

5.3.4 The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed for three types of flow:

1. Low flow routes

Regular flow from source control features such as permeable pavements should travel in low flow channels through the development in a controlled way contributing to landscape quality.

2. Overflows

In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the main SuDS drainage system when conditions return to normal.

3. Exceedance routes

Should SuDS be overwhelmed by exceptional rainfall (1:100 + allowance for climate change) then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

5.3.5 The primary consideration shall be risks to people and property on and off site.

5.3.6 Access should be maintained into and through the site for emergency vehicles. The drainage application must give consideration to flood risk vulnerability classifications (as defined through Planning Practice Guidance to the NPPF), as specific measures or protections may be necessary and need to be agreed with the appropriate authority.

5.3.7 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.

5.3.8 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 either on-site or off-site.

- 5.3.9 For large sites involving phased development, the strategic surface water management system will need to be designed to manage the flows from the final developed site, and specific conditions will need to be set for each development plot so that the original design assumptions are not invalidated⁶.

SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

- 1. Drainage schemes should be designed to match greenfield discharge rates and follow natural drainage routes as far as possible; pumps should therefore not form part of drainage schemes.**
- 2. Greenfield runoff should be calculated from IH124 or a similar approved method. SAAR and any other rainfall data used in run-off storage calculations should be based upon FEH rainfall values.**

5.4 SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

- 5.4.1 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.
- 5.4.2 By mimicking the natural drainage flow paths and working within the landscape, more effective and cost-efficient design can be developed and drainage systems can be kept shallower.
- 5.4.3 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.
- 5.4.4 Redevelopment on brownfield land has the potential to rectify or reduce flood risk. In all cases, including on brownfield sites, runoff should where possible be restricted to the greenfield 1 in 1 year runoff rate during all events up to and including the 1 in 100 year rainfall event with climate change. An alternative approach would be for discharge rates to be limited to a range of greenfield rates, based on the 1 in 1, 1 in 30 and 1 in 100

⁶ For further details on this subject, see chapter 7 of the SuDS manual.

year storm events. However, the use of this method to restrict discharge rates would also require the inclusion of on-line long-term storage, sized to take account of the increased post development volumes, discharging at no greater than 2l/s/ha. While discharging at no greater than 2 l/s/ha is acceptable, it is still the LLFA's preference that the former approach is used wherever possible. If it is deemed that this is not achievable, evidence must be provided and developers should still seek to achieve no increase in runoff from greenfield sites and a 50% betterment of existing run off rates on brownfield sites (provided this does not result in a runoff rate less than greenfield). For further guidance see Susdrain Fact sheet on Designing attenuation storage for redeveloped sites:
http://www.susdrain.org/files/resources/fact_sheets/01_15_fact_sheet_at_tenuation_for_redeveloped.pdf

SuDS Policy 4: Seek to Reduce Existing Flood Risk

- 1. New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.**
- 2. 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 an early stage and subsequently incorporated at the detailed design stage.**

5.5 SuDS Policy 4: Seek to Reduce Existing Flood Risk

- 5.5.1 Paragraph 100 of the NPPF 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.
- 5.5.2 As LLFA, West Sussex 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-/of -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 (or off-site) surface water management, we will encourage developers to explore these fully.

SuDS Policy 5: Maximise Resilience

- 1. 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.**
- 2. 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.**
- 3. Culverting an existing watercourse should only be considered if there is no feasible alternative.**

5.6 SuDS Policy 5: Maximise Resilience

- 5.6.1 The Environment Agency published updated Flood risk assessments: climate change allowances in February. Further advice on the interpretation of these allowances is available via the following link:

Flood risk assessments: climate change allowances

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

- 5.6.2 Design of drainage systems utilising a sustainable drainage design and reducing reliance on below ground systems such as pipes and tanks, provides greater flexibility to accommodate changes in surface water peak flows and volumes. Sustainable measures that control flow rates near to the source and maximise natural losses through infiltration and evaporation are preferred. Surface systems are preferred as their function can be more easily observed and maintenance is generally easier. If underground storage tanks are used, they should have easily accessible surface inspection points to allow maintenance checks / silt removal.
- 5.6.3 Culverting (piping) a watercourse is not advised unless it is for access purposes or there is no reasonable alternative; the resulting reduction in storage volume, flow capacity, habitat potential and ease of access for maintenance is likely to be unacceptable (see also paragraph 3.5.4).
- 5.6.4 Development results in 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 allowances set out in Table 5.2 must be applied to the impermeable area within the property curtilage according to the proposed development density.

Table 5.2: 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

- 1. A drainage scheme Management and Maintenance Plan should be prepared which demonstrates the function of the drainage system and a schedule of activities, access points, outfalls and any biodiversity considerations.**
- 2. The Management and 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.**

5.7 SuDS Policy 6: Design to be Maintainable

- 5.7.1 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. Ditches and watercourses (including culverts) should retain a three metre easement with access that allows for its future maintenance by people / equipment in perpetuity. 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. Consideration should also be given to the Construction Design and Management regulations for health and safety purposes.
- 5.7.3 Design considerations will need to address the practicalities and funding arrangements for lifetime maintenance, identifying the body responsible and ensuring that financial mechanisms are in place such as bonded maintenance arrangements via S106 agreements and planning conditions. The Management & Maintenance Plan shall include details of the financial management and arrangements for the replacement of components at the end of the manufacturers recommended design life.
- 5.7.4 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.
- 5.7.5 With surface water drainage systems, a careful balance must be struck between functionality and 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 Management & 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.

5.7.6 The Management & Maintenance Plan to be provided should indicate

SuDS Policy 7: Safeguard Water Quality

- 1. 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.**
- 2. Interception of small rainfall events should be incorporated into the design of the drainage system.**

schedules and times 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 interconnectivity 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.

5.7.7 As LLFA, West Sussex County Council has a duty to maintain a register of structures or features which are likely to have a significant effect on flood risk. SuDS features are required to be designated under Section 21 of the Flood and Water Management Act 2010. Drainage schemes within new developments may include structures or features that will be required to be included within the register.

6 Environmental Policies

The policies in this section provide local interpretation of the environmental legislation and guidance that West Sussex County Council and the Local Planning Authorities have a duty to comply with, including the regulations referred to in Section 3.7 of this document.

6.1 SuDS Policy 7: Safeguard Water Quality

- 6.1.1 Paragraph 109 of the NPPF 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) unacceptable levels of soil, air, water or noise pollution or land instability. The Water Framework Directive Regulations (see paragraph 3.7.1) is the principle statutory instrument that applies.
- 6.1.2 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 ground pipes and tanks which are efficient for drainage purposes may not provide appropriate water quality treatment.

- 6.1.3 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, therefore, possible to get a high initial pollution concentration for relatively small rainfall events.
- 6.1.4 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.
- 6.1.5 West Sussex LLFA would expect developers to 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.
- 6.1.6 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.
- 6.1.7 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 from the outset 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.

6.2 SuDS Policy 8: Design for Amenity and Multi-functionality

- 6.2.1 Multi-functional use of land constitutes best practice and is underpinned by paragraph 10.1.1 of The SuDS Manual:

The challenge for designers and planners is to create integrated urban spaces that include SuDS in creative and innovative ways, taking into consideration their potential contribution to a range of functions such as flood risk management, water supply, green infrastructure, habitat

provision, transport corridors, climate proofing, community identity, recreation and tourism.

6.2.2 Applications of this policy include:

- the use of park areas as temporary flood storage during heavy rainfall events;
- wetlands being used to deliver amenity value and habitat as well as water treatment;
- use of permeable paving and tree pits to improve the design quality of the public realm, while improving permeability.

6.2.3 SuDS should form an integral component of networks of high quality open space which adapt for attenuation of surface water, sports and play and enhancement of biodiversity. A range of other considerations apply to creation of wetland areas / features which can generally be addressed through careful design. Refer to the SuDS Manual for detailed guidance.

SuDS Policy 9: Enhance Biodiversity

Drainage design should from the outset consider opportunities for biodiversity enhancement, through optimising the scope for surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification.

6.3 SuDS Policy 9: Enhance Biodiversity

6.3.1 All public authorities have a duty to conserve biodiversity under the Countryside and Rights of Way Act (CROW) 2000 (see paragraph 3.7.4 of this document). 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.

6.3.2 Drainage Strategies should draw upon best practice guidance clearly signposted in chapter 6 of The SuDS Manual.

SuDS Policy 10: Link to Wider Landscape Objectives

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

6.4 SuDS Policy 10: Link to Wider Landscape Objectives

- 6.4.1 The landscape character of West Sussex is defined by its topography, flora and fauna, land use and cultural associations. The West Sussex Landscape Strategy, 2005 aims to protect and enhance the landscape of West Sussex as an asset for future generations. Integral to this is ensuring that new development is well designed and fits sympathetically with the differing character of localities and natural and that historic landscape features are conserved and enhanced.
- 6.4.2 The form of drainage provision for 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 to deliver benefits for biodiversity and also enhance the aesthetic character of these areas. 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.
- 6.4.3 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.

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