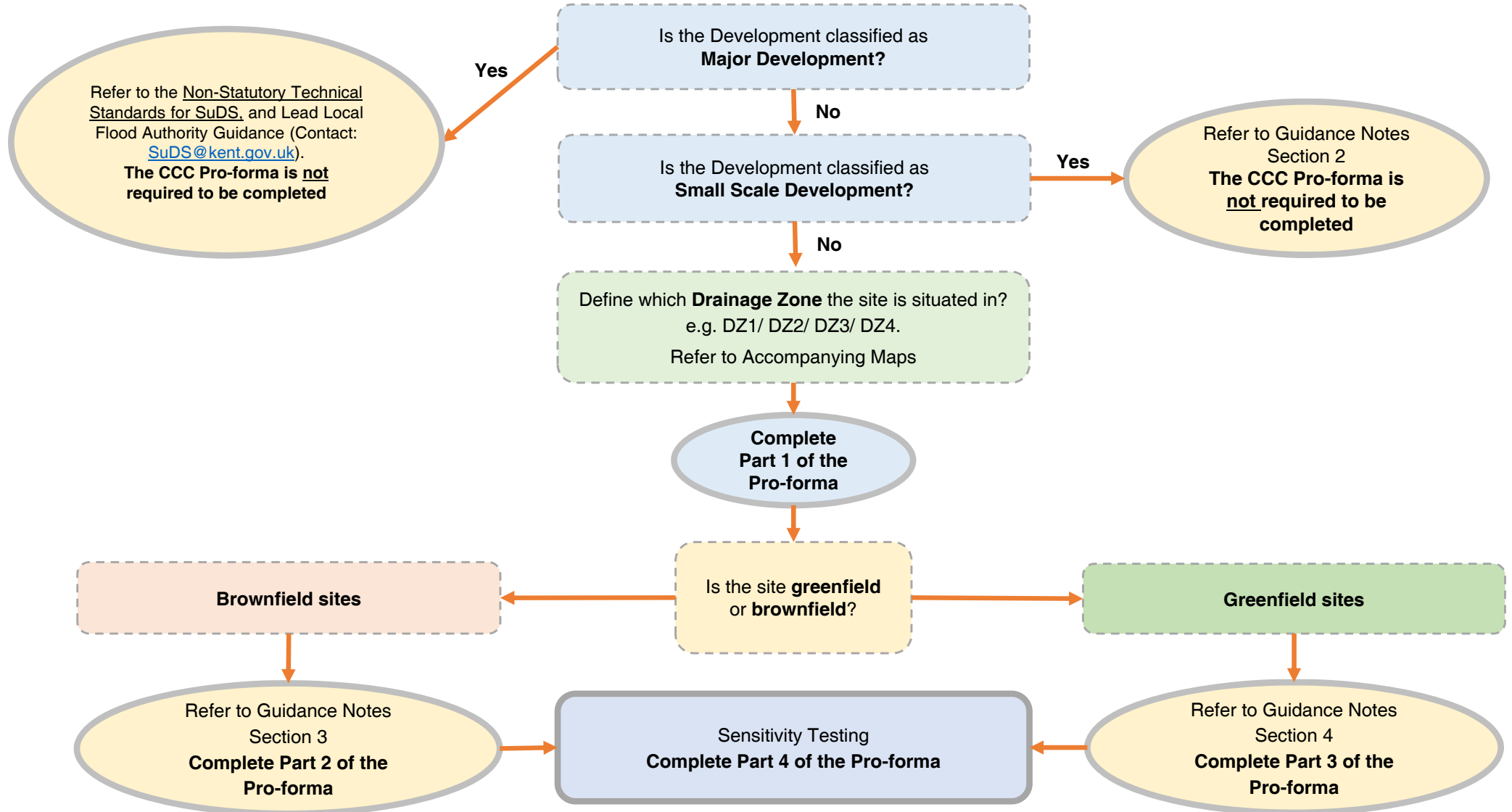
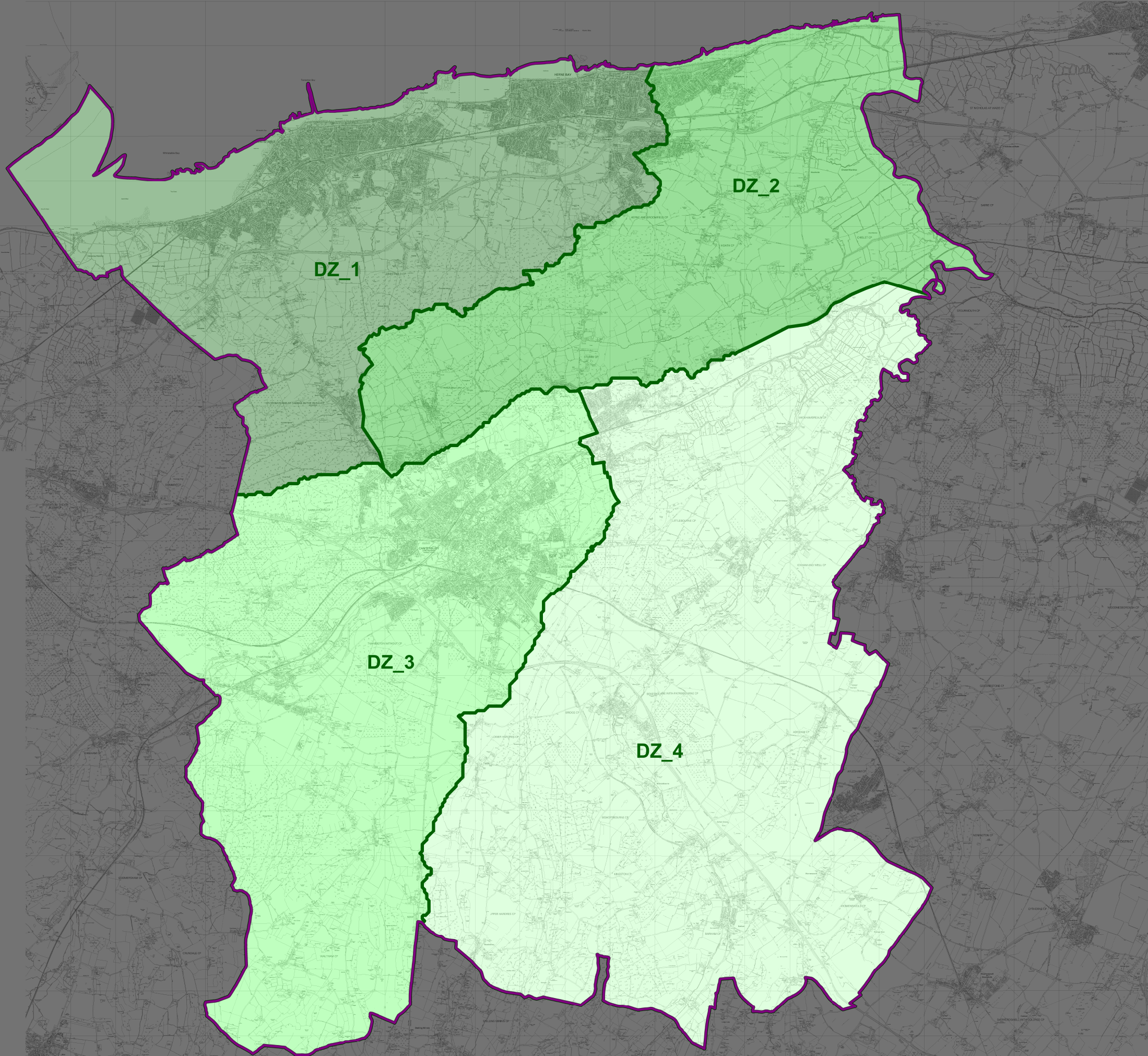


## Canterbury City Council Surface Water Drainage Pro-forma Flow Chart

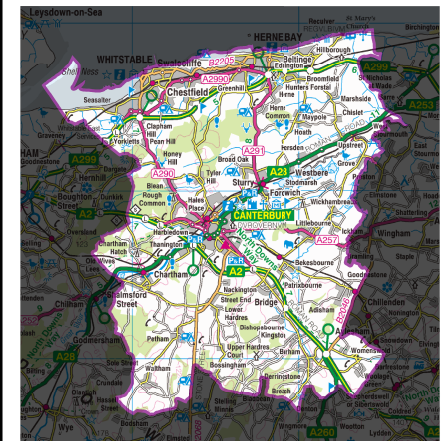











## Drainage Zones

Canterbury City Council  
Strategic Flood Risk Assessment



### Legend

-  Drainage Zone 1
-  Drainage Zone 2
-  Drainage Zone 3
-  Drainage Zone 4
-  Canterbury City Council Boundary

Users should note that these extents are mapped at 1:10,000 scale, as appropriate to the level of the investigation and are based on information available. Amendments may be required in the future to account for information gathered subsequently e.g. observations following flood events.

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Drawn: BW	Date: 29-05-2018	Original @
Checked: KT	Date: 03-09-2018	A3
Approved: SMB	Date: 03-09-2018	
Drawing Number: Drainage Zones	Revision Number: Rev0	Sheet Number: 1 of 1
		Status: FINAL

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## Guidance Note – Canterbury City Council Surface Water Drainage Pro-forma

New development within the Canterbury District has the potential to increase the rate at which surface water runoff is discharged from a site and if unmanaged, this can increase the risk of flooding. In general, this risk can be mitigated by ensuring that the rate of discharge is not increased by the development through the use of Sustainable Drainage systems (SuDS). This Guidance Note is designed to assist developers to complete the **Surface Water Drainage Pro-forma**. Canterbury City Council requires all developers to complete this pro-forma for ALL developments that are not classified as ‘small scale’.

Whilst this document is meant to provide general drainage guidance to developments across the entire of Canterbury District, it is recognised that there may be specific locations that are more sensitive to flooding and therefore, Canterbury City Council reserve the right to alter or introduce additional requirements to ensure that developments do not increase the risk of flooding.

In accordance with the National Planning Policy Framework (NPPF) 2018 and Non-statutory Technical Standards for SuDS (NTSS), it is preferable to provide a drainage solution which replicates surface water runoff under greenfield conditions. The estimated peak runoff rate from a development site in its greenfield condition is referred to as the ‘greenfield runoff rate’, and the return period of the rainfall event will dictate the greenfield runoff rate for that specific return period. The greenfield runoff rate is dependent on several key site characteristics; including underlying ground conditions and the topography of the site.

Given that the topography and geology of the Canterbury District varies widely, it is considered inappropriate to request that developers restrict the runoff rates from sites to a specific *single* limiting discharge rate. On this basis, the District has been sub-divided into four “Drainage Zones” and a map delineating each of the identified Drainage Zones is appended to this document.

### **SECTION 1 - Climate Change**

#### Section 1.1 – Impact of Climate Change

The global climate is constantly changing, but it is widely recognised that we are now entering a period of accelerating change. The nature of climate change at a regional level will vary: for the UK, projections of future climate change indicate that more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall of the type responsible for the recent UK flooding could be expected.

To ensure that any recommended mitigation measures are sustainable and effective throughout the lifetime of the development, it is necessary to base the appraisal on the extreme flood level that is commensurate with the planning horizon for the proposed development. The National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance (NPPG) state that residential development should be considered for a minimum of 100 years, but that the lifetime of a non-residential development depends on the characteristics of the development.

The recommended allowances for increases in peak rainfall intensity are applicable nationally and a range of climate change allowances are provided for the different time epochs over the next century. These time epochs correlate with the planning horizons for the varying classifications of development.

For each time epoch, values have been provided which correspond with different levels of statistical confidence in the possible emissions scenarios on which they are calculated. The Environment Agency’s recommended allowances, as of July 2018, are shown in Table 1 below.

Allowance Category (applicable nationwide)	Total potential change anticipated for each epoch		
	2015 to 2039	2040 to 2069	2070 to 2115
Upper End	+10%	+20%	+40%
Central	+5%	+10%	+20%

*Table 1 – Recommended peak rainfall intensity allowance for small and urban catchments (1961 to 1990 baseline)*

These climatic changes can have an impact on the way in which development affects flood risk and are primarily linked to the surface water discharged from the site. As such, any potential increase in future rainfall needs to be taken into consideration when designing surface water drainage systems.

#### Section 1.2 - Which Climate Change Values Should I Use?

When designing surface water drainage systems a ‘central’ allowance should typically be applied. In most instances, for either commercial or residential development, the development lifetime will fall within the 2070 to 2115 epoch and therefore, any references to climate change within this document assume a 20% increase in peak rainfall intensity will be incorporated in the design of surface water drainage system.

The upper end allowance should also be considered in order to test the sensitivity of a drainage system to increases in peak rainfall intensity. An increase of 40% should be considered to represent an exceedance event (sensitivity testing). This is discussed further in Section 8 – Sensitivity Testing.

In circumstances where it can be demonstrated that the lifetime of the proposed development will be lower, then the corresponding allowances stated in Table 1 can be used to complete the Surface Water Drainage Pro-forma.

## **SECTION 2 - ‘Small Scale Development’**

For certain types of development, the requirement to restrict to the limiting discharge is not considered appropriate; either due to the nature of the development proposals (i.e. no external alterations), or due to the scale of the development being so small that the impact is considered negligible. For such ‘small scale development’, it is not reasonably practicable to require the limiting discharge to be adhered to. The definition of ‘small scale development’ has been based on the definition of ‘minor development’ taken from the National Planning Practice Guidance (NPPG) accompanying the National Planning Policy Framework (NPPF).



- Minor non-residential extensions: industrial/commercial/leisure, extensions etc. with a footprint less than 25 square metres.
- Householder development: e.g. sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself, that have a footprint less than 30 square meters.
- Change of use/alterations to an existing development: development that does not increase the size of buildings e.g. alterations to external appearance. This includes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats.

***If the proposed development meets the criteria outlined above and is classified as small scale development, the developer is not required to complete the Surface Water Drainage Pro-forma.***\*

*\* Nevertheless, small scale development should aim to provide a betterment in respect to the risk of flooding from surface water. Priority should therefore be given to the use of SuDS (where practicable) in accordance with the CIRIA SuDS Manual (C753) and the NPPF (2018).*

### **SECTION 3 – Brownfield Development Sites**

For brownfield sites, all developments must make best endeavours to reduce the post development discharge rates to greenfield rates, under all return period rainfall events. Only if it can be demonstrated that it is not possible to achieve the greenfield runoff rate(s), can the rate of surface water discharged from a brownfield development be higher than greenfield runoff rates. In this case the proposals must never exceed 50% of the existing discharge rate for the site, including the appropriate allowance for climate change.

**Exemption:** The 50% reduction requirement may not apply if you are building over an area which consists 100% existing impermeable hardstanding, and there is no opportunity to incorporate SuDS into the scheme. The Applicant will, however, still be required to confirm that there will be no increase in the existing discharge rate to receiving sewers, or watercourses as outlined below. Canterbury City Council may request further information to confirm whether this exemption is applicable on a site by site basis.

#### Section 3.1 - Calculating the Existing Discharge Rates:

Brownfield sites often have existing drainage infrastructure which can increase, or restrict the rate at which surface water runoff is discharged from a site. Consequently, any existing drainage infrastructure at a site should be considered when calculating the rate at which runoff is discharged to any receiving waterbodies or sewers.

If existing drainage features such as; SuDS, storage systems, soakaways, are present onsite, these should also be taken into consideration when calculating the rate and volume of runoff exiting the pre-developed, brownfield site.

There are two approaches acceptable to CCC for calculating the rate of existing discharge from brownfield sites and these are outlined below:

#### *Option 1 - Preferred Option*

If the existing drainage system has been surveyed, or it can be clearly demonstrated that runoff from the existing impermeable surfaces is drained directly to a waterbody or sewer, an assessment of the existing discharge rate should be made based on the capacity and details of the existing drainage system. In this case, any runoff which is not drained directly to the sewer or waterbody should not be included within the pre-development discharge rate calculations. If this option is considered, evidence should be provided within the application which confirms the existing drainage at the site (i.e. photographs of sewer connections, CCTV drainage surveys, existing drainage plans, infiltration test results (if existing soakaways are present), etc.)

#### *Option 2 - Alternative Option*

If the existing drainage system is unknown and there is no evidence of an existing drainage connection between the site and a waterbody or sewer, it should be assumed that the pre-developed brownfield discharge rate (to any waterbody or sewer) is no greater than the greenfield runoff rate for the site.

**If the development site is classified as brownfield, Sections 1, 2 and 4 of the Surface Water Drainage Pro-forma are required to be completed.**

## **SECTION 4 – Greenfield Sites**

The overarching objective of managing surface water runoff discharged from a development site is to reduce the rate of discharge to the corresponding greenfield runoff rate, in order to better replicate pre-developed conditions. By limiting the discharge rate of surface water runoff from the proposed development, it is possible to reduce the risk of flooding to the area surrounding the site. Consequently, it should be clearly demonstrated that the peak rate of runoff from any proposed development site would not increase the risk of flooding both onsite and elsewhere.

Due to varying characteristics across the district, the requirements for limiting the rate of discharge from a development site have been specified for a number of 'Drainage Zones'. The coverage of each Drainage Zone is shown in the map appended to the end of this guidance document.

### Section 4.1 - Drainage Zone 1

Due to the impermeable geological make-up of the northern half of the Canterbury District, the calculated greenfield runoff rates are generally very high. The impermeable nature of the ground in this location means that infiltration rates are often insufficient for the use of infiltration SuDS to be used effectively. As such, surface water runoff is typically discharged either into watercourses, or alternatively into the public sewer network. For this very reason, the burden on the public sewer network is high, an issue which is reflected in the historic sewer flooding records for these areas.

Although it is recognised that greenfield runoff rates will be high across the entire northern half of the District, there are a number of key urban towns (e.g. Whitstable and Herne Bay), which are particularly susceptible to surface water and sewer flooding.

Consequently, the limiting discharge rate for sites located within **Drainage Zone 1** has been set to a specific rate of **4 l/s/ha**, which must be achieved for all return period events.



#### Section 4.2 - Drainage Zones 2, 3 and 4

For the remainder of the district, surface water runoff from a new development should be **restricted to the corresponding greenfield runoff rate**. There are a number of methods by which greenfield runoff rates can be calculated. These are detailed below and provide the developer with the opportunity to undertake bespoke hydrological analysis (to determine a greenfield runoff rates based on site-specific ground conditions), or to use a pre-calculated runoff rate based on the characteristics of each Zone. In either case, it will be the developers' responsibility to provide evidence to demonstrate that the limiting discharge has been derived in accordance with current best practice guidance.

*Method 1 – Calculate the site-specific greenfield runoff rates for the development site.*

The developer should specify within the Surface Water Drainage Pro-forma the hydrological method used to calculate the *site-specific* greenfield runoff rates for the development site. In certain circumstances, it may be possible to discharge at the greenfield runoff rates for all return periods, i.e. the rate of runoff from the developed site should replicate the current day rainfall runoff for each specified return period.

The greenfield runoff rates calculated should be based on current day conditions, and should **not** include an allowance for climate change.

HR Wallingford have produced an online tool for assisting developers and consultants with undertaking greenfield runoff rate calculations, this can be accessed from the following link:  
<http://www.uksuds.com/drainage-calculation-tools/greenfield-runoff-rate-estimation>

*Method 2 – Where the applicant does not have access to the relevant hydrological software and is therefore unable to calculate the site-specific greenfield runoff rates.*

The greenfield runoff rate (Qbar) has been calculated for each for each Drainage Zone using loH Report 124 methodology (refer to Table 3 below). If Method 2 is adopted by the developer, the limiting discharge rates specified in Table 3 below should be applied for all return period events, *including an allowance for climate change*.

Drainage Zone	Limiting Discharge Rate (l/s/ha)
Zone 2	4.0
Zone 3	0.4*
Zone 4	0.5*

*Table 3 – Limiting Discharge Rate for each zone derived using loH Report 124 methodology.*

*\*From Table 3 above it can be seen that the limiting discharge rate for Drainage Zones 3 and 4 are particularly low, primarily as the southern half of the District is underlain by geology which is more likely to have an infiltration rate which is considered suitable for infiltration SuDS to be effectively, e.g. soakaways, permeable surfacing.*

In locations where the infiltration rate is found to be unsuitable for infiltration SuDS (as demonstrated by the results of infiltration testing), it will be necessary to discharge the runoff from the development into either a watercourse, or the public sewer network. Under these circumstances, it may be necessary to recalculate the greenfield runoff rates from the development site using Method 1 (outlined above). The implications of blockage should also be considered if extremely low discharge rates are specified (refer to Section 8).

**If the development site is classified as greenfield, Sections 1, 3 and 4 of the Surface Water Drainage Pro-forma are required to be completed.**

## **SECTION 5 – Method of Discharge**

The drainage hierarchy identifies that the preferred option for discharging surface water runoff from the site is to **infiltrate** water into the ground, as this deals with the water at source and serves to replenish groundwater. If this option is not viable, then the next preferred option is for the runoff to be discharged into a **watercourse**. Only if neither of these options are possible should the water be conducted into the **public sewer system**.

The following sections provide some additional information to assist developers in the completion of the Surface Water Drainage Pro-forma.

### Section 5.1 – Discharge via Infiltration

Where infiltration is the primary route of discharge from a development site, soakage rates should be confirmed by undertaking infiltration testing (in accordance with BRE Digest 365). Results should be submitted for each test to confirm viability of infiltration.

For brownfield sites, discharging surface water runoff via infiltration should be considered above any other method of discharge, even if the existing site currently discharges to a watercourse, or to a public sewer.

If surface water runoff from the proposed development cannot be discharged via infiltration, it will be necessary to provide evidence to justify why this is the case. This information should take into consideration any specific site constraints, or restrictions which could include, but are not limited to the following:

- Poor ground conditions / limited infiltration rate
- High groundwater levels (within 1m of the base of the soakaway)
- Contaminated ground (a contamination report should be provided to support any assumptions)
- Environment Agency's Source Protection Zones (specify which SPZ the site is located in)

In all instances, where infiltration is proposed, details of the proposed SuDS should be provided (e.g. soakaway calculations, permeable paving details, etc.)

### Section 5.2 – Discharge to a Watercourse/Waterbody



In accordance with the drainage hierarchy, if it has been demonstrated that the proposed development cannot discharge surface water runoff via infiltration, then the next preferred option is to discharge surface water to a watercourse/waterbody. When considering this option, the topography of the site should be analysed to ensure that this option is viable and to confirm that the outfall will not become blocked by high water levels in the watercourse.

If discharging to a watercourse/waterbody, a location plan delineating the proximity of the site to the watercourse/waterbody and details of the proposed outfall location will be required to be provided.

For brownfield developments, if an existing connection to a watercourse is to be maintained, details of this outfall and its location should be provided. However, it should be recognised that the presence of an existing connection to a watercourse does not automatically set a precedent and it must be demonstrated why infiltration cannot be utilised.

For all developments, consideration needs to be given to the classification of the watercourse (e.g. EA Main River/ IDB maintained watercourse / ordinary watercourse / privately owned), as at the detailed design stage it will be necessary to apply for consent to discharge into the watercourse from the relevant organisation responsible for the watercourse (e.g. EA/IDB/LLFA). Contact details for the EA, IDB and LLFA are provided below:

Environment Agency:	<a href="mailto:enquiries@environment-agency.gov.uk">enquiries@environment-agency.gov.uk</a>
River Stour Internal Drainage Board:	<a href="mailto:enquiries@riverstouridb.org.uk">enquiries@riverstouridb.org.uk</a>
Lead Local Flood Authority (Kent County Council):	<a href="mailto:SuDS@kent.gov.uk">SuDS@kent.gov.uk</a>

It is also recognised that any new outfalls to the River Stour must include a non-return valve (flap valve) on the outlet into the river. Furthermore, details of any proposed flow control devices and / or attenuation features (e.g. cellular storage crates, detention basins etc.) should also be provided.

If the proposed development cannot discharge into a watercourse/waterbody, it will be necessary to provide justification to demonstrate why this option is not viable (e.g. the absence of a waterbody in close proximity to the site).

Unrestricted discharge into the River Stour will not be permitted, unless it is confirmed with the River Stour Internal Drainage Board, Environment Agency, and Lead Local Flood Authority that there are no alternative more preferable solutions available. If this approach is adopted, unattenuated discharge must be agreed prior to submission of a planning application. For sites on upland areas and for sites which are indirectly connected to the River Great Stour (i.e. via a public sewer), the LPA, EA, IDB & LLFA, would always request attenuation is provided where infiltration is unviable.

For all developments discharging to watercourses the following limitations will apply:

- There is a requirement to manage the first 5mm of rainfall (typically termed the 'first flush'). This should ideally be achieved through the use of open vegetated storage, or infiltration.
- A Flood Risk Activity Permit (FRAP) will be required for all outfall structures into a 'main river'.

- Sufficient pollution treatment should be provided in accordance with the latest EA pollution prevention guidance.

### Section 5.3 – Discharge to a Sewer

In accordance with the drainage hierarchy, if it can be demonstrated that the proposed development cannot discharge via infiltration, and that discharging to a watercourse is not possible, then discharging to the public sewer is likely to be acceptable. However, this option should be considered as a final option for discharging surface water runoff from the development site and discharge to a dedicated public sewer would be the preferred approach.

When considering this option, the topography of the site should be analysed to confirm whether the site can drain via gravity, or alternatively specify whether a pumped system may be required. Gravity systems are always favoured over pumped systems, which rely upon ongoing maintenance to prevent failure. If a pump system is to be used, evidence is required to be submitted to demonstrate why the site cannot be drained by gravity and what mechanisms will be put in place to prevent flooding should the pump system fail (e.g. back-up pumps, alternative battery power supply etc.).

For all developments, there is a requirement to consider the classification of the public sewer (e.g. surface water/ foul/ combined/ other). Discharging surface water to a foul sewer will only be acceptable if it can be demonstrated that there are no surface water or combined sewers available to connect to. Ideally dialogue should be had with the sewerage undertaker (Southern Water) to confirm that discharge to the foul sewer system is acceptable.

If discharging to the public sewer, an annotated site location plan should be submitted delineating the location of the proposed connection(s). Southern Water should also be contacted to ascertain the location of their public sewer assets within close proximity to the site. A copy of the asset location plan should be submitted in support of the Surface Water Drainage Pro-forma.

If an existing connection to a public sewer is to be maintained, details of this outfall and its location should also be provided. However, it should be recognised that the presence of an existing connection to a sewer does not automatically set a precedence and it must be demonstrated why infiltration and/or a connection to a watercourse cannot be specified. Furthermore, details of any proposed flow control devices and/or attenuation features (i.e. cellular storage crates, detention basins etc.) should also be provided for the LPA to review.

Southern Water should be contacted prior to any new connection being made to the public sewer system. Similarly, if any new development is proposed to discharge to the public sewer at a higher rate than the existing site, the sewerage undertaker should be consulted to agree the limiting discharge rate which will be considered acceptable.

If existing sewers have insufficient capacity to accommodate surface water runoff discharged from the development, the LPA may impose a Grampian planning condition to ensure construction does not commence until the upgrades to the sewer system have been completed. The LPA may object to proposals where the details of the proposed drainage solution, and the timescales involved in upgrading sewers to accommodate the development, are not provided. It is recommended that the capacity of the existing sewer system is assessed prior to submission of a planning application.



## **SECTION 6 – Post-development Runoff Rate and Volume**

The rate of runoff from the proposed development should meet the requirements outlined within this guidance document. The Surface Water Drainage Pro-forma requires the limiting discharge rate (or the greenfield runoff rates) to be clearly stated; this is the *maximum* allowable rate of discharge from the site.

The rate of runoff from the proposed development for the 1 in 1 year return period, and the 1 in 100 year return period event (including an appropriate allowance for climate change – refer to Section 1.2) should be provided. Additional runoff rates for other return periods can also be supplied, however, these should not replace the 1:1 and 1:100+cc rates. These values should account for any attenuation provided and should show the details of how the rate has/can be restricted (e.g. a flow control device). Relevant calculation sheets should be provided as supporting evidence.

In certain circumstances, it is recognised that it may not be reasonably practicable to achieve the limiting discharge rate, and therefore a number of exceptions have been outlined in Section 7 below. The post-development discharge rate stated within the pro-forma for the 1 in 1 year event, and 1 in 100 year event (including an allowance for climate change) should therefore state the **peak** rate of discharge from the site. This value should recognise the exceptions outlined below.

Where the proposed development may increase the volume of water discharged off site which could impose a greater risk of flooding, additional volume control should be considered. The LPA may also request post development discharge rates to be reduced further, (e.g. to  $Q_{bar}$ ) to ensure long term storage for stormwater is provided.

## **SECTION 7 – Exceptions**

The overarching objective of managing surface water runoff is to promote sustainable development by ensuring that the risk of flooding from surface water is not increased. However, it is recognised that the requirement to restrict the rate of discharge should not be overly prescriptive and prohibit development unnecessarily. A number of exceptions have therefore been identified which *apply to both greenfield and brownfield sites*:

### Section 7.1 - Small Sites

Whilst the limiting discharge rates set out above are aspirational, it is acknowledged that on some sites such as particularly small developments, it is not viable to attenuate to the limiting discharge rate. One reason may be due to limited space on site which could prevent the required storage from being provided. Although valid for existing development, this should not automatically be deemed as a reason why the limiting discharge cannot be achieved for proposed developments. If limited space is to be used as a justification for not attenuating to the specified rate, then the developer will be required to demonstrate that no viable alternative solutions are available. In this circumstance, the LPA should be consulted.

### Section 7.2 - Reducing the Risk of Blockage in Flow Control Devices

In some situations, it may not be possible to restrict to the required limiting discharge rate. For example, if the attenuated flow rate is too low, this could result in blockages in flow control device. Consequently, in circumstances where it can be demonstrated that it is not possible to achieve the limiting discharge rate, an alternative discharge

rate of 2.0l/s may be considered acceptable. However, higher discharge rates will only be considered acceptable if justification can be provided to CCC to demonstrate that the risk of blockage is considered to be too high.

## **SECTION 8 – Sensitivity Testing**

### Section 8.1 – Exceedance Event

The Surface Water Drainage Pro-forma facilitates the design of surface water drainage systems for new development, ensuring the runoff from a site is limited for the lifetime of the development. Typically, the design event is classified as a rainfall event with a 1 in 100 year return period, including a 20% increase in peak rainfall intensity to account for the impacts of climate change. However, in accordance with the precautionary principle promoted by the NPPF, it is also necessary to consider the impact of an event which exceeds the design event.

Evaluating the response of the proposed drainage system under an event greater than the 1 in 100 year event (which includes a 20% allowance in climate change) will help to assess the sensitivity of the system to changes in peak rainfall intensity, and represents any uncertainty in calculating the rainfall hydrograph or climate change allowance.

Based on the EA's climate change guidance an Upper End climate change allowance of 40% should be used to test the proposed drainage system. This climate change scenario represents the 90<sup>th</sup> percentile (refer to Section 1). Although it is more improbable, a 40% increase in peak rainfall intensity is still possible.

It is therefore a requirement for the developer to consider both the impact on-site and off-site, as a result of an exceedance event. The peak rate of discharge from the proposed drainage system and the volume of additional flood water should be discussed within the Surface Water Drainage Pro-forma for the 1 in 100 year return period rainfall event, including a **40% increase** in peak rainfall intensity. Where applicable, this should include flow route diagrams and areas where flood water could pond.

### Section 8.2 – Blockage Event

It is also necessary to consider the implications of a failure of the proposed drainage system. This is of particular importance for development sites where the proposed method of discharge is to a watercourse, which could exhibit high water levels. High water levels could prevent the site from discharging surface water as the outfall could become submerged. Consequently, it is necessary for the developer to quantify the impact that a 100% blockage scenario could have.

### Section 8.3 – Evaluating the Impacts of a Sensitivity Scenario

Sensitivity testing does not require the developer to design the drainage system to accommodate the 40% climate change allowance scenario, or a 100% blockage scenario, instead the relevant section on the Surface Water Drainage Pro-forma is designed to appraise the sensitivity of the proposed drainage system, to ensure that there is no undue risk to life resulting from a residual risk scenario.

The following points are a guide to enable the developer to consider the impacts on the drainage system, based on the sensitivity tests described above:

On-site impacts: If water is shown to surcharge from the proposed drainage system under either; a 100% blockage, or an exceedance event: *What is the expected depth and velocity of flooding across the site? Can you describe the overland flow route of water leaving the drainage system, based on the topography of the site? What is the risk of internal flooding?*

Off-site impacts: If water is expected to flow off-site during either; a 100% blockage, or an exceedance event: *Can you describe the overland flow route of water leaving the site, based on the topography of the site? What is the risk of flooding off-site? e.g. to nearby properties, pedestrian/vehicular access routes etc.*

***For ALL developments, Sections 4 of the Surface Water Drainage Pro-forma is required to be completed***

Surface Water Drainage Pro-forma

This pro-forma should be completed in support any planning application which is not classified as ‘small scale development’. Refer to the accompanying guidance note for a definition of small scale development.

The accompanying Guidance Note, Drainage Zone Maps and Flow Chart should be referenced when completing this Pro-forma. Whilst these documents are meant to provide general drainage guidance to developments across the entire of Canterbury District, it is recognised that there may be specific locations that are more sensitive to flooding and therefore, Canterbury City Council reserve the right to alter or introduce additional requirements to ensure that developments do not increase the risk of flooding.

**Part 1 – Site Details**

#	Questions	To be completed	Notes for Developers
1.1	Which Drainage Zone is the site located in?	DZ1 / DZ2 / DZ3 / DZ4	Refer to drainage zone mapping appended to the accompanying guidance notes.
1.2	Total site area (ha)		Total area within red line boundary (in hectares).
1.3	Specify the type of development?	Residential / Commercial / Mixed	Delete as necessary.
1.4	Development description?		Provide a brief description of the proposed development.
1.5	Supporting documents (optional):		Provide details of relevant supporting documents and the reference numbers (if applicable) <i>e.g. topographic survey / drainage layout plan.</i>



**Part 2 – Brownfield Sites** (not applicable for greenfield sites – refer to accompanying flow chart for guidance)

#	Questions	To be completed	Notes for Developers
2.1	State the existing discharge method:		Provide details of the current discharge method e.g. infiltration/watercourse/sewer/other (if other, provide details).
2.2	State the <b>existing</b> rate of discharge (l/s):		Provide the <b>peak</b> rate of discharge for the existing impermeable area for a <b>1 in 100 year</b> return period event ( <b>not</b> including an allowance for climate change).
2.3	State the requirement for the maximum limiting discharge rate applicable to your site:		Refer to Section 3 of the accompanying guidance note.
2.4	Will any part of the <b>proposed</b> development discharge via <b>infiltration</b> ?	Yes / No	If yes, refer to question 2.5, if no refer to question 2.6. Refer to Section 5.1 of the accompanying guidance note.
2.5	<b><i>If yes to Question 2.4</i></b>	INFILTRATION	Complete questions <b>a – d</b> . Refer to Section 5.1 of the accompanying guidance note.
2.5	a) Has infiltration testing been undertaken?	Yes / No	If testing has been undertaken, <b>please provide a copy of the results</b> . All infiltration testing should be undertaken in accordance with BRE Digest 365 if infiltration is exclusively specified.
2.5	b) What is the rate of infiltration at the site? (mm/hr)		If testing has been undertaken at multiple locations across the development site, provide a trial pit location plan in addition to a copy of the infiltration testing results. If testing has not been undertaken, please state how this rate has been derived.
2.5	c) State the total impermeable area to be discharged via infiltration (ha):		Provide the total impermeable area (in hectares) which will be discharged via infiltration.

2.5	d)	Details of proposed SuDS		Provide details of any proposed SuDS features, including a site layout plan indicating how these measures are to be incorporated into the proposed development scheme. <b>If the entire site will be discharged via infiltration, continue to question 2.12</b>
2.6	<b>If no to Question 2.4, provide justification why.</b>			Outline the reasons why the development cannot discharge via infiltration. e.g. <i>high water table, local impermeable soils or contamination issues</i> . Refer to Section 5.1 of the accompanying guidance note.
2.7	Will any part of the <b>proposed</b> development discharge to a <b>surface waterbody</b> ?		Yes / No	If yes refer to question 2.8, if no refer to question 2.9. Refer to Section 5.2 of the accompanying guidance note.
2.8	<b>If yes to Question 2.7</b>		WATERBODY	Complete questions <b>a – d</b> . Refer to Section 5.2 of the accompanying guidance note.
2.8	a)	State the total impermeable area to be discharged to the waterbody? (ha)		Provide the total impermeable area (in hectares) which will be discharged via the waterbody.
2.8	b)	Proposed location of connection to waterbody:		Provide a site location plan delineating the proposed location of the outfall and the waterbody. If you are proposing to connect to an existing outfall, clearly mark the location of this outfall on the site layout plan.
2.8	c)	State the grid reference of the proposed connection point:		Please provide the 10 figure OS national grid reference for your site: e.g. TR 15810 58375
2.8	d)	What is the classification of the waterbody?		<i>E.g. EA Main River, IDB Maintained watercourse, Ordinary waterbody, landowner responsibility.</i>
2.8	e)	Does the connection require access across third party land?	Yes / No	If access across third party land is required, <b>please provide evidence that this connection is acceptable to the landowner.</b>

2.8	f)	Which consent will you require for your waterbody connection.	EA / IDB / LLFA	All connections to watercourses require consent Contact details: Lead Local Flood Authority: <a href="mailto:SuDS@kent.gov.uk">SuDS@kent.gov.uk</a> River Stour Internal Drainage Board: <a href="mailto:enquiries@riverstouridb.org.uk">enquiries@riverstouridb.org.uk</a> Environment Agency: <a href="mailto:enquiries@environment-agency.gov.uk">enquiries@environment-agency.gov.uk</a>
2.9	<b>If no to Question 2.7, provide justification why.</b>			Outline the reasons why the development cannot discharge to a surface waterbody. E.g. <i>'there is no watercourse in close proximity to the development site'</i>
2.10	Will any part of the <b>proposed</b> development discharge to the <b>public sewer system</b> ?		Yes / No	If yes, refer to question 2.11. If no, refer to question 2.12. Refer to Section 5.3 of the accompanying guidance note.
2.11	<b>If yes to Question 2.10</b>		SEWER	Complete questions <b>a – d</b> . Refer to Section 5.3 of the accompanying guidance note.
2.11	a)	State the total impermeable area to be discharged to the sewer (ha)?		Provide the total impermeable area (in hectares) which will be discharged via the public sewer.
2.11	b)	What is the designation of the sewer?		<i>E.g. Surface water/foul/combined/public/private</i>
2.11	c)	Location of connection to public sewer:		Provide a site location plan delineating the proposed location of the outfall to the public sewer. If you are proposing to utilise an existing connection to the public sewer, clearly mark the location of this connection on the site layout plan.
2.11	d)	Has the sewerage undertaker been contacted with regard to the proposed connection?		<b>Provide copies of any relevant correspondence with the sewerage undertaken.</b> <i>E.g. capacity check, pre-development enquiry, asset location plan</i>
2.12	<b>Does the proposed development restrict the discharge rate to the greenfield run-off rate?</b>		Yes / No	If yes refer to question 2.17, if no refer to question 2.13.

2.13	If you cannot discharge at the greenfield runoff rate, provide justification			Outline the reasons why the development cannot restrict discharge to greenfield run-off rate. Refer to Section 7 of the accompanying guidance notes.
2.14	Does the proposed development restrict the rate of discharge to the limiting discharge rate?		Yes / No	If yes, refer to question 2.14 a. If no, refer to question 2.14 b.
2.14	a)	<i>If yes</i> , provide details of the flow control device and/or method of attenuation proposed?		Provide details of any proposed attenuation measures and/or flow control devices, including a site layout plan indicating how these measures are to be incorporated into the proposed development scheme.
2.14	b)	<i>If no</i> , provide justification as to why the rate of discharge from the development cannot be restricted to the required limiting discharging rate:		It is acknowledged that there are a number of reasons why it may not be feasible to restrict the rate of discharge from the proposed development, these are discussed in Section 7 of the accompanying guidance notes. <b>Outline the constraints which are preventing surface water run-off from the proposed development from being restricted to the required limiting discharge rate.</b>
2.17	State the Proposed rate of discharge for the following return period events:			
	a)	1 in <b>1 year</b> discharge rate ( <b>current day</b> )		State the peak rate of discharge from the proposed drainage system for the 1 in 1 year return period rainfall event in l/s.
	b)	1 in <b>100 year</b> discharge rate <b>including an allowance for 20% climate change</b>		State the peak rate of discharge (l/s) from the proposed drainage system for the 1 in 100 year return period rainfall event, including an allowance for climate change. Refer to Section 1 and Section 6 of the accompanying guidance note for details.



**Part 3 – Greenfield Sites** (Not applicable to Brownfield sites – refer to accompanying flow chart for guidance)

#	Questions		To be completed	Notes for Developers
3.1	For sites located in <b>Drainage Zone 1</b> , what is the limiting rate of discharge for the site?			For sites situated in DZ1 there is a requirement to restrict the rate of surface water discharge from the site to <b>4l/s/ha</b> . Based on the total site area, please provide the limiting rate of discharge in l/s. Refer to section 4.1 of the accompanying guidance note for further details.
3.2	For all other sites, what is the calculated greenfield run-off rate from the existing site?			For sites situated in <b>DZ2, DZ3 or DZ4</b> , provide the greenfield run-off rate for the entire development calculated in l/s. Refer to section 4.2 of the accompanying guidance note for details on how this value should be calculated.
3.2	a)	What method has been used to derive the greenfield run-off rate stated above?	Method 1 / Method 2	State the method that has been used to calculate greenfield run-off rate with reference to section 4.2 of the accompanying guidance note. <i>E.g. Method 1/ Method 2. If Method 1 is applied, please provide supporting evidence.</i>
3.3	Will any part of the <b>proposed</b> development discharge via <b>infiltration</b> ?		Yes / No	If yes refer to question 3.4, if no refer to question 3.5
3.4	<b>If yes to Question 3.3</b>		INFILTRATION	Complete questions <b>a – d</b> . Refer to Section 5.1 of the accompanying guidance note.
3.4	a)	Has infiltration testing been undertaken?	Yes / No	If testing has been undertaken, <b>please provide a copy of the results</b> . All infiltration testing should be undertaken in accordance with BRE Digest 365. Testing will be required if infiltration is specified exclusively.
3.4	b)	State the total impermeable area to be discharged via infiltration (ha):		Provide the total impermeable area (in hectares) which will be discharged via infiltration.
3.4	c)	What is the rate of infiltration at the site? (mm/hr)		If testing has been undertaken at multiple locations across the development site, provide a trial pit location plan in addition to a copy of the infiltration testing results. If testing has not been undertaken, please state how this rate has been derived.

3.4	d)	Details of proposed SuDS		Provide details of any proposed SuDS features, including a site layout plan delineating how these measures are to be incorporated into the proposed development scheme.
3.5	<b>If no to Question 3.3, provide justification why.</b>			Outline the reasons why the development cannot discharge to infiltration. <i>e.g. high water table, local impermeable soils or contamination issues.</i> Refer to Section 5.1 of the accompanying guidance note.
3.6	Will any part of the <b>proposed</b> development discharge into a surface <b>waterbody</b> ?		Yes / No	If yes, refer to question 3.7, if no refer to question 3.8. Refer to Section 5.2 of the accompanying guidance note.
3.7	<b>If yes to Question 3.6</b>		WATERBODY	Complete questions <b>a – d</b> . Refer to Section 5.2 of the accompanying guidance note.
3.7	a)	State the total impermeable area to be discharged into the waterbody?		Provide the total impermeable area (in hectares) which will be discharged via the waterbody.
3.7	b)	Proposed location of connection to waterbody:		Provide a site location plan delineating the proposed location of the outfall and the waterbody. If you are proposing to connect to an existing outfall, clearly mark the location of this outfall on the site layout plan.
3.7	c)	Grid reference of connection point:		Please provide the 10 figure OS national grid reference for your site: e.g. TR 15810 58375
3.7	d)	What is the classification of the waterbody?		<i>E.g. EA Main River, IDB Maintained watercourse, Ordinary watercourse, landowner responsibility.</i>
3.7	e)	Does the connection require access across third party land?	Yes / No	If access across third party land is required, <b>please provide evidence that this connection is acceptable to the landowner.</b>
3.7	f)	Which consent will you require for your waterbody connection.	EA / IDB / LLFA	All connections to watercourses require consent Contact details: Lead Local Flood Authority: <a href="mailto:SuDS@kent.gov.uk">SuDS@kent.gov.uk</a> River Stour Internal Drainage Board: <a href="mailto:enquiries@riverstouridb.org.uk">enquiries@riverstouridb.org.uk</a> Environment Agency: <a href="mailto:enquiries@environment-agency.gov.uk">enquiries@environment-agency.gov.uk</a>

3.8	<b>If no to Question 3.6, provide justification why.</b>			Outline the reasons why the development cannot discharge to a waterbody. e.g. 'there is no watercourse in close proximity to the development site'
3.9	Will any part of the <b>proposed</b> development discharge into the <b>public sewer system</b> ?		Yes / No	If yes refer to question 3.10, if no refer to question 3.11. Refer to Section 5.3 of the accompanying guidance note.
3.10	<b>If yes to Question 3.9</b>		SEWER	Complete questions <b>a – d</b> . Refer to Section 5.3 of the accompanying guidance note.
3.10	a)	State the total impermeable area to be discharged into the public sewer system?		Provide the total impermeable area (in hectares) which will be discharged via the public sewer.
3.10	b)	What is the designation of the sewer?		<i>E.g. Surface water / foul / combined / public / private</i>
3.10	c)	Location of connection to public sewer:		Provide a site location plan delineating the proposed location of the outfall to the public sewer. If you are proposing to utilise an existing connection to the public sewer, clearly mark the location of this connection on the site layout plan.
3.10	b)	Has the sewerage undertaker been contacted with regard to the proposed connection?		<b>Provide copies of any relevant correspondence with the sewerage undertaker. E.g. Capacity check, pre-development enquiry, asset location plan</b>
3.11	Does the proposed development restrict the rate of discharge to the limiting discharge rate?		Yes / No	For sites situated in DZ1 – refer to question 3.1. For sites situated in DZ2, DZ3 or DZ4 – refer to question 3.2. If yes, refer to question 3.11.a. If no, refer to question 3.11.b.
3.11	a)	<i>If yes</i> , provide details of the flow control device and/or method of attenuation proposed?		Provide details of any proposed attenuation measures and/or flow control devices; including a site layout plan delineating how these measures are to be incorporated into the proposed development scheme.
3.11	b)	<i>If no</i> , provide justification to demonstrate why the rate of discharge from the development could not be restricted to the required limiting discharging rate:		Outline the constraints which are preventing surface water run-off from the proposed development from being restricted to the required limiting discharge rate. Refer to Section 7 of the accompanying guidance notes.

3.12	State the proposed rate of discharge for the following return period events:			
3.12	a)	1 in 1 year discharge rate (current day)		State the peak rate of discharge from the proposed drainage system for the 1 in 1 year return period rainfall event in l/s.
3.12	b)	1 in 100 year discharge rate <b>including an allowance for 20% climate change</b>		The peak rate of discharge (l/s) from the proposed drainage system for the 1 in 100 year return period rainfall event including an allowance for climate change. Refer to Section 1 and Section 6 of the accompanying guidance note for details.



**Part 4 – Sensitivity** – to be filled out for **all** development sites

#	Questions	To be completed	Notes for Developers
4.1	Have you tested the response of the proposed drainage system under an <b>exceedance</b> event?	Yes / No	Provide calculations for peak rate of discharge from the proposed drainage system, and details of the volume of water surcharged under the 1 in 100 year return period rainfall event, including a <b>40% increase</b> in peak rainfall intensity. Refer to Section 8.1 of the accompanying guidance note for details.
4.1	a) State the on-site impacts during an exceedance event:		Refer to Section 8.3 of the accompanying guidance notes for details.
4.1	b) State the off-site impacts during an exceedance event:		
4.2	Have you tested the response of the proposed drainage system under a <b>blockage</b> event?		Provide calculations for peak rate of discharge from the proposed drainage system, and details of the volume of water surcharged under the 1 in 100 year return period rainfall event with a <b>100% blockage of the outfall</b> . Refer to Section 8.2 of the accompanying guidance note for details.
4.2	a) State the on-site impacts during an exceedance event:		Refer to Section 8.3 of the accompanying guidance notes for details.
4.2	b) State the off-site impacts during an exceedance event:		