

September 2015

Kent County Council

Drainage and Planning Policy Statement

Local flood risk management strategy guidance



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1 Role of this Policy Statement

This policy statement sets out how Kent County Council, as Lead Local Flood Authority and statutory consultee, will review drainage strategies and surface water management provisions associated with applications for major development. It is consistent with the Non-Statutory Technical Standards for Sustainable Drainage (as published by Defra in March 2015), and sets out the policy requirements Kent County Council has for sustainable drainage. It should be read in conjunction with:

- the National Planning Policy Framework and,
- any specific policy set out by the relevant Local Planning Authority in their Local Plan.

These documents promote sustainable drainage.

The aim of this policy document is to clarify and reinforce their requirements. It also includes references to other design considerations which impact sustainable drainage design and delivery.

This policy statement should be used by:

- Developers when considering their approach to the development of new sites or redevelopment of brownfield sites,
- Developers or their consultants when preparing submissions to support a planning application for major development,
- Professionals involved in developing drainage schemes including engineering and urban and landscape professionals,
- Development management officers when considering development applications,
- Local Authorities when developing local planning and land-use policy.

2 Introduction

2.1 Background

Kent County Council was made Lead Local Flood Authority for Kent by the Flood and Water Management Act 2010 (the Act). As Lead Local Flood Authority, Kent County Council has a strategic overview of 'local flooding'. Local flooding is defined by the Act as flooding which is caused by:

- **Surface water,**
- **Groundwater, and**
- **Ordinary Watercourses**

The management of surface water on new developments is a key factor in managing local flooding.

At the time of its enactment, the Act did not provide a formal role for Lead Local Flood Authorities within the planning process to influence how surface water was managed within new development. It was the Government's intention that Lead Local Flood Authorities have a role in the delivery of appropriate surface water management provisions within new development, and that they encourage an increase in the uptake of Sustainable Drainage Systems (SuDS), as recommended by the Pitt Review into the Summer 2007 floods.¹

Since commencement of the Act in 2010, the Government has assessed various means of implementing the requirement for sustainable drainage systems. Following a consultation period, the Department for Communities and Local Government issued a Ministerial Statement on 18 December 2014 which outlined the intention to strengthen planning policy and clarified the Government's expectation for the provision of sustainable drainage systems in new developments through the planning process. Subsequent changes have been made to planning regulation to deliver this requirement.

As newly designated statutory consultees, Lead Local Flood Authorities are now required to provide the advice previously provided by the Environment Agency on the management of surface water within new development. Lead Local Flood Authorities have assumed this new role as they hold much of the most relevant information on the causes and consequences of Local Flooding and are therefore better placed to provide appropriate guidance.

2.2 Legislative Framework

As Lead Local Flood Authority within Kent, Kent County Council is required under Article 18 of the Town and Country Planning (Development Management Procedure) (England) Order

¹ Schedule 3 of the Act established each LLFA as a Sustainable Drainage Approving Body. This section of the Act has not been commenced; therefore the requirements for adoption are not in place and are not mandatory.

2015 ('the Development Management Procedure Order') to provide consultation response on the surface water drainage provisions associated with major development.

Major development is defined within the Development Management Procedure Order as development that involves 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.

As a statutory consultee, Kent County Council must provide a substantive response within 21 days of consultation (Article 22 of the Development Management Procedure Order). A substantive response is one which:

- (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.

The Planning and Compulsory Purchase Act 2004 describes the duty to respond as a consultee, including the duty to report to the Secretary of State on compliance with the provision of substantive responses.

2.3 Sustainable Drainage in Planning

Sustainable drainage systems are designed to control surface water as close to its source as possible. They should also aim to closely mimic the natural, pre-development drainage across a site, wherever possible. Well-designed sustainable drainage systems also provide opportunities to:

- reduce the causes and impacts of flooding,
- remove pollutants from urban run-off at source,
- combine water management with green space with benefits for amenity, recreation and wildlife.

The purpose of the planning system is to contribute to the achievement of sustainable development and deliver the requirements of the National Planning Policy Framework

(NPPF). The use of sustainable drainage systems helps to achieve the sustainability objectives of the NPPF.

2.4 Drainage Strategies

Development has the potential to change surface water and ground water flows, depending upon how the surface water is managed within the development proposal. Planning applications for major development should therefore be accompanied by a site-specific **drainage strategy** that demonstrates that the drainage scheme proposed is in compliance with Kent County Council's sustainable drainage policies, as outlined within this document.

The drainage strategy must also demonstrate that the proposed surface water management proposal is consistent and integrated with any other appropriate planning policy and flood risk management measures that are required.

2.5 Strategic Consultation

As the Lead Local Flood Authority, Kent County Council has a consultation role in relation to the preparation of local plans, neighbourhood plans, strategic flood risk assessments and other planning instruments produced by Local Planning Authorities². Kent County Council will provide advice and guidance on local flood risks and appropriate policy for them according to the plan area upon request.

Upon request, Kent County Council will provide information with respect to drainage and local flood risk for individuals and other organisations to utilise in preparation of planning documents.

² National Planning Policy Guidance, Flood Risk and Coastal Change, paragraph 2.

3 Planning policy and guidance for drainage

This section sets out the sources of planning policy relevant to the management of surface water. These will form the basis of Kent County Council's assessment of any submitted drainage strategy. The drainage strategy will need to demonstrate how the development meets these requirements.

3.1 NPPF

The National Planning Policy Framework (NPPF) was published on 27 March 2012; it sets out the Government's planning policies for England and how these are expected to be applied. Planning law requires that applications for planning permission must be determined in accordance with the relevant Local Planning Authority's development plan, following public consultation and with due regard for other material considerations.

The NPPF is itself a material consideration in the determination of planning applications. At the heart of the NPPF is a presumption in favour of sustainable development, excepting where adverse impacts significantly outweigh the benefits (or where specific policies indicate that development should be restricted). Flooding and drainage may also be considered material considerations in the determination of planning applications as their management contributes to sustainable development.

In summary, the NPPF states that planning authorities should:

- direct development away from areas at highest flood risk;
- take the impacts of climate change into account;
- use opportunities offered by new development to reduce the causes and impacts of flooding;
- ensure flood risk is not increased elsewhere;
- give priority to the use of sustainable drainage systems;
- enhance the natural and local environment; and,
- prevent contributing to water pollution.

Paragraphs 100, 103 and 109 of the NPPF (Appendix A) have particular relevance to flooding and drainage.

The NPPF is supported by the **Planning Practice Guidance**³ which provides further advice on how planning can take account of the risks associated with flooding in plan-making and the application process.

³ The Planning Practice Guidance is a web-based resources which can be accessed from the Planning Portal at: http://planningguidance.planningportal.gov.uk/?s=Drainage&post_type=guidance

3.2 Non-statutory technical standards for sustainable drainage

To support the Lead Local Flood Authority's statutory consultee role, Defra published the 'Non-Statutory Technical Standards for Sustainable Drainage Systems' on 23 March 2015. These standards provide advice and guidance for the design, maintenance and operation of sustainable drainage systems.⁴

Further guidance on the application of the Non-Statutory Technical Standards will be provided by Defra and associated stakeholders.

A summary of the requirements of these non-statutory standards is provided in Appendix B. The policies in this policy statement are consistent with the Non-Statutory Technical Standards.

3.3 Local Authority Guidance

Local Planning Authorities are ultimately responsible for determining planning applications and have numerous planning and policy documents to support the delivery of sustainable development within their districts.

3.3.1 Local Plans

National planning policy places Local Plans at the heart of the planning system. Local Plans set out a vision and a framework for future development of the area. Local Plans should be based upon and reflect the presumption in favour of sustainable development. The Local Plans will address housing, the economy, community infrastructure and environmental issues such as adapting to climate change and ensuring high quality design.

The management of flood risk and surface water can be dealt with through policies for sustainable construction, flood risk, open space, landscape character and green infrastructure. These policies may be supported by further Supplementary Planning Documents or guidance notes.

Any drainage strategy should make reference to the relevant Local Plan policy and may also have to provide evidence which supports delivery of biodiversity, amenity and other benefits.

3.3.2 Strategic Flood Risk Assessments (SFRA)

Strategic Flood Risk Assessments are required to inform the development of Local Plans, as stated within the NPPF. A SFRA assesses the risk to an area from flooding from all sources, now and in the future, taking into account climate change and assesses the impact that land use changes and development in the area will have on flood risk. Each Local Planning

⁴ The Non-statutory Technical Standards are published at:
<https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards>

Authority within Kent has prepared and referenced a SFRA within their planning documents. These documents provide key information on sources of flooding and may provide information for specific site allocations.

3.4 Kent County Council Guidance

The Local Flood Risk Management Strategy (the Local Strategy) for Kent sets out a countywide strategy for managing the risks from local flooding. One of the five objectives set out in the Local Strategy specifically states the importance of *'ensuring that development in Kent takes account of flood risk issues and plans to effectively manage any impacts'*.

To support delivery of this objective, Kent County Council has developed guidance to define the approach to planning and design of drainage. When considering surface water drainage within new developments in Kent, it is recommended that reference is made to:

3.4.1 Water. People. Places – a guide for master planning sustainable drainage into developments

This guidance outlines the process for integrating sustainable drainage systems into the master planning of large and small developments⁵. This guidance should be used as part of the initial planning and design process for all types of development.

3.4.2 Kent Design Guide: Making It Happen – Sustainability (drainage systems)

The Kent Design Guide was produced to ensure that all new development results in vibrant, safe, attractive, liveable places. *'Making It Happen'* comprises technical appendices that provide advice and guidance on the design and construction of systems for that Kent County Council may be adopting.

3.4.3 Surface Water Management Plans

Surface Water Management Plans (SWMPs) have been prepared by Kent County Council (in partnership with other relevant stakeholders) to identify specific local actions to manage local flooding. They have been undertaken in areas which were identified as a potential risk from local flooding in the Preliminary Flood Risk Assessment. These studies may provide a greater understanding of the current flood risk. Any proposed development in the locality of a SWMP should include consideration of any findings and recommendations. The areas

⁵ The document can be found at: <http://www.kent.gov.uk/waste-planning-and-land/flooding-and-drainage/sustainable-drainage-systems>

covered by SWMPs are regularly being updated and can be found on the Kent County Council website⁶.

3.5 Other Guidance

In approaching or reviewing design, technical aspects may need clarification and specification in order to satisfy Kent County Council that it meets the required standard. Kent County Council will make reference to good practice presented within the following documents, and would recommend that any designer also refers to:

3.5.1 CIRIA *SuDS Manual (C753)*, 2015

This guidance document provides comprehensive information on the all aspects of the life cycle of sustainable drainage from initial planning, design through to construction and management including landscaping, waste management and costs.

3.5.2 BS 8585:2013 Code of practice for surface water management for development sites

The British Standard gives recommendation on the planning, design, construction and maintenance of surface water management systems for new development and redevelopment sites in minimizing and/or mitigating flooding and maximizing the social and environmental benefits.

3.6 Environmental Drivers

There is an opportunity to add value to a site through an integrated approach to policy goals. The manner in which drainage is delivered has a direct relationship to other policy goals and it presents an opportunity to add value to these areas. In particular water quality protection, biodiversity, open space provision, green infrastructure, amenity and landscape can be enhanced by good drainage design. Policy for these areas is delivered through a number of Acts and regulations as summarised in Figure 1.

⁶ SWMPs can be found at: <http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/surface-water-management-plans>

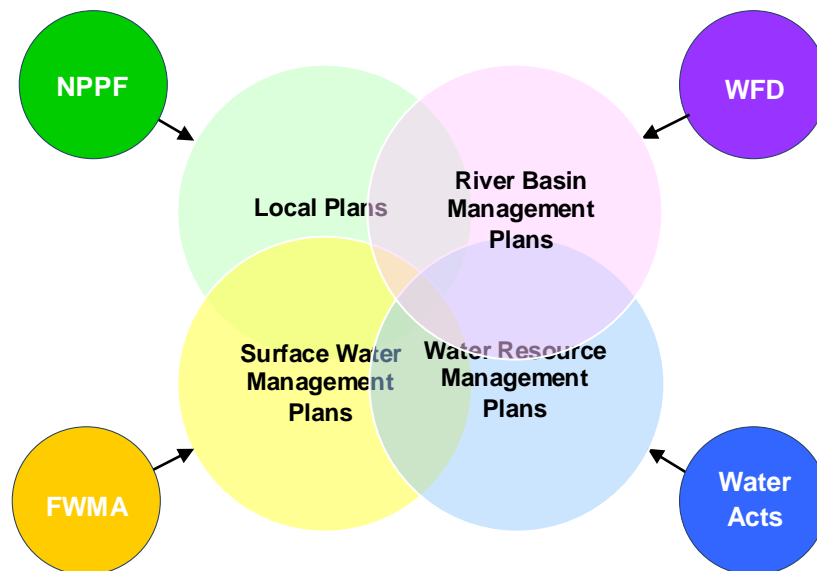


FIGURE 1: INTER-RELATIONSHIPS BETWEEN DIFFERENT AREAS OF WATER POLICY (PLANNING ADVICE FOR INTEGRATED WATER MANAGEMENT, CAMBRIDGE NATURAL CAPITAL LEADERS PLATFORM, 2014)

Through the assessment of drainage proposals, Kent County Council may wish to recognise and identify opportunities to strengthen these other policy goals. Although these opportunities may fall outside of Kent County Council’s immediate statutory remit, we have a duty to raise any issues that fall within these areas with the Local Planning Authority for their consideration in determining the planning application.

3.6.1 Water Framework Directive

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 3242) (WFD) became UK law in December 2003.⁷ The aim of the WFD is to provide the opportunity to plan and deliver a better water environment, focusing on ecology. The WFD aims for the water environment to reach ‘good’ chemical and ecological status in inland and coastal waters by 2015. Planning and programmes are continuing in six year cycles until 2027.

The WFD drives water quality improvement planning along total river catchment areas, with the production of River Basin Management Plans. The directive puts a duty on public bodies to have regard to river basin management plans (and associated supplementary plans) when exercising their functions where it may affect a river basin district.

Controlling water is inherent in the WFD’s objectives, as uncontrolled surface flow or flooding can cause unmanageable quality problems. Sustainable drainage principles are the major weapon in meeting the objectives of the WFD in its continuing cycles.

⁷ More information on the WFD Directive can be found at: http://ec.europa.eu/environment/water/water-framework/index_en.html

3.6.2 Habitats Directive

The EU Habitats Directive was adopted in 1992 (formally known as 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora)⁸. It aims to provide protection to habitats and species which have been designated as being of European significance and sits alongside the EU Birds Directive adopted in 2009.

The sites where such habitats and species are legally protected due to their exceptional importance are known as Natura 2000 sites and this network protects rare, endangered or vulnerable habitats and species. The Natura 2000 network includes Special Areas of Conservation (SACs, identified under the Habitats Directive), Special Protection Areas (SPAs, identified under the Birds Directive) and Ramsar sites (wetlands of international importance designated under the Ramsar Convention). All Natura 2000, or 'European', sites are also classified as Sites of Special Scientific Interest (SSSIs) but not all SSSIs are Natura 2000 sites.

3.6.3 Kent Environment Strategy

Kent County Council has produced a Kent Environment Strategy (KES) setting out how it is proposed to respond to the pressures facing Kent's environment, particularly as a result of carbon emissions and climate change.⁹ This document is currently under revision with partners and will be going for consultation over summer 2015 with a final agreed Strategy in place December 2015. Kent County Council has invited the District Councils in Kent to adopt the strategy in order to provide a basis for co-ordinated action.

The KES recognises that the environment is a key part of the infrastructure supporting the Kent economy. The strategy aims to make the most of environmental opportunities whilst addressing challenges arising from development pressures, need for improved air and water quality, decline in biodiversity and the effects of climate change.

⁸ More information on the Habitats Directive can be found at:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

⁹ The Strategy can be found at: [http://www.kent.gov.uk/about-the-council/strategies-and-](http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/environmental-policies/kent-environment-strategy)

[policies/environment-waste-and-planning-policies/environmental-policies/kent-environment-strategy](http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/environmental-policies/kent-environment-strategy)

4 Drainage Consultation

4.1 Introduction

A drainage strategy should be submitted to the relevant Local Planning Authority along with any planning application for any major development.

It is important that the consultation reflects the level of risk. Consequently consultation may also occur for development, other than major development in areas of higher local flood risk, as described in Section 4.2.

Whilst consultation is not undertaken with Kent County Council for minor development, all applicants should be aware that the NPPF priorities for sustainable drainage apply to all development. Developers for sites with minor development are encouraged to consider the policies outlined in this document with respect to site drainage design. Applicants for these smaller developments are directed to guidance on best practice to help minimise flood risk.

Consultation on flood risk will also occur with other risk management authorities. For example, the management of tidal and fluvial flood risk and the prevention of inappropriate development in the flood-plain remains the responsibility of the Environment Agency. The Environment Agency is also responsible for the management of permitting regulations which may affect discharge to water bodies or the ground. Similarly, if any drainage scheme requires connection to a public sewer, additional approval will be required from the appropriate sewerage undertaker.

A statutory consultation matrix for flood risk areas is shown in Table 1.

TABLE 1: STATUTORY CONSULTATION MATRIX FOR FLOOD RISK AREAS

	Flood Zone 1	Critical Drainage Area	Flood Zone 2	Flood Zone 3
Permitted development	Guidance notes from LLFA and EA			
Minor development	Guidance notes from LLFA	EA	Standing advice EA	EA
Major development	LLFA	EA	LLFA (surface water) EA (river & sea)	LLFA (surface water) EA (river & sea)

Within Flood Zones 2 or 3 (areas of medium/high tidal or fluvial flood risk), a Drainage Strategy should be a component of a wider Flood Risk Assessment and should outline how the management of runoff will not exacerbate the existing flood risk to/from the development proposed.

A Flood Risk Assessment should also be submitted with any application for planning permission on sites in excess of 1 ha in Flood Zone 1 (low flood risk); in these instances the Flood Risk Assessment/Drainage Strategy should be primarily concerned with the management of surface water within the proposed development site.

4.2 Other local flood risks

As Lead Local Flood Authority, Kent County Council has a role to oversee local flood risk in the county. This role includes overseeing the risks arising from surface water and ordinary watercourses. Development at even a minor scale may have the potential to result in significant increases in flood risk associated with ordinary watercourses or in areas of existing drainage problems.

4.2.1 Critical Drainage Areas and Areas of High Local Flood Risk

The Town and Country Planning (General Development Procedure Amendment No. 2, England) Order 2006 introduces the concept of Critical Drainage Areas as *“an area within Flood Zone 1 which has critical drainage problems and which has been notified [to] the local planning authority by the Environment Agency”*. However, no Critical Drainage Areas have yet been defined within Kent.

Kent County Council will work with the Local Planning Authorities to identify ‘Areas of High Local Flood Risk’ for their districts. These areas will be based upon the Surface Water Management Plans that Kent County Council has developed in partnership with other risk managing authorities. Where these areas are identified, all planning applications with potential surface water management implications will need to be submitted with a more rigorous justification of the chosen drainage system and an assessment of its associated impact.

Any drainage strategy submitted to accompany a planning application for major development should make full reference to the most recent available Surface Water Management plan for the area in which the development is planned. Kent County Council’s SWMPs can be found on the County’s website.¹⁰

4.2.2 Ordinary Watercourses

An ‘ordinary watercourse’ is defined as any channel capable of conveying water that is not part of a ‘main river’; it need not have a permanent water level. Small rivers, streams, ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) can all be classified as ‘ordinary watercourses’.

¹⁰ Kent’s SWMPs can be found at: <http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies/surface-water-management-plans>

When considering the development/redevelopment of any site, existing ordinary watercourses should be identified and accommodated within any drainage strategy design. They should be preferably retained as an open feature within a designated corridor, and ideally as public open space.

It is recommended that any discharge to an ordinary watercourse or any modification to an ordinary watercourse be identified and agreed in principle with Kent County Council prior to submission of any planning application. The ability of a watercourse to convey water (and to function as an effective exceedance flow route, where appropriate) will always need to be maintained.

For those watercourses where no flood mapping currently exists, developers should fully consider the potential flood risk arising from them. Where a risk from flooding has been identified, appropriate flood risk mitigation should be identified and agreed with the Local Planning Authority/Kent County Council; development should be avoided in any area likely to be affected by exceedance of the channel's capacity.

Under the terms of the Land Drainage Act 1991, any work or structure that has the potential to affect the flow within any ordinary watercourse requires consent. This will be either from Kent County Council or from an Internal Drainage Board, where they operate.

Culverting of open watercourses will not normally be permitted except where essential to allow highways and/or other infrastructure to cross. In such cases culverts should be designed in accordance with CIRIA *C689: Culvert Design and Operation Guide*, (2010).

If a culverted watercourse crosses a previously developed site, it should be reverted back to open channel, wherever practicable. In any such case, the natural conditions deemed to have existed prior to the culverting taking place should be re-instated.

Measures should be in place to ensure that any future owner of a property through which a watercourse passes is aware of their maintenance responsibilities as a riparian owner.

4.3 Consultation Process

4.3.1 Overview

Consultation with Kent County Council will occur through the planning process. Kent County Council will be notified of the submission of a major planning application by the Local Planning Authorities within Kent (as defined in Section 1.2 above).

A substantive response to the LPA is legally required from Kent County Council within 21 days of consultation.

4.3.2 Pre-application Advice

Incorporating appropriate drainage is easier and more sustainable if it is planned and designed in from the start of a development. Kent County Council welcomes pre-planning consultation to ensure that the issues are appropriately addressed at an early stage.

If an application is submitted which does not comply with the Non-Statutory Technical Standards and/or NPPF, Kent County Council may object to the application. Pre-planning discussions are advocated to avoid this situation.

Relevant questions to ask during the pre-application discussion include:

- Has the means of outfall and location of the final discharge destination in relation to the hierarchy of discharge been considered?
- If the surface water infiltrates to the ground has infiltration testing been undertaken and discussions taken place with the EA and/or water company in relation to pollution risk to any underlying aquifers?
- If the surface water discharges to a water body, ordinary water course or main river, has advice been sought from the Environment Agency/relevant Consenting Authority over the requirement for an Environmental Permit and/or land drainage/flood defence consent?
- If the surface water discharge is to a sewer or highway drain, have discussions taken place with the appropriate sewerage undertaker and Highways Authority?
- Have any specific constraints which may have an impact on the drainage scheme been identified including but not limited to soil geology, topography, and ground water?
- Within the development has the connectivity of the drainage system been determined, for both the impermeable areas around the properties and outside of the properties?
- Are there any off site issues for the surface water discharge which must be considered within design, including but not limited to access across third party land, or offsite works to water bodies?
- As part of the development and the drainage scheme are there any environmental or ecological issues, such as water quality, biodiversity or landscape that need to be considered?
- Will the drainage scheme require phasing and what is the anticipated development programme for the site?
- Will the site require any substantial re-grading which will affect the existing drainage or drainage proposed ?
- Are there any temporary arrangements or interim works that need to be implemented to enable drainage through construction and phasing?
- Have matters surrounding accessibility and future maintenance needs been incorporated into the design?
- Will there be any flood risk features which will require designation under Schedule 1 of the Flood and Water Management Act?

4.3.3 Planning application submission

The Local Planning Authority will confirm that a Drainage Strategy has been submitted with the planning application and pass it to Kent County Council for consultation. Kent County

Council will review the submitted material for adequacy and, depending upon the submission, may request further information. This will be communicated to the applicant via the Local Planning Authority.

In reviewing a drainage application, Kent County Council will, in the first instance, confirm compliance with this policy statement, national planning policy (as defined in the NPPF), and compliance with the Non-Statutory Technical Standards. Local planning requirements (as set out in Local Plans or other local planning documents) and other site-specific land-use factors that affect surface water management will also be referenced, where appropriate. Additionally, Kent County Council will consider adherence to wider environmental principles of the NPPF that may have a bearing on drainage design (for example, water quality, biodiversity and landscape).

A consultation response will be prepared and returned to the Local Planning Authority within the required 21 days following receipt of a suitably detailed submission. The consultation response may result in a request for further information or for planning conditions for subsequent determination.

4.4 Drainage Strategy Development

This section sets out the principles that should be considered when developing a drainage strategy. The drainage strategy will need to incorporate the policies set out in Section 4.

4.4.1 Design Philosophy

Kent County Council recommends that sustainable drainage is considered from the inception of any scheme as an interconnected system that provides additional benefits, rather than as an individual, standalone drainage measure.

The drainage strategy should consider sustainable drainage techniques to manage surface water that work with the natural drainage of the site, retain surface water within the site and manage the risk of flooding during severe storms (both on and off site).

It is important to identify and consider constraints which may impact the manner in which drainage is provided on site. The drainage strategy should take account of existing flow routes, either by incorporating them into the drainage system or designing the layout appropriately.

During the assessment of any site, full reference should be made to any existing flood risk management information that may be available. Accordingly, evidence from both the Strategic Flood Risk Assessment and Kent County Council's Surface Water Management Plan for the area in which the development is being planned should be taken into consideration. If it has been previously identified that the site or its immediate surroundings are susceptible to flooding from any source, the site layout and drainage design should take the existing risk fully into account.

Similarly, if there are any constraints to the utilisation of infiltration (e.g. contaminated land, source protection zones or high groundwater), the drainage design should take these into account.

A recommended approach to masterplanning for sustainable drainage is included within *'Water. People. Places – a guide for master planning sustainable drainage into developments'* – a guidance document which was produced by the Southeast Lead Local Flood Authorities, of which Kent is a member (please refer to Section 3.4.1).

4.4.2 Large sites

Large phased developments or sites with multiple developers may require the development of an overall Surface Water Management Strategy which sets out objectives and parameters for the whole site, but leaves aspects of detailed design for a later stage of planning.

In any such case, a Surface Water Management Strategy will be tied to a planning condition at the outline stage. Further definition would be provided within a detailed Drainage Strategy at each phase of development, which must remain consistent with the overall site strategy. This document may be reviewed as different phases are delivered.

Pre-application discussion is encouraged in the case of phased development to agree the level and detail of any Drainage Strategy to be submitted.

Large sites in close proximity within a locality or catchment are encouraged to cooperate or consult concurrently as there may be opportunities for combined solutions with mutual and greater benefit.

4.4.3 Connection to a public sewer or other drainage system

The proposed point of connection and discharge rate to any destination must be agreed with the relevant owner or responsible body including internal drainage boards, highway authorities, sewerage undertakers, riparian owner, Environment Agency, Canals and River Trust and others. Any connection or discharge must be compliant with regulation or guidance governing the operation of the existing drainage system (e.g. IDB bye-laws or standard specifications for public sewers). Correspondence with the relevant owner or responsible body should be submitted to demonstrate agreement in principle to the discharge and connection point.

Infrastructure for new development should ensure that surface water is always drained and managed separately from foul water. Where a surface water connection to an existing combined sewer is unavoidable, it must be undertaken in such a manner and at such a location so as to facilitate future separation of the surface water from that combined system.

4.4.4 Adoptable highways and drainage

Most major development would normally include some aspect of highway improvement, which may be adopted or require approval by Kent County Council as the Highway

Authority. The provision of drainage to adopted highways is normally subject to Section 38 Agreement, with approval and inspection by Kent County Council as the Highway Authority.

Surface water from a private drive or private land must not discharge onto the highway. It is usual that measures to prevent such discharge are required where vehicular accesses fall towards the highway. It is important to ensure that design criteria for provision of drainage do not conflict with highway objectives or significantly impact other highway arrangements (e.g. adoptable construction standards, proximity to junctions, access widths, visibility splays, pedestrian and vehicle visibility and parking).

These matters are best raised in pre-application discussion with Kent County Council to ensure there will be appropriate arrangements in place for highways and drainage adoption, where appropriate. Highways advice for planning applications is provided on the County's website.¹¹

Highway matters may be reviewed within the consultation by Kent County Council as Lead Local Flood Authority. Kent County Council will endeavour to seek internal consultation on such matters; however, the detail provided within a planning submission may not be sufficient. The response from Kent County Council as Lead Local Flood Authority does not commit Kent County Council as Highways Authority for any particular highways arrangement or extent of adoption and should be confirmed with the Highways team at an appropriate time within the planning and design process.

4.4.5 Flood Risk and Groundwater

The drainage strategy may be constrained if the site is located wholly or partly within Flood Zone 2 or 3 or if the drainage discharges to the ground via infiltration in a source protection zone or area of low permeability.

Consultation with the Environment Agency early in the planning process is recommended to identify any constraints or specific requirements in these areas.

4.4.6 Adoption and Maintenance

Drainage systems may be adopted by the highways authority as part of a highway drainage system or by a sewerage undertaker as a 'public' sewer, provided the systems meet certain standards and specification. Systems may also be adopted by other parties including local councils and private management companies.¹²

¹¹ <http://www.kent.gov.uk/waste-planning-and-land/planning-applications/planning-advice/highway-pre-application-advice>

¹² Adoption as outlined in Schedule 3 of the Flood and Water Management Act is not available within Kent.

The selection of adoption approach for the drainage system will impact the selection of drainage measures for inclusion within a drainage strategy and the layout of the drainage system. Early consideration of adoption extent is therefore recommended.

The design of any drainage system must take into consideration the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any personnel, vehicle or machinery access required to undertake this work. This must be demonstrated through appropriate site layout or noted through the need for further legal agreement for access arrangements.

The continued operation of any drainage system is dependent upon ongoing maintenance which may be undertaken by an adopting authority or management agent; it is therefore necessary that any drainage proposal indicates the intended adopting authority or agent and proposed maintenance requirements.

The management and control of erosion and sediment should be considered throughout design and construction, operation and maintenance.

The Local Planning Authority will be responsible for determining the acceptability and enforcing compliance with any maintenance schedule as required by relevant planning conditions.

4.4.7 Building Regulations

Building Regulations exist to ensure the health, safety, welfare and convenience of people in and around buildings. Part H of the Building Regulations specifically covers drainage. The consultation with the LLFA addresses flood risk to and from developments and does not replace any requirement for Building Regulation approval.

4.5 Consultation Submission Requirements

At a minimum, a drainage strategy must comprise:

- A site layout
- A drainage proposal schematic or sketch
- A description of key drainage features within the drainage scheme (e.g. attenuation volumes, flow control devices etc.)
- Information to support any key assumptions (e.g. impermeable areas, infiltration rates etc.)

The elements included within a drainage strategy are at the applicant's discretion but must be sufficient to enable an assessment of the drainage rationale to be undertaken.

The detail provided in the drainage strategy will reflect the type of planning application submitted, whether 'outline' or 'full'. Details which may require definition and explanation are listed in Table 2.

It is recommended that an applicant seeks confirmation of submission requirements if in doubt through pre-application discussion with Kent County Council. Kent County Council can be contacted via email at:

suds@kent.gov.uk

Kent County Council needs sufficient information to assess the drainage strategy in accordance with the appropriate policies. If insufficient information is submitted then this may delay return of a substantive comment to the planning authority or lead to an objection.

TABLE 2: CONSULTATION SUBMISSION

For outline planning application, details of:	For detailed planning application or discharge of conditions, those listed for an outline planning application as well as details of:
<ul style="list-style-type: none"> • Impermeable area (pre- and post-development) • Discharge location • Infiltration capacity • Design calculations for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate • Inclusion of climate change & future development allowances • Topographical survey of the site • Details of any adjacent water course • Areas of flood risk • Quantification of any surface water flows on-site from off-site locations • Exceedance routes • Offsite works • Consents • Any constraints which affect the proposed development • Locations of sensitive receptors, including groundwater protection zones, habitat designations or archaeological features • Principles of temporary drainage during construction • Proposed extent of adoption strategy • Phasing • Correspondence from any receiving authority or permitting authority 	<ul style="list-style-type: none"> • Final design calculations • Plan of proposed SuDS with sub-catchment areas including impermeable areas and phasing • Existing and proposed site sections and site levels • Long sections and cross sections for the proposed drainage system • Details of connections to watercourses and sewers • Soil and groundwater conditions if discharging to ground, tested to the appropriate standard • Operational characteristics of any mechanical features • Access arrangements for all proposed drainage measures • Management plan for all non-adopted drainage with extents of responsibilities • Landscape planting scheme if proposing vegetated sustainable drainage measures • Plan for management of construction impacts including any diversions, erosion control, phasing and maintenance period (pre-adoption) • Correspondence from any receiving authority or permitting authority

5 Policies for Sustainable Drainage

5.1 Introduction

A range of sustainable drainage techniques may be utilised across a site to manage the surface water runoff from the planned development; the use of more than one technique will often be appropriate to achieve the objectives of sustainable development on any given site (notwithstanding situations which may still arise where a conventional solution may be the most appropriate).

Given the range of design options to provide a drainage solution, Kent County Council has defined:

- **Drainage Policies** (SuDS Policy 1 through 6) that set out the requirements for a drainage strategy to be compliant with the NPPF (Table 3) and guidance within the Non-Statutory Technical Standards for Sustainable Drainage (Table 4).
- **Wider Environment Policies** (SudS Policy 7 through 10) that set out expectations to be considered within a drainage strategy in response to environmental legislation and guidance that Kent County Council and the Local Planning Authorities have a duty to comply with.

These policies summarised in Table 5 reflect the requirements of the Local Flood Risk Management Strategy, Surface Water Management Plans and Local Planning Authority Local Plans. Sufficient information must be submitted to demonstrate compliance.

TABLE 5: KENT COUNTY COUNCIL SUDS POLICIES

Policy	Summary
SuDS Policy 1	Follow the drainage hierarchy
SuDS Policy 2	Manage Flood Risk Through Design
SuDS Policy 3	Mimic Natural Flows and Drainage Flow Paths
SuDS Policy 4	Seek to Reduce Existing Flood Risk
SuDS Policy 5	Maximise Resilience
SuDS Policy 6	Design to be Maintainable
SuDS Policy 7	Safeguard Water Quality
SuDS Policy 8	Design for Amenity and Multi-Functionality
SuDS Policy 9	Enhance Biodiversity
SuDS Policy 10	Link to Wider Landscape Objectives

5.2 Drainage policies

These policies are specified from the NPPF and the guidance within the Non-Statutory Technical Standards for Sustainable Drainage, as published by Defra.

SuDS Policy 1: Follow the drainage hierarchy

Surface runoff not collected for use must be discharged according to the following discharge hierarchy:

- to ground,
- to a surface water body,
- a surface water sewer, highway drain, or another drainage system, or
- to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewage undertaker.

The selection of a discharge point should be clearly demonstrated and evidenced.

When development occurs, the urbanisation process within a catchment affects the natural hydrology; if the destination of the water is altered this may result in:

- a reduced supply of rainfall to groundwater,
- an accelerated passage of flow to the receiving watercourses, and
- water directed away from existing receiving catchments.

In order to maintain the natural balance of the water cycle, the above discharge hierarchy must be observed. Where development results in changes in runoff destinations, the design must account for how the surface flows are managed and demonstrate it does not exacerbate off-site flood risk.

Any development application would need to be accompanied by evidence from appropriate authorities indicating the acceptability of a discharge location and consent to connect.

Other consents by regulation may be required in relation to the discharge location (e.g. Environmental Permit Flood Defence consent and Ordinary Watercourse consent). Kent County Council may recommend consultation with other authorities in these instances.

SuDS Policy 2: Manage Flood Risk Through Design

It is essential that the drainage scheme proposed:

- protects people and property on the development site from flooding; and,
- does not create any additional flood risk outside of the development in any part of the catchment, either upstream or downstream.

Any drainage scheme must manage all sources of surface water, including exceedance flows and surface flows from offsite, provide for emergency ingress and egress and ensure adequate connectivity.

The drainage system must be designed to operate without any flooding occurring during any rainfall event up to (and including) the critical 1 in 30 year storm (3.33% AEP). The system must also be able to accommodate the rainfall generated by events of varying durations and intensities up to (and including) the critical, climate change adjusted 1 in 100 year storm (1% AEP) without any on-site property flooding and without exacerbating the off-site flood-risk. Sufficient steps are to be taken to ensure that any surface flows between the 1 in 30 and 1 in 100 year events are retained on site. The choice of where these volumes are accommodated may be within the drainage system itself or within other areas designated within the site for conveyance and storage.

Exceedance flows that cannot be contained within the drainage system shall be managed in flood conveyance routes. The primary consideration shall be risks to people and property on and off site.

Access should be maintained into and through the site for emergency vehicles during all storms up to (and including) the critical, climate-change adjusted 1 in 100 year event. The drainage application must give consideration to flood risk vulnerability classifications (as defined through Planning Practice Guidance to the National Planning Policy Framework), as specific measures or protections may be assessed and need to be agreed with the appropriate authority.

The time required for the storage to accept further storm flows should be considered, especially if downstream flood levels can affect the outfall. Attenuation storage volume provided by any drainage area should half empty within 24 hours so that it can receive runoff from subsequent storms. If the drain down time (full to empty) is more than 24 hours, then long duration events should be assessed to ensure that drainage is not compromised by inundation (e.g. periods of wetting on vegetation or slope failure).

If the proposed system connects to an existing drainage system, whether it is a sewer, highway drain, water body or sustainable drainage system, consideration must be given to the operational capacity and functionality of the existing system to ensure that no adverse impacts result or flood risk is increased on-site or off site.

If a proposed development is to be delivered in phases, a commitment should be made for a site-wide SuDS scheme to be delivered with the first phase of development, designed to be capable of accommodating the runoff from each of the subsequent phases. If this is not possible, the runoff from each separate phase must be controlled independently. Whichever approach is taken, the control of surface water runoff during construction should be considered.

SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

Drainage schemes should be designed to match greenfield discharge rates and follow natural drainage routes as far as possible.

Runoff rates should match greenfield runoff rates, follow natural or existing drainage routes, utilise existing natural low-lying areas or conveyance pathways, and match infiltration rates and discharges as far as possible for all events up to and including the climate-change adjusted 1 in 100 year (1% AEP) design event.

By mimicking the natural drainage flow paths and working within the landscape, more effective and cost-efficient design can be developed. Working with existing natural gradients also avoids any reliance on pumped drainage, with its associated energy use and failure risk. The natural environment including woods, trees and hedgerows can play a part in water management.

Redevelopment on brownfield land has the potential to rectify or reduce flood risk. For developments which were previously developed, the peak runoff rate from the development must be as close to the greenfield runoff rate from the development as reasonably practicable for the same rainfall event, but must not exceed the rate of discharge from the development prior to redevelopment for that event. The discharge rate must also take account of climate change.

SuDS Policy 4: Seek to Reduce Existing Flood Risk

New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.

Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at the masterplanning stage of design and subsequently incorporated at the detailed design stage.

Paragraph 100 of the National Planning Policy Framework outlines how flood risk management bodies should seek to manage flood risk through using opportunities offered by new development to reduce the causes and impacts of flooding, taking the predicted effects of climate change into account.

As Lead Local Flood Authority, Kent County Council will endeavour to ensure that this principle is applied across the County. Where a developer's Surface Water Management

Strategy has identified that there are existing flood risks affecting a site or its surroundings, there would be an expectation that the developer manages the identified risk appropriately to ensure that there are no on/off site impacts as a result of any development. Similarly, where there are opportunities to reduce the off-site flood risk through carefully considered on-site surface water management, we will encourage developers to explore these fully.

SuDS Policy 5: Maximise Resilience

The design of the drainage system must account for the likely impacts of climate change and changes in impermeable area over the design life of the development. Appropriate allowances should be applied in each case.

A sustainable drainage approach which considers control of surface runoff at the surface and at source is preferred and should be considered prior to other design solutions.

There is unequivocal evidence that the global climate is warming and a near scientific consensus that this is a result of human activities. In July 2009, the UK Climate Impacts Program (UKCIP) and DEFRA produced projections (UKCP09) for climate at national and regional levels for the years 2020, 2050 and 2080. These projections include increased average and maximum temperatures, increased seasonality of rainfall and a rise in sea levels (CiWEM, Multi-Functional Urban Green Infrastructure, 2010).

A Foresight report, investigating the potential impact of climate change on flooding, identified that changes were likely to be largest in urban areas with rainfall intensities rising by up to 40% by 2080 and the costs of defending the UK increasing by four or eight fold.

Design of drainage systems utilising a sustainable drainage design approach and reducing reliance on below grade systems in pipes and tanks, provides greater flexibility to accommodate change in the peak and volumes of surface runoff. Sustainable measures which control flow rates near to the source and which maximise natural losses through infiltration and evaporation are preferred. Operation of surface systems is also more easily observed and maintained.

Vegetated measures may also mitigate increased temperatures and reduce the urban heat island effect within urban areas through shading and cooling. The ASCCUE Project²⁵ (Adaptation Strategies for Climate Change in the Urban Environment) by Manchester University found that an increase in green areas of 10% will keep temperatures at or below current temperatures up until the 2080s.

A recent trend in development has also been the conversion of permeable surfaces to impermeable over time (e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas). The consideration of urban creep should be assessed on a site by site basis but is limited to residential development only.

The appropriate allowance for the increase of impermeable area from urban creep must be included in the design of the drainage system over the lifetime of the proposed development. The allowances set out in Table 6 must be applied to the impermeable area within the property curtilage according to the proposed development density.

TABLE 6: IMPERMEABLE AREA ALLOWANCES FOR URBAN CREEP

Residential development density (Dwellings per hectare)	Change allowance (% of impermeable area)
≤ 25	10
30	8
35	6
45	4
≥ 50	2
Flats & Apartments	0

SuDS Policy 6: Design to be Maintainable

A drainage scheme maintenance plan should be prepared which demonstrates a schedule of activities, access points, outfalls and any biodiversity considerations.

The maintenance plan should also include an indication of the adopting or maintaining authority or organisation and may require inclusion within a register of drainage features.

The drainage system must be designed to take account of the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any personnel, vehicle or machinery access required to undertake this work. Without maintenance, the function of drainage systems may alter. Increased leaf litter, sediments and colonisation of vegetation may clog drainage measures or impact the characteristics of operational controls.

The drainage strategy must demonstrate that adequate access is available and practicable for personnel and equipment either through an appropriate layout or legal agreement to provide agreed access arrangements in perpetuity. Consideration should also be given to the Construction Design and Management regulations for health and safety purposes.

Wherever possible, it is preferable that drainage schemes should be designed at the surface to allow easy inspection and maintenance. Drainage maintenance can usually be incorporated as part of a typical landscape maintenance specification.

With surface water drainage systems, a careful balance must be struck over the creation of habitats. The encouragement of certain protected species or creation of protected habitats may conflict with the regular maintenance works essential to ensuring long term functionality of the drainage measures. An awareness of any biodiversity objectives should be considered as part of a maintenance plan for the drainage measures, specifically timing of vegetation cuts and silt removal to ensure no conflict with nesting or specific life stages of biota.

Where, in particular circumstances, underground techniques are used, more extensive inspection processes will be necessary, for example where longer pipe runs are used, CCTV surveys may be required. All inlet, outlet and control structures must be indicated and known to the appropriate adopting authority to be protected from blockage and located near the surface, to allow for easy management during routine maintenance visits.

An operation and/or maintenance plan should be provided which indicates a schedule and time of activities, as well as critical controls or components of the drainage scheme. This plan should include an indication of the roles and responsibilities for each authority or organisation which may have a responsibility for maintenance activities. Any inter-connectivity with or reliance upon other drainage systems should be indicated. Where automatic systems form part of the operational functionality of a drainage system, then processes should be in place to allow immediate action in terms of restoration of performance.

As Lead Local Flood Authority, Kent County Council has a duty to maintain a register of structures or features which are likely to have a significant effect on flood risk. Drainage schemes within new developments may include structures or features that will be required to be included within the register.

5.3 Environmental Policies

These policies are driven by environmental legislation and guidance that Kent County Council and the Local Planning Authorities have a duty to comply with.

SuDS Policy 7: Safeguard Water Quality

When designing a surface water management scheme, full consideration should be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system.

Interception of small rainfall events should be incorporated into the design of the drainage system.

Paragraph 109 of the National Planning Policy Framework states that the planning system should contribute to/enhance the natural and local environment by preventing both new and existing development from contributing to (or being put at unacceptable risk from)

Additionally, the Water Framework Directive has been established to improve and integrate the way water bodies are managed throughout Europe. It provides a legal framework to protect and restore clean water throughout Europe to ensure its long-term sustainable use. In particular it will help deal with diffuse pollution which remains a big issue following improvements to most point source discharges.

The design of any drainage proposal should therefore ensure that surface water discharges do not adversely impact the water quality of receiving water bodies, both during construction and when operational. Sustainable drainage design principles have the potential to reduce the risk of pollution, particularly through managing the surface water runoff close to the source and on the surface. Below grade pipes and tanks which are efficient for drainage purposes may not provide appropriate water quality treatment.

Runoff from small rainfall events can pose a particular problem for water quality. The 'first flush' of runoff contains the initial flush of pollutants that has built-up on surfaces during the preceding dry period. It is possible to get a high initial pollution concentration for relatively small rainfall events.

Rainfall events that are less than or equal to 5mm in depth also comprise more than half of the rainfall events across the UK. The volume of runoff from these small events therefore can cumulatively contribute significantly to total pollutant loadings from the site over a specified period of time. Interception of an initial rainfall depth of 5 mm would mimic greenfield response characteristics in that small rainfall event do not generally produce any run-off.

Kent County Council would expect that developers demonstrate that the first 5 mm of any rainfall event can be accommodated and disposed of on-site, rather than being discharged to any receiving watercourse or surface water sewer. This can easily be achieved through the inclusion of sustainable drainage measures such as infiltration systems, rain gardens, bioretention systems, swales, and permeable pavement.

Where it proves exceptionally difficult to achieve this principle, it must be demonstrated that any water leaving the site has been appropriately treated to remove any potential pollutants.

When discharging to the ground, ground conditions and locations of any source protection zones should be confirmed.

SuDS Policy 8: Design for Amenity and Multi-Functionality

Drainage design should in the first instance consider opportunities for inclusion of amenity and biodiversity objectives and thus provide multi-functional use of open space with appropriate design for drainage measures within the public realm.

Where land performs a range of functions it affords a far greater range of social, environmental and economic benefits than might otherwise be delivered (Landscape Institute Position Statement, Green Infrastructure). Open spaces are often multifunctional, fulfilling several different valuable roles; for example, in the main they may be for recreational use, but they may also provide valuable wildlife habitat, an attractive landscape, paths for walking and cycling and space for community events.

Well-designed, open, sustainable drainage measures may also provide this degree of opportunity, optimising all of these functions in a way which fits with the surrounding landscape. For example, park areas which can be used as temporary flood storage during heavy rainfall events, and wetlands being used to deliver amenity value and habitat as well as water treatment. The aim should be to create networks of high quality open space which adapt for attenuation of surface water, sports and play and enhancement of biodiversity.

Large open spaces are most appropriate for sustainable drainage features which can offer a wider combined, multi-functional use; however, small spaces can be designed to offer multiple benefits and all opportunities should be considered, regardless of site-size.

Permeable paving in town squares can be used to improve the design quality of the space while increasing land permeability. Similarly, tree pits can improve amenity value while delivering flood mitigation opportunities.

In designing open spaces and appropriate drainage, a key driver may be that efficiently utilising the open space areas delivers drainage functions at the same time and therefore does not result in any further reduction of developable area. A second advantage which has been documented through residential surveys in Kent is the perceived increased value when sustainable drainage measures are incorporated into landscaped areas.

The integration of sustainable drainage measures into open spaces can introduce open water and variable ground surfaces into the public realm with associated risks of: drowning; slips, trips and falls; waterborne disease; and bird strike if near airports. In the majority of situations these potential risks can be assessed and removed through good site design. Reference should be made to best practice for appropriate design is provided in CIRIA's 'SuDS Manual'.

SuDS Policy 9: Enhance Biodiversity

Drainage design should in the first instance consider opportunities for biodiversity enhancement, through provision of appropriately designed surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification.

Biodiversity is defined as the variety of life on Earth. As a result of human impacts, the rate of species extinction over the last 200 years is far higher than in any period of the preceding 65 million years. In the UK, freshwater ecosystems are at the most risk and populations of key species have declined significantly.

The NPPF requires that Local Planning Authorities set out a strategic approach to plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure (NPPF para 114). Maximising the ecological value of drainage systems is consistent with national and local policies which aim to conserve and enhance biodiversity. This is underpinned by a variety of legislation including the biodiversity 'duty' for public bodies which is enshrined in the Natural Environment and Rural Communities (NERC) Act 2006.

Kent County Council's 'SuDS and Biodiversity' project (2014) has demonstrated that drainage schemes within residential areas contribute to the biodiversity of the local area and provide important habitats for animals and plants that would otherwise be absent. In some cases invertebrate species of significant nature conservation value have been found.

A number of key factors were identified to strongly influence the biodiversity value of the sustainable drainage features. These included:

- connectivity with other waterbodies and habitats,
- planting assemblage and cover,
- waterbody design,
- retained water,
- fish/wild fowl presence, and
- water quality.

The design of any drainage scheme can provide an opportunity for increasing biodiversity value by including surface vegetated systems with some retained water and through ensuring appropriate edge treatments and gradients. Review of engineering design by an ecologist may identify simple improvements in pond design and planting specification that would maximise the biodiversity potential.

SuDS Policy 10: Link to Wider Landscape Objectives

Drainage design should consider in the first instance opportunities to contribute to the wider landscape and ensure proposals are coherent with the surrounding landscape character area.

The landscape character of Kent is defined by its topography, flora and fauna, land use and cultural associations. Of particular importance are areas defined within Areas of Natural Beauty, Ramsar sites, National Nature Reserves, Sites of Special Specific Interest as well as local nature reserves, priority habitat and species areas, Kent Biodiversity Action Plan species and habitats, and other conservation areas.

The form of drainage provision with any new development within or adjacent to any of these areas has the potential to contribute or detract from the wider landscape. Working with the landscape to provide drainage may promote other opportunities with greater benefits for biodiversity but also provide greater attractiveness. The linear nature of many SuDS features can help create green corridors through developments; these are important for wildlife and ensure that the associated development is connected with its surrounding environment.

When assessing drainage design, particularly surface systems, it is important to consider the drainage scheme in the context of the surrounding landscape character area. Landscape Character Assessments are valuable in understanding how to create a landscape with its proposed sustainable drainage scheme for a development so it fits into the landscape and townscape of the area. Effective integration will also require carefully researched and selected plants, which work to improve the local green infrastructure.

Glossary

Aquifer	A source of groundwater comprising water-bearing rock, sand or gravel capable of yielding significant quantities of water.	Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Attenuation	Attenuation is the process of water retention on site and slowly releasing it in a controlled discharge to a surface water or combined drain or watercourse. The amount of discharge will vary depending whether it is a brown or greenfield site. For brownfield sites the developer must determine the likely run off and agree an acceptable discharge with the LLFA, environment agency or water authority.	Flood Risk Assessment	An appraisal of the flood risks that may affect development or increase flood risk elsewhere
		Flood Zones	Flood Zones provide a general indication of flood risk, mainly used for spatial planning.
Brownfield site	Any land or site that has been previously developed.	Floodplain	An area of land that would naturally flood from a watercourse, an estuary or the sea.
Catchment	The area contributing surface water flow to a point on a drainage or river system.	Freeboard	A vertical distance that allows for a margin of safety to account for uncertainties.
CIRIA	Construction Industry Research and Information Association. www.ciria.org	Flood and Water Management Act	The Flood and Water Management Act clarifies the legislative framework for managing surface water flood risk in England.
Climate change	Long-term variations in global temperature and weather patterns both natural and as a result of human activity (anthropogenic) such as greenhouse gas emissions	Flow control device	A device used to manage the movement of surface water into and out of an attenuation facility.
Culvert	A structure which fully contains a watercourse as it passes through an embankment or below ground.	Geocellular storage systems	Modular plastic systems with a high void ratio, typically placed below ground which allow for storage of storm water to infiltrate or discharge to another system.
Development	The undertaking of building, engineering, mining or other operations in, on, over or under land or the making of any material change in the use of any buildings or other land.	Gravity drainage	Drainage which runs through pipework installed to a fall, and not therefore under pressure.
Flood event	A flooding incident usually in response to severe weather or a combination of flood generating characteristics.	Greenfield	Undeveloped land.

Greenfield runoff rate	The rate of runoff which would occur from a site that was undeveloped and undisturbed.	Overland Flow	Flooding caused by surface water runoff when rainfall intensity exceeds the infiltration capacity of the ground, or when the soil is so saturated that it cannot accept any more water.
Groundwater	Water that exists beneath the ground in underground aquifers and streams.	Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium.
Groundwater flooding	Flooding caused by groundwater rising and escaping due to sustained periods of higher than average rainfall (years) or a reduction in abstraction for water supply.	Pitt Review	An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Impermeable	Will not allow water to pass through it.	Rainwater harvesting	Collection and Re-use or recycling of rainwater for the purpose of garden irrigation, car washing, toilet flushing etc.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.	Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Infiltration	Infiltration or soakaway is the temporary storage of water to allow it to naturally soak away into the ground. Because water soaks into the ground gradually, reduces the risk of flooding downstream. Infiltration may be used where there is no surface water sewer or where existing systems are at full capacity. Infiltration helps to recharge natural ground water levels.	Source Protection Zone	Defined areas showing the risk of contamination to selected groundwater sources used for public drinking water supply.
		Strategic Flood Risk Assessment	A study to examine flood risk issues on a sub-regional scale, typically for a river catchment or local authority area during the preparation of a development plan.
Local Flood Risk Management Strategy	Strategy outlining the Lead Local Flood Authority's approach to local flood risk management as well as recording how this approach has been developed and agreed.	Surface water flooding	Flooding caused by the combination of pluvial flooding, sewer flooding, flooding from open channels and culverted urban watercourses and overland flows from groundwater springs
Main River	A watercourse designated on a statutory map of Main rivers, maintained by Department for Environment, Food and Rural Affairs (Defra).	Surface Water Management Plan	A study undertaken in consultation with key local partners to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long term.
Mitigation measure	A generic term used in this guide to refer to an element of development design which may be used to manage flood risk to the development, or to avoid an increase in flood risk elsewhere.	SUDS	Sustainable (urban) drainage systems. A sequence of management practices and control structures that are designed to drain surface water in a more sustainable manner.
National Planning Policy Framework	Framework setting out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.	Watercourse	A term including all rivers, streams, ditches drains cuts culverts dykes sluices and passages through which water flows.

Appendix A. National Planning Policy Framework (Extract)

100	<p>Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:</p> <ul style="list-style-type: none"> • applying the Sequential Test; • if necessary, applying the Exception Test; • safeguarding land from development that is required for current and future flood management; • using opportunities offered by new development to reduce the causes and impacts of flooding; and • where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations
103	<p>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 that:</p> <ul style="list-style-type: none"> • within the site, the most vulnerable development is located in areas of lowest flood risk unless there are 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.
109	<p>The planning system should contribute to and enhance the natural and local environment by:</p> <ul style="list-style-type: none"> • protecting and enhancing valued landscapes, geological conservation interests and soils; • recognising the wider benefits of ecosystem services; • minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; • preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and • remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Appendix B. Non-Statutory Technical Standards for Sustainable Drainage

<p>Flood risk outside the development</p>	<p>Flood risk within the development</p>
<p>S1 Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply.</p>	<p>S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.</p>
<p>Peak flow control</p>	<p>S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.</p>
<p>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 and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.</p>	<p>S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.</p>
<p>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 and the 1 in 100 year rainfall event must 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.</p>	<p>Structural Integrity</p>
<p>Volume control</p>	<p>S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.</p>
<p>S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.</p>	<p>S11 The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.</p>
<p>S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.</p>	<p>Designing for maintenance considerations</p>
<p>S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.</p>	<p>S12 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.</p>
	<p>Construction</p>
	<p>S13 The mode of construction of any communication with an existing sewer or drainage system just be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.</p>
	<p>S14 Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.</p>