Urban flood risk and integrated drainage

Ouseburn and North Gosforth pilot project

Report of Newcastle City Council on creeping impermeability and drafting of an SPD on Integrated Water Management

March 2008

Newcastle City Council

Integrated Urban Drainage Pilots

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Section 1 - Introduction

1.1 Background to report

1.1.1 This report has been produced by Newcastle City Council as a contribution to a DEFRA funded project under the banner of *Urban flood risk and integrated drainage.* It involves a partnership between the Environment Agency, Newcastle City Council, Newcastle University, the Ouseburn Catchment Steering Group, JBA Consulting with assistance from Northumbrian Water Limited.

1.1.2 The project aims to develop a better understanding of the actual nature of the problems and risks within the upper Ouseburn area. A clearer understanding has been established through the project and the partners will now go on to develop solutions both on the ground and in terms of policies or strategies to reduce risk and to do so in a sustainable and more integrated way.

1.1.3 The complex mesh of responsibilities for water management has always been a barrier both to finding solutions to problems and to informing non-specialists (or even specialists) of 'who does what'. Appendix 1 gives a very brief overview in relation to planning concerns. It is hoped that central government will find a way of rationalising responsibilities as part of its current review of flooding.

1.2 General objectives for this report

1.2.1 The Council has set itself some overarching objectives derived from the scoping work for the project. These are:

- To further develop working relationships and collaborative thinking with identified stakeholders, in accordance to PPS 25.
- Contribute to the sharing of information and expertises as well as gaining to technical knowledge relating to identified local risks and issues.
- To promote collaborative workings between stakeholders, authorities and the public.
- To develop integrated and holistic solutions that provide robust and cost-effective benefits in the long term for the public and private sectors.

1.2.2 The Council will use the various outputs from the project to review the current policy approach and then to apply the lessons learnt to the plan making and development control processes. This will be done most specifically through a Supplementary Planning Document on Integrated Water Management.

Section 2 - Creeping impermeability study

2.1 Need for the study

2.1.1 Land use changes, artificial drainage and the confinement of rivers have increased the severity, frequency and vulnerability to flooding events. Increased efficiency in draining rural areas has led to an increase in the speed that heavy rainfall enters watercourses and travels through to the lowland, predominately urban areas. The reduction of permeable surfaces in the urban areas is now contributing to flooding from watercourses, but also increasing the risk of flooding from surface water drainage.

2.1.2 There are many sources of increased impermeability, some of which can already be controlled through planning powers. However, significant building and construction works including much external paving to residential properties can be undertaken as 'permitted development'. A very common occurrence is the paving of front gardens for car parking, often though not always using impermeable materials. The increase in the amount of impermeable surface especially within urban areas will result in the loss of natural water storage and the increase the risk of flooding from surface or combined sewers or from water that has not even reached the sewers or watercourses.

2.2 Aims and objectives

2.2.1 The broad aim of this study was to identify and review any significant changes in the percentage of permeable land found within selected residential urban areas over a nine year period. The study is a contribution to the larger body of work currently being undertaken by the project partnership, as mentioned above.

2.2.2 The specific objectives of the study were to:

- To study and compare the change over the last ten years or so in the percentages of impermeable and permeable land within various typical residential urban areas across Newcastle.
- Review as far as possible the extent of permitted development leading to an increase in impermeability.
- Assess the possible need for change in permitted development rights.
- Examine the monitoring arrangement that would be necessary to support this.

2.3 Other similar studies

Crazy Paving; The environmental importance of London's front gardens.

2.3.1 This study by the London Assembly in 2005 examined the amount of impermeable development that had occurred within front gardens, with a focus on development that had resulted in additional off street parking. It involved a similar methodology to that was undertaken for this study. The report concluded 'that around two thirds of London's front gardens area is already at

least partially covered by surfacing other than vegetation – paving, brick, concrete or gravel being the most likely alternatives.'

From the findings the report recommended:

- Improving public awareness of the cumulative environmental impact of impermeable surfacing.
- The introduction of policies and strategy to acknowledging, promoting and protecting the environmental advantages of front gardens.
- Changes in planning regulation to enable local authorities greater control to monitor and regulate permeable surfaces lost through the development of front gardens. This could involve a review of permitted development rights.

Front Gardens - Are we parking on our gardens? Do driveways cause flooding?

2.3.2 Following on from the study undertaken by the London Assembly, the Royal Horticultural Society in 2006 carried out a similar study nation wide. It said that almost a quarter of front gardens in the North-East of England are now completely paved, with 47% of front gardens having more than 75% paved with impermeable materials.

2.3.3 The study highlighted the fact that gardens 'can soak up rain, while paving, tarmac are less porous and increase the amount of rainwater that runs off by as much as 50 per cent'. The study provided good practice examples to ensure that front gardens remained permeable, providing greenery and maintain attractive frontage as well as providing desired parking space.

2.4 Methodology

Desk top study and on-site verification

2.4.1 This study involved the analysis of 11 chosen urban residential areas within the city, over the past 9 years, the chosen sample areas aimed to provide examples of a variety of housing type, age and density. For each sample area, aerial photographs from 1996 and 2005 were examined, and the amount of permeable surfaces (such as gardens and grass verges) was measured using the computer software GIS, to calculate the percentage changes over time.

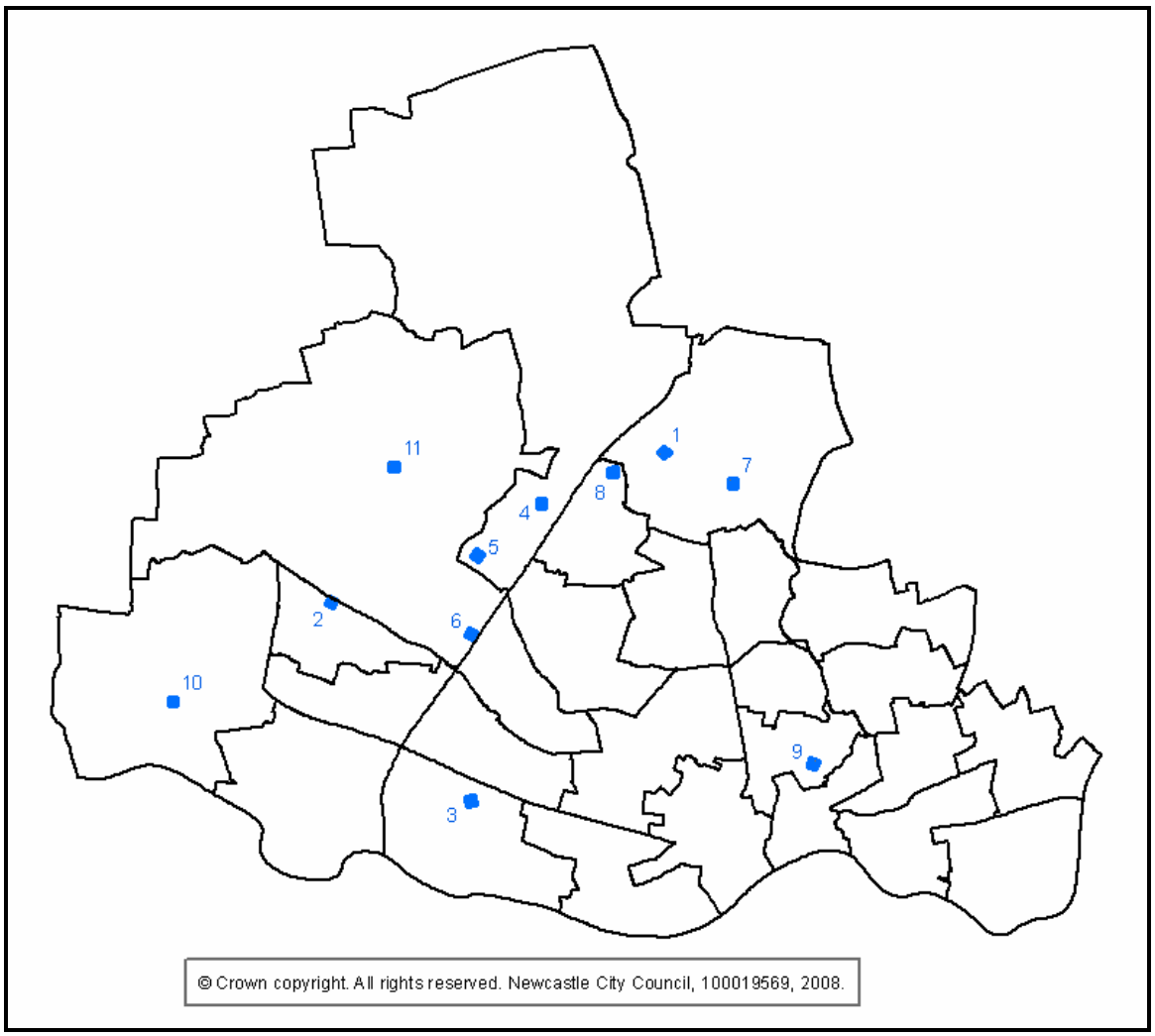
2.4.2 The methods used were not completely accurate due to the lack of clarity of the aerial photographs, especially in the 1996 data set. However, the results from the study are still helpful and provide a general indication of the extent and nature of urban creep currently being experience through out the city. Site visits were also carried out to improve accuracy and provided examples of the use of impermeable and permeable surfacing, especially within front gardens within the city. This work needs to be followed through in more detail, perhaps as a student project, to validate the results

Choice of sample areas

2.4.3 The sample areas have been chosen to a certain extent to match where we have looked at housing density issues in the past, but the choice has also been influenced by the project focus in North Gosforth and by known areas at

risk of flooding elsewhere as indicated by the Strategic Flood Risk Assessment for Newcastle of 2007. Each sample area was a square grid of 100m x 100m.

Map: Location of sample area (with ward boundaries)



Survey results

2.4.4 In the maps following the current permeable surfaces from the 2005 aerial photographs are shaded in green with the amount of permeable surface lost from 1996 overlain in red.

Results follow on next page

1. Brunton Park

Density	• Low
Description	• North of the City • Area around Milford Gardens & Waterbury Road • Post war, low rise suburban private housing with generous gardens

2. Chapel Park

Density	• Low
Description	• West of the City • Off Ingram Drive, • Private, post war estate, moderate low rise family housing with gardens front and back

3. Ex. Newcastle United training ground

Density	• Medium
Description	• South west of the City • Modern housing, built in the mid 1990s • Off Gretna Road and Milburn Drive

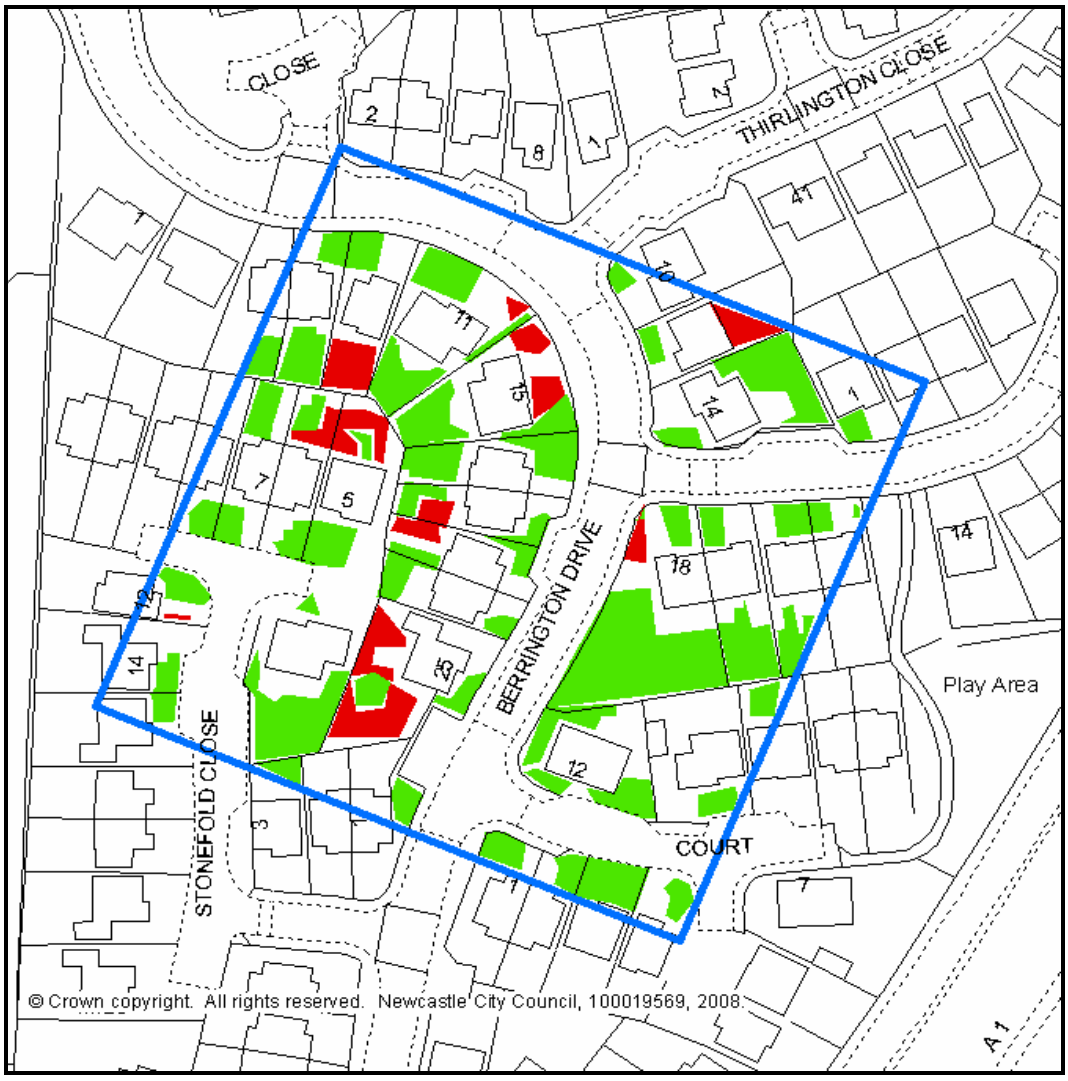
4. Kingston Park (a)

Density	• Medium
Description	• North of the City • Dwellings from the late 1970s • Off Hastings Avenue

5. Kingston Park (b)

Density	• Medium
Description	• North of the City • Dwellings from the late 1970s • Off Warbeck Close

6. Land of Upper Redewood School

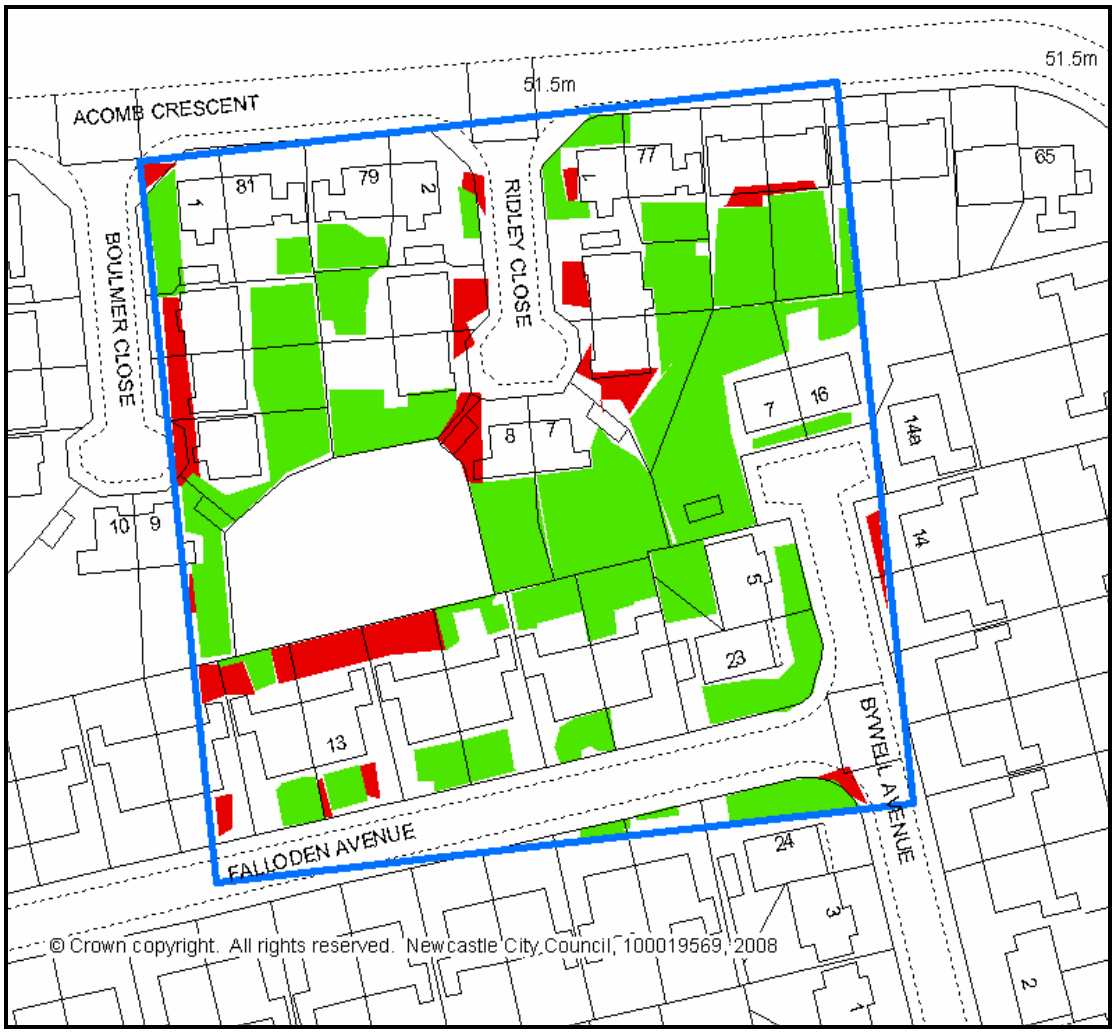


Density	• Medium
Description	• Central area of the City • Completed mid 1990s - off Berrington Drive

7. Whitebridge Park: opposite McCracken Park (rugby football ground)

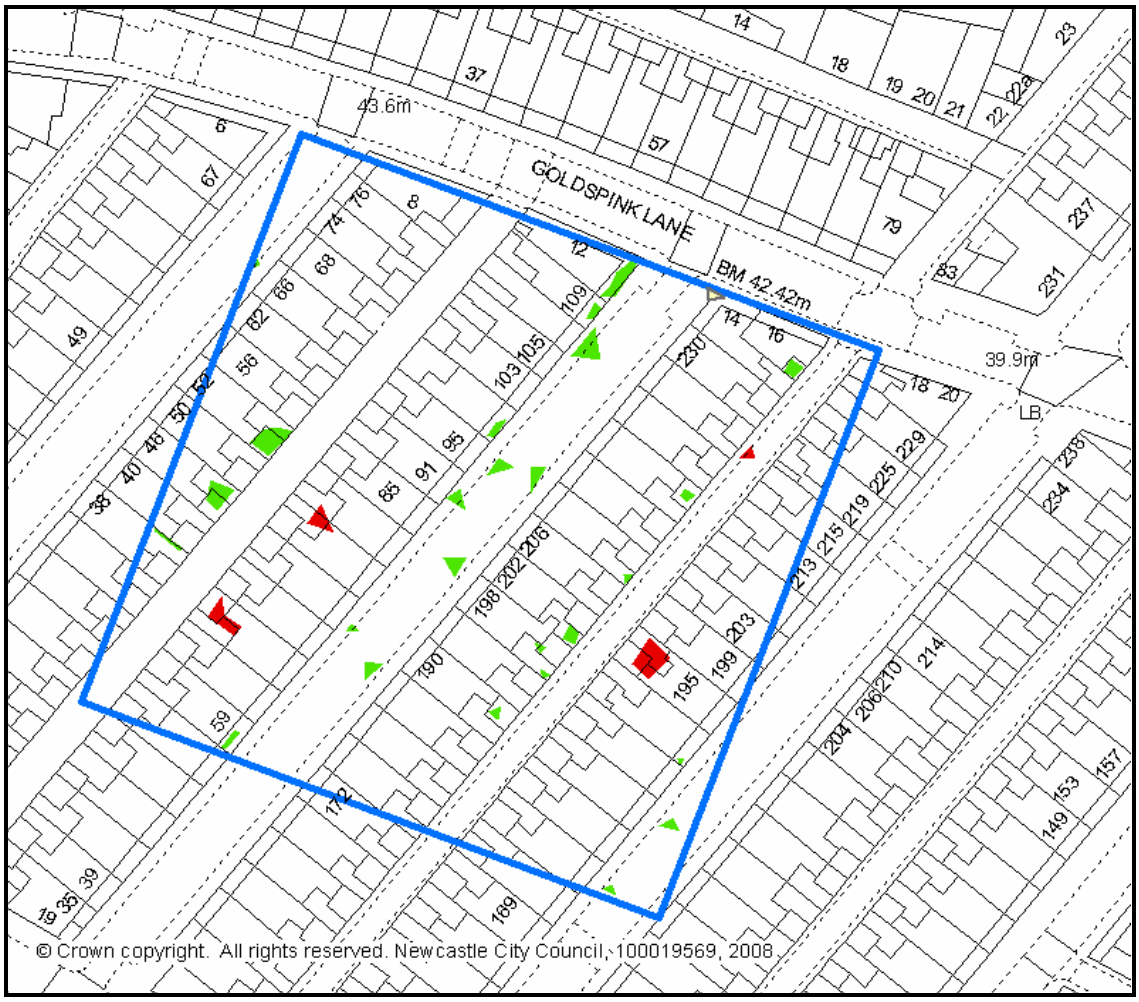
Density	• Low
Description	• North of the City • Area around Broadway East and Whitebridge Close

8. Red House Farm



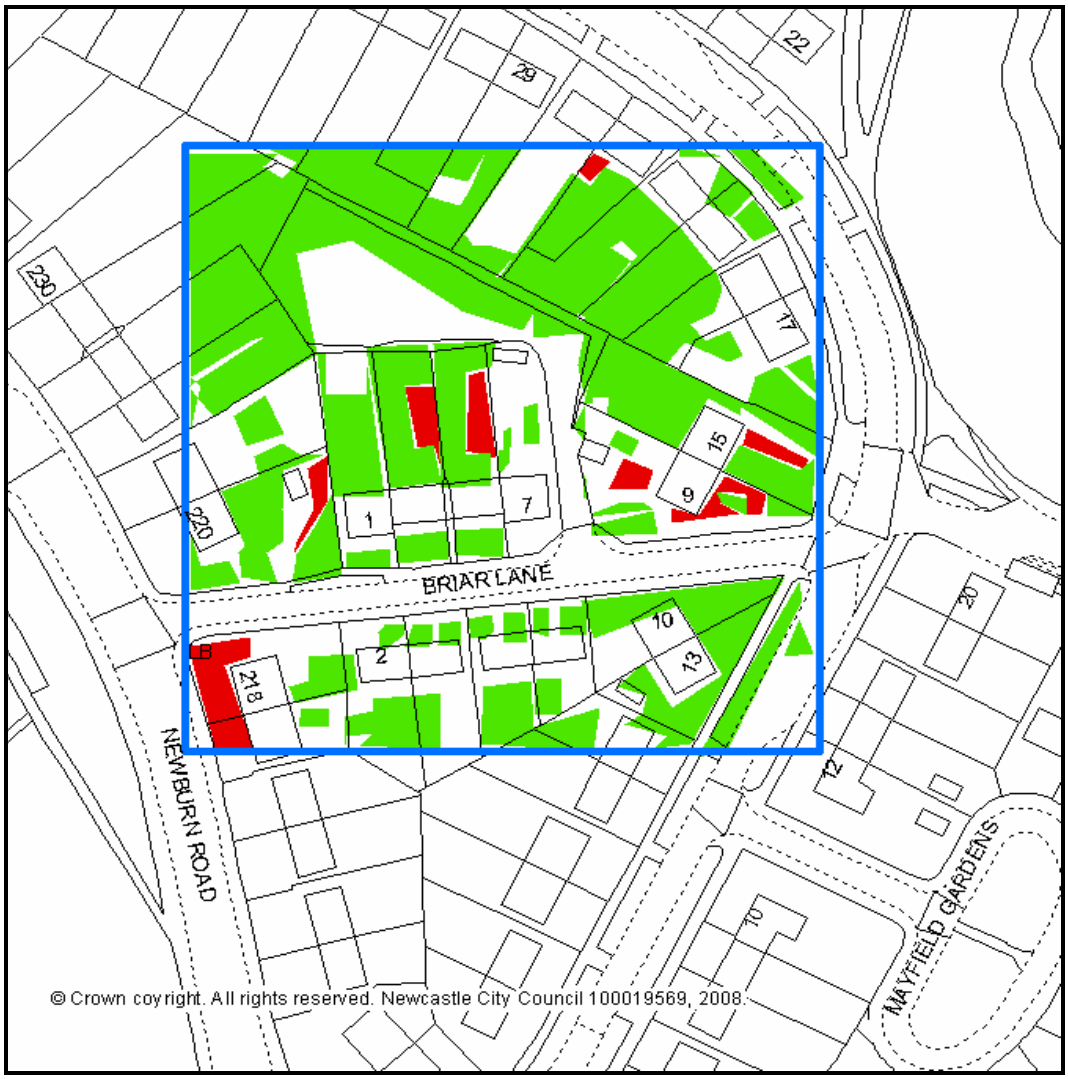
Density	• Medium
Description	• North of the City • Area around Falloden Avenue and Acomb Crescent • Low rise, edge-of-city estate of private houses with gardens, built late1970s, around courts and in culs-de-sac

9. Sandyford



Density	• High
Description	• Inner East of the City • Off Goldspink Lane • Low rise terraced houses, many are 'Tyneside flats' with minimal front gardens and small back yards.

10. Throckley



Density	• Medium
Description	• West of the City • Area around Mayfield Ave, Briar Lane • Urbanised village, diversity of housing type, with variable garden sizes

11. Woolsington Bridge

Density	• Low
Description	• North of the City • Area around Ponteland Road, Middle Drive • Post war semis

Analysis of survey results

Table 1: Percentage change in permeability

Site	Description	1996 (m^2)	2005 (m^2)	Total % Decrease	Annual % Decrease
Brunton Park	North of the City Area around Milford Gardens/ Waterbury Road. Post war, low rise suburban private housing with generous gardens	4,112	3,469	15	1.6
Chapel Park off Ingram Drive	West of the City Off Ingram Drive, Private, post war estate, moderate low rise family housing with gardens front and back	5,513	4,595	16	1.7
Ex. Newcastle United training ground, off Gretna Road and Milburn Drive	South West of the City Modern housing, built in the mid 1990s	2,445	2,177	10	1.1
Kingston Park (a) - off Hastings Ave	North of the City Dwellings from the late 1970s	3,067	2,837	6	0.6
Kingston Park, (b) off Warbeck Close	North of the City Dwellings from the late 1970s	3,332	3,018	9	1
Land of Upper Redewood School - off Berrington Drive	Central area of the City Completed mid 1990s	2,548	2,147	15	1.6
Whitebridge Park - opposite McCracken Park (rugby football ground)	North of the City Area around Broadway East	4,048	3,654	9	1
Red House Farm - off Falloden Ave	North of the City Low rise, edge-of-city estate of private houses with gardens,	2,870	2,357	17.87	1.9

	built circ. Late1970s, around courts and in culs-de-sac				
Throckley, off Mayfield Ave	West of the City Urbanised village, diversity of housing type, with variable garden sizes	4,694	4,374	5	0.5
Sandyford - off Goldspink Lane	Inner East of the City Low rise terraced houses, many are 'Tyneside flats' with minimal front gardens	144	126	12	1.3
Woolsington Bridge, off Ponteland Road and Middle Drive	North West of the City in outlying commuter village. Inter war semis	4,067	3,274	19	2.1
Total		**41,899**	**32,038**	**20.80**	**2.31**

2.5 Findings

Variations in creep

2.5.1 The nature and the extent of the creep of impermeable surfaces varied with the housing type and density of each sample grid. With reference to Table 4 those samples with lower density, often with larger front and back gardens, tended to experience the largest amounts area lost in comparison to those with lower densities, often with small gardens.

2.5.2 This may be because there was more green (permeable) space in the first place and therefore the lost of permeable land through activities such as building extensions, paving and patio areas has less visual and spatial impact. In comparison to those samples where density was classed as 'medium' the amount to green space (permeable land) for each property is less and with the amount of permeable surfaces lost was less.

2.5.3 The sample area within Sandyford where density was classed as 'high' experienced the least amount of permeable surface lost. The properties within the sample were densely packed late 19th century terraced house many of which are 'Tyneside flats' with shared rear yards and minimal if any front gardens. Permeable surfaces within the area were mainly provided by tree and shrub boxes along pavements and the few remaining unpaved 'gardens'.

Nature of creep

2.5.4 The nature of the causes of creep varied in all sample areas, where permeable surfaces have been reduced in the back of the property it has been mainly due to the building of conservatories and extensions, as well as patio and decking of gardens. Reductions in the permeable surfaces to the front of

properties were mainly attributed to the gravelling and paving of front gardens either for management purposes or to achieve a larger driveway.

Table 2: Comparing the amount of development within the front and rear of properties

Site	% properties where creep has occurred mainly in the back of the properties	% properties where creep has occurred mainly in the front of the properties
Brunton Park	42%	58%
Chapel Park - off Ingram Drive	54%	46%
Whitebridge Park - opposite McCracken Park (rugby football ground)	100%	0
Woolsington Bridge	60%	40%
Ex. Newcastle United training ground, off Gretna Road	85%	15%
Kingston Park (a) - off Hastings Avenue	33.3%	66.6%
Kingston Park (b) - off Warbeck Close	75%	25%
Land of Upper Redewood School - off Berrington Drive	70%	30%
Red House Farm - off Falloden Avenue	47%	53%
Throckley - off Mayfield Ave	78.5%	21.5%
Sandyford - off Goldspink Lane	70%	30%
City Wide	**65%**	**35%**

Number of conservatories and sun rooms

2.5.5 Within the possible causes of the lost of permeable surfaces with existing areas can include the actions taken by property owners some of which does require planning permission. These include conservatories and sun room, the development of which is assumed most likely to result in the loss of permeable surfaces with the boundaries of a property (i.e. the loss of rear garden).

Table 3: Potential amount of permeable surface loss through non-permitted development city-wide

Type of development	Number of applications granted 2000 - 2008	Potential amount of permeable surface lost sq m in total	Potential amount of permeable surface lost sq m annually
Conservatories	1292	11,619	1,602
Sun Rooms	87	783	108
Total	**1379**	**12,402**	**1,710**

Number of properties with reduced permeability

2.5.6 The number of properties experiencing 'creep' in each sample are listed below, this again varied with the housing type and density of the samples. The samples showed that in those areas with lower density often with larger gardens (notably with larger front and back lawns) more properties had decreased the amount of permeable surfaces.

Table 4: Number of properties where 'creep' has been identified

Site	Density	Number of Properties	Percentage	Mean percent (by density)
Brunton Park	Low	12 out of 23	52%	47.7%
Chapel Park - off Ingram Drive	Low	13 out of 18	72%	
Whitebridge Park - opposite McCracken Park (rugby football ground)	Low	3 out of 19	15%	
Woolsington Bridge	Low	13 out of 25	52%	
Ex. Newcastle United training ground - off Gretna Road and Milburn Drive	Medium	10 out of 34	29%	31.5%
Kingston Park (a) - off Hastings Ave	Medium	6 out of 25	24%	
Kingston Park (b) - off Warbeck Close	Medium	10 out of 30	33%	
Land of Upper Redewood School - off Berrington Drive	Medium	10 out of 35	28%	

Red House Farm - off Falloden Ave	Medium	16 out of 29	55%	
Throckley - off Mayfield Ave	Medium	6 out of 30	20%	
Sandyford - off Goldspink Lane	High	3 out of 64	4.6%	4.6%
Total		**102 of 326**	**31%**	**34.9%**

Examples of gardens with impermeable and permeable surfaces

2.5.7 Site visits were made to some of the sample areas towards the end of the project period. Accuracy was checked and although this needs a more systematic rerun, did indicate a reasonable match of desk-top findings to actual development.

2.5.8 The visits also enabled photographs to be taken of 'good' use of permeable surfacing material as well as 'poor' use of impermeable materials in front gardens to be taken - see following pages for examples.

2.5.9 In practice it was difficult to establish the degree of permeability of some forms of block surfacing - for example the block paving in the first photograph. These may be marketed as permeable but much will depend on how they are laid and how they are maintained. They may also act as permeable up to certain rainfall levels and then shed any further water like a hard surface and before a truly permeable surface becomes saturated.

Photographs follow on next page

Examples of impermeable or less permeable surfaces in front gardens

Examples of permeable surfaces in front gardens

2.6 Interim Conclusions

2.6.1 The results from the study have provided an initial insight in to the extent of urban creep often under permitted development rights and the use of impermeable surfaces. The findings showed a clear city-wide trend of permeability loss, although within the inner city areas the amount lost was much lower (due mainly to it being so hard already).

Permitted development

2.6.2 From the GIS desk study work and in particular the site visits carried out the findings of the study carried out by the Royal Horticultural society were in broad terms confirmed. There was a clear trend especially in relation to front gardens moving to being semi or fully paved, very often for off-street car parking. This reflected the current trend of multi car ownership as well as the clear change in attitude and fashions towards gardening.

Development requiring planning permission

2.6.3 Although difficult to measure from the site visits, the GIS desk study provided detailed information on non permitted development which occurred mainly in back gardens through extensions, notably conservatories and sunrooms. For the study the number of householder applications for conservatories and sunrooms was also examined with results in Table 3. A significant amount of permeable surface could have been potential lost with no compensatory water storage provided.

Creating a policy response

2.6.4 The Council, using national and regional guidance in conjunction with local evidence will need to make a decision on whether to seek some control over the amount of impermeable surfaces with the city (or if national changes in regulations give us the control, we will need to decide how to exercise it). If the evidence and guidance prompts the Council to do so, further work on the practicalities would have to be done.

2.6.5 Initial steps are being taken by national government to possibly revise permitted development rights so that use of impermeable surfaces in front gardens would require an application for planning permission. The need for planning permission would presumably act as a deterrent to property owners and therefore encourage the use of permeable alternatives. For further information see; www.communities.gov.uk/documents/planningandbuilding/pdf/686153. The Council can currently seek Article 4 directions to remove permitted development rights, but there are financial implications which inhibit this line of action for existing properties.

2.6.6 Although, in principle, possible removal of permitted development rights appears a simple solution, the implementation may proved problematic. If the Council decides it wishes to control impermeable surfaces by in some or all cases refusing planning permission, it would have to justify this on city-wide or area specific grounds. This would have to be informed by further studies to

ensure local and appropriate evidence is available. The surveys done in this project would be the first step along that road.

2.6.7 Area specific policies might be the best way forward, presumably based on assessments of flood risk. This would have to be assessed through either the Environment Agency Flood Risk maps or possible future studies of surface water flooding. A total ban on hard surfaces would be impractical, so some form of maximum coverage might be needed.

2.6.8 The above comments (and this study generally) apply to existing urban areas and buildings. The planning system does of course have much greater control over new development and use of permeable surfaces and on-site storage of water should feature much more strongly in years to come. Even in the absence of new planning powers, much can be done to heighten public awareness of the importance of permeable surfaces within urban areas, as very recent work by the RHS as publicised by the BBC shows.

Further work

2.6.9 In order to be able to develop localised specific standards and development control requirements that are robust and consistent with planning law requirements further studies are needed.

2.6.10 Our work needs to be dovetailed with more technical exercises to assess the sensitivity of the surface water drainage system to the sort of changes in impermeability the study has shown. This will require input of such information into modelling exercises and related analysis.

2.6.11 The degree of permeability of some forms of surfacing such as block paving may not be clear from superficial inspection and advice is needed on this.

2.6.12 This study examined the loss of permeable surfaces in the existing urban area with a focus on creep within residential neighbourhoods. Obviously the loss of permeable surfaces around commercial and other buildings will also be another area where further study is required.

2.6.13 Regular monitoring of the spread in impermeable surfaces is suggested and ideally this should be done city-wide, or at the very least in areas at most risk of flooding (once identified). The best and most effective ways of doing this need to be studied further, as it could be an extremely time consuming exercise.

Section 3 - Drafting of an SPD on Integrated Water Management

3.1 Introduction

Scope of SPD

3.1.1 The Council is to prepare a Supplementary Planning Document (SPD) on Integrated Water Management, as set out in the LDF Local Development Scheme of April 2007. This section of the report mirrors the likely structure of the SPD, with commentary on what background work has been done already and what remains to be done. Preparation of the SPD has not been formally started, but publication of this report will be the prompt to start that process.

3.1.2 The focus for the SPD will be on new development, but many of the principles will be useful in addressing existing problems in both urban and rural areas. The Supplementary Planning Document (SPD) will sit within the framework of national, regional and local policy. It will provide guidance for land owners, prospective developers on:

- coping with flood risk
- protecting and improving water quality
- reducing water consumption
- dealing with these and other issues in an integrated way

3.1.3 In line with regulations and guidance in PPS12 *Development Plans* a draft of the SPD will be subject to consultation and will then be amended as appropriate to reflect comments received. The regulations do not require that am SPD is subject to independent scrutiny. When adopted, the SPD will be a material consideration in determining planning applications and may be used for other purposes.

Sustainability and Climate Change

3.1.4 The Council has for many years recognised the need to address sustainable development issues and its land-use and transportation development plan - the Unitary Development Plan - has included policies covering such matters since 1998. More recently it has noted the strong evidence that climate change is occurring as a result of human activity and is taking action more specifically on its causes and impacts.

3.1.5 The Council is tackling current and potential impacts and implications through a *Climate Change Strategy. Part 1- Operations and Service* was approved in early 2008. The strategy includes a section under the Heading *Integrated Drainage and Flood Management* with associated objectives (see Appendix 2 for the full list). Objective 2 is ‘to ensure that new developments minimise the risk of flooding from watercourses and drainage systems, with the use of SUDS wherever possible’.

3.2 Flooding

Definitions

3.2.1 Broadly speaking there are four categories of flooding:

- coastal
- river (or fluvial)
- localised surface water (or pluvial)
- groundwater.

3.2.2 Coastal flooding is mainly due to tidal effects often associated with spring tides, although low pressure and high winds can also be contributing factors. Fluvial flooding in general is caused by heavy or prolonged rainfall which results in rivers overtopping or bursting their banks. Groundwater flooding is generally due to high water table levels which result in springs occurring, often after prolonged periods of rainfall. Pluvial flooding is the product of localised heavy rainfall which results in surface runoff exceeding that of the drainage network's capacity.

3.2.3 The effects of flooding from any other these sources can be serious. For Newcastle the threat of flooding has been perceived as being relatively limited, being primarily from coastal or fluvial flooding, principally from the major River Tyne and the smaller Ouseburn. However, attention is now focussing increasingly on the possibility of surface water flooding, perhaps on a very localised basis. The SPD will address the possibility of flooding from all sources.

Objectives

3.2.4 The objectives of the SPD for flooding will be based in the following:

- To ensure that new development is only allowed where the effects of existing flood risk on the site have been taken into account fully
- To ensure that new development does not increase the risk of flooding elsewhere and to seek opportunities wherever possible to help reduce such risks
- To promote sustainable, integrated solutions to flooding risk challenges
- To take into account the likely effects of climate change in all the above
- To ensure that stakeholders are aware of the implications of PPS25 and the future role they may be required to undertake.

Policy Context

National policy

3.2.5 Planning Policy 25: Development and Flood Risk, aims to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk, directing development away from high risk areas. Where in exceptional cases where new development is necessary is these areas, PPS25 aims to provide mitigating advice without increasing flood risk elsewhere and where possible, reducing the risk from

flooding. This risk based approach includes requirements for flood risk assessments, use of the sequential approach and an exceptions test in either or both preparation of development plans and in dealing with specific planning proposals.

3.2.6 The Council notes that central government through DEFRA is currently consulting on the document *Improving surface water drainage*, following a review of the flooding of 2007 by Sir Michael Pitt. Major changes to legislation and practice on management of surface water are possible, and some reference to the possible changes are made in this report.

3.2.7 This consultation document seeks views on three main areas:

- A possible requirement to prepare Surface Water Management Plans, with options for lead organisation an funding
- Clarification of responsibilities for adoption and management of sustainable drainage systems (SUDS)
- Review of the 'automatic right to connect' for surface water to sewers

The outcomes from this consultation may include changes in primary legislation, which would take some time to bring in. Even so, it is likely the SPD will take on board many of the messages that it includes.

Regional policy

3.2.8 Existing Regional Spatial Strategy (adopted as Regional Planning Guidance RPG1) includes policy EN4 Flooding:

"ENV4 Flooding

Development Plans and other strategies should:

- protect flood plains and existing or proposed flood defences;
- avoid development in areas identified as being at risk or likely to be at medium to high risk in future from flooding, as defined in PPG25, where alternative sites are available; and
- ensure that where other considerations in favour of the development outweigh the flooding issues in identified flood risk areas, development will only be permitted where it has been established, following consultation with the Environment Agency and other relevant organisations, that any necessary protection or management measures will be provided and are environmentally acceptable."

3.2.9 Currently RSS (RPG1) is being reviewed and will be replaced by revised RSS. As at March 2008, there is a second *Proposed Changes* version (published February 2008) with a draft policy as follows:

"Policy 37 Flood Risk

A. Strategies, plans and programmes should adopt a strategic, integrated, sustainable and proactive approach to catchment management to reduce flood risk within the Region, managing the risk from:
   a. tidal effects around estuaries and along the coast including the implications of the latest Government predictions for sea level rise;

b. fluvial flooding along river corridors and other significant watercourses resulting from catchments within and beyond the Region and other sources of flooding.
c. flooding resulting from surface water runoff and capacity constraints in surface water drainage systems.

B. In developing Local Development Frameworks and considering planning proposals, a sequential risk-based approach to development and flooding should be adopted as set out in PPS25. This approach should must be informed by Strategic Flood Risk Assessments prepared by planning authorities in liaison with the Environment Agency to inform the application of the Sequential Test and, if necessary, the Exception Test, in development allocations in their LDDs and consideration of planning proposals."

Local policy

3.2.10 Under the Planning and Compulsory Act 2004, the Council is in the process of replacing the Unitary Development Plan (UDP) with the Local Development Framework (LDF). The current position is given here.

Unitary Development Plan

3.2.11 Under the Act, policies (including that for flooding), were formally 'saved' from September 2007 until such time as they are superseded by those in LDF Development Plan Documents. The relevant UDP policy is as follows:

> "POL14 Flooding and development
>
> Development which would be at direct risk from flooding or likely to increase the risk of flooding elsewhere will not be allowed."

Local Development Framework

3.2.12 The Council's Core Strategy is due for submission at the time of writing this report. It does not include a policy for addressing flood risk or integrated water management. However there is text at paragraph 8.21 onwards under the heading *Flood Risk and Integrated Water Management* which notes that planning policy has a crucial supporting role in addressing flood risk.

3.2.13 It says that the policy framework provided by policies and guidance at national and regional level along with the saved UDP policies should be adequate. The need for detailed LDF policies to replace policy POL14 in the UDP will be looked at as part of the forthcoming Development Control Policies DPD.

Other local policy considerations

3.2.14 The Council recognises the need to address flood risk in a range of other documents, including the *Sustainable Community Strategy* (nearing completion as at April 2008) and the *Climate Change Strategy Part 1* (approved in early 2008 - see Appendix 2 for objectives relating to).

Evidence base

Environment Agency Flood Risk maps

3.2.15 The geographically comprehensive Flood Risk maps produced by the Agency have been the prime source of information to local authorities and others on likely risk. These look only at coastal and fluvial flooding, that is from the sea or from rivers and streams. They are now updated on a three monthly basis. They have been and remain a very valuable source of information, but do not address flooding from other source, notably localised surface water flooding due to topography or capacity problems in the drainage system.

3.2.16 The Council has identified some anomalies in the maps in the past (due to the low level of resolution in some of the underlying studies) but is confident that most of these are now resolved. It is recognised that there is always the possibility of change in the maps due to new information or better modelling.

3.2.17 Within Newcastle there are extensive rural areas in the north and west liable to fluvial flooding in the River Pont, Hartley Burn and Ouseburn catchments. In the upper reaches of the Ouseburn there is risk to a very small number of properties in the village of Woolsington. Once the Ouseburn enters the existing urban area at the A1 Western Bypass there is a relatively narrow corridor down to Haddrick's Mill within which some properties are shown to be at risk. Once the Ouseburn enters Jesmond Dene, the flood risk is to open space rather than properties.

3.2.18 The River Tyne forms the southern boundary of the city and flood risk becomes primarily tidal based, including that at the very southern end of the Ouseburn where it meets the Tyne. Some existing industrial properties at Newburn are shown to be at high risk (though a review is underway in this area) and part of the major development site at Newburn Riverside is in the medium risk category.

3.2.19 Due to the steep sided nature of the River Tyne valley (even gorge in some places), flood risk from the river is limited downstream of Newburn Riverside. However there are some key sites and buildings along the city's central Quayside which are at risk. Potential development sites at Spiller's Quay and Walker are at risk, although the latter is caused by the cut away form of former shipyard slipways.

3.2.19 In addition to the flooding outlined above from the two major watercourses, there small areas at risk associated with smaller watercourses, including land at Denton Dene, Throckley Dene and Walbottle Dene.

Strategic Flood Risk Assessment

3.2.20 The Council commissioned JBA Associates to prepare a Strategic Flood Risk Assessment (SFRA) for the city in 2006 and it reported in June 2007. The SFRA investigated and identified the extent and possible severity of flooding based on available evidence and thus provides a strategic review of flood risk. The information provided to the consultants was primarily that from the Environment Agency Flood risk maps and the SFRA thus addressed mainly tidal and fluvial flooding from the main watercourses.

3.2.21 It listed all potential development sites identified as at the end of 2006 sites with a commentary on each in relation to the amount of the site in Zone 2 or Zone 3 and what impact this might have on development. More information is now becoming available and the SFRA as published must be read in the light of such new information. Notably, the Flood Risk maps issued by the Agency in December 2007 reduced the extent of risk significantly in the lower Ouseburn valley area and the comments in the SFRA on a number of sites are no longer applicable.

3.2.22 The SFRA was being finalise as PPS25 was being introduced and it was too late to include information that would now be useful, for example on functional flood plains (likely to be limited in Newcastle) and surface water flooding and surface flows (increasingly significant). As at March 2008 the Council is considering an update to the SFRA. It will take account of the following new sources of information and may also include some modelling of overland surface water flows.

Urban Flood Risk and Integrated Drainage

Pilot project for Ouseburn and North Gosforth

3.2.23 This report by the Council forms part of a wider set of studies on the upper Ouseburn catchment in the Gosforth area funded by DEFRA and coordinated by the Environment Agency under the banner of *Urban Flood Risk and Integrated Drainage*. Other reports are being produced alongside this one to cover the more technical aspects of monitoring, measuring and analysing flows in streams, flood storage areas and sewers. The conclusions of these other reports will assist in finalising both the city-wide and possibly area-specific provisions in the SPD.

Creeping impermeability study

3.2.24 Alongside drafting of this section on the proposed SPD on Integrated Water Management, the Council has undertaken a study of changes in the percentage of impermeable land found within typical residential urban areas over a ten year period. The study was looked at in detail in the first part of this document. The study indicated that urban creep had occurred within all the chosen areas except the most densely developed.

3.2.25 The overall percentages found were relatively limited and in themselves may not justify the bringing in of strict controls over paving. However, further work will be done to validate the results, to extrapolate them over a longer period and then provide them as inputs in to technical studies of drainage system capacities, both generic and area-specific.

3.2.26 At the time of drafting this report in March 2008 the Council awaits confirmation from DCLG that it may introduce changes to permitted development rights for paving front gardens to provide (principally) car parking spaces. A DCLG document *Impact Assessment - Permeable Surfaces* of February 2008 indicates that the government may withdraw permitted development rights except for porous surfaces.

Recent Flash Flooding Incidents in Newcastle

3.2.27 An internal report was produced in 2005 examining the issues and impacts that resulted from the high intensity of localised rainstorms experienced by the city during the summer of 2005. The report provides recommendations to reduce the risk of flooding occurring and the level and rate of the Council's response when dealing with the impacts of such intense rainstorms. Northumbrian Water also hold records of flooding from their sewers.

Strategic Utilities Study

3.2.28 Consultants were commissioned by the Council in 2006 to undertake a utilities study for the Newcastle targeting the main regeneration areas in order to assist in the future development proposals of these areas. The scope of the study was to consider future strategic utility provision within the city wide growth areas to foresee potential utility constraints and plan ahead. Northumbrian Water did not identify major capacity issues in the foul and combined systems generally in the regeneration areas except in the lower Ouseburn, where extra pumping capacity was perhaps needed. An second interim progress report was produced in November 2007 and further work may be commissioned soon to round the project off.

PURE Ouseburn and Ouseburn Catchment Steering Group

3.2.29 PURE Ouseburn was an Interreg 3B funded project which ran until mid 2006. It laid the ground for a multi-functional approach to planning in the Ouseburn catchment, with a focus on flooding. Its final report (only ever produced as a 'draft') in June 2006 provides a useful overview.

3.2.30 Since the end of the PURE project (which involved significant community engagement) a cross sector working group has been set up to take forward a sustainable approach to drainage and related issues in the catchment. The Group will play a key role in development of the SPD. More details can be found at http://ouseburnplan.blogspot.com/.

Issues for the SPD and other planning work

3.2.31 The work so far on preparing for the SPD (building on a wide range of previous work) has identified a number of issues which the Council with partners needs to address. Not all of these will ultimately be addressed directly by the SPD. The issues are:

- Knowledge about risk of flooding from open watercourses well established but further work underway or needed to remove all anomalies from Environment Agency Flood Risk plans and to advise the Council on whether there are functional flood plains.
- Further dialogue required with Environment Agency about possible measures to protect properties from existing risk (upper Ouseburn and central Quayside).
- Extensive knowledge of sewer capacity issues - 'hot-spots' - within Highway Authority and Water Company, but not necessarily shared well - closer working needed to take strategic approach.

- Limited knowledge about surface water flows and behaviour of water in extreme but possibly very localised rain conditions
- Not very clear how climate change should be taken into account.
- Need for user friendly guidance for land owners and developers on requirements for flood risk assessments with area specific information on known or suspected flood risk.
- Need for guidance for householders on desirable (or possibly mandatory) measures such as green roofs, water butts and porous paving.
- Need for guidance for commercial developers on how to meet requirements in the Code for Homes and any Environment Agency requirements in a Newcastle context, including comments on appropriate forms of on-site or off-site water storage and flood attenuation.
- Need for advice on how to combine dealing with flood risk alongside other objectives, such as water quality, biodiversity and landscape.
- Advice needed on resilience to flooding and on emergency response.

Possible planning responses to issues

3.2.32 The DEFRA consultation document on *Improving surface water drainage* of February 2008 includes a useful list of the possible contents of a Surface Water Management Plan, which can help inform our further actions through the SPD and otherwise. It reads:

> "2.66 Once problem areas have been identified, the plan should examine a range of options for managing surface water drainage, including:
>
> - Directing new development to sites at lowest risk of surface water flooding
> - Managing flood risk at source, for example site-specific policies and plans to promote sustainable drainage approaches
> - Limiting urban creep and not increasing the amount of hard standing
> - Managing surface water flow, for example through identifying aboveground flow routes and strategic flood storage locations, such as balancing ponds
> - Creating capacity in the below-ground system, for example through separation of foul and surface flows, or increasing sewer capacity at pinch points in the system
>
> Exploring other options, such as property-level flood resistance and resilience or improving emergency planning for surface water flood events."

3.2.33 The Council may decide shortly to bring together much of its work on water management under the banner of a Surface Water Management Plan, even if not yet under a duty to do so. In any case, actions of various sorts are planned to meet the objectives in the Council's climate Change Strategy - see Appendix 2. Some matters are beyond the direct influence of land-use planning and are not dealt with further here, though are important. They include emergency response, resilience of existing buildings and infrastructure and raising public awareness.

3.2.34 Flowing from the issues identified above, the Council's planning function will seek to carry out work including the following:

- Resolve known anomalies in the official Flood Risk maps with the Environment Agency
- Provide easy access to this information for prospective developers and others
- Ensure that adequate information on alternative development sites is available so that sequential 'tests' can be undertaken efficiently
- Build in the sequential approach at an early stage of considering land allocations in development plan work
- Work with others to reduce the risk to property from flooding from watercourses through protection where appropriate but preferably through reducing flows in the watercourse
- Consider the need to require flood resilience in new property in or close to known flood risk areas
- Clarify the current and possible future requirements on developers to attenuate surface water flows, both in general terms and with area or site specific information where possible
- Clarify where development may or may not be permitted in the future in areas of identified risk, both in general terms and with area or site specific information where possible, developing the approach in the existing SFRA
- Work with others on identifying capacity problems in the surface water and combined sewer systems, with a view to reducing both flooding from sewers and the need for Combined Sewer Overflows to operate
- Seek cost effective and sustainable solutions to deal with capacity issues, with the emphasis on holding back water close to the point of rainfall
- Commission work to look at surface water flows in extreme weather events
- Consider the need to create new or protect existing surface water flow paths that avoid property
- Look for opportunities to provide emergency surface water storage, preferably above ground, to meet problems identified by capacity and surface water flow studies
- Produce general guidance on Sustainable Drainage Systems, referring to existing publications where possible, but adding local city-wide or area specific information, e.g. on soil type and ground conditions
- Ensure that guidance on SUDS recognises other objectives, notably reducing diffuse pollution and biodiversity
- Consider how best to take forward the findings on impermeability creep, including planning for a national withdrawal of permitted development rights
- Update the SFRA to take account of all the above
- Consider the need for flood risk and wider water management policies in the Development Control Policies Development Plan Document
- Prepare and consult on the Supplementary Planning Document.
- Review the advice and supporting information on validation of planning applications (see Appendix 3)

3.3 Water Quality

Interim statement

3.3.1 This section of the SPD has not yet been researched in detail. The structure will mirror that on Flooding, generally as follows:

Objectives

Policy Context

National policy

Planning

Regional policy

Local policy

Unitary Development Plan

Local Development Framework

Other local policy considerations

Evidence Base

Issues

Planning responses

3.4 Water Supply and Consumption

Interim statement

3.4.1 This section of the SPD has not yet been researched in detail. The structure will mirror that on Flooding, generally as follows:

Objectives

Policy Context

National policy

Planning

Regional policy

Local policy

Unitary Development Plan

Local Development Framework

Other local policy considerations

Evidence Base

Issues

Planning responses

References

DCLG (2001)Water, England and Wales, The Water Supply (Water Quality) Regulations 2001, No.3611 (W.323) HMSO www.hmso.gov.uk/legislation/wales/wsi2001/20013911e.htm

DCLG (2005) Circular 05/05: Planning Obligations, Planning, Building and the Environment, HMSO, London TSO www.communities.gov.uk/documents/planningandbuilding/pdf/147537

DCLG (2006) Code for Sustainable Homes, A Step-Change in Sustainable Home Building Practice, Department for Communities and Local Government: London, December 2006 www.planningportal.gov.uk/uploads/code_for_sust_homes.pdf

DCLG (2006) Planning Policy Statement 25: Development and Flood Risk, 2005), HMSO, London TSO www.communities.gov.uk/documents/planningandbuilding/pdf/planningpolicystatement25

DCLG (2007) Development and Flood Risk: A Practical Guide Companion to PPS 25, 'Living Draft', HMSO London TSO www.communities.gov.uk/documents/planningandbuilding/pdf/324694

DCLG (2008) Impact Assessment- Permeable Surfaces, HMSO, London TSO www.communities.gov.uk/documents/planningandbuilding/pdf/686153

DEFRA (2004) Making Space for Water- Developing a new Government Strategy for Flood and Coastal Erosion Management in England, First Government Response to the autumn 2004 Making Space for WATER Consultation Exercise (March 2005) www.defra.gov.uk/environ/fcd/policy/strategy/1stres.pdf

DEFRA (2008 Future Water, The Government's Strategy for England, HM Government, HMSO, London TSO (February 2008) www.communities.gov.uk/documents/planningandbuilding/pdf/686153

Environment Agency (2006) The Water Framework Directorate and Planning, Initial Advice to Planning Authorities in England and Wales (February, 2006)

Environment Agency (2006) Water for Life and Livelihoods, A Framework for River Basin Planning in England and Wales

HM Treasury (2006) Stern Review on the Economics of Climate Change, HMSO, London TSO www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

London Assembly (2005) Crazy Paving, The Environmental Importance of London's Front Gardens, Environment Committee, Greater London Authority.

National SuDS Working Group (2004) Interim Code of Practice for Sustainable Urban Drainage Systems, NSWG. www.ciria.org/suds/pdf/nswg_icop_for_suds_0704.pdf

Newcastle City Council (July 2005) Recent Flash Flooding Incidents In Newcastle, Preliminary Report

PURE Ouseburn (June 2006) Draft Ouseburn Catchment Plan & Appendices www.colinpercy.pwp.blueyonder.co.uk/pure/

Newcastle City Council (February 2008) Newcastle Climate Change Strategy Part 1- Operations and Services www.newcastle.gov.uk/core.nsf/a/climatechange?opendocument

Official Journal of the European Communities (2000) Establishing a Framework for Community Action in Field of Water Policy, Directive 2000/60/EC of the European Parliament and of the Council eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri= OJ:L:2000:327:0001:0072:EN:PDF

Pitt, M. (Sir) (2007) The Pitt Review: Learning Lessons for the 2007 Floods, Interim Report, HMSO, London, TSO www.cabinetoffice.gov.uk/upload/assets/www. cabinetoffice.gov.uk/flooding_review/flood_report_web.pdf

Royal Horticultural Society (2006) Gardening Matters. Front Gardens: Are We Parking on our Driveways? Do Driveways Cause Flooding? www.rhs.org.uk/learning/research/gardeningmatters/documents/frontgardens.pdf

Strategic Flood Risk Assessment for Newcastle, Final Report, June 2007. JBA Consulting. www.newcastle.gov.uk/wwwfileroot/regen/ldf/05.04.09_SFRA_NewcFinalReport.pdf

The Validation of Planning Applications in Tyne and Wear. April 2008 www.newcastle.gov.uk/wwwfileroot/regen/plantrans/ValidationTWfinalversionrb.pdf

Note on Flood Risk and Integrated Water Management, Newcastle City Council, March 2008 www.newcastle.gov.uk/wwwfileroot/regen/ldf/06.02.09_Noteonfloodrisk_CSroadmap.pdf

Appendix 1 - Summary of responsibilities for drainage

PPS25 identifies various stakeholders involved in protecting property and people against flood risk. Landowners have the primary responsibility for safeguarding their land and other property against flooding. Currently there is no statutory duty on the Government to protect land or property against flooding. Operating authorities such as the Environment Agency and Local Authorities have permissive powers but not a statutory duty to carry out or maintain flood defence works in the public interest.

Owners and developers

Individual property owners and users are also responsible for managing the drainage on their land, ensure in such a way to prevent (as far as reasonably practical) any adverse effects on neighbouring land.

Those proposing development are responsible for and encouraged to consider as early as possible:

- Consistency with national, regional and local policies
- Completing a FRA (further details see page)
- Incorporating designs which reduce flood risk, such as SUDS and flood defences
- Identify opportunities to reduce flood risk whilst meeting other planning objectives
- Seek collective solutions with other stakeholders

Regional Planning Body

Consider flood risk in determining strategic planning considerations in the RSS, including the selection of strategic housing locations and transportation infrastructure. As well as consulting the Environment Agency and other operating authorities regarding flood risk issues when preparing its RSS.

Local Authority

Local councils consult with the Environment Agency and other relevant bodies on preparation of plans in the LDF. Councils are required to consult the Environment Agency on all development control applications in flood risk areas and those with critical drainage problems and for any site over 1 hectare outside the flood risk zones. They must ensure that the determination of these applications is taken in the light of the comments made by the Environment Agency.

The Environment Agency

The Environment Agency has statutory responsibility for flood management and defence, their role is to provide support to the planning system through information and advice on flooding issues. As well as provide an advisory role to those proposing new development and undertaking Flood Risk Assessments

Details of the roles of other main stakeholder bodies can be found in Annex H of PPS25.

Appendix 2 - Climate Change Strategy

Extract from Climate Change Strategy for Newcastle - Part 1 Operations and Services

February 2008

6.1 Integrated Drainage and Flood Management

Aims:

- To minimise the impact of flooding within the City
- To plan for the future impacts and pressures climate change may bring with regards to flooding

Objectives:

1 To adopt a Supplementary Planning Document (SPD) to support the consideration of water management in new developments.

2 To ensure that new developments minimise the risk of flooding from watercourses and drainage systems, with the use of SUDS wherever possible.

3 To reduce the risk of damage to properties and infrastructure by monitoring with other partners, the capacity of the surface drainage system and develop a programme of works to address hotspots of flooding across the city.

4 To take opportunities to improve the capacity of existing bridges and culverts so that the Authority can comply at times of flooding with a general duty of care to the public.

5 Aim to achieve, through collaborative working with partners a transport system that performs safely and with minimal disruption under conditions of high intensity rainfall.

6 To prioritise across existing public buildings in ensuring they will have the ability to deal with high intensities of rainfall and take appropriate action when necessary (using a risk based approach).

7 To provide targeted advice and guidance to communities to inform and raise awareness of recommended measures and procedures that they should follow when an unavoidable flooding event occurs.

Appendix 3 - Validation of planning applications

Extract from *The Validation of Planning Applications in Tyne and Wear*

April 2008

18. Flood Risk Assessment

Risk Assessment (FRA) identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed, taking climate change into account. An FRA will be required for:

Applications which are for non-residential extensions not exceeding 250 sq m lying within the Environment Agency's Flood Zones 2 or 3, or for applications which involve the culverting or controlling the flow of any river or stream.

Applications for operational development on sites of less than 1 hectare that lie within the Environment Agency's Flood Zones 2 or 3, or for applications which involve the culverting or controlling the flow of any river or stream.

Applications for operational development on sites exceeding 1 hectare.

An FRA will also be required where the proposed development or change of use to a more vulnerable class may be subject to other sources of flooding, or where there are identified drainage problems. There is further guidance in PPS25 and its related Good Practice Guide at http://www.communities.gov.uk/index.asp?id=1504640

For developments that are for new dwellings or for non–residential extensions. Industrial/Commercial/Leisure etc. extensions with a footprint that exceeds 250m2 that lie within Flood Zones 2 or 3 applicants will need to submit a statement demonstrating how they have applied the sequential approach at a site level to minimise risk by directing the most vulnerable development to areas of lowest flood risk, matching vulnerability of land use to flood risk. Any major or non-major development in Flood Zones 2 and 3 will require a sequential test and exception test if necessary as set out in table D3 of PPS25.

http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/pps25/

This should be completed at the earliest stage of the pre-application process. This assessment will not be required on sites allocated in development plans which have been through the application of the Sequential Test, as informed by a Strategic Flood Risk Assessment. Further advice on what should be included within a Flood Risk Assessment can also be found at the Environment Agency's website - http://www.pipernetworking.com/floodrisk/index.html.

19. Foul Sewage and Utilities Assessment

All new buildings need connections to foul and storm water sewers. If an application proposed to connect a development to the existing drainage system then details of the existing system should be shown on application drawing(s). It should be noted that in most circumstances surface water is not permitted to be connected to public foul sewers.

Where the development involves the disposal of trade waste or the disposal of foul sewage effluent other than to the public sewer, then a fuller foul drainage assessment will be required including details of the method of storage, treatment and disposal. A foul drainage assessment should include a full assessment of the site, its location and suitability for storing, transporting and treating sewage.

Where connection to the mains sewer is not practical, then the foul/non-mains drainage assessment will be required to demonstrate why the development cannot connect to the public mains sewer system and show that the alternative means of disposal are satisfactory. Guidance on what should be included in a non-mains drainage assessment is given in DETR Circular 03/ /99 and Building Regulations Approved Document Part H and in BS6297.

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