any proposed discharge rate to be limited to the greenfield of the “natural” catchment area. This may necessitate large volumes of water being stored on site to achieve these rates.

18.4 If discharging into an Ordinary Watercourse outside an IDB area where there are known flooding issues, it should not be assumed that the drainage scheme can be free flowing. We would expect that a flood flow e.g. bank full would act as an outfall constraint in modelling calculations.

18.5 Where there are issues of known history of flooding or capacity constraints within a watercourse e.g. Dereham Stream, greenfield runoff rates would need to be carefully considered. It is unlikely we would accept a proposed runoff rate that is greater than the greenfield equivalent (100%, 3.33% and 1% annual probability event or QBAR) without a robust assessment that the flood risk is not increased elsewhere. This would include any proposed design suggesting a discharge of 5 l/s to avoid blockage where there are lower calculated greenfield runoff rates. It is understood that 5 l/s is suggested as a minimum design for pipe outlets where sedimentation may be an issue in line with Sewers for Adoption rather than inclusion of SuDS treatment train and outlet control devices (Chapter 28 of CIRA SuDS Manual (C753)). There are also many priority vortex control devices which can limit discharges below 5l/s which have no reported problems of blockage. Were discharge of surface water should be discharged to ground but cannot be due to constraints such as contaminated land, greenfield rates would also likely produce a low greenfield runoff rate due to the soil type. The LLFA will consider proposals on a site be site basis and agree a rate between 1 to 2 l/s/ha based on other constraints (as in Section 3.3.2 of CIRA SuDS Manual (C753)).

18.6 Drainage strategies must also consider the potential increase in the volume of runoff from a development as a result of increases in the area of impermeable surfaces. Although runoff rates may be restricted to equivalent greenfield rates, the duration over which the site could discharge at this rate is likely to increase (as shown in Policy Box 5).

Policy Box 5: Runoff Volume

CIRIA SuDS Manual (C753)

"Peak rates of surface water runoff discharged from a development (i.e. relatively impermeable) site, if left uncontrolled, are normally significantly greater than from the site in its greenfield state. This is because most of the runoff drains off the surfaces of the developed site much quicker than the greenfield site and there is much more runoff, as less water is able to penetrate the ground or be intercepted in other ways."

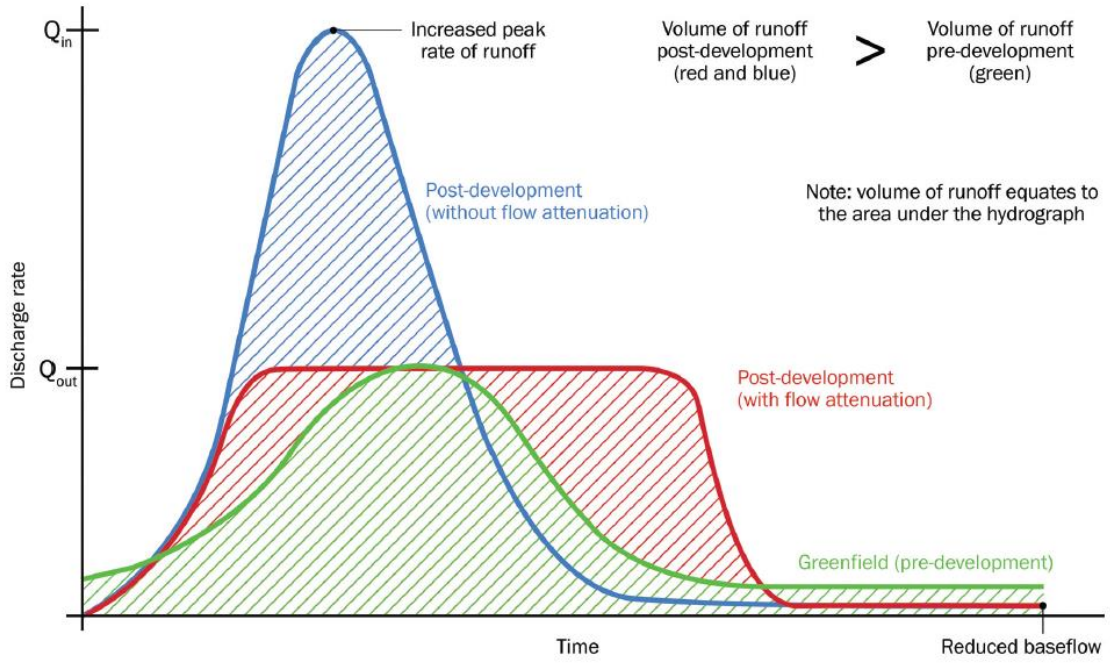

Figure 3.1 Example of a runoff hydrograph

[Reproduced from C753 Suds manual Section 3.1.1 ©CIRIA 2015]

18.7 Where it is not possible to use or dispose of the additional volume of runoff on the site (i.e. through infiltration or water re-use), we would expect that the final runoff rates from the development be restricted further to ensure compliance with Standard S6 of the SuDS Non-Statutory Technical Standards (2015).

18.8 The CIRIA SuDS Manual presents two approaches for the consideration of runoff volume from a development site:

- Approach 1 (Complex) – The additional volume (i.e. the increase from the volume calculated for the greenfield 1% annual probability, 6 hour event as stated in Section 24.10 of the CIRIA SuDS Manual 2015) should be discharged at a rate of 2l/s/ha. or less while still allowing greenfield peak runoff rates for the greenfield runoff volume.
- Approach 2 (Simple) – All runoff from the site should be discharged at a rate of 2l/s/ha or the annual average peak flow rate (QBAR), whichever is the greater.

18.9 Although Approach 2 will require a greater volume of storage than Approach 1, this approach is preferred in Norfolk.

18.10 If complex controls are to be used for control of discharge rates, calculations for the Greenfield runoff rate should be provided for the 100%, 3.33% and 1% annual probability events.

18.11 An assessment of the volume of attenuation storage that would be required on site should be submitted. This should be based on the 1% annual probability critical storm duration with climate change for the site and the allowable discharge rate. FSR (Flood Studies Report) rainfall data should be used for storm durations less than 1 hour and FEH (Flood Estimation Handbook) rainfall data should be used for storm

durations greater than 1 hour when identifying the critical storm duration. The method of attenuation should be identified and located on a plan of the site.

18.12 Urban Creep should be considered in any application to account for increases in impermeable surfaces throughout the lifetime of the development. This should be limited to residential development only and use the allowances shown in Table 4 (LASSO Practice Guidance). Where the inclusion of the appropriate allowance would increase the total impermeable area to greater than 100%, 100% should be used as the maximum

Table 4: Urban Creep Allowances

Residential Development Density Dwellings per hectare (ha)	Change Allowance % of Impermeable Area
≤ 25	10
30	8
35	6
45	4
≥ 50	2
Flats & Apartments	0

19. Climate Change

19.1 All flood risk assessments and surface water drainage strategies are now expected to incorporate the updated Environment Agency climate change allowances for peak river flow and rainfall intensity. This guidance supersedes the previous NPPF climate change allowances.

19.2 The information for the Anglian Region and transitional arrangements for use within the planning process can be found at https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. We highlight that peak river flow climate change allowances should be considered for ordinary watercourses as well as main rivers.

19.3 Further to this, the new allowances should be used to update any detailed design at reserved matters or discharge of conditions planning applications following an outline planning approval where the previous allowances may originally have been applied.

Policy Box 6: Flood risk assessments: climate change allowances

"Making an allowance for climate change in your flood risk assessment will help to minimise vulnerability and provide resilience to flooding and coastal change in the future.

The climate change allowances are predictions of anticipated change for:

- *peak river flow by river basin district*
- *peak rainfall intensity*
- *sea level rise*
- *offshore wind speed and extreme wave height*

They are based on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere. There are different allowances for different epochs or periods of time over the next century."

[https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances]

19.4 For ordinary watercourses we expect anyone undertaking a flood risk assessment to review Table 1 (peak river flows) for the Anglian Region and again assess the lifetime of the development and the vulnerability of the proposed land use. The appropriate allowances (explained in text under Table 2) can be applied to any modelling to assess the flood risk from an ordinary watercourse.

19.5 For the example of housing developments, we would anticipate the central allowance (a 20% increase) is used in the initial design of any surface water drainage system including SuDS, however, the upper end (a 40% increase in rainfall intensity) should also be tested to ensure that there is no additional mitigation required to protect people and property. This upper end scenario could inform any additional mitigation which might be required to prevent an increased risk of flooding such as additional freeboard allowances on drainage infrastructure and / or housing finished ground floor levels.

Table 5: Extract from the Environment Agency Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline), 2016

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Anglian	Upper end	25%	35%	65%
	High central	15%	20%	35%
	Central	10%	15%	25%

Table 6: Extract from the Environment Agency Table 2 peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline), 2016

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 3039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

20 Water Framework Directive and Water Quality

20.1 It is recognised that this guidance does not cover this issue in any detail as we are still working with other Risk Management Authorities to develop it.

20.2 The Environment Agency have standing advice that in general they consider pollution of surface water runoff from residential development to be adequately addressed if SuDS have been provided to manage the runoff. Water quality treatment would not be met if traditional piped drainage schemes are promoted. If piped schemes are promoted as part of a SuDS scheme e.g. pipes connecting to geo-cellular crates or attenuation tank(s), other SuDS components, such as permeable paving, swales, filter drains or strips should also be used to treat water prior to the final discharge.

20.3 Only clean residential roof water can be directly discharge to the water environment (including any watercourse or soakaway) without treatment. The use of oil interceptors are not generally seen as a treatment step in SuDS but could be considered as a pre-treatment stage.

20.4 An applicant should review Section 4 and 26 of CIRIA SuDS Manual (C753), Tables 4.3 and 26.1 in particular, to risk assess the development and likely water quality treatment required as mitigation. In general, housing developments would need to assess if the simple index approach (Section 26.7.1 of the CIRIA SuDS Manual (C753) is as suitable assessment. We would expect this assessment to be included with an application.

21. Management and Maintenance

21.1 The management and maintenance of SuDS should appropriately account for the construction, operation and maintenance requirements of all components of the drainage system (surface and sub-surface). Applicants should sufficiently consider the likely maintenance requirements of new and existing infrastructure, over its design life including the provision of funding during the feasibility and planning

stages of a scheme (in accordance with CIRIA (C753) Part E, Chapter 32, 2015)). It is important that maintenance is also considered in the design of the drainage system and the development site to account for the requirements of undertaking all stages of maintenance work such as ease of access whether this is for personnel, vehicles or machinery.

Policy Box 7: Management and Maintenance

House of Commons Written Statement (HCWS161): Sustainable drainage systems

"in considering planning applications, local planning authorities should consult the relevant lead local flood authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development."

21.2 We therefore require, in accordance with the Written Ministerial Statement, PGG and the SuDS Manual, applicants to provide a management plan and maintenance schedule of work detailing the activities required and who will adopt and maintain the surface water drainage features for the lifetime of the development. The operation, management and maintenance of such systems should be accounted for in any proposed drainage works as early as possible.

21.3 Further guidance regarding the typical key operation and maintenance activities for each type of SuDS component are indicated in Table 32.1 of the SuDS Manual (2015). Further consideration of the frequency of such tasks should be provided.

21.4 Where it is proposed that a community will be adopting SuDS, maintenance plans and schedules should be clearly communicated to any future property owners. This should be done in accordance with section 12 and 11.4 of British Standard BS8582:2013. Such plans should further explain the consequences of not carrying out the maintenance.

21.5 There are several options for adoption and maintenance of SuDS and include:

- Anglian Water will consider adoption of a scheme designed to their standards set out in their manual (further information can found on their website at http://www.anglianwater.co.uk/developers/suds.aspx)
- An Internal Drainage Board will maintain certain watercourses of arterial importance within the IDB Internal Drainage District that are designated by the Board as 'Main Drains' of 'District Drains'. All watercourses within the IDB area generally remain the responsibility of the riparian owner irrespective of their designation as a 'Main Drain'. IDBs also may consider adopting a drainage scheme associated with new development if the site falls within their IDB area. (Details of how to contact the IDB can be found at http://www.ada.org.uk/idb_members_map.html)
- Norfolk County Council Highways Authority will consider adoption of SuDS and drainage schemes which only drain a highway (not additional housing or open space areas). Further information can be found at https://www.norfolk.gov.uk/roads-and-transport/roads/highway-boundaries-new-private-and-adopted-roads/adopted-and-private-roads
- Adoption could be also agreed through a Section 106 Agreement with a Borough, District Town or Parish Council. This could be combined with any public open space maintenance agreement.
- A third party company could be established to adopt and maintain a SuDS Scheme across the whole or part of a development.
- Individual property owners can become responsible for management and maintenance where it falls within their property boundary, however this would not cover any public or open space.

21.6 Where ordinary watercourses or other surface water features are bounding or within the development site, these should also be included within a management plan and maintenance schedule. Were new properties bound a watercourse, each property would have riparian owner responsibilities to undertake maintenance and this should be clearly highlighted to future property owners or tenants. An alternative is to provide other management arrangements for these features such as encompassing them in the responsibilities of any third party company established for the site. A maintenance buffer zone of 10 m is advocated by British Standard BS 8533:2011(section 5.3.3) but discussions should be held with the appropriate

regulatory authority (including an IDB) to discuss requirements. We recommend that at least a 10 m buffer should be allocated to an ordinary watercourse outside of IDB areas to allow for access for maintenance, in line with British Standards.

21.7 Many development sites are constructed on land which may have had an agricultural use. No dwelling should be constructed over an existing culvert that is to remain active and any field drains intercepted on the boundary of the development should be should be diverted so overall land drainage discharge can be maintained.

22 Resistance and Resilience

22.1 Safe access and egress through a new development site should be maintained in accordance with PPG (Paragraph: 039 Reference ID: 7-039-20140306). We expect that any source of flooding is considered and that any areas expected to flood are managed in accordance with DEFRA / Environment Agency Hazard to People Classification/Rating. It should be noted that there are currently no flood warnings provided to notify communities / residents of predicted surface water flooding events. The rapid inundation often experienced with surface water flooding, especially those events caused by convective thunder storms, means that careful consideration should be given to development proposed in areas identified at risk from Environment Agency Mapping.

22.2 The Guidance document "Improving the Flood Performance of New Buildings" by DEFRA dated 2007 can be reviewed when approaching the development of a mitigation strategy. This guidance advocates a hierarchy approach to development with the top of the hierarchy being avoidance of vulnerable development being place at risk of flooding (as stated in NPPF). We expect any resistance and resilience measures to assess the hierarchy of building and site design to avoid the risk in the first instance. Only where it is agreed this is not possible would the other steps be followed e.g. resistance (or prevention) of water entering a building and resilience of the building. Resilience seeks to ensure that if water did enter fabric of the building that the impacts are reduced. The last stage in the hierarchy is repairable design to ensure that any damage is easily repaired or replaced.

22.3 Resistance and resilience measures can also be included where there is a residual risk of flooding e.g. the development has avoided the risk of flooding up to a 1% annual probability plus climate change allowance but there are still properties proposed that would be at risk of 0.1% annual probability flood event. Where this is the case the LLFA would expect as a minimum that property finished ground floor levels (FFL) throughout the development are recommended to be set to a minimum of 300 mm freeboard above the anticipated flood levels in 1% annual probability event plus climate change from any source of flooding. Any source of flooding would also include an assessment to ensure there is 300 mm above anticipated flood levels within the drainage system, to provide protection in the event of an exceedance event. Where there is uncertainty in flood levels, this freeboard level should be increased up to 600 mm. We would expect that there would be a minimum of at least 150 mm freeboard between proposed external ground levels and property FFL. External ground levels should always slope away from any building, especially entrances to avoid ponding of water against or within a structure. An overview of mitigation is expected at an initial planning application stage to establish what is achievable within the development. The LLFA would expect the detailed design to then follow and implement any recommendations.

22.4 The types of mitigation that could be included in any proposal may be limited by the source, depth and velocity of flooding. For example groundwater flooding may require significantly different mitigation to surface water flooding. Examples of resistance and resilience include providing measures such as landscaping of external ground levels to avoid water entering buildings (including basements) or ensuring that essential electrical equipment is located above the expected water level.

Policy Box 8: Flow exceedance management

"For the 1 in 100 year return period event [1% annual probability event] (including relevant design allowances) for the site, flood levels associated with the surface water drainage system should be not less than 300 mm below the finished ground floor levels and the level of any opening into any basement of the proposed buildings on the site.

The design of the drainage system for exceedance flow management should take account of any residual flood risks for the site. An assessment should also be made of the likely significance of risks associated with the following scenarios:

a) a blockage or failure of a drainage system component;

b) failure of any embanked storage facility; and

c) rainfall events that are larger than the storms used for the design of the drainage system."
[British Standard BS8582:2013 Section 5.2.2.6]

22.5 The LLFA would expect that any water from a drainage scheme being managed on site during a 1% annual probability event plus climate change event outside of structures designed to store or convey water will meet recommendations within Table 12.3 of CIRIA Report C635 (2006), i.e. water on minor roads where speed limits are 30 mph will be a maximum of 100 mm deep and car parks would be a maximum of 200 mm deep.

22.6 Standard S9 of the SuDS Non-Statutory Technical Standards (2015) also require an applicant to consider how impacts to people and property will be minimised in the event that the drainage system will be exceeded in an event greater than 1% annual probability event plus climate change.

ANNEX - Reference Documents

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