Appendix A - County Durham's Strategic Water Environment

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A.1.1 Introduction

SWMPs involve an extensive data collection exercise to obtain relevant data from Local Authorities, water companies and the Environment Agency. The availability and extent of data will influence the SWMP in terms of the level of analysis that is possible and the ultimate findings of the study. In light of this it is necessary for the Partners to review the SWMP at regular intervals in the future to take into account additional data that was not available at this time.

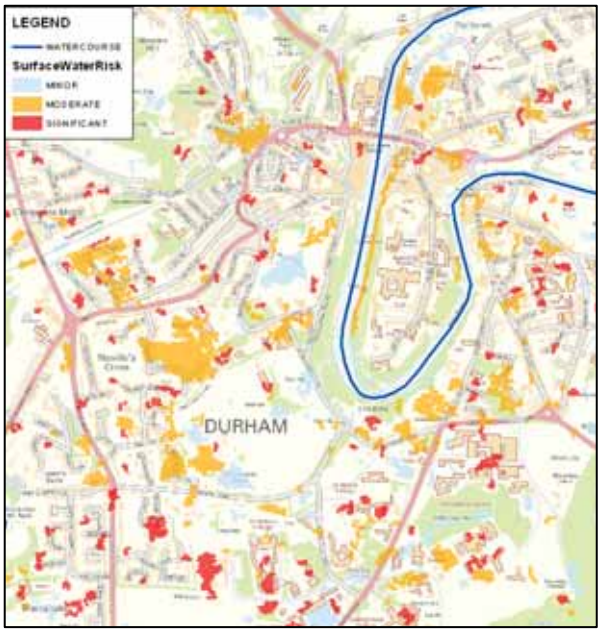
The following Chapter outlines the data collection process that has been undertaken for the Durham SWMP and the data review exercise. Based on the information available a gap analysis has been carried out to identify missing information and propose how to fill in the gaps.

A.1.2 Data Collection and Review

Data requests were submitted to Durham County Council, Northumbrian Water and the Environment Agency. A list of data that has been made available from the three Partners which shows a clear commitment by the Partners to share information to inform the SWMP. A summary of the information is provided below.

A.1.2.1 Strategic Flood Risk Assessment

Level 1 and 2 SFRAs have been produced for County Durham. The Level 1 SFRA is intended to provide an overview of the risk posed by flooding throughout the County from rivers, the North Sea, groundwater and surface water runoff. Where a balanced view has been taken (following the application of the Sequential Test), and it is determined by the Council that further consideration of areas at risk of flooding may be warranted on planning grounds, a Level 2 SFRA will be required. The Level 2 SFRA involves a more detailed (local) investigation of the risk of flooding within an emerging development area to ensure that the requirements of the Exception Test can ultimately be met.



The SFRA modelled the risk of surface water flooding across the County, producing maps of areas that may be susceptible to ponding and/or overland flow following periods of heavy rainfall.

A considerable number of localised, historic (surface water) flood incidents were also collated by the SFRA. This flood incident dataset pinpoints locations of known surface water flooding; contains information on the causes of the incidents and helps define surface water risk areas for the SWMP Risk Assessment.

There is a reasonable correlation between known surface water flood incidents and the SFRA surface water modelling. Whilst known surface water flood incidents do not perfectly match with the SFRA model results, the majority of known incidents fall within the same locality and areas of perceived risk.

The surface water flooding produced by the SFRA was subsequently classified into areas of high, medium or low susceptibility on the basis of the depth of flooding and the frequency of flooding. These areas were classified again with regard to the prioritised risk. The risk classification was significant, moderate and minor based on the land use and susceptibility. Both classifications are shown in Figure A.1.1.

Figure A.1.1: SFRA Classifications for Surface Water Flooding

1. **Susceptibility** to Surface Water Flooding

Susceptibility		Depth of Flooding (1% (1 in 100) Event)		
		<0.1m	0.1m to 0.5m	>0.5m
Threshold of Flooding	Less than, or equal to, 5% (1 in 20)	Medium	Medium	High
	2% (1 in 50) to 1% (1 in 100)	Low	Medium	High
	Greater than 1% (1 in 100)	Low	Medium	Medium

2. **Prioritised Risk** of Surface Water Flooding

Prioritised Risk		Land Use		
		Urban	Road	Non Urban
Susceptibility to Surface Water Flooding	Low	Moderate	Minor	Minor
	Medium	Significant	Moderate	Minor
	High	Significant	Moderate	Moderate

The SFRA recommends that the prioritised risk classification is used to inform development of a SWMP, allowing effort to be directed towards the areas of greatest need. The modelled outputs from the SFRA will form the basis of the Risk Assessment to be undertaken by the SWMP.

A.1.2.2 Areas Susceptible to Surface Water Flooding

The Environment Agency's Areas Susceptible to Surface Water Flooding (2009) were compared and contrasted against the SFRA model results and known surface water flood incidents. There is a poor correlation between the Environment Agency's Areas Susceptible to Surface Water Flooding and the model results of the SFRA which has been deemed to be a result of the different methodologies used to produce each data set. The SFRA used a more detailed approach and has been considered to be a more accurate representation of where surface water flooding might occur.

There is however a reasonable correlation between known surface water flood incidents and the Areas Susceptible to Surface Water Flooding. Whilst known surface water flood incidents do not perfectly match with the Environment Agency data (or the SFRA data), the majority of known incidents fall within the same locality and areas of perceived risk

The Areas Susceptible to Surface Water Flooding will be used in conjunction with the SFRA data and known flood incidents to define areas at risk of surface water flooding as part of the SWMP Risk Assessment.

Following completion of the Draft Scoping Report the Areas Susceptible to Surface Water Flooding data was superseded by the Flood Maps for Surface Water.

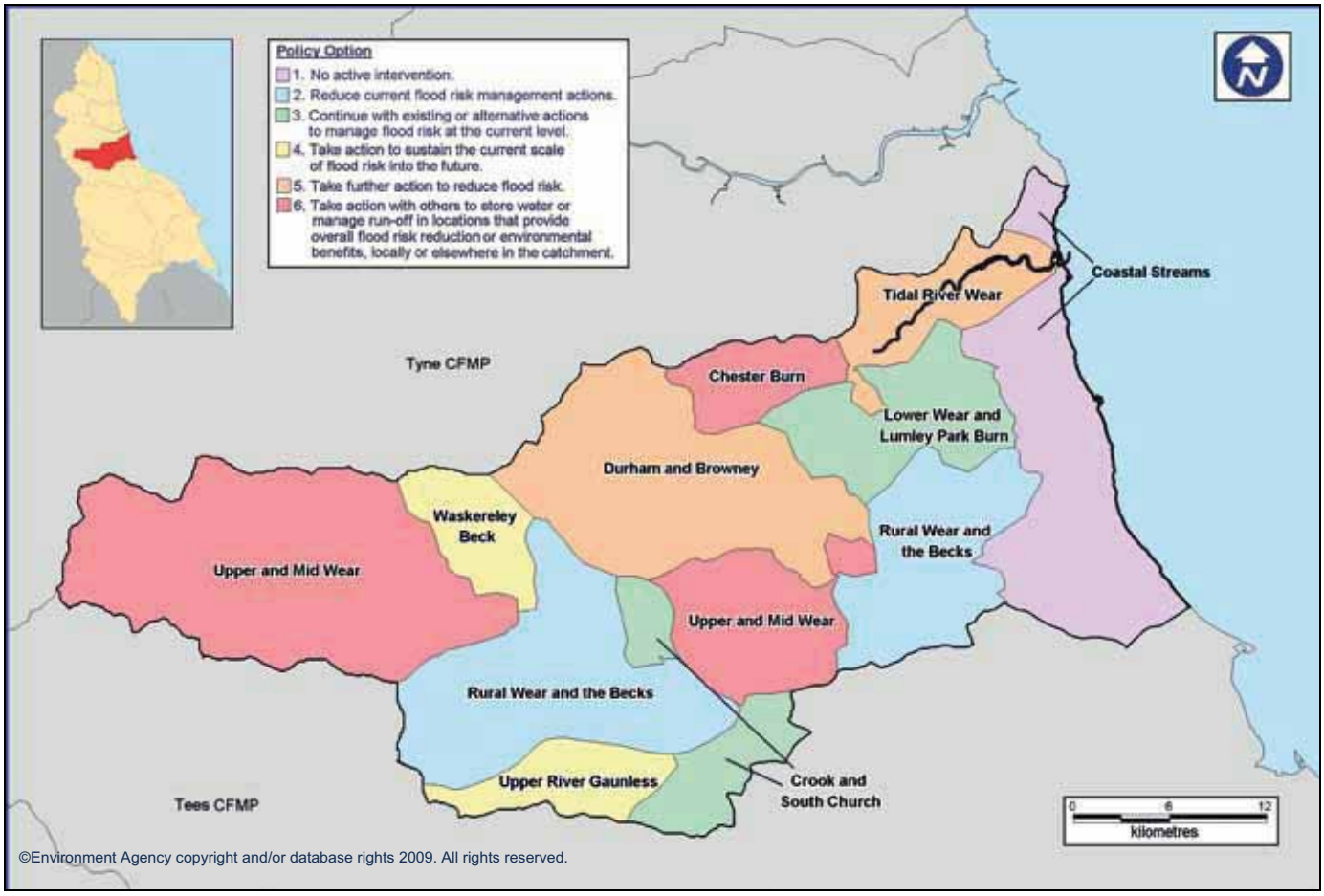
A.1.2.3 Catchment Flood Management Plans

The Environment Agency has produced CFMPs across England and Wales which are strategic plans in which they seek to understand the factors that contribute to flood risk and to identify and agree policies for sustainable flood risk management across a river catchment for the next 50-100 years. County Durham falls across two CFMPs; the Wear CFMP covers the majority of the County and the southern extremities fall within the Tees CFMP.

A.1.2.3.1 Wear CFMP

The Wear CFMP is split into ten sub-areas and covers the urban settlements of Durham, Lanchester, Stanhope, Bishop Auckland, Peterlee and Seaham. Each sub-area has been assessed in terms of current and future flood risk and categorised into one of six Policy Options. The chosen Policy Option for each sub area is shown in Figure A.1.2.

Figure A.1.2: Map of the Wear CFMP Policies



(Source: Environment Agency, 2010)

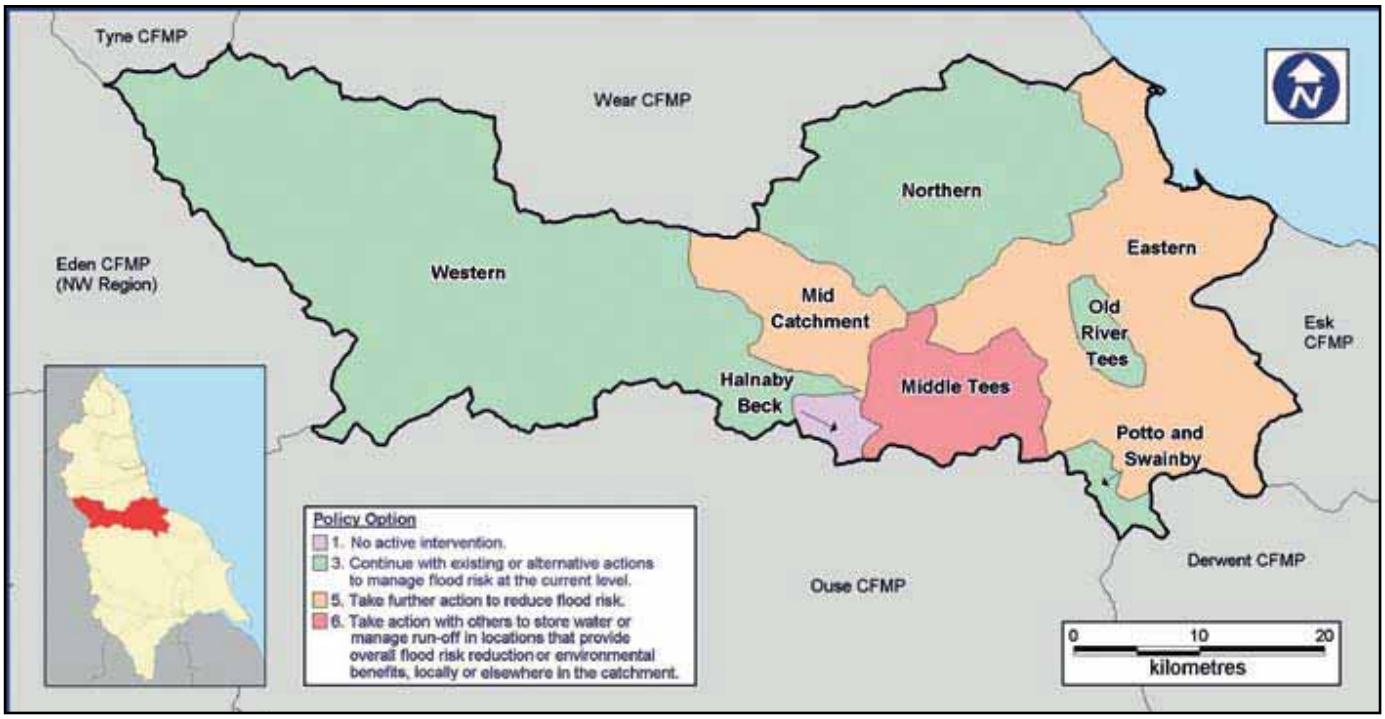
The Wear CFMP identifies flooding hotspots in Chester-le-Street, Lanchester and Durham City however the CFMP does not identify if they are surface water issues. The CFMP details additional flooding hotspots which may or may not be attributed to surface water flooding in Stanhope, South Church, West Auckland and Houghton-le-Spring. The Durham and Browney sub-area is the notable flood risk hotspot in the Wear CFMP, where the Policy Option is to take further action to reduce flood risk. This sub-area includes the risk areas of Durham City and Lanchester. These areas will be given due consideration as part of this study.

Chester-le-Street is influenced by the neighbouring policy units Chester Burn and Lower Wear and Lumley Park Burn. Whilst Lower Wear and Lumley Park Burn is categorised as Policy Option 3 (continue with existing or alternative actions to manage flood risk to the current level), Chester Burn adopts Policy Option 6. This policy option aims to reduce runoff within the sub area through the use of SuDS for any new developments or redevelopment, and adopting a Partnership approach with key organisations and by working with landowners. As part of this study, any surface water risk areas which are influenced by the Chester Burn policy unit, should consider options within the policy unit as a means to mitigate the surface water risk.

A.1.2.3.2 Tees CFMP

The Tees CFMP is split into 8 sub-areas (Figure A1.3) however, only the Western and Northern sub-areas fall within the Durham SWMP study area. These include the urban areas of Barnard Castle (Western sub-area) and Newton Aycliffe (Northern sub-area). Both sub-areas are classified as Policy Option 3 - continue with existing or alternative actions to manage flood risk at the current level, inferring that there is minor flood risk in the sub areas including surface water risk.

Figure A.1.3: Map of the Tees CFMP Policies



(Source: Environment Agency, 2010)

The Western sub-area has no reported surface water flood incidents. The Northern sub-area details known surface water incidents, however further information regarding the specific locations are not identified.

A.1.2.4 Site Specific Flood Risk Assessments

As part of the data collection exercise Durham County Council provided a number of Flood Risk Assessments (FRAs) that had been provided to support planning applications. None of these highlighted surface water as a significant issue facing the developments.

A.1.2.5 Environmental Priorities

Environmental priorities have been produced by the Environment Agency for seven urban areas; Chester-le-Street, Derwentside, Durham City, Easington, Sedgefield, Teeside and Wear Valley. These documents were produced to inform the LDF and highlight a number of surface water and water quality issues of relevance to the SWMP which are detailed below.

Promotion of Green Infrastructure along watercourses is highlighted as an environmental priority across a number of areas. The provision of green spaces and SuDS on future developments would support the environmental priority by encouraging the activity, health and well being of local people and wildlife.

Table A.1.1: Relevant Environmental Priories

Prioirity	Details
Chester-le-Street	
Careful planning of future development in relation to managing and reducing flood risk (Chester-le-Street Cricket Ground and Surface Water Flooding)	This priority states that surface water flooding occurs at the junction of North Approach and Pelton Fell Road. Water is unable to enter Chester Burn due to the presence of a wall along Pelton Fell Road. It is suspected that the surface water drains at the top of North Approach do not have sufficient capacity to cope with surface water run-off. Surface water run-off is also suspected to enter North Approach from the adjacent open space.
Water Quality and Abstractions	This priority highlights that although the WFD sets a target for all waters to achieve "good status" by 2015, many of the rivers in Chester-le-Street area are failing to achieve this target (Draft Northumbrian RBMP).
Derwentside	
Careful planning of future growth in relation to sewerage capacity	With sewerage capacity a problem in Derwentside a recommendation is the mandatory use of soft SuDS schemes to dispose of surface water for all new developments in certain areas. This priority also states that the Twizell Burn has long standing water quality problems due to the discharges from Hustledown Sewage Treatment Works (STW).
Reduce flood risk in Lanchester	This priority details surcharging of manholes and the surface water drainage system in Lanchester, (both as a result of high flows and backing up from the Smallhope Burn), the blockage of culverts on the Smallhope Burn and Alderdene Burn, and overtopping of the channel banks due to insufficient channel capacity.
Durham City	
Careful planning of future growth in relation to sewerage capacity	Sewerage capacity is identified as a problem in Durham City with a recommendation for the mandatory use of soft SuDS schemes to dispose of surface water for all new developments in certain areas. This priority also identifies that Croxdale Beck has long standing water quality problems due to low water flows and the discharge from Bowburn STW.
Careful planning of future development in relation to managing and reducing flood risk	Whilst the environmental priority does not specifically state surface water risk, it identifies that there is potential for a number of people and business to be affected by flooding in Durham City. It is not known whether surface water risk plays a vital part and will need to be investigated further as part of this study.
Easington	
Increased use of SuDS to reduce flood risk and address diffuse pollution	Two actions from the Northumbrian RBMP are 'promote the wide scale use of sustainable drainage schemes to reduce the risks of flooding and the impact on surface water quality at times of high rainfall' and also to 'promote the use of SuDS in new urban and rural development where appropriate, and retrofit in priority areas including highways where possible'. These actions aim to help achieve the good ecological status of all water bodies by 2015 set out in the WFD. In addition, there can be no deterioration of ecological status of any water body.

Sedgefield	
Protect and improve the water quality of Valley Burn (Spennymoor STW)	The priority recommends the mandatory use of soft SuDS schemes, as opposed to piped discharges, to dispose of surface water for all new developments draining into the Valley Burn. This should help a more constant volume of water flowing down the Burn, allowing greater dilution of pollutants and improvement to water quality. Valley Burn is currently not meeting the WFD objectives (i.e. achieving good ecological status by 2015 and that there can be no deterioration of ecological status of any water body). It has been identified that one of the key reasons for failing to meet the requirements of the in the Wear catchment is point source discharges from STWs.
Teeside	
Sensitive use of non mains drainage	The WFD states that all waterbodies should achieve good ecological status by 2015 and that there can be no deterioration of ecological status of any water body. Although the watercourses in Tynedale are headwaters, and therefore likely to be of fairly good ecological status for the most part, continued prevalence of the use of non-mains methods to dispose of foul sewage can have a cumulative negative effect on watercourses and groundwaters.
Wear Valley	
Encourage and promote policies to reduce flood risk, particularly in Crook and Stanhope	The Wear CFMP identifies Crook and Stanhope at fluvial flood risk; however this environmental priority refers to the Waskerley Beck sub-area, notably Wolsingham which is vulnerable to surface water flooding.
Careful planning of future growth in Bishop Auckland growth point in relation to sewerage capacity	The WFD states that all waterbodies should achieve good ecological status by 2015 and that there can be no deterioration of ecological status of any water body. It has been identified that one of the key reasons for not achieving the WFD requirements in the Wear catchment is point source discharges from STWs. Additionally, continued prevalence of the use of non-mains methods to dispose of foul sewage can have a cumulative negative effect on watercourses and groundwaters.
Sensitive use of non mains drainage	

A.1.2.6 Pre Feasibility Studies

Twelve pre-feasibility studies have been supplied and reviewed as part of the Scoping Stage. Of these twelve studies, two provide details of known surface water issues; Lanchester Pre-Feasibility Study and the River Wear Reaches 3-5 Flood Risk Mapping Study.

A.1.2.6.1 Lanchester Pre-Feasibility Study

The Lanchester Pre-Feasibility Study[4] undertaken by Atkins investigated surface water flooding along Smallburn Hope and a culverted section of Alderdene Burn. In November 2000 there was flooding affecting approximately 30 properties in the Front Street area, which was attributed to surface water drainage issues. Atkins concluded that under existing conditions if the peak water levels on Smallhope Burn and Alderdene Burn coincide, flooding will occur from the Alderdene Burn culvert in the 1 in 100 year event. In its existing condition if there is only a 2 year water level in Smallhope Burn the 100 year flow can pass through the Alderdene Burn culvert without flooding. The condition of the Alderdene Burn Culvert has a significant impact on flood risk in Lanchester and requires regular maintenance.

[4] Atkins (April 2006). Lanchester Pre-Feasibility Study, Final Report.

A1.2.6.2 River Wear Reaches 3-5 Flood Risk Mapping Study

The River Wear Reaches 3-5 Flood Risk Mapping Study was undertaken by JBA in 2009[5] and looks briefly at the surface water risk in Chester-le-Street. The study concludes the STW in Chester-le-Street is likely to be at risk from surface water flooding since its ground level is lower than the surrounding area. No recommendations to alleviate the surface water problem were proposed.

A.1.2.7 Information Concerning Future Development

Durham County Council's Strategic Housing Land Availability Assessment (SHLAA) and Employment Land Review (ELR) will form part of the evidence base for the Core Strategy and other elements of the LDF by providing information concerning the potential housing and employment land supply. Identification of development sites in these documents does not allocate a site for development but indicates it has potential. The data provided is to be revised in the future but represents the best available information concerning future growth across County Durham. The SWMP will review the SHLAA and ELR data-sets with due regard for surface water flooding.

A.1.2.8 District Local Plans

The Chester-le-Street, Derwentside, Easington, Teesdale District and the Durham City Council Local Plans all contain direct policies for the protection of the water environment, as shown in Table A.1.2.

Table A.1.2: District Local Plan Policies

Location	Policy Reference	Policy	Surface Water Comments
Derwentside	GDP1 (I)	Adequate provision for surface water drainage	Protecting and maintaining the quality of watercourses and water supplies should be considered at the outset of any design process. Adequate provision, to the satisfaction of the National Rivers Authority, will need to be made for surface water drainage and development should be excluded from areas which are liable to flood or where groundwater resources and their use would be damaged.
Teesdale	GD1	Development will be permitted provided that it complies where relevant to the proposal where:	P) It will not cause an unacceptable risk to the quality of ground or surface water (1 criteria related to surface water flooding out of 20)
	ENV14	Development will not be permitted which would unacceptably prejudice the quality of surface or groundwater	The water (surface waters and ground water) within Teesdale District is generally of good quality and should be protected. The quality of surface and ground water is vitally important to a wide range of uses and users within Teesdale District including domestic, agricultural and industrial. It is also important to general amenity, fisheries, nature conservation and water-based recreation. Inappropriate development can result in both indirect and direct pollution of the water environment, which can be difficult to detect and mitigate. Groundwater is particularly at risk from distributed and diffuse sources of pollution which can accumulate over many years and can be especially difficult to identify and rehabilitate. The District Council will, in consultation with the Environment Agency, strictly control any development

[5] JBA (2009). River Wear Reaches 3-5 Flood Risk Mapping Study.

Location	Policy Reference	Policy	Surface Water Comments
			which will have an adverse effect on the quality of surface and/or ground water. Where appropriate the District Council will require appropriate pollution control measures to be incorporated into development proposals to reduce the risks of water pollution.
	ENV15	Development (including the intensification of existing development or land raising) which may be at an unacceptable risk of flooding or may increase the risk of flooding elsewhere will not be permitted ... Where appropriate, new development should incorporate a sustainable drainage system in order to manage surface water runoff rates and so assist the prevention of flooding.	New development can also increase the risks of flooding by accelerating surface water run-off. In such cases hydrological/hydraulic surveys may be necessary and works may be required to control/attenuate surface water run-off, such as on-site storage.
	ENV17	Proposals for development which increase the demands for off-site sewerage infrastructure, such a surface water drainage, sewerage and sewage treatment, will be permitted only where adequate capacity exists or satisfactory improvements can be provided in time to serve the development without detrimental effects on the environment.	In some parts of Teesdale the sewerage infrastructure is nearing its design capacity. In certain areas, further development could result in severe environmental problems. New development, therefore, will be restricted to locations where adequate infrastructure already exists or where additional provision can be made in time to serve the development. A number of sewage treatment works within the Plan area are due to be upgraded by Northumbrian Water Ltd to meet new demands and the tighter discharge consent standards imposed by the Environment Agency. Where Northumbrian Water's proposals for the timing and capacity of new infrastructure are not compatible with a developer's programme, they will be asked to investigate, with the developer, alternative arrangements for the appropriate implementation of the capacity provision.
Durham City	U8A (sub policy of U8)	Development proposals will only be approved if they include satisfactory arrangements for disposing foul and surface water discharges. Where satisfactory arrangements are not available, then proposals may be approved subject to the submission of a satisfactory scheme and its implementation before its development is brought into use.	All development should include adequate foul and surface water drainage arrangements. Where existing sewage infrastructure is insufficient to accommodate the proposed development, then that development will only be permitted submitted to submission of a scheme of works for disposing of foul and surface water discharge, and the implementation of such a scheme, before the development is brought into use.

Sedgefield and Weardale District Council Local Plans do not contain any specific planning policies for the protection of the water environment. National policies for water protection and management in the relevant Planning Policy Statements are now applied throughout the County in place of a number of lapsed policies.

A.1.2.9 Sewer Data

Northumbrian Water has provided a spreadsheet with details of sewer flooding locations. There are 824 references across County Durham with the Drainage Area and a 100m grid cell which the flood instance falls within. A second spreadsheet lists 323 pipe length references which were affected by flooding and the Drainage Area they fall within. The 100m grid cells provide a broad indication of localities affected by sewer flooding however without spatial information concerning the coverage of Drainage Areas it is not possible to utilise the pipe length references where flooding occurred. This information was received late in the Scoping process and has not been utilised in the Risk Assessment. Until the Data Sharing Protocol has been finalised Northumbrian Water are unable to provide any further information.

In order to obtain further information concerning the sewer networks, Durham County Council have provided pdf maps illustrating the sewer network that will have to suffice for Phase 3: Options of the SWMP.

A.1.3 The Strategic Water Environment in County Durham

This Section provides an overview of the strategic water environment in County Durham so as to be able to understand the current water quality status and the role that the SWMP could potentially play to work towards achieving the WFD targets. In order to categorise the water environment of County Durham we have used the following Geographical Information Systems (GIS) data:

- GIS layers of all WFD designated surface water bodies;
- WFD classifications (for all biological, physico-chemical, and hydromorphological parameters) for all surface and groundwater bodies in County Durham (excel spreadsheet);
- Location of groundwater source protection zones;
- Groundwater vulnerability maps;
- Active licenced discharge consents (now Water Activity Permits) and abstraction licences;
- Location and compliance of salmonid and cyprinid river stretches designated under Freshwater Fisheries Directive;
- Chemical and biological General Quality Assessment (GQA) data for last five years (i.e. 2003-2008 before monitoring ended); and
- National and International nature conservation sites (MAGIC website, www.magic.gov.uk).

The above information has been supplemented by a review of the Northumberland RBMP and data from the Environment Agency and Northumberland Water with regards the following environmental improvement programmes.

A.1.3.1 Study Area – County Durham

County Durham can be divided in two from north to south, roughly either side of the A68 and A688 between Consett and Barnard Castle. To the west lies the western North Pennines (a rural upland landscape) and to the east is the lowland and more populated coastal plain. There are three main river catchments, the Wear, Tees and Derwent (of the River Tyne). All rise in the North Pennines and flow east, meeting the sea outside of County Durham. The County's rivers provide an important source of water for domestic, industrial and agricultural purposes, as well as supporting important aquatic ecosystems.

The River Wear rises in the North Pennines at the confluence of the Killhope and Burnhope Burns, in an Area of Outstanding Natural Beauty (and the North Pennines Moors Special Area of Conservation and Special Protection Area). It flows east to Bishop Auckland, and then north towards Sunderland and the North Sea. Significant tributaries of the River Wear include the River Deerness and River Browney (See Figure A1.4).

The River Tees also rises in the North Pennines (to the south of Weardale) and flows in a southeasterly direction towards Barnard Castle leaving County Durham upstream of the A1(M) and Darlington. The River Skerne is a significant tributary of the River Tees and drains a catchment south of Durham towards Darlington, being within County Durham up until Newton Aycliffe. To the east of the A1(M) there are some minor watercourses draining the lowland plain towards the Tees, and the coast directly.

The upper reaches of the River Derwent and Derwent Reservoir lie along the northern boundary of County Durham between Townfield and Rowlands Gill, with numerous small first and second order tributaries extending within the County boundary.

A.1.3.2 Geology

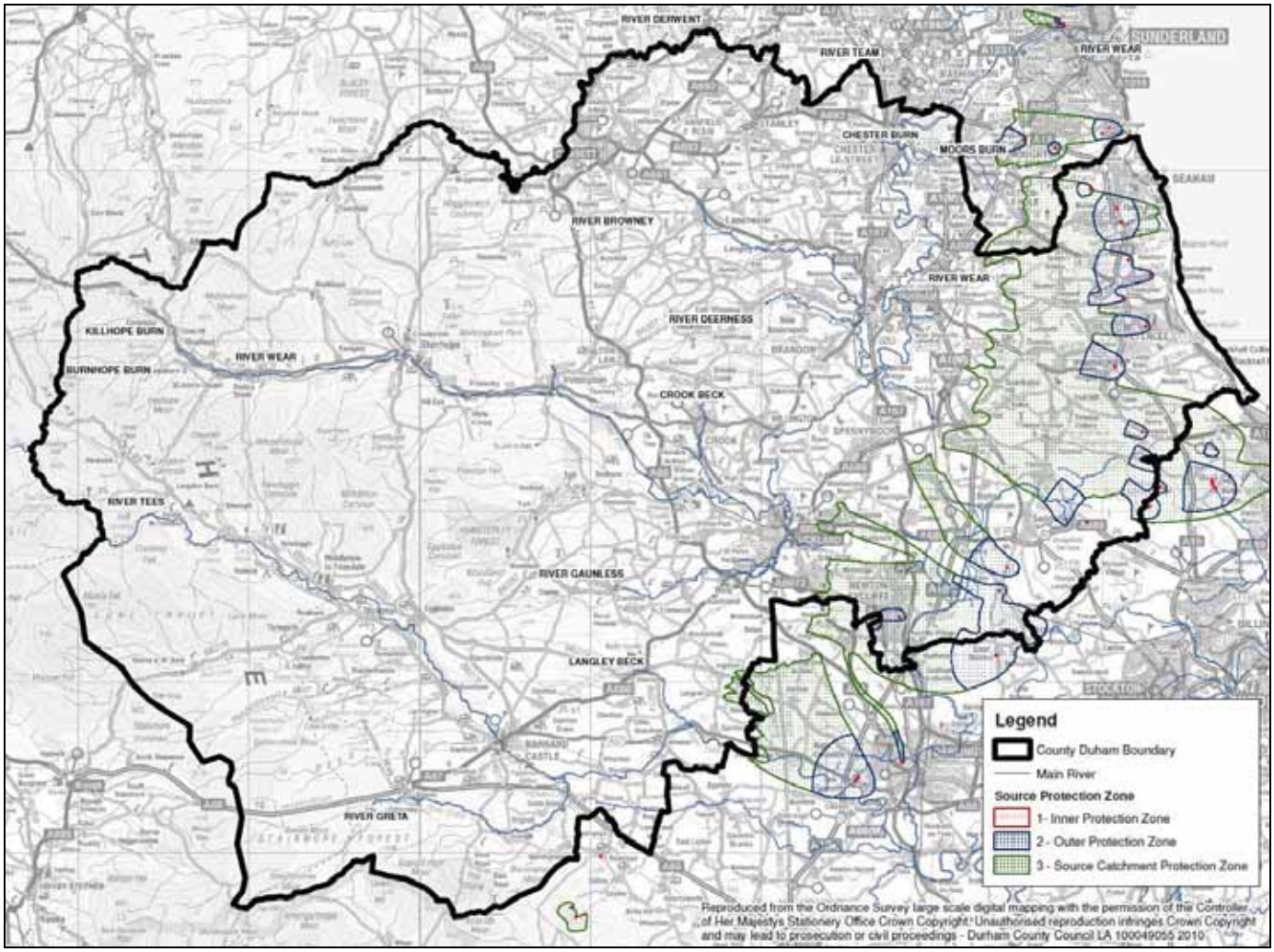
With reference to the British Geological Survey Geological Ten Mile Map Northern Sheet (Solid) scale 1:625 000 the central area around Durham and occupying the lowland plain consists of the Westphalian Formation of the carboniferous Period, a sedimentary rock described as Coal Measures (a minor aquifer according to the Environment Agency). In the southeast corner of County Durham is Magnesium Limestone of the Permian Period (a major aquifer according to the Environment Agency) and in the western edge of the Northern Pennines consists of the Namurian Formation of the Millstone Grit series, a sedimentary rock laid down during the Carboniferous Period. The valleys of the River Wear and Tees have formed in the Tournaison and Viséan Formation of the Carboniferous Limestone Series, with some igneous rock intrusions.

Large parts of the County are underlain by porous rock that holds groundwater. The limestone in the east provides a significant amount of water at the regional scale, but there are locally important minor aquifers further west. The geological strata in the central area can hold and transmit water, but this area tends to be contaminated by previous mine workings.

The Environment Agency designated areas around major groundwater abstractions as Source Protection Zones (SPZ). SPZs can be one of three zones depending on the time it takes for water to travel to the point of abstraction, or the percentage of the entire resource (whichever is the greater). The Environment Agency has identified several SPZs on the East Durham Limestone plateaux (See Figure A1.4). Some of these sites are at risk from rising contaminated mine waters and leachate from landfills.

Capabilities on project:
Water

Figure A.1.4: Source Protection Zones



(Source: Environment Agency, 2010)

5.3.1 WFD Classification

Table A1.3 below presents a summary of the available water quality classification for all water bodies within the Durham SWMP study area under the WFD.

Table A.1.3: Status objectives for water bodies in the Northumbria River Basin District* (RBD)

Water Body Category	Catchment	Status Objective		Less than Good in 2015	Total Number of Water Bodies
		Good or High in 2015	Good or High in 2027		
Overall					
All		***147***	***334***	***187***	***334***
Rivers, Canals	Tyne	47	82	35	82
	Wear	8	47	39	47
	Tees	15	58	43	58
	Total	***70***	***187***	***117***	***187***
Lakes and SSSI ditches	Tyne	1	4	3	4
	Wear	2	5	3	5
	Tees	1	3	2	3
	Total	***4***	***12***	***8***	***12***
Heavily Modified Water Body (HMWB)	Tyne	23	43	20	43
	Wear	6	24	18	24
	Tees	14	36	22	36
	Total	***43***	***103***	***60***	***103***
Artificial Water Body (AWB)	Tyne	4	6	2	6
	Wear	8	8	0	8
	Tees	17	17	0	17
	Total	***29***	***31***	***2***	***31***
Coastal		1	0	0	1

* The information presented refers to the catchments within the Northumbria RBD that fall within the Durham SWMP study area

(Source: Environment Agency Northumbria RBMP, Appendix B Objectives for Waters (December 2009))

Overall, there are 334 water bodies (333 freshwater bodies and 1 coastal water body) within Durham SWMP study area of which 134 (40%) are designated as Heavily Modified Water Bodies (HMWB)/Artificial Water Bodies (AWB). It is predicted that 146 water bodies (44%) will achieve at least good status or potential by 2015. It envisaged that the remaining 187 water bodies (56%) will not achieve their good status/potential until 2027.

There are a number of reasons for these watercourses not achieving good status by 2015. Key reasons for failures in the status of water bodies within the Northumbria RBD include physical modifications due to control structures, dredging, land claim, aggregate extraction, flood risk management and impoundments, as well as recreation, commercial fisheries and urban/transport pressures. Diffuse pollution from agriculture, urban areas and mines, together with point source discharges, also play a key role in determining the status of these water bodies.

Annex G of the Northumberland RBMP describes the pressures and risks to the water environment from anthropogenic sources in this RBD. This requires a proactive response to “risks” rather than the reactive response to “impacts.” These pressures and risks were reviewed in the context of surface water flood risk management and the following shortlisted risks have been identified:

- Physical modification (morphology);
- Urban and transport pollution pressures;
- Phosphorous in rivers and standing waters;
- Sediment in rivers and lakes;
- Other pollutants (e.g. faecal indicators organisms, metals and radioactivity); and
- Chemicals including priority hazardous substances, priority substances and specific pollutants (excluding pesticides);

Using the above pressures we have reviewed the Programme of Actions set out in Annex C of the RBMP. The Programme of Actions will be a consideration during development of options for key sites.

A.1.3.3 General Quality Assessment

Before the implementation of the WFD, the Environment Agency used to monitor water quality using the chemical and biology General Quality Assessment (GQA) method, which targeted the effects of organic pollution. Across County Durham there were 200 chemical (covering 762 km across 64 separate watercourses) and 100 biology monitoring sites (taken from 56 separate watercourses). Table A.1.4 provides a summary of the GQA results for County Durham in 2008. Figures A.1.5 and A.1.6 show the GQA Grades for biology and chemistry respectively.

Table A.1.4: GQA Results for 2008

GQA Grade	Chemical GQA				Biology GQA	
	Number of Sites	Percentage of total monitoring sites	Total stretch distance (km)	Percentage total stretch distance (km)	Number of Sites	Percentage of total monitoring sites
A (very good)	56	28 %	280.7 km	36.8 %	33	33 %
B (good)	78	39 %	297.7 km	39.1 %	26	26 %
C (fairly good)	39	19.5 %	108.4 km	14.2 %	15	15 %
D (fair)	8	4 %	30.7 km	4 %	14	14 %
E (poor)	12	6 %	36.3 km	4.8 %	11	11 %
Unclassified	7	3.5 %	8.2 km	1.1 %	1	1 %

(Source: Environment Agency, 2010)

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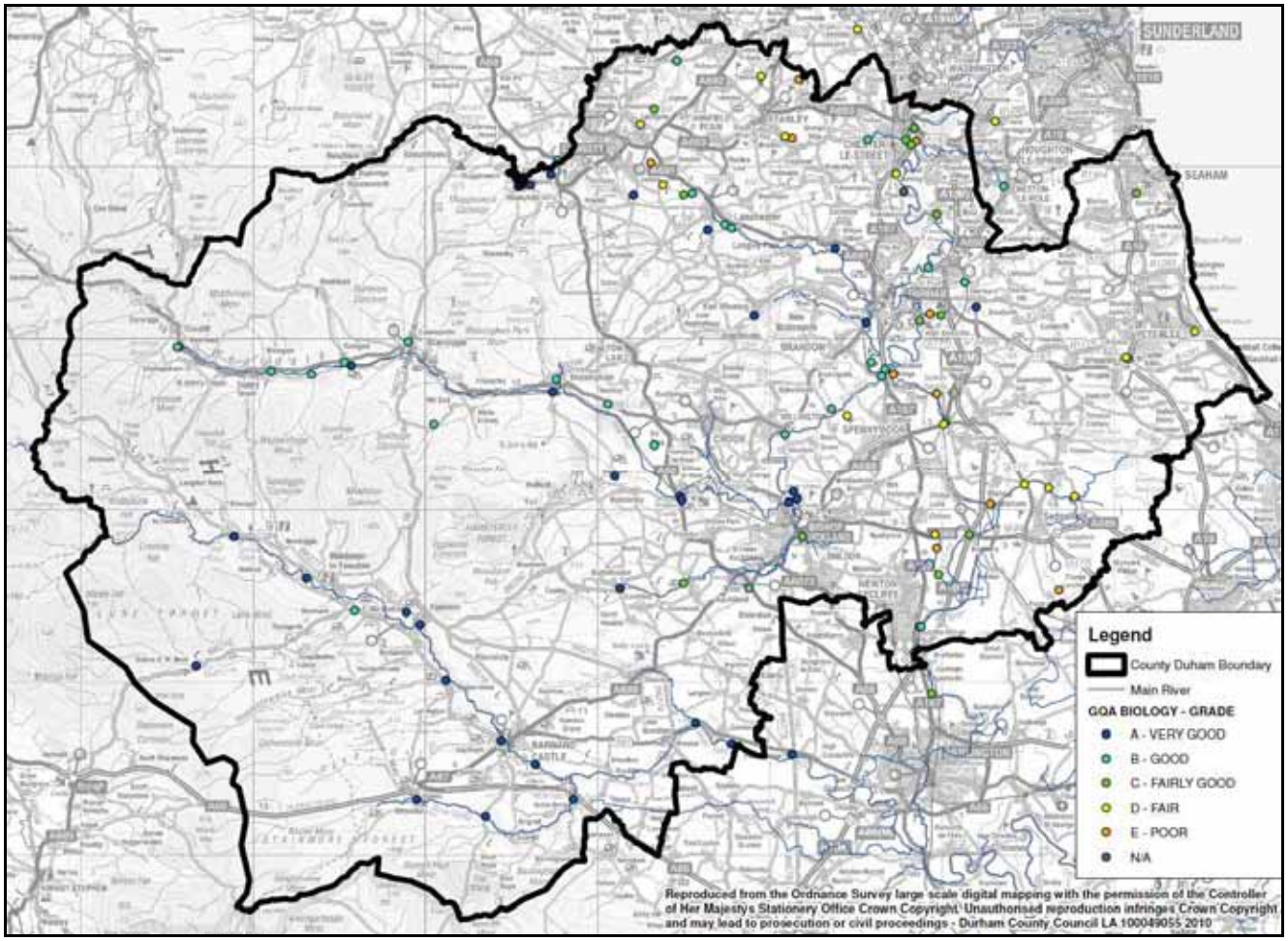
Figure A.1.5: GQA Biology



(Source: Environment Agency, 2010)

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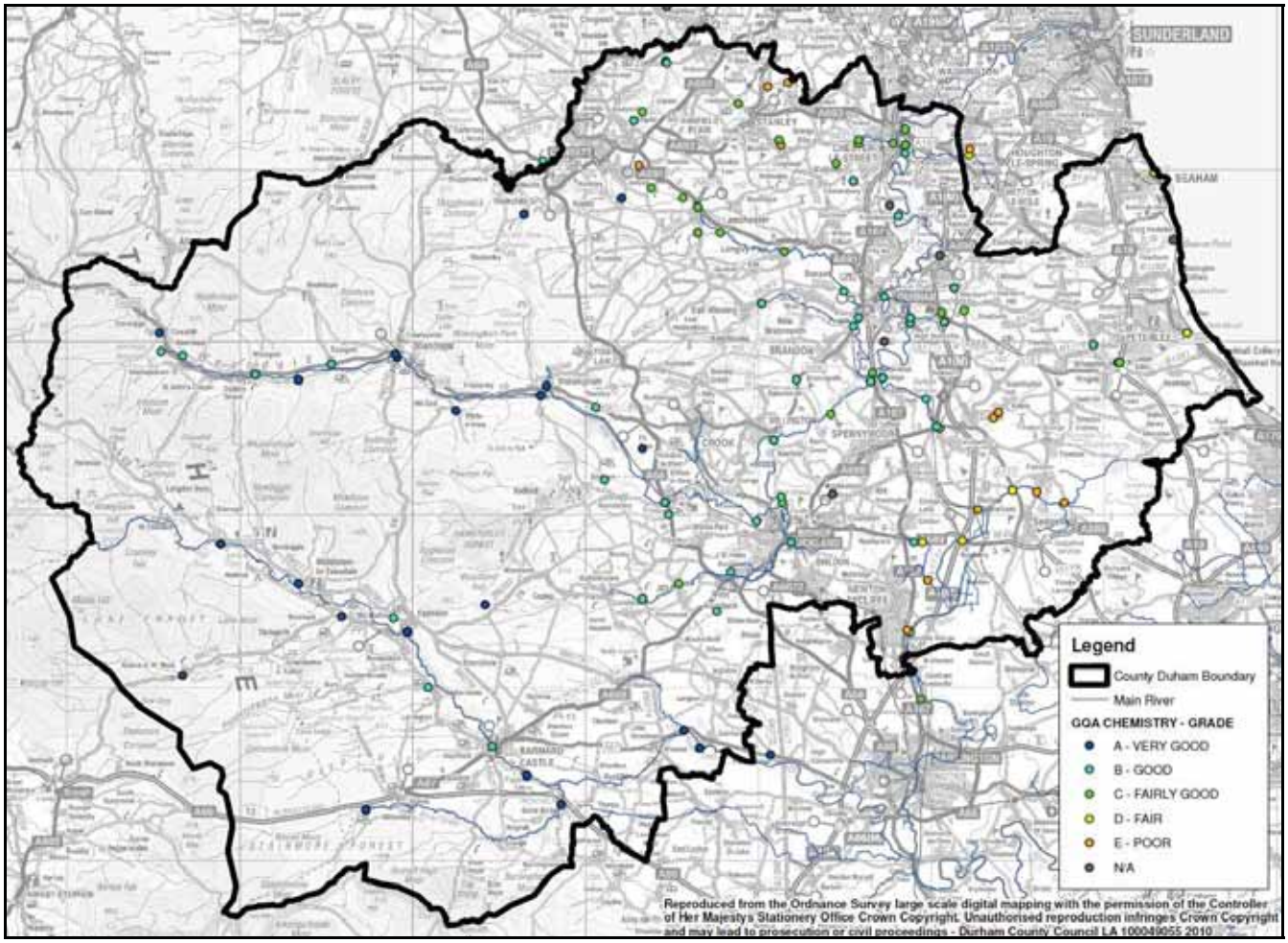
Figure A.1.6: GQA Chemistry



(Source: Environment Agency, 2010)

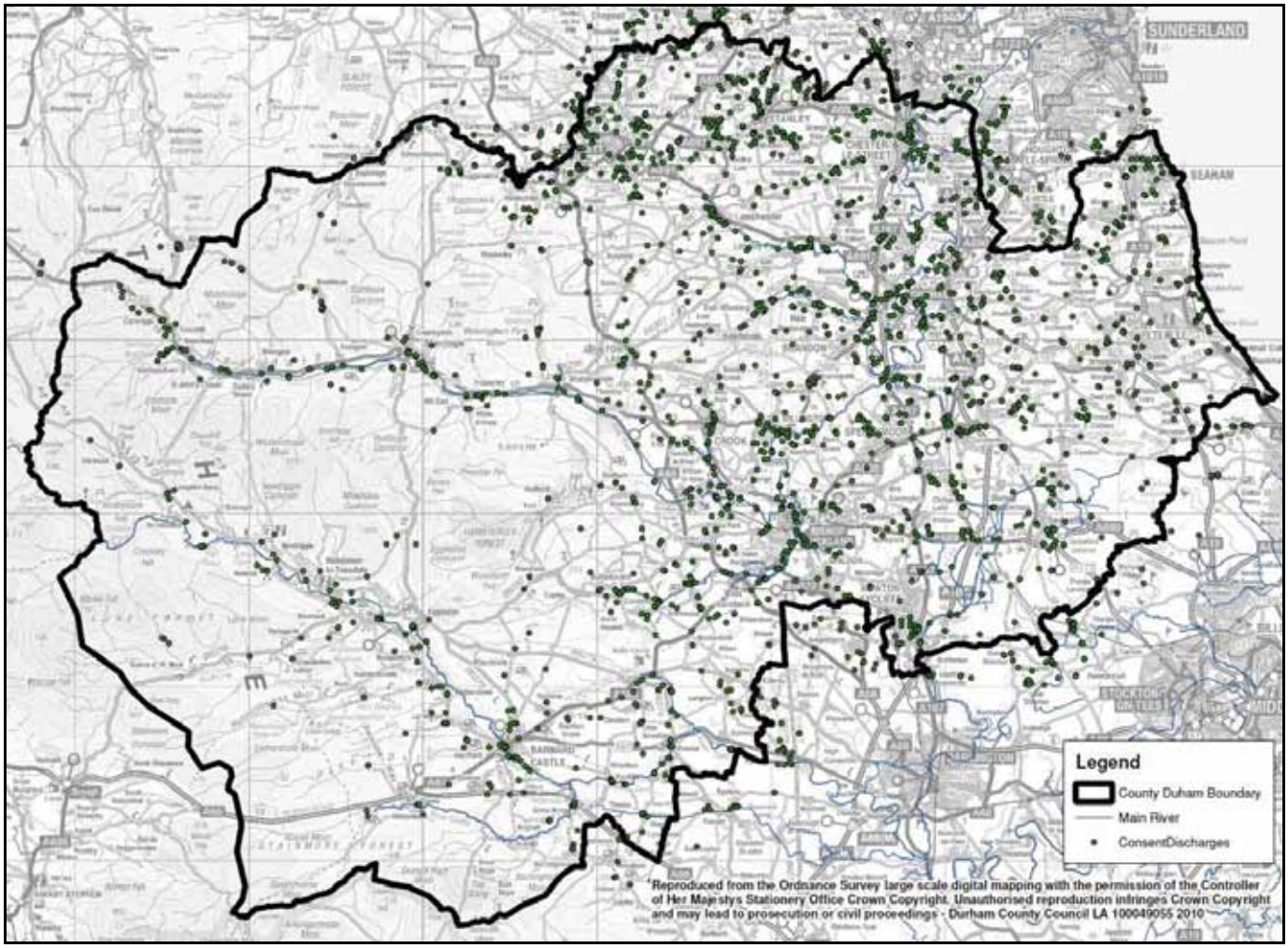
In 2008 67 % of chemical GQA monitoring sites covering 76 % of the monitored stretch of rivers in County Durham had water that was classed as good or very good. A similar level (59 %) of monitoring stations recorded results of good or very good in terms of biological quality (based on invertebrate assemblages sampled over three years and compared against predicted pristine conditions). In terms of GQA results, which reflect the effects of organic pollution, watercourses in County Durham tend to be of good and high quality, but tend to deteriorate in lower reaches.

A.1.3.4 Discharge Consents

There are 1,029 live discharge consents in County Durham mainly for sewage disposal and other waste water network requirements, with lesser requirements including the discharge of industrial and domestic waste and trade effluent (Figure A.1.7).

Capabilities on project:
Water

Figure A.1.7: Consent Discharges



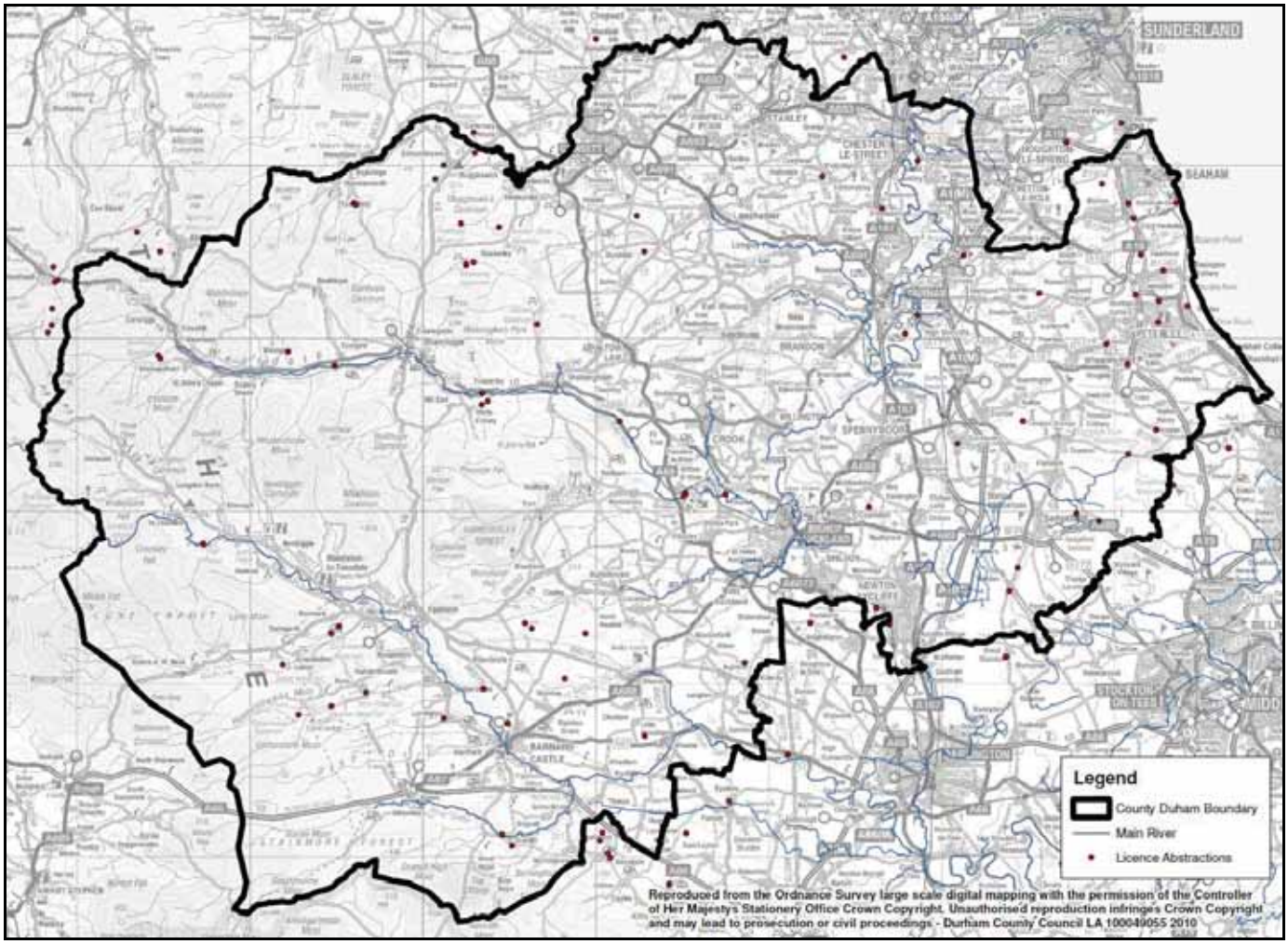
(Source: Environment Agency, 2010)

A.1.3.5 Abstraction Licences

The Magnesian Limestone escarpment in the east is the major aquifer extensively exploited for public water supply. There are 77 live abstraction licences within County Durham. This includes 39 groundwater sources (including 29 borehole, 5 spring, 3 colliery, and 2 ponds) and 38 surface water sources (Figure A.1.8). The primary use of abstracted water is water supply (54.5 %), with lesser uses including industrial/commercial/public services (20.8 %) and agriculture (14.3 %).

Capabilities on project:
Water

Figure A.1.8: Abstraction Licences



(Source: Environment Agency, 2010)

A.1.3.6 Nature Conservation Areas and Protected Areas

The WFD takes into account the requirements of other European Directives, the only relevant Protected Areas (i.e. those that have the potential to be impacted by surface water runoff and flooding) are:

- Sites designated for nature conservation (including Special Areas of Conservation (SAC), Special Protection Area (SPA));
- Freshwater fisheries;
- Nitrate Vulnerable Zones; and
- Water Protection Areas / Drinking Water Protection Areas.

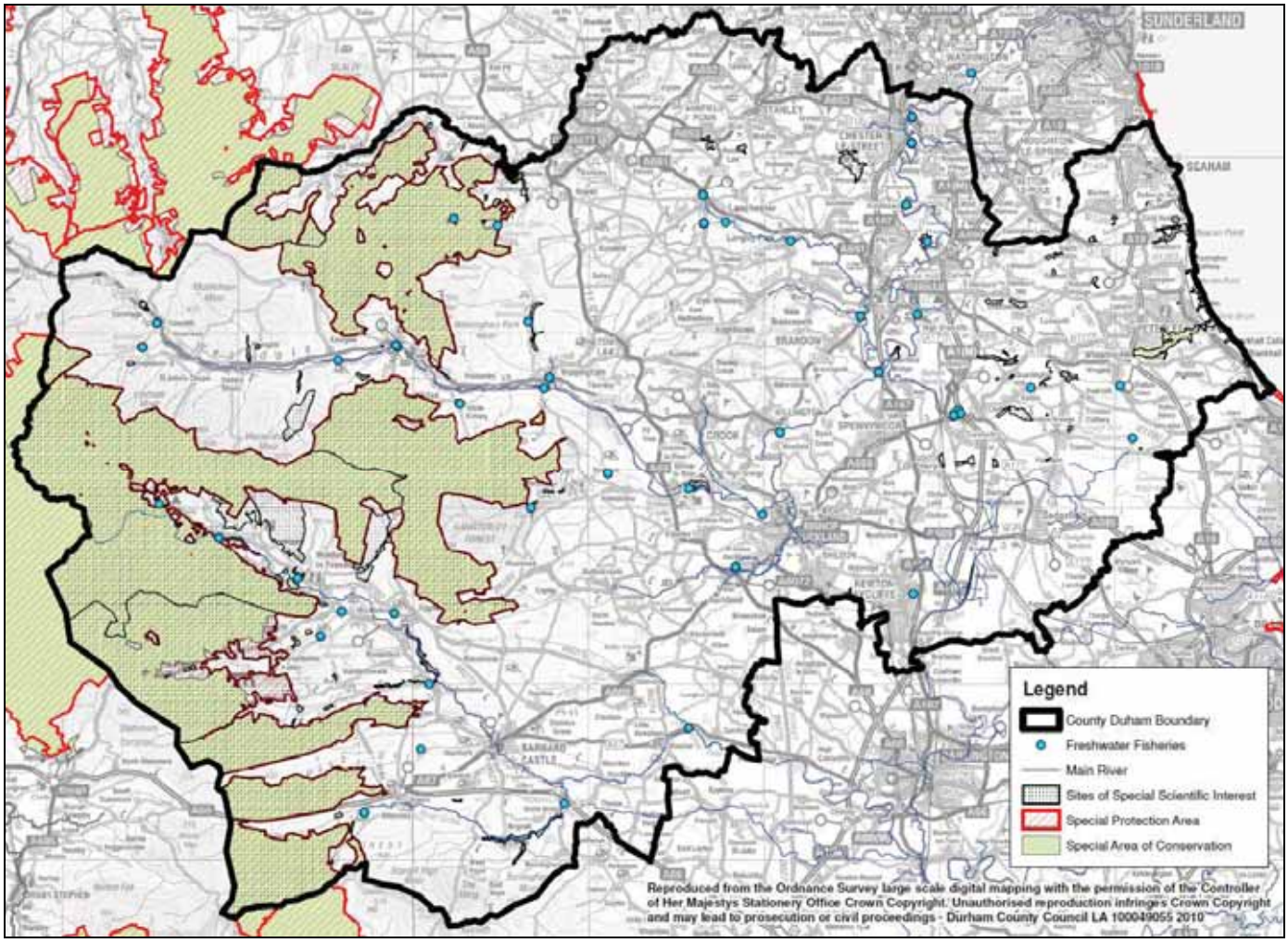
Relevant SACs and SPAs are listed below (See Figure A.1.9):

- North Pennine Moor cSAC & SPA
- North Pennine Dales Meadow cSAC
- Castle Eden Dene cSAC
- Moor House – Upper Teesdale cSAC
- Thrislington cSAC

There are 77 river stretches designated as salmonid fisheries in County Durham covering 399 km (including 11 still waters). There are also 27 cyprinid river stretches in County Durham (including 9 still waters) covering 75 km.

Although not a Protected Area in terms of the WFD, it is also important to consider nationally important Sites of Special Scientific Interest (SSSI) for which there are 89 in County Durham (See Figure A1.9). At this stage it is not known which of these sites are water dependent or those that have a connection to surface water flood zones or flow pathways. They tend to be distributed in the uplands to the west and the lowland coastal plain, and therefore the majority may not be impacted by proposed development or key surface water flood risk areas. Nevertheless, as options are developed any nearby SSSIs will be considered.

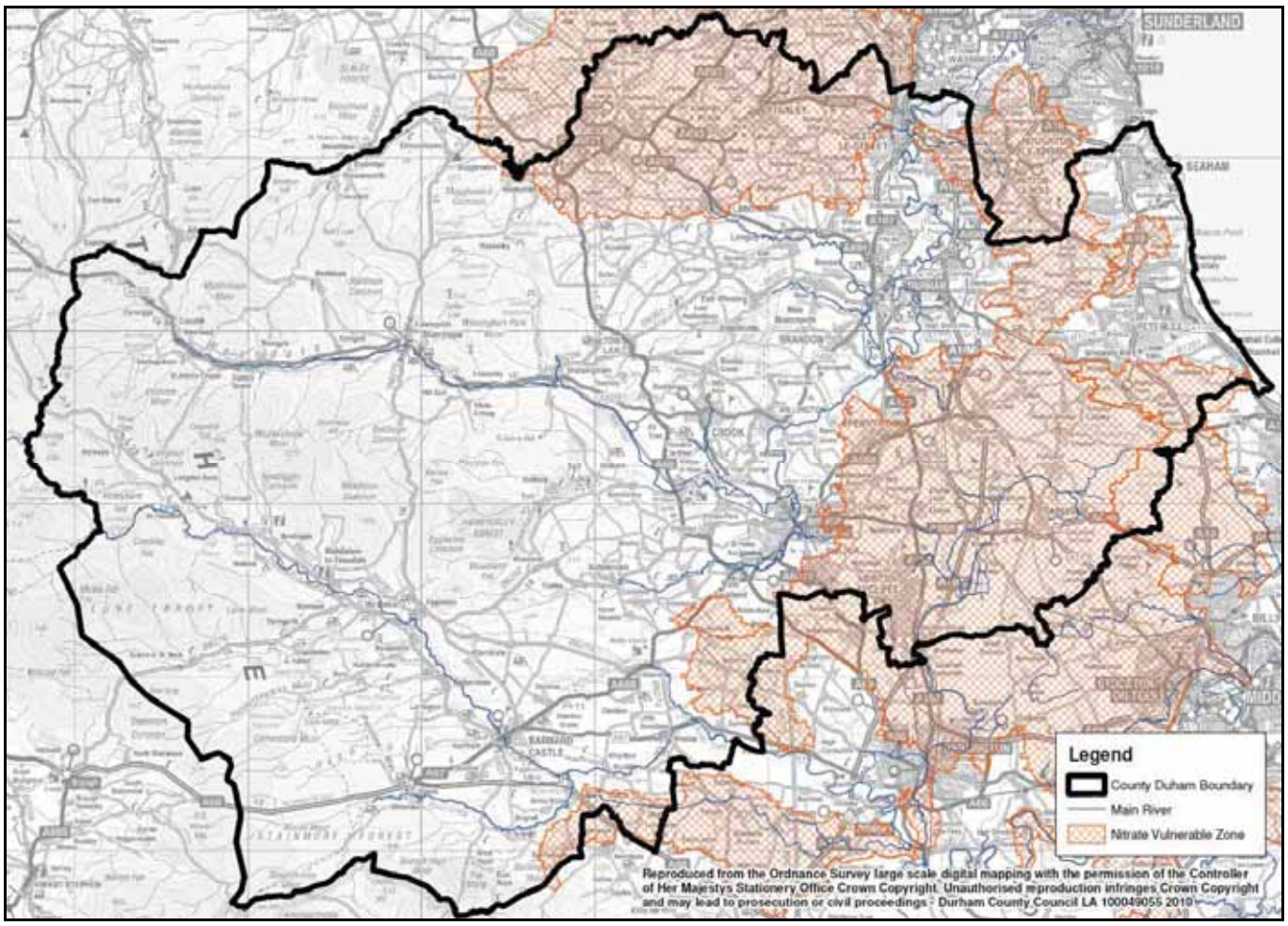
Figure A.1.9: Environmental Designations



(Source: MAGIC, 2010)

Much of the land to the east of Bishop Auckland and between the A1(M) and the A19 is designated as a Nitrate Vulnerable Zone (NVZ) as is the area between just west of Consett (Muggleswick Common) and Chester-le-Street. Please refer to Figure A.1.10 for precise location of the NVZs.

Figure A.1.10: Nitrate Vulnerable Zone



(Source: MAGIC, 2010)

A.1.3.7 Water Protection Zones

The WFD requires the identification of Drinking Water Protected Areas (DrWPA), which are water bodies that provide more than 10m3/day potable water or serve more than 50 people. All groundwater bodies in the Northumberland RBMP are DrWPAs. Balderhead, Blackton, Hurry, Selset, Grassholme, Derwent, Hiselhope, Waskerley, Smiddy Shaw and Burnhope Reservoirs are also DrWPAs, as is the lower (freshwater) Wear and middle Tees (between Barnard Castle and Darlington) river sub-catchments (as taken from Figure D.1 of Annex D of the RBMP (Environment Agency, 2009). Where additional water protection measures are required Safeguard Zones may be designated. Figures D.2 and D.3 of Annex D of the RBMP (Environment Agency, 2009) show that there are no Safeguard Zones in County Durham. Finally, under the Water Resources Act 1991 (as amended) Water Protection Zones may be designated where existing measures have failed or are unlikely to prevent failure to meet the WFD objectives. The Environment Agency is trailing a limited number of Water Protection Zones in the UK and at present it is not currently known whether any sites are located in County Durham.

Annex A1 – Water Quality Legislation Review

A2.1 Water Framework Directive

The aim of the WFD is to prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands, promote sustainable water consumption, and contribute to mitigating the effects of floods and droughts. The WFD was transposed into law in England and Wales by the Water Environment (Water Framework Directive) Regulations 2003. These regulations implement a holistic approach to the management, protection and monitoring of the water environment. The key objectives of the WFD are to prevent deterioration in the status of water bodies and aim to achieve good ecological and chemical status/potential (including quantitative status in groundwater bodies) by 2015. Water bodies must also comply with standards and objectives of Protected Area (i.e. an area designated under another European Directive, such as an SAC or SPA) where these apply. In addition, under the WFD requires emissions of priority substances must be reduced and emissions of priority hazardous substances prevented. Finally, action must be taken to reverse any identified sustained upward trend in pollution concentrations in groundwater bodies.

The actions (or measures) required to ensure that all the water bodies achieve their WFD objectives are set out in a series of statutory River Basin Management Plans (RBMPs) published in December 2009 by the Environment Agency. County Durham is covered by the Northumberland RBMP.

A2.1.1 Preventing Deterioration in Status or Potential

Deterioration in WFD terms refers to a change between status classes – for example, from high to good status or from moderate to poor status. Preventing deterioration in status is a strict requirement of the WFD. For water bodies other than those at 'high status', there is only one possible exception to this requirement. This is the situation where physical modification to the water body is required to support certain sustainable human activities (including flood defence) and where a number of criteria set out in the Directive are met (See Section 1.2.2.6).

A2.1.2 Meeting the 'Aim to Improve' Objective

If a water body is not already at good status, the RBMP may set out the measures required to achieve good status or it may set an alternative objective for the water body (which must be justified on grounds of technical feasibility or disproportionate cost). It is important to take these measures into account in the SWMP to avoid conflicts that could prevent any intended improvements being realised and to resolve any such potential conflicts; to identify whether other measures could be taken to help improve status in failing water bodies.

A2.1.3 WFD Objective for Groundwater Bodies

Groundwater bodies are classified in terms of their chemical (quality) and quantitative status, in addition to an indication of trend. There are only two classes for groundwater status – good and poor, the outcome being set at the lower of either chemical or quantitative status. The specific criteria that must be met for a groundwater body to be classed as being at good quantitative status and good chemical status are set out in the WFD and further elaborated in the Groundwater Directive (2006/118/EC, (replacing 1980/68/EC)). These criteria have been developed in the UK into a series of tests, which are triggered when a relevant risk is identified (i.e. the identification of a risk leads to investigations to determine whether or not the criteria specified in the test are met).

A2.1.4 Achieving Objectives for EU Protected Sites

The WFD identifies areas requiring special protection under other EC Directives (which will also be taken into account where necessary) and water used for the abstraction of drinking water as protected areas. Under Article 4 of the Directive, Member States are required to achieve compliance with any standards and objectives set for each protected area by the end of 2015 unless otherwise specified in the other EC Directive.

Capabilities on project:
Water

A2.1.5 Article 4.7

Article 4.7 provides a mechanism whereby the objectives of the Directive may not be achieved if this is a result of new modifications and / or new sustainable human activities, and providing the following conditions are met:

- All practicable steps are taken to mitigate the adverse impact on the status of the water body;
- The reasons for those modifications or alterations are specifically set out and explained in the RBMP, required under Article 13 and the objectives are reviewed every 6 years;
- The reasons for those modifications or alterations are of overriding public interest and / or the benefits to the environment and to society are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and
- The beneficial objectives served by those modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.

The SWMP is an opportunity to bring about co-ordinated improvements in water quality, and thus the aquatic ecosystems that depend on it, through a framework of surface water management to control pollution (e.g. control of urban diffuse pollution and intermittent discharges from Combined Sewer Overflows (CSO) through site management and the introduction of SuDS) and to reinstate where possible natural flow regimes, riparian habitats, and flood plain connectivity. Through an integrated approach (including all relevant stakeholders in Partnership) solutions with a dual benefit that address flood and pollution risks can be realised, and thus help to fulfil and comply with the ecology, water quality, and hydromorphology requirements of the WFD. Mitigation measures for surface water flood risk have the potential to improve water quality or cause deterioration through diffuse pollution or changes in the flow regime and effects on the physical habitat. The WFD requires that effects on water bodies do not cause deterioration nor do they lead to the prevention of a target being achieved, although under certain circumstances there can be exceptions (using Article 4.7). There is also the possibility that the status of a watercourse may change to a modified status, and vice versa, although this would depend on the degree of change relative to the size of the water body. Therefore, it is important that the SWMP considers the implications of the WFD.

A2.2 The Flood and Water Management Act 2010

The Flood and Water Management Act 2010 intends to provide better, more comprehensive management of flood risk for people, homes and businesses. It will also tackle bad debt, improve the affordability of water bills, and help ensure continuity of water supplies. In particular, it encourages the uptake of SuDS by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SuDS for new developments and redevelopments.

A2.3 The Water Resources Act 1991 (as amended)

It is an offence under Section 85 of the Water Resources Act 1991 to cause or knowingly permit pollution of controlled waters. Controlled waters include all watercourses (drainage ditches, streams, rivers), canals, lakes, estuaries and groundwater. The Water Resources Act also makes provision for the consenting (by the Environment Agency) of discharges of potentially polluting substances and the licensing of water abstractions (amended by the Water Act 2003). Both the consenting of discharges and the abstraction of water from waterways have implications for future water quality and the aquatic environment.

A2.4 Future Water

The Government’s water strategy for England, Future Water was published in February 2008. This strategy sets out the Government’s long-term vision for water and the framework for sustainable water management in England. It aims to permit the supply of secured water supplies whilst ensuring an improved and protected water environment. Future Water brings together the issues of water demand, water supply, water quality in the natural environment, surface water drainage, river/coastal flooding, into a single coherent long term strategy, in the context of the need to reduce greenhouse gas emissions, and also considers the issue of charging for water. The water environment and water quality have great economic, biodiversity, amenity and recreational value, playing an important role in many aspects of modern day society, and thus the functions provided must be sustainably

managed to ensure they remain available to future generations without compromising environmental quality. Future Water refers to the improvements that have been made to reduce polluting activities but reaffirms the work still to be done. The potential for water quality impacts to occur from poor surface water management is referred to and the need to sustainable manage runoff, through co-ordinated Partnerships with well defined roles and responsibilities set out in SWMPs.

A2.5 Planning Policy 23 Planning and Pollution Control

National planning policy for the prevention of water pollution is set out in Planning Policy Statement 23 (PPS 23) Planning and Pollution Control (ODPM, 1994). PPS 23 is a material consideration for proposed planning applications and provides guidance on the location of, and appropriateness of certain “polluting” developments, so as to prevent pollution and ensure that the environment and human health are protected. In particular, PPS 23 Annex 1 encourages the use where appropriate of SuDS by developers. SuDS are drainage measures but can help to attenuate pollutants contained in surface water runoff reducing the impact of diffuse pollution on receiving watercourses. In terms of planning policy the requirements of PPS23 have been amended and to some extent superseded by the requirements of The Flood and Water Management Act 2010.