

Sustainable Drainage Systems (SuDS) Guidance – Council Specific Information

Volume 2: Cheshire West and Chester Borough Council
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Purpose

This document has been prepared as part of a suite of SuDS Guidance Document for Cheshire West and Chester Borough Council. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by Cheshire West and Cheshire Borough Council the purposes for which it was originally commissioned and prepared.

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1 Introduction

WHAT THIS SECTION WILL COVER:

- Introduction – Cheshire West & Chester Council vision for SuDS
- Introduction to Volume 2 – the Cheshire West and Chester SuDS Guidance document.

1.1 Introduction & Cheshire West & Chester Vision for SuDS

Sustainable Drainage Systems (SuDS) provides an approach to surface water management where water is drained in a more sustainable way than traditional methods. These approaches provide the opportunity to address pressures on the environment, by reducing the causes and impacts of flooding, allowing for the removal of pollutants from urban run off at source and providing green spaces with amenity, recreation and wildlife benefits.

Cheshire West and Chester Council are encouraging SuDs design for developments of all sizes, including new development and redevelopment, incorporating SuDS at stages from masterplanning, to pre-application and application submission. This guidance will support the Developer's SuDS selection and confirm the minimum information required to support any application and review by the Local Planning Authority.

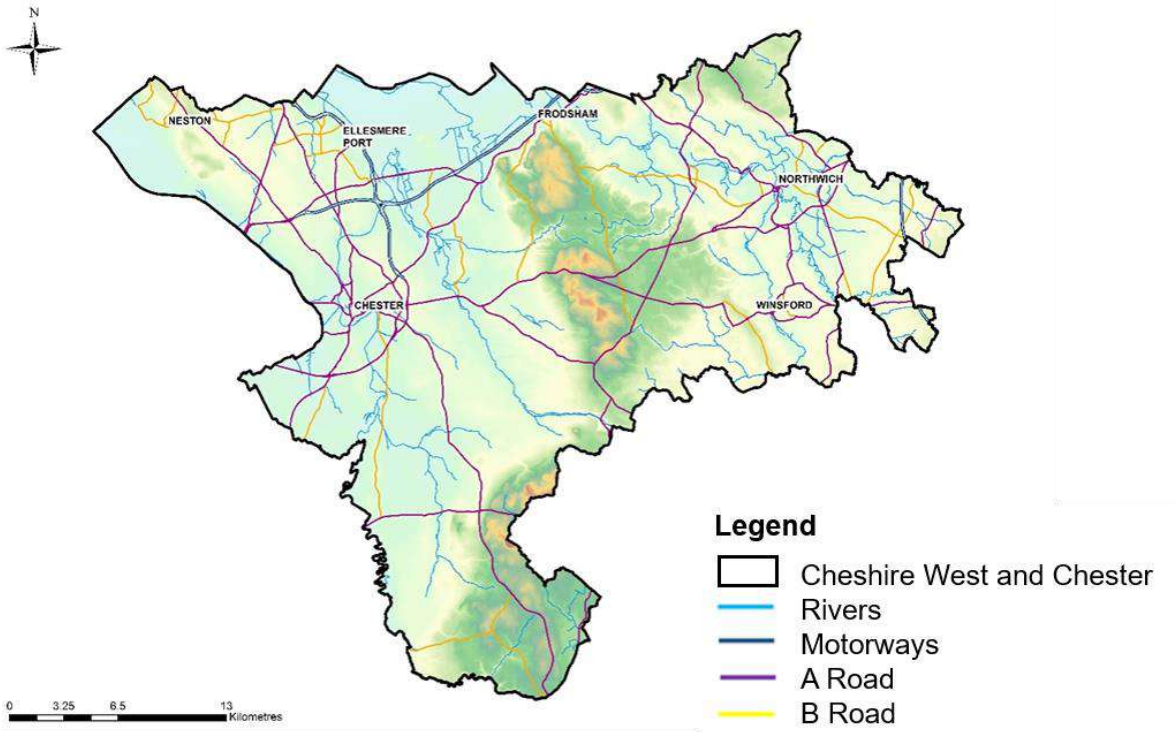
Surface water flood risk is a significant flood source and the requirement for SuDs as part of detailed design planning proposals was clearly outlined in the recommendations of the **2008 Pitt Review – Learning Lessons From the 2007 Floods**.

The Cheshire West and Chester Preliminary Flood Risk Assessment (PFRA) 2017 provides a high level overview of flood risk from local flood sources, including surface water, groundwater, Ordinary Watercourses and canals as well as Main River Flood extents base on Environment Agency flood maps. The PFRA identifies that the total number of properties (residential and non residential) that are categorised as being at "less risk of surface water flooding" as 11,234. A further 2,121 properties are identified as being at "intermediate risk", and 616 categorised as being at "more risk". This equates to 13,971 properties within a population (2017) of 333,900 persons and a 91,664ha area. Local flood risk from PFRA (2017) Cheshire West and Chester indicated risk to 27,451 persons.

This document forms the the second Volume of the Council's Sustainable Drainage System (SuDS) Guidance and provides information and specific requirements for the **Cheshire West and Chester Borough Council** area. This guidance should be read in conjunction with the **Council Design and Technical Guidance (Volume 1)**.

1.2 Local Authority Boundary

The Cheshire West and Chester Borough Council boundary is shown below.



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1.3 Who is This Guide For?

This guidance is primarily aimed at Developers, to identify the information that they need to provide to enable the assessment of SuDS proposals by the Council as the Lead Local Flood Authority (LLFA), other Statutory Consultees and the Local Planning Authority. This guidance is intended to provide a standardised approach to the selection of appropriate SuDS and identify the information that the Developer is required to provide to enable the Local Authority and Statutory Consultees to effectively review planning applications. It is intended that this guidance is used by:



- Developers
- Architects and Urban Planners,
- Drainage Engineers,

- Landscape Designers,
- Local Authority Departments and internal stakeholders such as Planners, Building Control, Highways Maintenance and Design Engineers
- The Lead Local Flood Authority (LLFA) as a Statutory Consultee in their assessment of SuDS proposals.
- Other Statutory Consultees involved in the assessment of SuDS proposals

2. BACKGROUND

2 Background

WHAT THIS SECTION WILL COVER:

- Legislation & National Policy
- Local policy context

2.1 Legislation & National Policy Context

Flood and Water Management Act 2010

The Flood and Water Management Act (FWMA) 2010 aims to provide for better, more comprehensive management of flood risk for people, homes and businesses, safeguarding community groups from unaffordable rises in surface water drainage charges, and protect water supplies to the consumer, whilst Schedule 3 relates to sustainable drainage adoption and approval.

The Pitt Review – "Learning Lessons From The 2007 Floods" 2008 identified that serious flooding can happen at any time and climate projections suggest that extreme weather will happen more frequently in the future. The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather by implementing the recommendations of the Pitt Review.

Increasingly, councils are turning to sustainable urban drainage systems to reduce the impact of development on flooding. Chapter 7 of the Pitt Review discusses this in more detail.

WAY MARKER 2.1

Flood and Water Management Act 2010
http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf

Pitt Review
http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_full%20pdf.pdf

National Flood and Coastal Risk Management Strategy for England 2011

The Strategy sets out a framework for implementing the Flood and Water Management Act 2010, aiming to assist Local Authorities and communities with their responsibilities by taking a risk based approach to flood and coastal risk management and ensure a full range of options is managed in a co-ordinated way. Manging the risk to people and property, facilitating decision making and achieving environmental, social and economic benefits. Flood Risk Management Authorities are required to consider a combination of flood storage, source control and SuDS to help manage surface water more effectively and avoiding damage to property, people, or assets.

WAY MARKER 2.2

National Flood and Coastal Risk Management Strategy for England 2011
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228898/9780108510366.pdf

"Understanding the risks, empowering communities, building resilience"

National Planning Policy Framework 2012 and Planning Practice Guidance:

Flood Risk and Coastal Change (2015)

The 2012 Framework provides the planning policy and guidance for England which informs local plans and decisions. There is a focus on the role of sustainable development which should underpin planning and decision making, particularly with regards to reducing the causes and impacts of flooding.

It states that SuDS provide numerous opportunities in addition to reducing the causes and impacts of flooding. It advises on the need to plan for maintenance of SuDS to ensure effective drainage for properties and notes that local authorities and developers should work together to implement SuDS.

WAY MARKER 2.3

National Planning Policy Framework (NPPF) 2012
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

Planning Practice Guidance: Flood Risk and Coastal Change (relating to Section 10 of NPPF): Why are sustainable drainage systems important?
https://www.gov.uk/guidance/flood-risk-and-coastal-change

Defra Non-statutory Technical Standards for SuDS
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

LASOO Non-statutory Technical Standards for SuDS
http://www.lasoo.org.uk/wp-content/uploads/2015/06/155639-SUDS-Booklet-A4_HR.pdf

The **Planning Practice Guidance (PPG)** note relating to SuDS was revised 23 March 2015 and highlights the considerations which should be made about the types of SuDS, operation, and maintenance in relation to the Defra and Local Authority SuDs Officer Organisation (LASOO) Non-Statutory Technical Standards for SuDS. The PPG is a live document with regular updates.

Climate Change Allowances

The Environment Agency have recently updated guidance relating to use of climate change allowances in flood risk assessments and drainage design to assist with minimising vulnerability and providing resilience to flooding and coastal change in the future. The climate change allowances are predictions of anticipated change for:

WAY MARKER 2.4

Flood Risk Assessments: Climate Change Allowances
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1

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

These allowances are based on climate change projections and different scenarios of carbon dioxide (CO_2) emissions to the atmosphere for different epochs or periods of time over the next century.

North West Flood Risk Management Plan (FRMP) (2016)

Flood risk management plans (FRMPs) explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work with communities to manage flood and coastal risk over the period 2015-2021. The North West river basin district covers 13,160km^2 from Cumbria in the north to Cheshire in the south, with Lancashire, Merseyside and Greater Manchester in between. The river basin district comprises 12 river catchments and 2 flood risk areas (FRAs).

Of the 7 million people living in the river basin district, there are:

- over 51,000 people at high risk of surface water flooding (more than a 1 in 30 chance of being flooded in any year (3.3%))
- 31,000 people at high risk of flooding from rivers and the sea (more than a 1 in 30 chance of being flooded in any year (3.3%)

The North West FRMP recommends the use of SuDS; to date, most measures to limit run-off have been below ground, such as underground storage tanks or over-sized sewers. SuDS are usually above ground. They limit site run-off and can filter out some silt and contaminants. The approach to be adopted requires infiltration to be considered first, then attenuation and discharge to a watercourse as the next option and only if these are impractical should attenuation with discharge to a sewer be considered.

River Dee Flood Risk Management Plan (FRMP) (2015)

The majority of the river basin district is in north-east Wales and a smaller part from the River Dee to the east is in Cheshire. In the Dee River Basin District there are approximately 26,400 people at risk of flooding from rivers and the sea. Over 3,000 of these are considered to be at high risk (more than a 1 in 30 chance of being flooded in any year (3.3%).

Large areas of agricultural land are at risk of flooding, including 5,777 hectares at high risk of flooding. Other areas at risk of flooding include parts of the road and railway networks, and many environmentally designated sites, such as the Dee estuary Site of Special Scientific Interest (SSSI).

Consequently, in the context of planning for flood risk, the River Dee FRMP encourages Local Planning Authorities to adopt a Green Infrastructure approach and SuDS form a significant aspect of this. It should be planned and managed in a similar way to critical infrastructure, because it is a climate change adaptation response that will help build a community's overall resilience – reduced flood risk, increased shading, drought tolerance and protection of urban ecosystems.

2.2 Local Planning Policy and Context

There are three Catchment Flood Management Plans which relates to the Cheshire West and Chester Borough Council area;

- Mersey Estuary
- River Dee
- Weaver Gowy

The policies for each of the CFMP areas covering the Cheshire West and Chester Borough Council Boundary are shown in Table in 2-1 below (extract from Cheshire West and Chester Strategic Flood Risk Assessment).

Table 2-1 Catchment Flood Management Plan Policy Options

CFMP	Unit Area	Policy Option
Weaver Gowy	Sub Area 3 Northwich	Policy 5 - take further action to reduce flood risk
	Sub Area 4 Winsford and Middlewich	Policy 3 - continue with existing or alternative actions to manage flood risk at the current level
	Sub Area 2 Frodsham and Runcorn	Policy 4 - take further action to sustain the current level of flood risk into the future (responding to the potential increases in risk from urban development, land use change and climate change)
	Sub Area 1 Stanlow	
	Sub Area 7 Rural Areas	Policy 6 - take action with others to store water or manage runoff in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment
River Dee	Sub Area 7 Chester	Policy 5 - take further action to reduce flood risk
	Sub area 6 Deeside, Wirral, and North Flintshire	
	Sub area 3 Middle Dee	Policy 2 - reduce existing flood risk management actions
	Sub Area 5 Lower Dee	Policy 3 - continue with existing or alternative actions to manage flood risk at the current level
Mersey Estuary	Sub Area 7 Middle Mersey Estuary (Moss Side, Ince Banks and Knowsley)	Policy 2 - reduce existing flood risk management actions
	Sub Area 9 Bebington (not	Policy 3 - continue with existing or alternative actions to manage flood risk at the current level

CFMP	Unit Area	Policy Option
	including Bromborough (plus Ellesmere Port))	
	Sub Area 10 Greasby (Heswall & Neston)	Policy 6 - take action with others to store water or manage runoff in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment

Mersey Estuary Catchment Flood Management Plan (CFMP) 2009

WAY MARKER 2.5

Mersey Estuary Catchment Flood Management Plan (CFMP) 2009
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/293769/Mersey_Estuary_Catchment_Flood_Management_Plan.pdf

Three of the ten Mersey Estuary CFMP sub-areas are located within Cheshire West and Chester boundary. This CFMP identifies flood risk management policies to assist all key decision makers in the catchment. In total (noting that the CFMP extends wider than the Cheshire West and Chester Council area) approximately 19,000 properties have a 1% chance of flooding in any one year from rivers (i.e. a 1% annual probability). The CFMP estimates that by 2100 approximately 25,000 properties within the CFMP area will be at risk of river flooding. This is a 30% increase compared to the current number at risk across the catchment. The CFMP area includes 19 Sites of Special Scientific Interest (SSSIs) and the Mersey Estuary Ramsar site. The CFMP considers environmental opportunities and constraints with regards to future flood risk management.

River Dee Catchment Flood Management Plan (CFMP)

WAY MARKER 2.6

River Dee Catchment Flood Management Plan (CFMP) 2010
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/357552/LIT_10019_River_Dee_CFMP_gewa0110brko-e-e.pdf

Four of the ten River Dee CFMP sub-areas are located within Cheshire West and Chester boundary. The River Dee CFMP estimates that a 1% Annual Exceedance Probability (AEP) flood event could affect approximately 4,200 properties across the whole catchment area (noting that the CFMP extends wider than the Cheshire West and Chester Council area). There are 13 Internationally Designated sites and 30 Sites of Special Scientific Interest (SSSI's) at risk from the 1% AEP flood event and 22 Scheduled Monuments within the CFMP area. The highest number of properties currently at risk from a 1% AEP flood event are located within Chester and Deeside. Chester is one of the areas which is classed as the most socially vulnerable to flooding.

Weaver Gowy Catchment Flood Management Plan (CFMP)

The Weaver Gowy CFMP examines seven sub areas in the Weaver Gowy catchment, of which five are relevant to Cheshire West and Chester. The CFMP identifies the main sources of flood risk as fluvial flooding from the rivers, surface water and sewer flooding from the drainage system.

WAY MARKER 2.7

Weaver Gowy Catchment Flood Management Plan (CFMP) 2009
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/293779/Weaver_Gowy_Catchment_Flood_Management_Plan.pdf

Approximately 1,130 properties in the Weaver Gowy catchment have a 1% chance of fluvial flooding in any one year (noting that the CFMP extends wider than the Cheshire West and Chester Council area). There are five Sites of Special Scientific Interest and one scheduled ancient monument within the 1% annual probability flood extent. The Weaver Gowy catchment is predominately rural and low lying in nature, with only 6% being urban. The Cheshire Plain makes up most of the catchment, which is interrupted by a sandstone ridge running north-south across it. This area generally responds slowly to rainfall events. Higher ground surrounds the catchment, particularly in the Dane sub-catchment to the east, which generates a faster response to rainfall. Watercourses generally flow north towards the River Mersey.

2.3 Council Policy Context

2.3.1 Key Legislation, Policy, and Guidance

Although the consideration of SuDS in Cheshire West and Chester will be guided by the Non-Statutory Technical Standards for SuDS and this Guidance, there are other legislative and policy drivers which must be considered.

Local Plans – in line with requirements of national policy on flood risk, Local Plans include setting out policies governing the management of flood risk as part of new development, and allocate land for development based upon the consideration of several factors including flooding. Key to allocation of sites for development is the Strategic Flood Risk Assessment which is intended to provide a high-level assessment of the risk of all forms of flooding to potential development sites.

The Cheshire West and Chester Local Plan (Part One) Strategic Policies was adopted in January 2015 and included the following polices relating to flood risk management and SuDs, open space, landscape, and Green Infrastructure:

2.3.2 Council Adopted Cheshire West and Chester Local Plan January 2015

The Local Plan core strategy sets out a series of policies for addressing the vision for 2030 (noted in Way Marker 2.8) and objectives to achieve this vision. The spatial policy reflects the need for sustainable development in the National Planning Policy Framework 2012. Relevant Local Policies are summarised below.

WAY MARKER 2.8

Council Local Plan Core Strategy October 2012

Vision for 2030: to make Cheshire West and Chester "a desirable and attractive place to live, work, learn and visit with vibrant towns and rural villages, reflecting the vision of the Sustainable Community Strategy".

ENV1 – Flood Risk and Water Management

The drainage of new development shall be designed to reduce surface water run-off rates to include the implementation of Sustainable Drainage Systems (SuDS) unless it can be demonstrated that it is not technically feasible or viable.

National legislation, including the **'Flood and Water Management Act 2010'** seeks to address the risk of flooding and water scarcity, both of which are expected to increase because of climate change. The Act requires the use of Sustainable Drainage Systems (SuDS) by removing the automatic right to connect new development to sewers and providing for Local Authorities to adopt SuDS.

the drainage of new development to be designed to reduce surface water run-off rates and include the implementation of SuDS. Managing surface water discharges from new development is crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding.

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and consequently a potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts, and other drainage infrastructure.

The runoff destination should always be the first consideration when considering design criteria for SuDS including the following possible destinations in order of preference:

- To ground;
- To surface water body;
- To surface water sewer;
- To combined sewer.

Effects on water quality should also be investigated when considering runoff destination in terms of the potential hazards arising from development and the sensitivity of the runoff destination. Developers should also establish that proposed outfalls are hydraulically capable of accepting the runoff from SuDS.

It is important to understand the location and capacity of existing drainage to determine what infrastructure could or should be reused in a SuDS scheme. When building on brownfield or pre-developed sites, existing on-site infrastructure should be documented and mapped. It is important to understand the location and capacity of existing drainage to determine what infrastructure could or should be reused in the SuDS scheme.

STRAT11 – Infrastructure

To ensure the delivery of infrastructure improvements, to secure the future of sustainable communities throughout Cheshire West and Chester, and meet the wider sustainability objectives of the borough, the Council will support the provision of appropriate new infrastructure, including schemes intended to mitigate and adapt to climate change and any cross-boundary schemes necessary to deliver the priorities of the Local Plan where this will have no significant adverse impact upon recognised environmental assets.

WAY MARKER 2.9

Cheshire West and Chester Local Plan (Part One) Strategic Policies – STRAT11 - Infrastructure
http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?pointId=1419339111254#section-1419339111254

ENV3 – Green Infrastructure

Landscape scale assessments have been a consideration of the 'Green Infrastructure Framework'. This identifies areas where investment in environmental enhancement, rural enterprise, access, and biodiversity will bring benefits to landscape value in the form of improved water resource management, tourism, climatic resilience, and wildlife.

WAY MARKER 2.10

Cheshire West and Chester Local Plan (Part One) Strategic Policies – ENV3 – Green Infrastructure
http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?pointId=1419339111269#section-1419339111269

ENV6 – High Quality Design and Sustainable Construction

WAY MARKER 2.11

Cheshire West and Chester Local Plan (Part One) Strategic Policies – ENV6 – High Quality Design and Sustainable Construction
http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/adopted_cwac_lp/lp_1_adopted?pointId=1419339111272#section-1419339111272

The Local Plan will promote sustainable, high quality design and construction. Development should, where appropriate mitigate and adapt to the predicted effects of climate change. **The National Planning Policy Framework (NPPF)** sets out that the Council should 'adopt proactive strategies to mitigate and adapt to climate change'. Mitigation relates to the causes of climate change, and is primarily addressed through the control of greenhouse gases, and carbon dioxide. Adaptation relates to the consequences of climate change, and is primarily addressed through design, behavioural changes, and land use controls. Early adaptation will cost less money and will mean the Borough will be better equipped to deal with future impacts.

DM31 - Development and flood risk

Planning Permission for sites that are at risk will only be permitted where a site-specific Flood Risk Assessment shows that:

- The effects of climate change have been considered;
- There is no loss in floodplain storage resulting from the development;
- The development will not increase flood risk elsewhere;
- There is no adverse effect on the operational functions of any existing flood defence infrastructure;
- Proposed resistance / resilience measures designed to deal with current and future risks are appropriate;
- Appropriate SuDS techniques have been considered and are to be incorporated into the design of the site, where applicable; and
- Whether the development will be safe and pass the Exception Test, if applicable.

WAY MARKER 2.12

Cheshire West and Chester Local Plan (Part One) Strategic Policies – DM31 - Development and flood risk
http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cw_lp_part_two/pref_app?pointId=s1468582948365#section-s1468582948365
1419339111272

"To avoid flood risk to people and property where possible, and manage any residual risk through location, layout and design, taking account of the impacts of climate change on changing flood risk as identified in the SFRA. This includes making space for water by directing development to areas at lowest flood risk first, protecting sites required for flood risk management and the use of sustainable drainage systems (SuDS) where applicable".

DM33 - Sustainable Drainage Systems (SuDS)

In line with policy ENV 1 of the Local Plan (Part One), residential development of 10 dwellings or more and non-residential development of over 1,000 square metres of floorspace or with a site area over 1 hectare, will be required to incorporate SuDS scoping and design.

SuDS must be included within the early stages of the site design to incorporate appropriate SuDS within the development and will be required to satisfy technical standards and design requirements in accordance with the Council's SuDS Design Handbook.

Restrictions on surface water runoff from new development should be incorporated into the development planning stage. For brownfield sites, where current infrastructure may be staying in place, then runoff should attempt to mimic that of greenfield rates with betterment of at least 30% as a minimum, unless it can be demonstrated that this is unachievable or hydraulically impractical to do so.

WAY MARKER 2.13

Cheshire West and Chester Local Plan (Part One) Strategic Policies – DM33 - Sustainable Drainage Systems (SuDS)
http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cw_lp_part_two/pref_app?pointId=s1468582948368#section-s1468582948368

DM34 - Flood water storage and critical drainage areas

In line with policy ENV 1 and ENV 3 of the Local Plan (Part One), development within or adjacent to a flood water storage area as defined on the policies map which would have a negative impact on its function will not be permitted. All development in designated Critical Drainage Areas (CDAs) will be required to incorporate measures to alleviate surface water flood risk through the layout and form of the development, including the appropriate application of SuDS to intercept and attenuate overland flow and drained water.

DM35 - Reducing flood risk through site layout, design and phasing

Policy DM 35 seeks to avoid flood risk to people and property where possible, and manage any residual risk through location, layout, and design, taking account of the impacts of climate change on changing flood risk as identified in the SFRA. This includes making space for water by directing development to areas at lowest flood risk first, protecting sites required for flood risk management and the use of sustainable drainage systems (SuDS) where applicable.

DM36 - Water quality, supply, and treatment

In line with policy ENV 1 and SOC 5 of the Local Plan (Part One), development proposals will be required to demonstrate that it does not cause unacceptable deterioration to water quality or have an unacceptable impact on water quantity (including drinking water supplies).

2.3.3 Cheshire West and Chester Level 1 Strategic Flood Risk Assessment (SFRA)

WAY MARKER 2.14

Cheshire West and Chester Level 1 Strategic Flood Risk Assessment (2015)

"SuDS should be used where possible. Appropriate SuDS may offer opportunities to control runoff to Greenfield rates."

The Cheshire West and Chester Level 1 Strategic Flood Risk Assessment focuses acts as a key reference tool for assessment of flood risk and SuDs

It identifies the level of risk from different sources of flood risk in the Borough including fluvial flooding from the River Dee and River Gowy in the west and the River Weaver in the east, their key tributaries, and remaining watercourses. The SFRA assesses other sources include surface water flooding, sewer flooding such as surface water flooding and residual risks associated with the Manchester Ship Canal, the Shropshire Union Canal, the Trent and Mersey Canal, the Weaver Navigation, and also dams and reservoirs within the Borough. There are two key policies whch relate to SuDs, which are briefly summarised below (for full details please refer to SFRA

SFRA Policy recommendation 4 states the use of appropriately sourced SuDs are for all major development of 10 or more residential units or equivalent commercial; development (in line with interim national standards published in April 2015). It states SuDs scoping and design, as part of site specific FRA must be included within the early stages of the site design in order to incoprporate SuDs within the development. It states the LP, LLFA, EA/NRW must be

consulted during the design stage and the FRA must be submitted to and approved by the LPA including suitable consultation with LLFA and EA/NRW.

Policy recommendation 6 for planning permissions for at risk sites refers to a criteria policy inlcudng the demonstration, of appropriate SuDs techniques have been considered and incorporated within the design of the site where applicable.

In the SFRA, there are designated critical drainage or flood storage areas which would prioritise the areas within the Borough for SuDs. There are indicative areas or Areas of Critical Drainage (ACD) relate to areas of potential development sites (shown in Appendix A of the SFRA maps).

The SFRA completed a detailed assessment of flood risk in four key areas;

- Chester central, including the Sealand Basin and the Watersmeet site
- Ellesmere Port and Stanlow
- Northwich Town Centre and Gadbrook
- Winsford

2.3.4 Cheshire West and Chester Water Cycle Strategy

The study makes specific recommendations in relation to both planning and sustainable drainage and provides an Environment Agency checklist to encourage SuDS to be considered at the earliest opportunity. It also examines where infiltration SuDS would be applicable in Council.

WAY MARKER 2.15

Cheshire West and Chester Water Cycle Strategy

Reccommendations include:

- The Development Policies Document should include policies that promote SuDS in all new developments, as opposed to traditional piped systems
- SuDS will support the Water Framework Directive objective to improve ecological status across the entre study area
- Local policies should consider the future maintenance of SuDS at the planning stage.

2.3.5 Cheshire West and Chester Local Flood Risk Management Strategy (LFRMS)

The DRAFT Local Flood Risk Management Strategy for Cheshire West and Chester. Sets out the local responsibilities for flood risk in the area, Introducing the partnership arrangements to ensure co-ordination between these organisations and carry out an assessment of the flood risk and plans and actions for managing the risk. It clearly recommends using "SuDS to manage surface water in new developments and encouraging developers to consider their use from the early design stage ensures that the best possible systems are built.".

WAY MARKER 2.16

Chester and Cheshire West Local Flood Risk Management Strategy Consultation Draft

"The Council will continue to encourage developers to consider SuDS arrangements."

2.3.6 Cheshire West & Chester - Local Plan (Part Two) Land Allocations and Detailed Policies Plan and Supplementary Planning Guidance (SPG)

The Local Plan (Part Two) sets out the non-strategic allocations and detailed policies, following on from the strategic framework set out in the Local Plan (Part One).

These planning documents detail the aspirations and aims of several areas to be developed. SuDS to be utilised in these areas should ensure that they are in keeping with the designs and maximise the benefits which can be derived from SuDS such as increasing green areas for recreation and improving the aesthetic quality of an area.

WAY MARKER 2.17

Cheshire West and Chester SPD Design for Residential Development (2007)

Local Plan (Part Two) Land Allocations and Detailed Policies Preferred Approach (2016)

For brownfield sites, where the current infrastructure may be staying in place, then runoff should attempt to mimic that of greenfield rates with betterment of at least 30% as a minimum, unless it can be demonstrated that this is unachievable or hydraulically impractical to do so.

Development layout should design-in habitat and wildlife features, whilst considering potential functional use (e.g. SuDS).

3. LOCAL SuDS ZONES

3 Local SuDS Zones

WHAT THIS SECTION WILL COVER:

- Local SuDS zones and suitable SuDS approaches.

3.1 Local Biodiversity, Ecology and Habitat

3.1.1 What is the biodiversity in the Cheshire West and Chester Council area?

The Councils landscape types provide valuable habitats for species including those designated as UK Species of Conservation Concern.

A Map showing key biodiversity designations in the Cheshire West and Chester Borough Council area can be found in Section 4 of this guidance (Map 2 Biodiversity).

WAY MARKER 3.1

Green Infrastructure Framework for North East Wales, Cheshire and Wirral
http://www.merseydeealliance.org.uk/wp-content/uploads/2013/04/small_2230_Framework_Final_March_2011.pdf

EC Green Infrastructure
http://ec.europa.eu/environment/nature/ecosystems/index_en.htm

Within the Cheshire West and Chester council area there are 6 Special Areas of Conservation, 10 Special Protection Areas, 17 Ramsar sites, 43 Sites of Special Scientific Interest, 477 Local Wildlife Sites, 96 Conservation Areas, 126 areas (>650m^2) of Ancient Woodland, and 19 country parks, woodlands, and nature reserves. Within these areas are located 183 priority species and 34 priority habitats.

There are also other landscape designations and programmes such as the Mersey Forest Initiative, which is a collection of woodlands and green spaces which provide social, economic, and environmental benefits to local people. It is recognised as part of the Green Infrastructure for the area. The Mersey Forest is a growing network of woodlands and green spaces spread across Cheshire and Merseyside.

Within Cheshire West and Chester, ancient woodlands cover only relatively small areas but these areas are considered to provide significant wildlife value as theyprovide green corridors for biodiversity.

SuDS features support the growth and development of plants and animals. Effective SuDS design can provide shelter, food and foraging, and breeding opportunities for a variety of wildlife species including plants, amphibians, invertebrates, birds, bats and other mammals.

WAY MARKER 3.2

Cheshire West and Chester Landscape Strategy 2016

The strategy "provides advice to applicants seeking to develop land within the borough on how to consider landscape character in their proposals"

https://www.cheshirewestandchester.gov.uk/residents/planning-and-building-control/total-environment/landscape-character-assessment.aspx

The landscape classification within the Cheshire West and Chester Landscape Strategy identifies sixteen different landscape character types across the borough. The classification reflects the unique character of a range of contrasting landscapes across the borough, which often extend into adjoining areas as part of a wider regional landscape.

The Landscape Strategy states that the design layout of a new development should incorporate a high quality landscape framework that includes provision for open space within the development and the establishment of green infrastructure such as linear buffer strips, creating a diverse network of informal open spaces and continuous wildlife corridors within and around the site.

3.1.2 Why should biodiversity be considered when designing SuDS?



The design of SuDS provides a potential opportunity to both enhance developments (existing and proposed) and to provide a wider benefit to the Cheshire West and Chester Borough Council area. For example, wetlands can enhance the aesthetic quality of an area and provide habitats for several creatures. The Dee and Mersey Estuaries are European Nature Conservation sites with a unique estuarine ecology that supports internationally important populations of birds. The estuaries, waterfront settlements and coastline are hugely important economic assets, supporting jobs and tourism, as well as creating a sense of place. The marine ecology and economy of Liverpool Bay is affected by the quality of water arriving from these rivers.

It is considered that the design of SuDS can help support the restoration of former industrial areas and benefit biodiversity.

3.2 Local Topography

3.2.1 What is the topography in the Council area?

The topography of the Cheshire West and Chester Council area is typified by the low lying and flat Cheshire plain with is traversed by the Sandstone Ridge of hills and escarpments which reaches a height of around 150m and extends from Frodsham in the North to Malpas in the south.

WAY MARKER 3.3

Cheshire West and Chester Landscape Strategy 2016

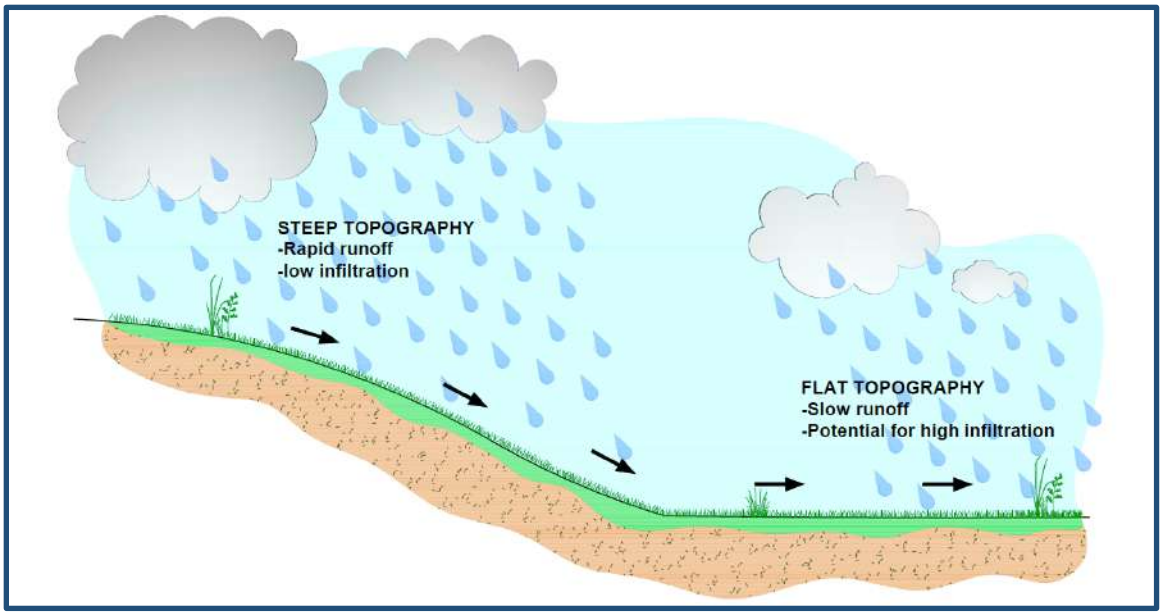
The western Cheshire plane is predominantly flat with ground levels generally in the range of 10-40m AOD. This is lower than the eastern Cheshire Plain where ground levels are generally in the range of 40-55m AOD).

3.2.2 Why should topography be considered when designing SuDS?



The topography of an area can dramatically influence drainage patterns. Areas of steep topography can decrease the time rainfall takes to reach urban areas and thus increases the risk of flooding. Similarly, flat land can encourage the storage of water which can prolong flooding due to the increased time which the water will take to drain away. SuDS techniques such as swales or filter trenches can assist in reducing these affects by providing areas to slow flood water.

A topography map of the Cheshire West and Chester Council area can be found in Section 5 of this guidance (Map 1 Topography).



3.3 Local Water Resources and Flood Risk

3.3.1 What are the water features in the Council area?

The annual average rainfall (1971-2000) recorded for the area is between 600 – 1000mm. This is reasonably distributed throughout the year with an average of 30-60mm in May and 40-100mm in October. The primary watercourses are the River Dee, River Gowy and River Mersey in the west and the River Weaver, Witton Brook, Arley Brook and Rivers Dane and Cocco in the east. Other significant watercourses include the Manchester Ship Canal, the Shropshire Union Canal, the Trent and Mersey Canal, and the Weaver Navigation.

United Utilities and Welsh Water provides water and sewerage services to the Cheshire West and Chester Council area.

WAY MARKER 3.4

Environment Agency 'What's in my backyard' Flood Maps
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?&topic=floodmap#x=357683&y=355134&scale=2

Met Office – UK Climate Average annual rainfall for UK North West Region
http://www.metoffice.gov.uk/public/weather/climate#?region=northwestengland

3.3.2 Why consider water resources and flooding when designing SUDS?



Employing SuDS for future developments provides the opportunity to assist with addressing the water quality issues which Council faces. Components such as filter drains can remove suspended sediments and other pollutants, thus facilitating the release of water of a higher quality, which is particularly important for drainage to water bodies where effort should be made to improve water body quality status.

River Catchment Area & Flood Risk maps for the Cheshire West and Chester Borough Council area can be found in **Section 4** of this guidance (Map 3 Areas at Risk from River & Coastal Flooding).

3.4 Local Geology and soil type

3.4.1 What is the geology of Cheshire West and Chester?

The bedrock geology of Cheshire West and Chester predominantly comprises mudstone, siltstone and sandstone from the Triassic Period and interbedded sandstone and conglomerate from the Triassic Period.

WAY MARKER 3.5

Superficial deposits:

- **Glacial Till**
- **Glacial sand and gravels**
- **Peat**
- **Alluvium Clay, silt and sand**

Superficial geology of the area originated from the Quaternary Ice Age and includes Till (formed from glaciers), Alluvium clay, silt and sand as well as Glacial sands and gravel. Peat is also encountered in some parts.

3.4.2 Why should geology and soil type be considered when designing SuDS?

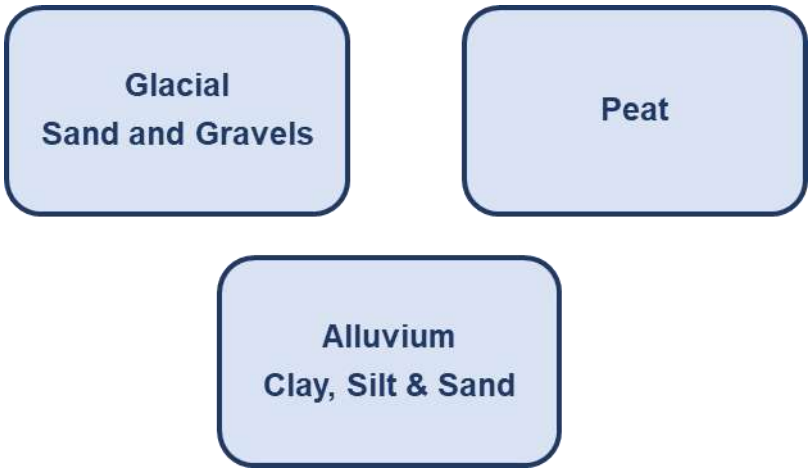


The geology of a region influences the types of SuDS that are appropriate to the soil characteristics and links to groundwater aquifers. Permeable soils assist with infiltration but soils with low permeability do not preclude the use of SuDS. The number of SuDS components have a variety of benefits aside from encouraging infiltration such as providing storage for flood waters and providing habitats.

A Map showing the superficial deposits in the Cheshire West and Chester Borough Council area can be found in **Section 4** of this guidance (Map 6 Superficial Geology).

3.4.3 Local Soil Types

According to the BGS website Cheshire West and Chester has three predominant soil types which are described in the subsequent sections with regards to which SuDS components are most suitable. The key areas are:



Appropriate site investigation should be undertaken prior to the design of the drainage system. Maps of the predominant soil types in the Cheshire West and Chester Council area can be found in **Section 4** of this guidance (Map 6 Superficial Geology).

3.4.4 Sand and Gravel Soils

Soil Description

SUDS aim to mimic natural drainage patterns as they would occur with a range of ground conditions. Sand and gravel dominated soils have a larger, more open texture that are generally more permeable soils. These soils tend to produce less runoff as water infiltrates more rapidly into the ground. The ability of the soil to drain provides a more stable soil mass and reduces hydrostatic pressures that could lead to land slip. However, these soils are also more susceptible to erosion and are more likely to be affected by fluctuating groundwater levels. These characteristics also mean that there can be a direct pathway for pollutants to enter underlying aquifers and adequate pre-treatment needs to be achieved prior to disposing of surface water to ground.

Possible opportunities

- The higher permeability of these soils is more likely to be suitable for soakaway techniques. It should be possible in most cases to match predevelopment runoff rates and volumes to provide a neutral development impact.
- A full range of SuDS techniques (subject to other geotechnical conditions such as contamination and groundwater) can be applied in these types of soils.



Possible constraints

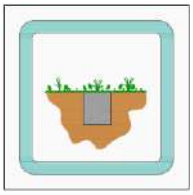
- Sand and gravel dominated soils tend to be more erodible. SuDS techniques that are designed to retain water, such as ponds, may need to be lined to prevent water dissipating into the ground and drying up.
- Buoyancy of certain SuDS, including pond liners, needs to be considered in fluctuating groundwater conditions.
- Direct disposal of surface water to ground may not be acceptable for all developments as highly permeable soils can provide a direct pollution pathway to aquifers within groundwater protection zones.
- Water balance needs to be considered in the management train, as water sensitive SuDS such as ponds at the end of a SuDS train need to receive sufficient water to thrive and function as designed.

Due Diligence

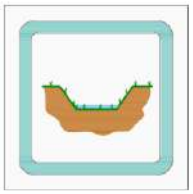
It is recommended that developers complete the following due diligence to fully investigate the opportunities and constraints for SuDS in these areas:

- Surface water flooding
- Receptor sensitivity check
- Groundwater protection status
- Ground investigations
- (including the assessment of seasonal groundwater levels)
- Pre- and post-development runoff rate and volume checks
- Ensure SuDS land take is accounted for in the development plans.

MOST SUITABLE SuDS:



Infiltration trench



Dry swale



Pond (with liner)



3.4.5 Peat

Soil Description

SUDS aim to mimic natural drainage patterns as they would occur with a range of ground conditions. These areas are a combination of organic deposits that form peat, which can hold water, thereby creating wetter conditions and mixed unsorted glacial deposits, which can be free draining. Individually these form very different landscape and hydrological characteristics, but when combined make particularly good soils for farming practices. Areas of significant peat deposits tend to be found around ponds, mires and bogs and the geotechnical characteristics are not normally conducive to standard development.

Possible opportunities

- The low permeability pockets within these soils makes above ground surface water management easier to implement, operate and maintain.
- The higher permeability pockets within these soils may be suitable for soakaway techniques. It may be possible to match predevelopment runoff rates and volumes to provide a neutral development impact.
- SuDS in these areas are more likely to be in proximity to existing wetland habitats and will be naturally exploited by existing flora and fauna. When implemented through good design practice this can enhance developments making better places to live and work.

Possible constraints

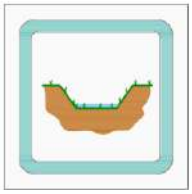
- These soils tend to be very variable and need to consider all the constraints of other soils types.
- These soils can be compressible, susceptible to erosion, underground piping and landslide hazards on steeply sloping sites.
- Perched, shallow, and seasonallyvariable groundwater table could present buoyancy problems or a pathway for pollutants to reach groundwater sources.
- SuDS aim to work with the natural environment. It is not desirable to remove peatland landscapes as these tend to provide ecological conditions and habitat for a distinctive fauna and flora.

Due Diligence

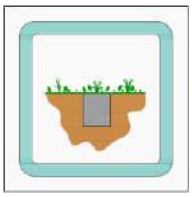
It is recommended that developers complete the following due diligence to fully investigate the opportunities and constraints for SuDS in these areas:

- Surface water flooding
- Receptor sensitivity checks including environmental designation.
- Groundwater protection status
- Ground investigations (including the assessment of seasonal groundwater levels)
- Pre- and post development runoff rate and volume checks
- Ensure SuDS land take is accounted for in the development plans.

MOST SUITABLE SuDS:



Swale (wet and dry)



Filter drain (with liner)



Pond (with liner and rubble ballast layer)

3.4.6 Clay

Soil Description

SUDS aim to mimic natural drainage patterns as they would occur with a range of ground conditions. Clay and silt dominated soils have a limited infiltration potential and SuDS in these soils will tend to collect, clean and store rainfall before conveying it into the nearest watercourse, drain, or sewer. Even on clay soils, some infiltration will occur and will bring associated benefits for reducing runoff volume and groundwater recharge. Other water losses will occur through the implementation of green infrastructure by transpiration and evaporation. However, appropriate SuDS design which assumes a realistic level of infiltration will be needed to create a SuDS management train that works with the existing ground conditions.

Possible opportunities

- The low permeability of these soils makes above ground surface water management easier to implement, operate and maintain.
- SuDS in these areas are more likely to be in proximity to existing wetland habitats and will be naturally exploited by existing flora and fauna. When implemented through good design practice this can enhance developments making better places to live and work.
- As clay and silt soils are aquicludes, it is less likely that groundwater protection zones will be affected by surface water SuDS.

Possible constraints

Clay and silt soils also present other constraints that will need to be given appropriate consideration including:

- Landslide hazards on steeply sloping sites
- Perched or shallow groundwater table that could present buoyancy problems or a pathway for pollutants to reach groundwater sources.
- Risk of swelling clays and underground piping.

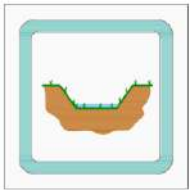
It is most likely that volume reduction will be difficult to achieve and peak flow rate reduction will be the main water management solution.

Due Diligence

It is recommended that developers complete the following due diligence to fully investigate the opportunities and constraints for SuDS in these areas:

- Surface water flooding
- Receptor sensitivity checks
- Groundwater protection status
- Ground investigations
- Pre and post development runoff rate and volume checks
- Ensure SuDS land take is accounted for in the development plans.

MOST SUITABLE SuDS:



Swales



Detention Basin



Ponds



3.5 Local Industrial Heritage & Contaminated Land

3.5.1 Brownfield Sites

A study of key, long-term brownfield sites in the local authority area of Cheshire West and Chester (CWAC) was produced in 2012 to try and allocate new developments to existing brownfield sites. A significant proportion of Cheshire West and Chester has a legacy of past industrial land use resulting in compacted, impermeable soils on brownfield sites. SuDS can therefore be exploited to provide betterment to drainage on brownfield sites.

3.5.2 Contaminated Land

The industrial heritage of Cheshire West and Chester Council also means that previously developed land may also be affected by contamination resulting from past industrial processes. Any SuDS design may therefore be constrained by the presence of contaminated soils. For example, SuDS proposals including discharge to the ground must consider the risk of infiltration drainage mobilising relict contaminants and potential pollution of groundwater.

Appropriate site remediation/de-contamination works and soil improvement measures will also need to be considered as part of the pre-application process.

Contaminated land has the potential to cause harm to people, property, the environment and rivers, lakes and groundwater, because of the presence of particular substances in, on and under the ground. These substances may include heavy metals such as lead or arsenic, organic compounds such as hydrocarbons or solvents and gases, including methane and carbon dioxide.

Where to find help

- Email: environmentalprotection@cheshirewestandchester.gov.uk
- Telephone: 0300 123 7 038 and ask to speak to the Contaminated Land Officer in the Environmental Protection Team
- By post: Environmental Protection Team, Regulatory Services, Cheshire West and Chester Council, Ist Floor, East Wing, Wyvern House, The Drumber, Winsford, CW7 1AH

What's available

- contaminated land issues
- contaminated land enquiry service for prospective property purchasers
- information relating to records of any contamination issues associated with the site, evidence of potential contamination from historic maps, referring to past land uses and the results of site investigations within close proximity to the property.

A charge is made for this service.

3.5.3 Archaeological Sites

Chester and Boughton is an Area of Archaeological Importance and is available on Cheshire West and Chester Council's Interactive Mapping website. The Chester Archaeological Plan contains further information and advice for applicants considering developments within the area of the Chester and Boughton Area of Archaeological Importance. Any SuDS design may therefore be constrained by the presence of both above ground and below ground archaeological remains. For example, SuDS proposals including discharge to the ground must consider the risk of infiltration drainage disturbing the remains. Depending on the nature of the proposed development, it may be appropriate for pre-determination archaeological work to be carried out (such as desk based archaeological assessment or a programme of field evaluation) and the results submitted as a report in support of the planning application.

WAY MARKER 3.6

Cheshire West and Chester Council's Interactive Mapping website
https://maps.cheshirewestandchester.gov.uk/cwac/webmapping

Chester Archaelogical Plan
http://www.cheshirearchaeology.org.uk/wp-content/uploads/Chester_Archaeological_Plan.pdf

4. MAPPING TO SUPPORT SuDS DESIGN / DECISION MAKING

4 Mapping to Support SuDS Design / Decision Making

Map 1 Topography

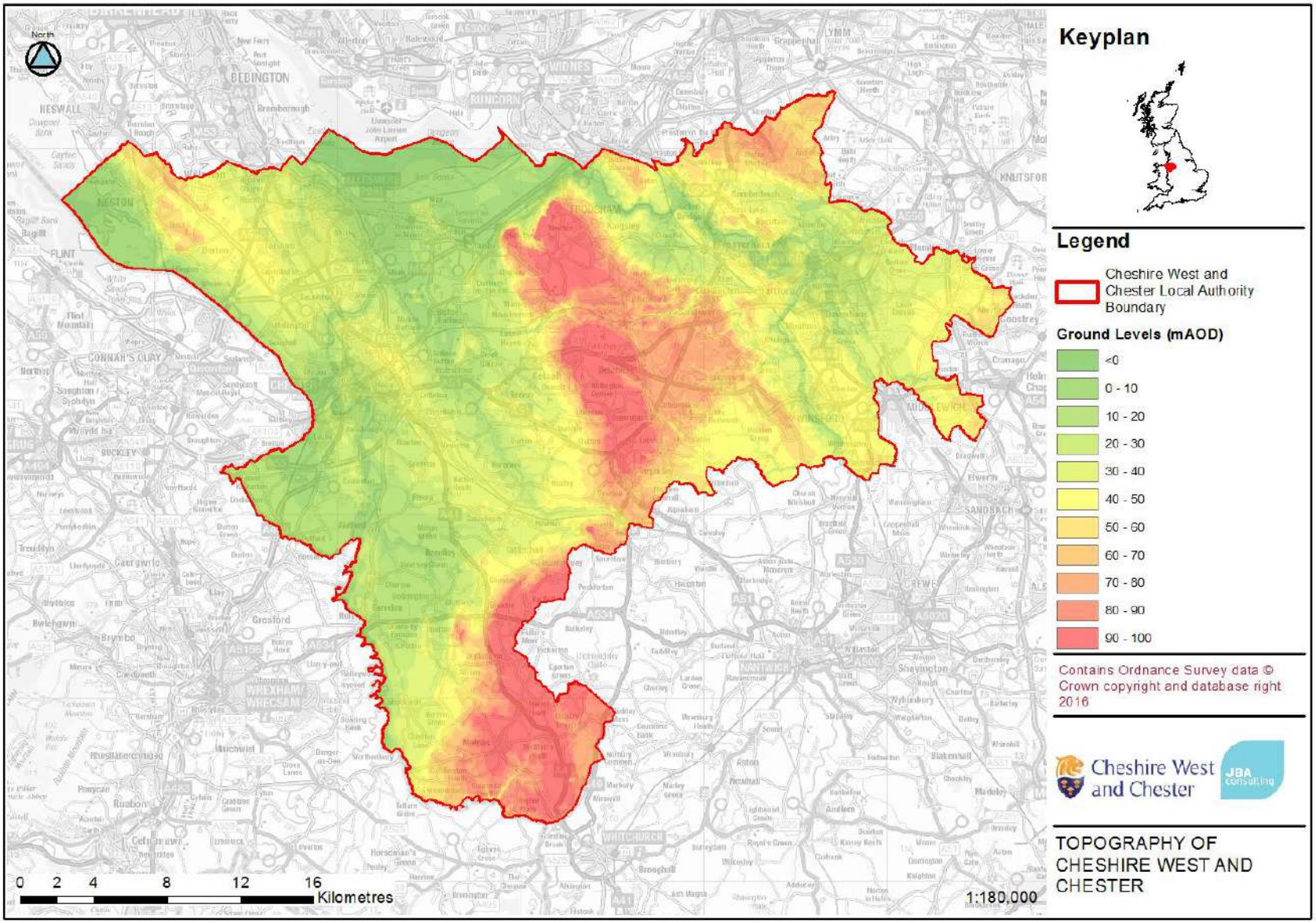
Map 2 Biodiversity

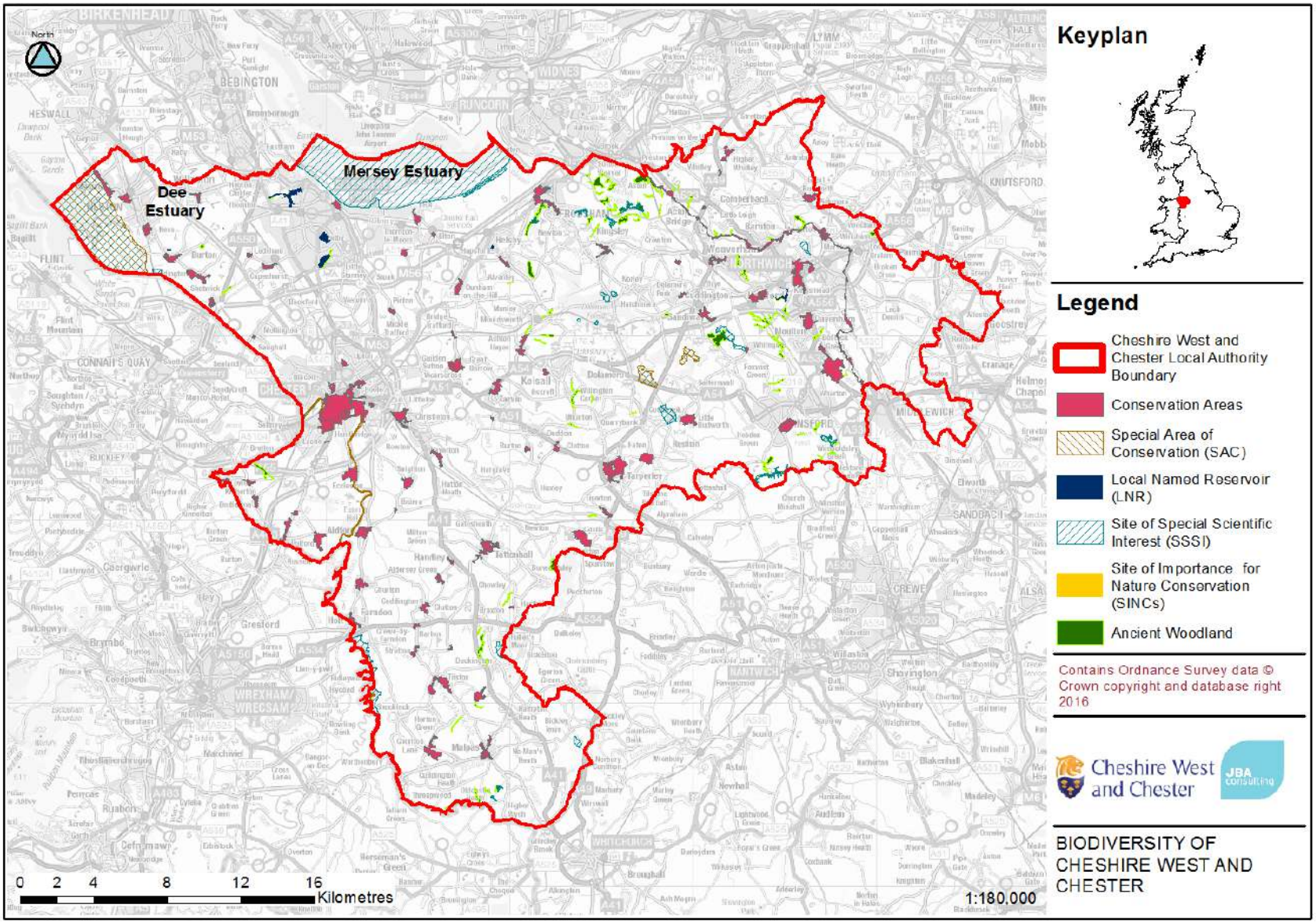
Map 3 Areas at Risk from River & Coastal Flooding

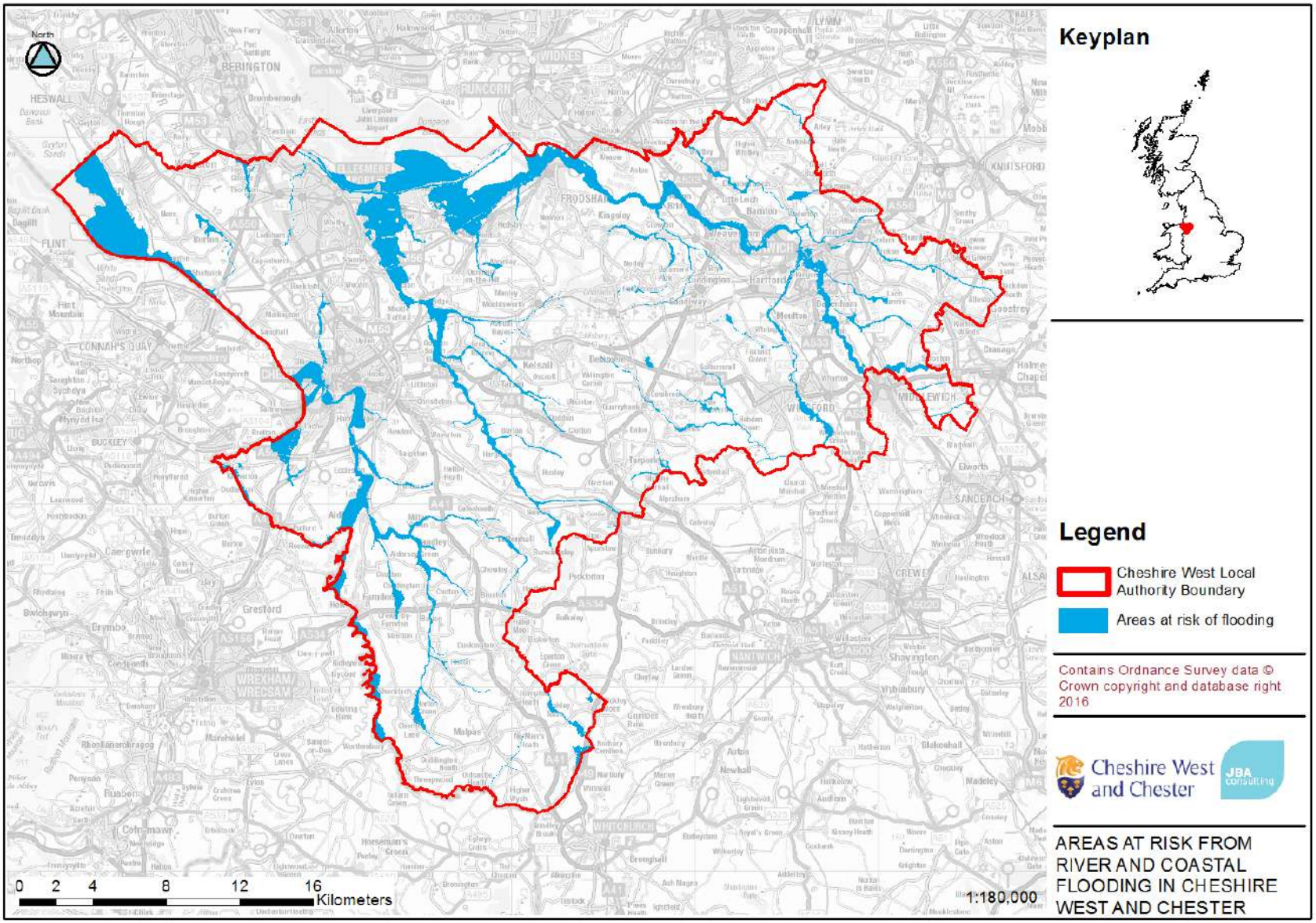
Map 4 Areas at Risk from Groundwater Flooding

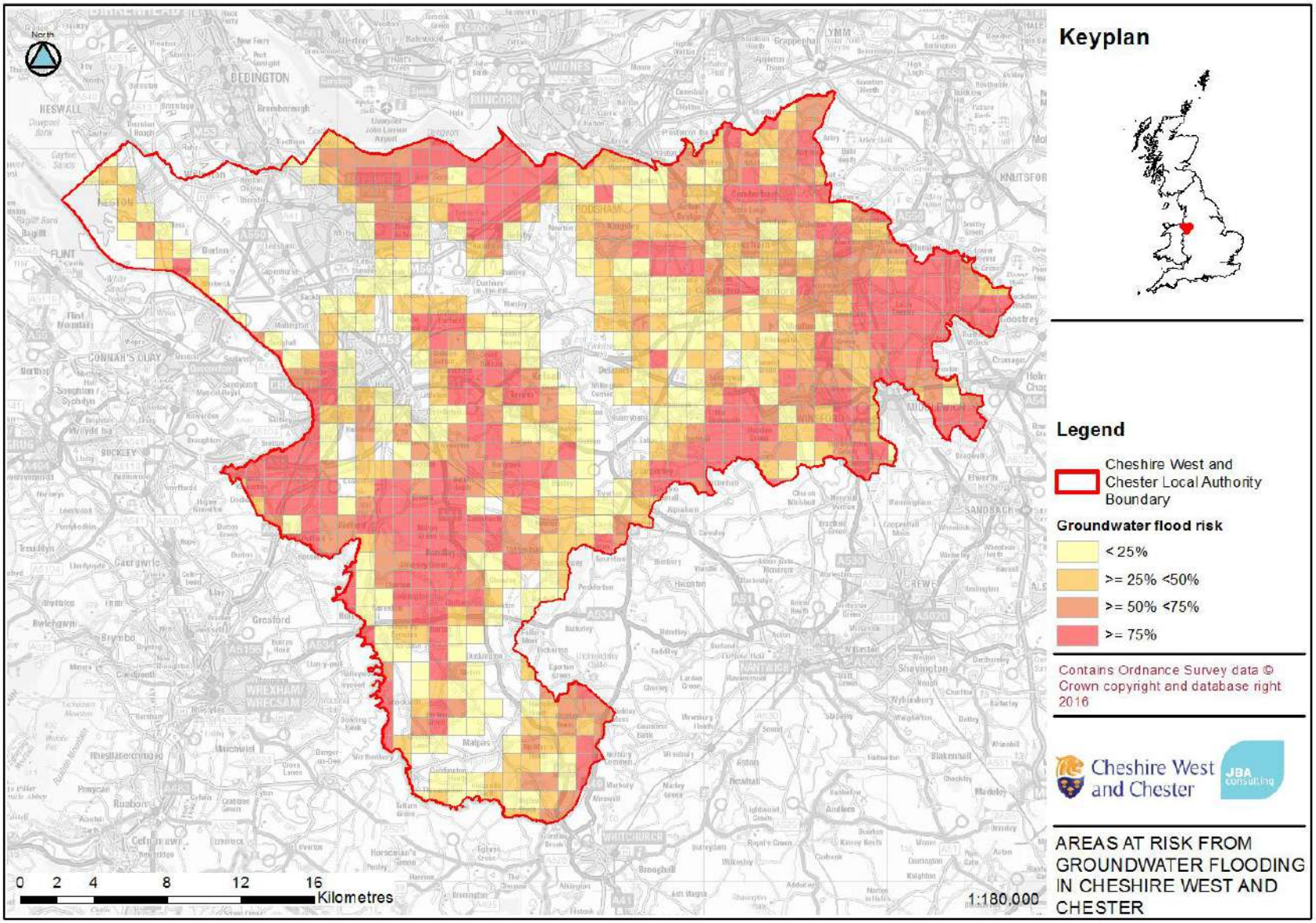
Map 5 River Catchments

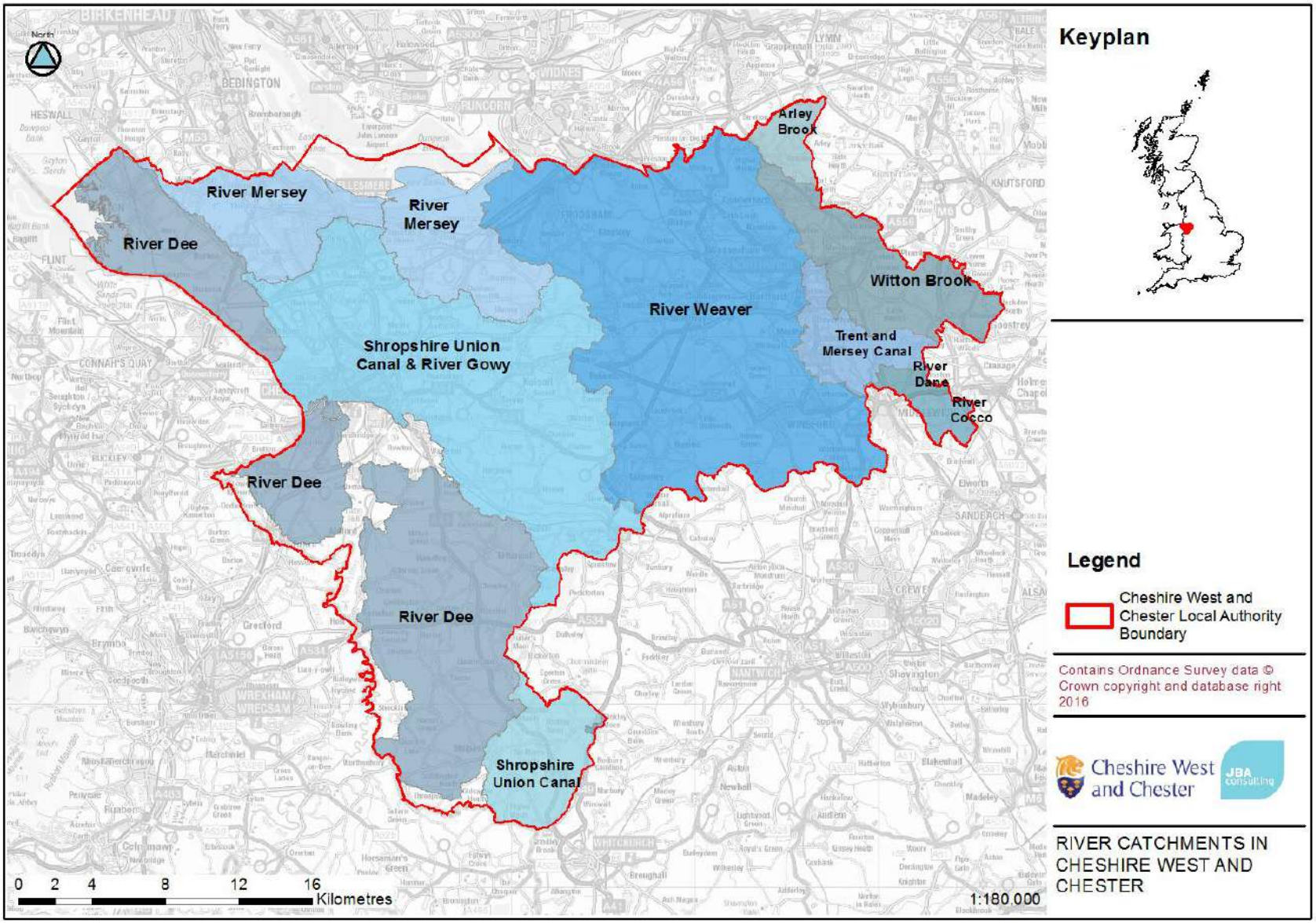
Map 6 Superficial Geology

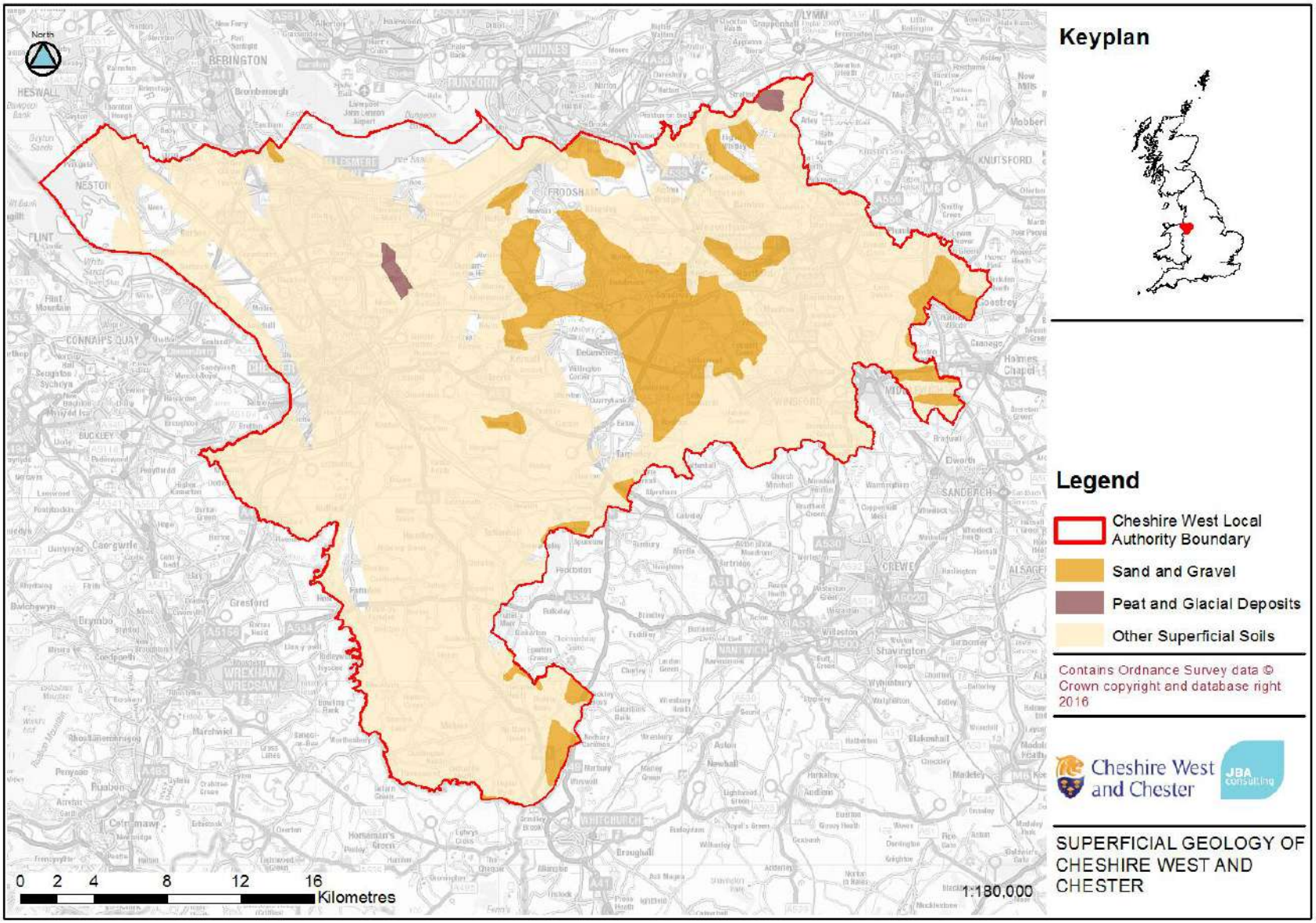

North
BEBINGTON
HESWALL
WIDNES
RUNCORN
NESTON
FLINT
CONNAH'S QUAY
BUCKLEY
WREXHAM
WRECSAM
CREWE
NANTWICH
SANDBACH
WINSFORD
MIDDLEWICH
0 2 4 8 12 16
Kilometres
1:180,000
Keyplan
Legend
Cheshire West and Chester Local Authority Boundary
Ground Levels (mAOD)
<0
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100
Contains Ordnance Survey data © Crown copyright and database right 2016
Cheshire West and Chester
JBA consulting
TOPOGRAPHY OF CHESHIRE WEST AND CHESTER


North
Mersey Estuary
Dee Estuary
0 2 4 8 12 16
Kilometres
1:180,000
Keyplan
Legend
Cheshire West and Chester Local Authority Boundary
Conservation Areas
Special Area of Conservation (SAC)
Local Named Reservoir (LNR)
Site of Special Scientific Interest (SSSI)
Site of Importance for Nature Conservation (SINCs)
Ancient Woodland
Contains Ordnance Survey data © Crown copyright and database right 2016
Cheshire West and Chester
JBA consulting
BIODIVERSITY OF CHESHIRE WEST AND CHESTER


North
0 2 4 8 12 16
Kilometers
1:180,000
Keyplan
Legend
Cheshire West Local Authority Boundary
Areas at risk of flooding
Contains Ordnance Survey data © Crown copyright and database right 2016
Cheshire West and Chester
JBA consulting
AREAS AT RISK FROM RIVER AND COASTAL FLOODING IN CHESHIRE WEST AND CHESTER


North
BEDINGTON
HESWALL
WIDNES
RUNCORN
KNUTSFORD
FLINT
CONNAH'S QUAY
BUCKLEY
SANDBACH
CREWE
NANTWICH
WREXHAM
WHITCHURCH
0 2 4 8 12 16
Kilometres
1:180,000
Keyplan
Legend
Cheshire West and Chester Local Authority Boundary
Groundwater flood risk
< 25%
>= 25% <50%
>= 50% <75%
>= 75%
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Cheshire West and Chester
JBA consulting
AREAS AT RISK FROM GROUNDWATER FLOODING IN CHESHIRE WEST AND CHESTER


North
River Mersey
River Dee
River Mersey
Arley Brook
Witton Brook
River Weaver
Trent and Mersey Canal
River Dane
River Cocco
Shropshire Union Canal & River Gowy
River Dee
River Dee
Shropshire Union Canal
0 2 4 8 12 16
Kilometres
1:180,000
Keyplan
Legend
Cheshire West and Chester Local Authority Boundary
Contains Ordnance Survey data © Crown copyright and database right 2016
Cheshire West and Chester
JBA consulting
RIVER CATCHMENTS IN CHESHIRE WEST AND CHESTER


North
0 2 4 8 12 16
Kilometres
1:180,000
Keyplan
Legend
Cheshire West Local Authority Boundary
Sand and Gravel
Peat and Glacial Deposits
Other Superficial Soils
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Cheshire West and Chester
JBA consulting
SUPERFICIAL GEOLOGY OF CHESHIRE WEST AND CHESTER

Appendices

Appendix A Bibliography of National & Local Policy & Legislation

Policy and Legislation

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UK Climate Projections (2009)

http://ukclimateprojections.metoffice.gov.uk/

UK Sustainable Drainage Guidance and Tools website

http://www.uksuds.com/f