

Surface Water Drainage Summary Pro-forma (2017)

Introduction (with links)

Surrey County Council recommends that this pro-forma should be completed in full and accompany the submitted drainage statement and sufficient additional evidence to confirm the information supplied. This information should be submitted with any planning application which seeks permission for ‘major’ development. This information contained in this form will be used by Surrey County Council in its role as Lead Local Flood Authority and ‘statutory consultee’ on SuDs for all ‘major’ planning applications. The pro-forma follows the national non-statutory technical SuDS standards ([Defra 2015](#)) is supported by the [Defra/EA Guidance on Rainfall Runoff Management](#) and can be completed using freely available tools including [SuDS Tools](#). The pro-forma should be considered alongside other supporting SuDS Guidance (particularly the LASOO Guidance available [online](#)), but focuses on NPPF paragraphs 103 and 109: ensuring flood risk is not increased on or off-site and using SuDS as the primary drainage option. The SuDS solution must operate effectively for as long as the development exists and consideration of maintenance and management must be clearly demonstrated throughout its lifetime.

A summary of the evidential information to be provided at each stage of planning is provided in Appendix A

Pre-application advice (fees may apply) and existing flood risk information is available from Surrey County Council – SuDS@surreycc.gov.uk

1. Site Details

Site/development name	
Address & post code	
Grid reference	
LPA reference	
Type of application (e.g. full, outline etc)	
Is the existing site developed or greenfield?	
Total site area	
Site area served by proposed drainage system (excluding open space) (Ha)*	
REFERENCES of topographical survey plan showing existing site layout, drainage system and site levels	

* The Greenfield runoff off rate from the development should either be calculated for the entire area or the part that forms the drainage network for the site; whatever the size of site and type of drainage technique. See section 3. Greenfield runoff rate is to be used to assess the requirements for limiting discharge flow rates and attenuation storage for the same area as chosen for greenfield rates. Please refer to the EA Rainfall Runoff Management document or CIRIA manual for further details.

2. Impermeable Area and Existing Drainage

	Existing (E)	Proposed (P)	Difference (P-E)	NOTES AND REQUIRED EVIDENCE
Impermeable area (Ha) (plan of areas and values) A 10% addition for urban creep to be included within proposed area				If the proposed amount of impermeable surface is greater than existing, then runoff rates and volumes will increase and will need to be attenuated. The national standards require that runoff for previously developed sites should be as close to greenfield rates/volumes as possible. Evidence: Plan showing impermeable areas, total area calculations +10% urban creep
Existing Drainage Method (infiltration/watercourse/sewer)				Evidence: Existing drainage plan showing location of drainage elements

3. Proposed Surface Water Discharge Method according to SuDS Hierarchy (see Appendix B)

SUDS HIERARCHY (see Appendix B)	Proposed (tick all that apply)	Reference of evidence that this is possible or not practicable	NOTES AND REQUIRED EVIDENCE
			Evidence must be provided to demonstrate that the proposed Sustainable Drainage proposal has had regard to the SuDS hierarchy
Reduced at source			Evidence: Details of amount of runoff reduced and storage provided
Infiltration to ground			Evidence: The results of infiltration tests in soakaway locations. If infiltration is deemed not viable clear site specific evidence must be provided see Section 6 (infiltration)
Attenuated volume and discharge to watercourse			Evidence: Details of any watercourse to which the site drains including cross-sections of any adjacent water courses for appropriate distance upstream and downstream of the discharge point (as agreed with the LLFA and/or EA) see Section 7 (attenuated discharge)
Attenuated volume and discharge to surface water sewer			Evidence: Confirmation from sewer provider of agreed discharge rate and that sufficient capacity exists for this connection see Section 7 (attenuated discharge)
Attenuated volume and discharge to combined/foul water sewer			Evidence: Confirmation from sewer provider of agreed discharge rate and that sufficient capacity exists for this connection see Section 7 (attenuated discharge)
	Drawings provided		NOTES AND REQUIRED EVIDENCE
Drawings and Details (e.g. Existing and proposed drainage, Topography, Impermeable areas, cross sections of SuDS elements)			Evidence: Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. If the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

4. Calculate Peak Discharge Rates – Technical Standards S2 and S3

This is the maximum flow rate at which surface water runoff leaves the site during the critical storm event.

	Greenfield Rates (l/s)	Brownfield rates (l/s) (as appropriate)	Proposed Rates (l/s)	Difference (Proposed-Existing) (l/s)	NOTES AND REQUIRED EVIDENCE
Qbar					Mean annual Greenfield peak flow - QBAR is approx. 1 in 2 storm events. Qbar_{rural} should be used for this value. If the site is currently developed, the appropriate figures should be used to calculate Qbar (and associated rates) in proportion to the amount of existing hardstanding present on the site. Use Qbar_{rural} and Qbar_{urban} as appropriate and prorata'd to effectively model the site.
1 in 1					Proposed discharge rates (with mitigation) should be as close to greenfield as possible and should be no greater than existing rates for all corresponding storm events. To mitigate for climate change the proposed 1 in 100 +CC must be no greater than the existing 1 in 100 runoff rate. If not, flood risk increases under climate change. See appendix 2 for climate change allowances. Evidence: Micro-drainage (or equivalent) calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology
1 in 30					
1 in 100					
1 in 100 plus 20% climate change *	N/A	N/A			

5. Calculate discharge volumes - Technical Standards S4 to S8

The total volume of water leaving the development site for a particular rainfall event. Introducing new impermeable surfaces increases surface water runoff and may increase flood risk outside the development.

	Greenfield Volume (m ³)	Brownfield Volume (m ³) (as appropriate)	Proposed Volume (m ³)	Difference (m ³) (Proposed-Existing)	NOTES AND REQUIRED EVIDENCE
1 in 1					Proposed discharge volumes (without mitigation) should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased attenuation must be provided to reduce volume outflow during the event. To mitigate for climate change the volume discharge from site must be no greater than the existing 1 in 100 storm event. Evidence: Micro-drainage (or equivalent) calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology
1 in 30					
1 in 100					
1 in 100 plus 20% climate change *	N/A	N/A			

* Climate Change Allowance for Rainfall Intensity Increases

Designs should include 20% provision for increases in surface water runoff due to climate change during the development's lifetime – please see Appendix C

6. Infiltration

If infiltration is proposed – sufficient evidence must be provided to show that this is viable and does not increase flood risk

	SITE INFORMATION	Details	NOTES AND REQUIRED EVIDENCE
Is infiltration feasible?	Yes/No?		Evidence: If deemed NOT FEASIBLE clear site specific evidence (site investigation, site photos, infiltration testing) must be provided to demonstrate why
Infiltration information	Site Geology (bedrock and superficial)		Avoid infiltrating in made ground. Evidence: suitable mapping/SI
	Is ground water table less than 3m below ground?		If yes, please provide details of the site's hydrology. Evidence : Site Investigation
	Is the site within a known Source Protection Zones (SPZ) or above a Major Aquifer?		Refer to Environment Agency website to identify and source protection zones (SPZ). Evidence: Adequate water treatment stages must be provided
	Infiltration rate used in calculations		Infiltration rates should be no lower than 1×10^{-6} m/s. Evidence: infiltration testing according to BRE 365 or equivalent
	Were infiltration rates obtained by desk study or on site infiltration testing?		Evidence: Infiltration rates solely estimated from desk studies are only suitable at outline planning applications unless clear site specific evidence can be provided and a back-up attenuation scheme is provided
	Is the site contaminated? If yes, consider advice from EA on whether infiltration is acceptable.		Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered
Design details	Infiltration type (soakaway, deep bore, blanket etc)		Evidence: Suitable designs must be provided
	Storage volume provided within infiltration feature (m ³)		Infiltration must be designed to ensure that at a minimum no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (+CC allowance) event Evidence: Calculations showing available volume of proposed infiltration device and storage. Plan and Cross sectional drawings of proposed infiltration.
	State the vertical distance between any proposed infiltration device base and the normal ground water (GW) level		1m (min) is required between the base of the infiltration device & the water table to protect groundwater quality & ensure groundwater doesn't enter infiltration devices.
	Half drain times of infiltration features (hr)		Evidence: Suitable calculations
	Factor of safety used in infiltration calculations		Evidence: Suitable calculations
	Minimum distance of infiltration from buildings		Evidence: Minimum distance should be >5m unless designed specifically to reduce impact on adjacent buildings.

7. Attenuated storage

In order to minimise the negative impact on flood risk resulting from any increase in runoff rate or volume from the proposed development, attenuation storage must be provided. Installed flow restriction and stored the attenuation volumes should ensure final discharge from the site at the rates and volumes set out in sections 4 and 5. If some of the stored volume of water can be infiltrated back into the ground, the remainder can be discharged at a rate at or below greenfield rates. A combined storage calculation using the partial infiltration rate and the attenuation rate used to slow the runoff from site.

ATTENUATION DETAILS	Details	NOTES AND REQUIRED EVIDENCE
How are flow rates being restricted?		Hydrobrakes can be used where rates are >2l/s. Orifice plates with an opening <75mm in open systems may require pre-screening.
Storage volume provided (m ³) (excluding non-void spaces)		Volume provided to attenuate on site to discharging at existing rates. See section 5. Evidence: Attenuation must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (+CC allowance) event. A 10% additional allowance should be included for underground attenuation systems which cannot be fully accessed/cleansed as well as the provision of u/s siltation protection and access/jetting points. Calculations showing available volume of proposed attenuation storage. Plan and Cross sectional drawings of proposed storage
How will the storage be provided on site?		
Half drain times of attenuation feature (hr)		Evidence: suitable calculations to show feature

8. Construction and Exceedance Planning - Technical Standards S9 and S14

CONSIDERATION	Details	NOTES AND REQUIRED EVIDENCE
How will exceedance/infrastructure failure events be catered on site without significantly increasing flood risks (both on site and outside the development)? Technical Standard S9		Evidence: Topographic plan showing flow routes for events above those designed – routing of water away from existing properties and critical infrastructure. Retained water should not cause property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths and not preventing safe access/egress
Drainage during construction period: temporary drainage, pollution prevention and protection of existing/part built drainage systems. Technical Standard S14		Provide details of how drainage will be managed during the construction period including any necessary connections, impacts, diversions and erosion control. How pollution prevention for any local watercourses will be considered – especially siltation from runoff Evidence: Construction phasing plan, construction environmental management plan (CEMP) or other statements

9. Management and Maintenance of SuDs - Technical Standards S10 to S12

Details are required to be provided of the management and maintenance plan for the SuDS, including for the individual plots, in perpetuity.

<p>How is the entire drainage system to be maintained in perpetuity?</p>		<p>Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided to show that all parts of SuDs are effective and robust. It should consider how the SuDs will perform and develop over time anticipating any additional maintenance tasks to ensure the system continues to perform as designed. Responsibility for the management and maintenance of each element of the SUDS scheme will also need to be detailed within the Management Plan. Where open water is involved please provide a health and safety plan within the management plan.</p> <p>Evidence: A maintenance schedule describes what work is to be done and when it is to be done using frequency and performance requirements as appropriate.</p>
<p>Please confirm the owners/adopters of the entire drainage system throughout the development. Please list all the owners.</p>		<p>If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit should be submitted</p> <p>Evidence: statement of ownership or plan on complex sites</p>
<p>Please demonstrate that any third party agreements required for adoption or using land outside the application site have been secured.</p>		<p>Evidence: proof of agreements (at least in principle at planning approval stage) with adopters or external landowners</p>

10. Additional Considerations to comply with the Technical Standards and other legislation

Water Quality – Appropriate level and stages of water treatment must be used to prevent pollution of the environment (SuDS manual CIRIA C753)

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.

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. (e.g. BS or kitemarked)

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.

S13 The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.

The above form should be completed using evidence from information which should be appended to this form/within the planning submission. The information being submitted should be proportionate to the site conditions, flood risks and magnitude of development. It should serve as a summary of the drainage proposals and should clearly show that the proposed discharge rate and volume as a result of development will not be increasing. Where there is an increase in discharge rate or volume due to development, then the relevant section of this form must be completed with clear evidence demonstrating how the greenfield rates (or as close to them as possible if a brownfield site) will be met.

This form is completed using factual information and can be used as a summary of the surface water drainage strategy on this site.

Form completed by:.....

Contact details: Tel.....Email.....

Qualification of person responsible for signing off this pro-forma:

Company:.....,

On behalf of (Client's details):

Date:.....

Appendix A

Evidence to be submitted at each stage of planning

Pre-app	Outline	Full	Reserved	Discharge	Document submitted
✓	✓	✓			Flood Risk Assessment/Statement
✓	✓	✓			Drainage Strategy/Statement & sketch layout plan
	✓				Preliminary layout drawings
	✓				Preliminary "Outline" hydraulic calculations
	✓				Preliminary landscape proposals
	✓				Ground investigation report (for infiltration)
	✓	✓			Evidence of third party agreement for discharge to their system (in principle/ consent to discharge)
		✓		✓	Maintenance program and on-going maintenance responsibilities
		✓	✓		Detailed development layout
		✓	✓	✓	Detailed flood & drainage design drawings
		✓	✓	✓	Full Structural, hydraulic & ground investigations
		✓	✓	✓	Geotechnical factual and interpretive reports, including infiltration results
		✓	✓	✓	Detailed landscaping details
		✓	✓	✓	Discharge agreements (temporary and permanent)
		✓	✓	✓	Development Management & Construction Phasing Plan

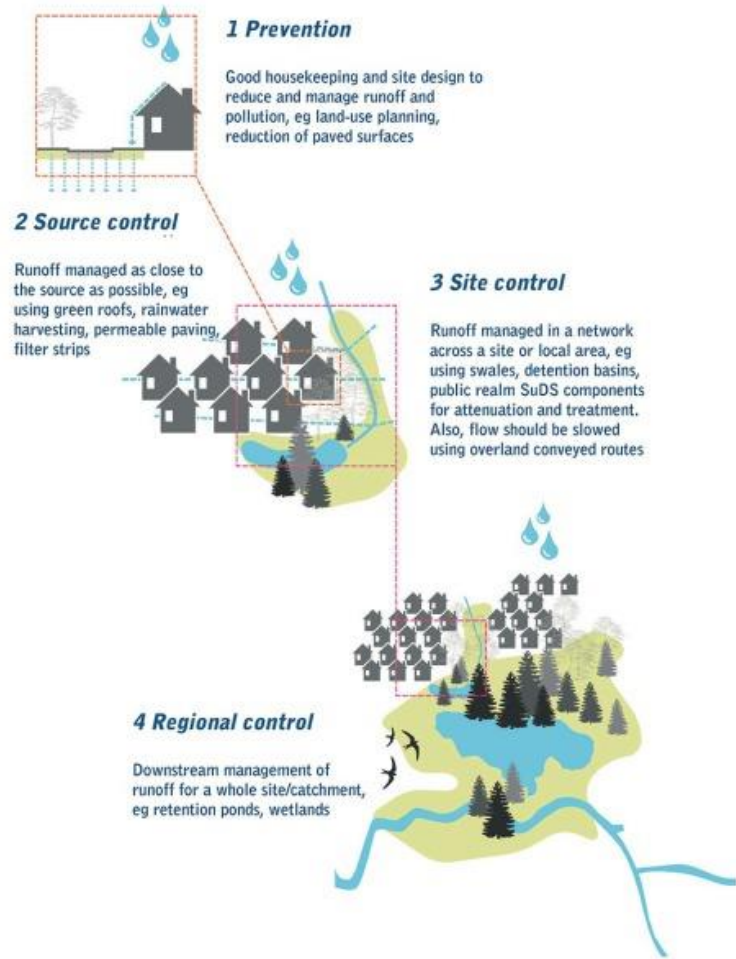
This chart details the minimum evidence required to be submitted regarding surface water drainage provision at each stage of planning:

At Outline Planning stage enough evidence must be provided to prove that a viable method of draining the site has been provided which does not increase local flood risk

At Full Application, Discharge of Conditions or Reserved Matters stage suitable evidence must be provided to show that all the requirements of the national standards have been met

Appendix B

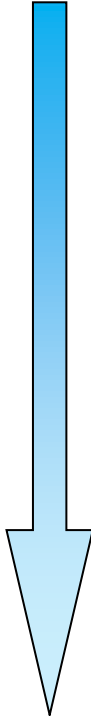
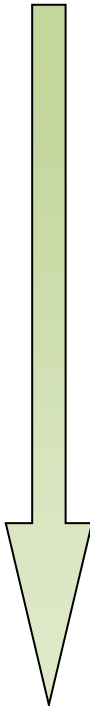
SuDS Treatment Train



Dickie, S, McKay, G, Ions, L, Shaffer, P (2010)
 Planning for SuDS – making it happen, C687,
 CIRIA, London (ISBN: 978-0-86017-687-9).

Discharge Hierarchy

Sustainability Hierarchy

DISCHARGE CHOICE		SUSTAINABILITY CHOICE				
Discharge Hierarchy	SuDS Type	Sustainability Level	SuDS Technique	Flood Reduction	Pollution Reduction	Wildlife & Landscape Benefit
MUST BE CONSIDERED FIRST 	Source Control	MOST SUSTAINABLE (PREFERRED) 	Green/Living Roofs & Walls	✓	✓	✓
	OPTION 1 Infiltration To Ground		Infiltration:	✓	✓	✓
	OPTION 2 Attenuation and Discharge:		Filter strips and Swales	✓	✓	✓
	To Pond, Ordinary Watercourse or Main River		Basins and ponds:	✓	✓	✓
	OPTION 3 Attenuation and Discharge		Permeable Surfaces & filter drains:	✓	✓	
ONLY IF ALL OTHER OPTIONS ARE UNVAILABLE	OPTION 4 Attenuation and Discharge		Tanks & Piped Systems:	✓		
	To Foul or Highways sewer (only in exceptional circumstances)		<ul style="list-style-type: none"> Crated Attenuation Tanks Oversize pipes 			

Appendix C

Climate change allowances

In February 2016 there was a change to the EA climate change advice to modify the allowance levels for rainfall when designing surface water drainage: to 20% CC allowance for 1 in 100 year events but with a 40% sensitivity test. (please note the advice for river flow levels also changed – please contact the Environment Agency for more details)

Applicants should design the discharge rates and attenuation on site to accommodate the 1:100 year +20% CC event and understand the flooding implications for the +40% CC event.

If the implications are significant i.e. the site contains “highly vulnerable” or “critical infrastructure” receptors, could flood another development or put people at risk then a view should be taken to provide more attenuation to meet the 40% CC event. This will tie into designing for exceedance principles.

An example: Attenuation basin designed to accommodate the 1:100 year + 20% climate change event, during the modelling of the 40% cc event the water level of the basin rises by 340mm, which equates to 40mm over the 300mm already freeboard provided. Therefore a suitable mitigation would be to provide freeboard of 350mm instead of 300mm, in order to ensure the development doesn't flood third parties downstream for the extreme 40% cc scenario.

Extract taken from Environment Agency publication; *Adapting to Climate Change: Advice for Flood and Coastal Risk Management Authorities:*

What are the climate change allowances?

To assess the potential impacts that climate change may have on extreme rainfall, river flood flows, sea level rise and storm surges, climate change allowances are provided in Annex 1. The climate change allowances quantify the potential change (as either mm or percentage increase, depending on the variable) to the baseline. The climate change allowances are based on the best available, credible, peer-reviewed scientific evidence from UKCP09, but given the complexity of the science around climatic projections, there are significant uncertainties attributed to the climate change allowances. This is why the climate change allowances are presented as a range of possibilities (Lower, Central, Higher Central and Upper), to reflect the potential variation in climate change impacts over three epochs from the present day to 2115. It is recommended that the performance of flood risk management options are assessed against all of the change allowances covering the whole of the decision lifetime.

Change to extreme rainfall intensity compared to a 1961-90 baseline Applies across all of England			
Climate Change scenario	Total potential change anticipated for '2020s' (2015-39)	Total potential change anticipated for '2050s' (2040-2069)	Total potential change anticipated for '2080s' (2070-2115)
Upper estimate	10%	20%	40%
Central estimate	5%	10%	20%