



Northumberland
County Council

Outline Water Cycle Study

May 2012

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FINAL REPORT
 May 2012

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EXECUTIVE SUMMARY

Northumberland is expected to experience planned development in housing and employment provision over the Local Development Framework (LDF) plan period to 2031. This proposed development represents a challenge in ensuring that both the water environment and water services infrastructure has the capacity to sustain this level of development proposed.

An Outline Water Cycle Study (WCS) has therefore been undertaken to identify any constraints that may be imposed by the water cycle and how these can be resolved. Furthermore, it provides a strategic approach to the management and use of water which ensures that the sustainability of the water environment in the study area is not compromised.

Two potential development scenarios covering housing and employment targets for each potential development area have been agreed with the relevant planning officers at Northumberland County Council (NCC) and these scenarios have been tested in the Outline WCS. NCC was not in a position to provide a definitive list of potential development locations; hence it has been necessary to carry out the assessment of capacity at a strategic level for this Outline WCS.

Wastewater Strategy

Wastewater Treatment

The Outline WCS has shown that wastewater flow from the proposed development across Northumberland can be accommodated within existing consent conditions by some of the WwTW.

However, several WwTW do not have capacity to accept and treat any further wastewater from proposed development at the current time (i.e. before future development is considered) or in the near future without requiring an increase in the volumes that they are permitted (or consented) to discharge. For these catchments (development areas) a solution is required to treat additional wastewater generated as a result of the proposed development.

NWL have confirmed the following WwTW do not have the capacity to accept and treat any further wastewater from the proposed development at the current time or in the near future and should be considered in further detail during the Detailed WCS:

- Allendale WwTW has little or no headroom to serve the proposed development,
- Alnwick WwTW may have insufficient capacity to serve the proposed development without upgrades (and/or consent extensions),
- Blyth WwTW has the capacity to support future housing development in the short term and it is NWL's intention to implement a scheme at the works during AMP6 (2015 – 2020) which will increase capacity to support the proposed levels of development,
- Cramlington WwTW is likely to suffer a significant shortfall in capacity should the proposed scale of development exceed 100 units per year,
- Haltwhistle WwTW has headroom to serve the proposed development in the short term, however additional headroom (and/or consent extensions) are required to serve development in the medium to longer term,

- Howdon STW treats wastewater and surface water from the Local Authority areas of Newcastle, Gateshead, North Tyneside, South Tyneside and parts of south Northumberland. Based upon the housing projections within the North East Regional Spatial Strategy (RSS) and relevant Core Strategies there would currently be in the order of seven to twelve years headroom unless surface water is removed from the network. Therefore Howdon WwTW presents a potential constraint to development in those parts of Northumberland which drain to Howdon,
- Morpeth WwTW currently has no headroom to serve new development within Morpeth; however NWL have confirmed that there is a fully developed solution to expand capacity which is due to commence in January 2013 and take up to eighteen months to complete construction,
- Rothbury WwTW has little or no headroom to serve the proposed development,
- Seahouses WwTW is unlikely to have sufficient capacity to serve the proposed new development without upgrades (and/or consent extensions),
- Wooler WwTW currently has no headroom to serve the proposed development,
- There are also known capacity issues at the some of the Coastal Village WwTW (Pegswood and Lynemouth).

Sewer Network Capacity

A high level assessment of capacity in the sewer network has been undertaken to determine whether there is likely to be capacity issues in relation to the transfer of additional wastewater flow generated to the various WwTW within existing infrastructure. This high level assessment included the interpretation of historical sewer flooding records from NWL.

The following areas have had reported sewer flooding incidents which could render the use of existing infrastructure (without upgrade) problematic and therefore further investigation at these sites will be required at the Detailed WCS stage to determine if upgrades to an existing main will be required once the final development sites are known:

- | | |
|--------------------------------|-----------------------------------|
| • South West Haltwhistle, | • North West Blyth, |
| • Central Alnwick, | • North East Hexham, |
| • North West Amble, | • Central Bedlington, |
| • South Hadston, | • East Bellingham, |
| • South East Ashington, | • North East of Haydon Bridge, |
| • North East Prudhoe, | • Several areas of South Morpeth. |
| • North East Ponteland, | |
| • North and South Cramlington, | |

The requirement to provide wastewater network infrastructure solutions will impact upon development phasing as opposed to absolute housing numbers and will be assessed in more detailed during the Detailed WCS once development locations are known.

Water Supply Strategy

Future water demand following development proposed in the two housing scenarios (and employment targets) has been calculated. For each housing scenario, five different water demand projections have been calculated based on different rates of water use for new homes that could be implemented through potential future policy.

Available Water Resources

Available water resources have been assessed according to the final Water Resource Management Plan (WRMP) as published by NWL in January 2010.

NWL has undertaken an assessment to calculate if there is likely to be a surplus of available water or a deficit in each of these supply areas in the study area by 2031, once additional demand from proposed development and other factors such as climate change are taken into account.

The results show that there are adequate water resources to cater for the proposed development within the Kielder Water Resource Zone (WRZ). Proposed development in the Berwick and Fowberry WRZ can also be catered for within existing resources except under exceptional circumstances. NWL are currently finalising the installation of improved aquifer monitoring equipment in the Berwick and Fowberry WRZ. The scope for a further project feasibility study as to water production within current licence conditions, via new infrastructure between networks, is also nearing completion. This will ensure the Berwick and Fowberry WRZ areas have an improved resilience in supply to help meet projected needs.

Water Environment Assessment

Within Northumberland only ten of the watercourse/waterbodies are predicted to achieve or remain at Water Framework Directive (WFD) Good Status or Good Potential in 2015. It is vital that proposed development in Northumberland does not cause deterioration in current water quality and does not prevent the future achievement of WFD Good Status or Good Potential, Shellfish Waters Directive (SWD) requirements and/or Bathing Water Directive (BWD) requirements in downstream waterbodies. A number of proposed development locations are considered to pose an amber risk to downstream watercourses/waterbodies based on how likely the WwTW is to exceed the current flow consent.

Ecological Assessment

Designated ecological sites that have the potential to be affected by the proposed development and its impact on the water environment have been considered. The majority of proposed development is unlikely to alter conclusions already drawn in the production of NWL's WRMP and the Review of Consents (RoC)¹ process undertaken for wastewater discharges. However, several sites will warrant further assessment in the Detailed WCS once preferred development sites are known:

The following key points can be made regarding ecological impact of WwTW discharges:

- Berwickshire and North Northumberland Coast SAC could potentially be affected by the increase in flow required (above consented conditions) by Seahouses WwTW and Wooler WwTW and by the likely required increase in flow (above consented conditions) from Alnwick WwTW. Therefore this site should be considered further in the Detailed WCS,

¹ Undertaken as part of the requirements under the Habitats Directive

- Northumbria Coast SPA may also be affected by the increase in flow required (above consented conditions) from Morpeth WwTW, Rothbury WwTW and Seahouses WwTW and the likely increase in flow required by Alnwick WwTW, Blyth WwTW, Cramlington WwTW, Allendale WwTW, Haltwhistle WwTW, Shillbottle WwTW, Pegswood WwTW and Lynemouth WwTW. Therefore the site should be considered further in the Detailed WCS,
- The River Tweed SAC/SSSI and the Tweed Estuary SAC/SSSI could potentially be impacted by the required increases in flow from Wooler WwTW due to the proposed development in Northumberland. This should be further investigated in the Detailed stage of the WCS,
- Lindisfarne SPA/Ramsar/SSSI may be impacted by the increase in flow required (above consented conditions) at Seahouses WwTW and the likely increase in flow from Alnwick WwTW due to the proposed development in Northumberland. Therefore this site should be considered further in the Detailed stage of the WCS,
- Coquet Island SPA may be impacted by the increase in flow required (above consented conditions) at Seahouses WwTW and Rothbury WwTW and the likely increase in flow from Alnwick WwTW and Shillbottle WwTW due to the proposed development in Northumberland. Therefore this site should be considered further in the Detailed WCS,
- The Farne Islands SPA may be impacted by the increase in flow required (above consented conditions) at Seahouses WwTW and the likely increase in flow from Alnwick WwTW and Shillbottle WwTW due to the proposed development in Northumberland. Therefore this site should be considered further in the Detailed WCS,
- There are also a range of SSSIs which may receive discharge volumes in excess of that currently consented. Unlike internationally important sites, there is no background analysis available through the RoC process for these SSSIs specifically, so it must be assumed that impacts on these sites cannot be dismissed and will need to be investigated further at the Detailed WCS.

Within Northumberland there are also three proposed Marine Conservation Zones (MCZs) and two recommended Reference Areas which may potentially be affected by the proposed development. Two of the three proposed MCZs and both of the Reference Areas are located downstream of the WwTW that will need to exceed consented discharge volumes to accommodate proposed development. The Aln Estuary MCZ is located downstream of Alnwick WwTW which currently has adequate headroom in the short-medium term but may require an increase in consented discharge volumes at some point in the Core Strategy (CS) period. Further investigations will be required at the Detailed WCS.

Flood Risk and Surface Water Management

Flood Risk to Development

The following key flood risk issues have been identified across Northumberland:

- Some areas across the county have been historically affected by a long history of flooding (including Belford, Hexham, Morpeth, Ponteland, Rothbury and Wooler). There are also some smaller settlements which are susceptible to flash flooding (including Bellingham, Buttery Haugh and Rothbury),
- A number of areas suffer historically from tidal flooding (Amble, Alnmouth, Warkworth, Seahouses, Berwick, Blyth and Bamburgh),

- Surface water flooding is most serious in the urban areas of Northumberland including Cramlington, Hexham, Morpeth and Ponteland,
- Historical sewer flooding records provided by NWL show that there have been reports of isolated sewer flooding incidents across Northumberland,
- Groundwater flooding is considered to be low across Northumberland except in Berwick where a detailed assessment of groundwater flood risk would be required in the Detailed WCS.

The Level 1 and Strategic Flood Risk Assessment (SFRA) and Level 2 SFRA for Northumberland have been used to inform this Outline WCS.

The Management of Surface Water Runoff

Surface water has the potential to act as a constraint to development in South East Northumberland due to the discharge of surface water to tidal reaches potentially being impacted during 'tide locked' conditions. Therefore new development must consider the impact of further urbanisation on the existing pumped system, and discharge of surface water must be mitigated within the pumped limitations of the drained system. The incorporation of Sustainable Drainage Systems (SuDS) into development footprints at an early stage is therefore essential to meeting the aspiration of sustainable water management in the study area.

In order to give an indication of SuDS suitability for the Outline WCS, the likely capacity for infiltration type SuDS for the potential development areas has been considered. The majority of the study area is not suitable for infiltration based SuDS (with the exception of small isolated areas in Prudhoe) and will therefore be reliant on surface attenuation and runoff restriction, which will require sites to make land provision for this mitigation. Once potential development locations are known, further advice on types of suitable SuDS and opportunities for linking to green infrastructure will be provided in the Detailed WCS.

Next Steps

This Outline WCS has been undertaken at a strategic level based on best estimates of where potential development is likely to occur on a settlement by settlement basis.

A Detailed WCS will therefore be required once more clarity is available on specific site allocations. Indeed, once development locations and numbers are confirmed by NCC, locations that require more detailed assessment could be determined, using the information provided in this Outline WCS.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
Wastewater Strategy	4
Water Supply Strategy	6
Water Environment Assessment.....	6
Ecological Assessment.....	6
Flood Risk and Surface Water Management.....	7
Next Steps	8
1 INTRODUCTION.....	15
1.1 Background.....	15
2 WATER CYCLE STUDIES	18
2.1 The Water Cycle	18
2.2 Implications for Development.....	18
2.3 Stages of a Water Cycle Study	19
2.4 Integration with the Planning System	20
2.5 Identification of Constraints.....	21
3 DEVELOPMENT IN NORTHUMBERLAND	23
3.1 Northumberland Study Area	23
3.2 Planned New Development	23
4 POLICY REVIEW	33
4.1 Legislation and Policy	33
4.2 Local Drivers and Policies.....	36
4.3 Additional Strategies/Policies Considered.....	38
4.4 Water Company Planning.....	39
5 WATER ENVIRONMENT.....	42
5.1 Introduction.....	42
5.2 Water Environment Background	42
5.3 Water Framework Directive Baseline Assessment.....	46
5.4 Baseline Coastal / Bathing Water Assessment.....	56
5.5 Green Infrastructure.....	58
5.6 Water Environment Summary	59
6 WATER RESOURCES AND SUPPLY	62
6.1 Introduction.....	62
6.2 Water Resources	62
6.3 Water Supply	70
6.4 Water Resources and Water Supply Summary	73
7 WASTEWATER COLLECTION, TREATMENT AND	

	DISPOSAL	75
7.1	Introduction.....	75
7.2	Wastewater Network Summary.....	78
7.3	North Northumberland SHMA	85
7.4	City Commuter Region SHMA.....	91
7.5	Urban Northumberland SHMA	98
7.6	Wastewater Treatment Works Analysis	104
7.7	Volumetric Capacity.....	105
7.8	Water Quality Consents.....	111
7.9	Howdon WwTW	114
7.10	Wastewater Matrix.....	115
8	FLOOD RISK, SURFACE WATER MANAGEMENT AND SUSTAINABLE DRAINAGE.....	118
8.1	Introduction.....	118
8.2	Strategic Flood Risk Assessment	118
8.3	Flood Risk Summary.....	119
8.4	Flood Risk Matrix	126
8.5	Surface Water Management and Sustainable Drainage	128
9	ECOLOGY AND BIODIVERSITY	131
9.1	Introduction.....	131
9.2	Background.....	131
9.3	Objectives and Approach	134
9.4	Proximity of WwTW to Sensitive Designated/Protected Sites	136
9.5	Screening Assessment – European Sites	138
9.6	Screening Assessment – National Sites.....	146
9.7	Screening Assessment - Marine Conservation Zones.....	151
9.8	Coastal Waters and Eutrophication	155
9.9	Ecology and Biodiversity Summary.....	155
10	PROPOSED NEW DEVELOPMENT AREA ASSESSMENTS	157
10.1	Introduction.....	157
10.2	North Northumberland SHMA	158
10.3	City Commuter Region SHMA.....	167
10.4	Urban Northumberland SHMA	180
11	INFRASTRUCTURE FUNDING OPTIONS	190

11.1	Suggested Developer Contribution Options	191
11.2	Proposed Funding Process.....	193
11.3	Further Cost Considerations.....	193
12	DEVELOPER CHECKLIST.....	195
APPENDIX A – DATA CATALOGUE		199
APPENDIX B – HOWDON WWTW POSITION STATEMENT		200

ACRONYMS AND ABBREVIATIONS	
Abbreviation	Description
AA	Appropriate Assessment
AAP	Area Action Plan
AMP	Asset Management Programme
AONB	Area of Outstanding Natural Beauty
ASStSWF	Areas Susceptible to Surface Water Flooding
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BOD	Biochemical Oxygen Demand
BWD	Bathing Water Directive
CAMS	Catchment Abstraction Management Strategy
CDA	Critical Drainage Area
CFMP	Catchment Flood Management Plan
CIL	Community Infrastructure Levy
CS	Core Strategy
CSO	Combined Sewer Overflow
CSF	Catchment Sensitive Farming
CSH	Code for Sustainable Homes
CLG	Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DO	Dissolved Oxygen
DPD	Development Plan Document
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
FEH	Flood Estimation Handbook
FFT	Flow to Full Treatment
FMfSW	Flood Map for Surface Water
GQA	General Quality Assessment
GW	Groundwater

HA	Highways Agency
HMWB	Heavily Modified Water Body (under the Water Framework Directive)
HRA	Habitat Regulations Assessment
IDB	Internal Drainage Board
l/h/d	Litres/head/day (a water consumption measurement)
LDD	Local Development Document
LDF	Local Development Framework
LNR	Local Nature Reserve
LP	Local Plan
LPA	Local Planning Authority
MCZ	Marine Conservation Zone
MI	Mega Litre (a million litres)
N	Nitrate
NE	Natural England
NFCDD	National Flood and Coastal Defence Database
NGP	New Growth Point
NNP	Northumberland National Park
NPPF	National Planning Policy Framework
NWL	Northumbrian Water Ltd
NTC	North Tyneside Council
OFWAT	The Water Services Regulation Authority (formerly the Office of Water Services)
OR	Occupancy Rate
PE	Population Equivalent
PoM	Programme of Measures
PPS	Planning Policy Statement
PR	Periodic Review
Ramsar	Ramsar Convention
RBD	River Basin District
RBMP	River Basin Management Plan
RoC	Review of Consents

RQP	River Quality Planning
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SAC	Special Area for Conservation
SEPA	Scottish Environmental Protection Agency
SFRA	Strategic Flood Risk Assessment
SHLAA	Strategic Housing Land Availability Assessment
SHMA	Strategic Housing Market Area
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
SuDS	Sustainable (Urban) Drainage Systems
SW	Surface Water
SWD	Shellfish Waters Directive
SWMP	Surface Water Management Plan
UKTAG	United Kingdom Technical Advisory Group (to the WFD)
UWWTD	Urban Wastewater Treatment Directive
WCS	Water Cycle Study
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRMU	Water Resource Management Unit (in relation to CAMS)
WRZ	Water Resource Zone (in relation to a water company's WRMP)
WwTW	Waste Water Treatment Works

1 INTRODUCTION

1.1 Background

The Regional Spatial Strategy (RSS) for the North East of England² ('The North East of England Plan') was published in July 2008 and set targets to guide the scale and location of new development in Northumberland. It should be noted that as of the 6th July 2010, the Secretary of State for Communities and Local Government announced the Government's intention to revoke Regional Strategies with immediate effect³. Regional Strategies were to be revoked under s79(6) of the Local Democracy Economic Development and Construction Act (2009) and will thus would no longer form part of the development plan for the purposes of s38(6) of the Planning and Compulsory Purchase Act (2004).

However, a legal challenge to the abolition was brought in November 2010 by a developer (Cala Homes), which was upheld by the High Court. The Court's ruling effectively reversed the Secretary of State's decision to abolish the RSS, although it should be noted that this is only a short term reversal, as the government announced in 2010 its intention to continue with the formal abolition via new legislation laid before Parliament in 2011.

The 'Localism Act', proposes to devolve greater power to local government over housing and planning decisions, however in the absence of a replacement for the RSS, the previous housing figures are being used for the purpose of this study for Northumberland.

The authority responsible for planning and implementing this new development across Northumberland is the unitary authority of Northumberland County Council (NCC). The area covered by NCC is shown in Figure 1-1.

In April 2009, local government reorganisation meant that the local planning authorities of NCC, Alnwick, Berwick-upon-Tweed, Blyth Valley, Castle Morpeth, Tynedale and Wansbeck were merged into a single new unitary council for Northumberland.

Following on from this a Core Strategy (CS) is being developed for NCC, as part of the Local Development Framework (LDF) and is expected to be adopted in late 2013. Once adopted, it will replace the current planning policy framework for Northumberland, which is a mixture of previous former county and district structure and local plans.

Through a combination of the figures for Northumberland contained within the RSS, CS allocations, Employment Sites Register and draft Employment Land Review, NCC are required to provide a net dwelling figure of 15,025 and has an employment land allocation target of 535 hectares (ha) of which 55 ha is for key employment locations between 2004 and 2021. NCC have chosen these as potential development scenarios plus an additional 20% growth scenario for residential development.

Northumberland has been divided into three Strategic Housing Market Areas (SHMAs) and within the SHMAs a number of Main Towns and Secondary Settlements have been identified by NCC for development up to 2031 based on the RSS housing targets.

Government Planning Policy through the National Planning Policy Framework (NPPF)⁴ and previously Planning Policy Statement 3 (PPS3)⁵ requires Local Planning Authorities (LPAs) to maintain a 15 year supply of housing from the date of adoption of the Development Plan

² Government Office for the North East (July 2008) North East of England Plan – Regional Spatial Strategy to 2021.

³ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/1631904.pdf>

⁴ National Planning Policy Framework (27 March 2012) (NPPF)

<http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf>

⁵ Housing, Communities and Local Government (29 November 2006) Planning Policy Statement 3:.

<http://www.communities.gov.uk/publications/planningandbuilding/pps3housing>

Document (DPD). NCC are proposing to adopt the CS in 2013 and will need to show a 15 year housing supply up to 2028 which is seven years beyond the end date of the RSS.

URS were commissioned by NCC to undertake a Scoping, Outline and Detailed Water Cycle Study (WCS) which builds upon previous work undertaken in the area. The WCS will comprise a wider, more holistic, evidence-based document which will feed into the LDF. The study will support the planned new development in the County and prepare for the new challenges of climate change whilst taking into account Government policies and European legislation including the Water Framework Directive (WFD) and European Habitats Directive.

This Outline WCS builds upon the findings of the draft Scoping WCS. Furthermore, it has been agreed that the Detailed WCS for Northumberland be put on hold until NCC are in a more advanced position in their CS (Issues and Options).

POSITION STATEMENT (MAY 2012)

As part of the work on the Northumberland CS, NCC needed to assess the impact of development on the existing water infrastructure and environment. Work was commissioned and undertaken at a stage when development scenarios for the Core Strategy Issues and Options stage were not far enough advanced or finalised. Therefore the provision of a set of potential future development levels based upon allocations in existing and emerging Core Strategies and the RSS as well as the Employment Sites Register and draft Employment Land Review projected to 2031 were utilised. These potential development options may not be options that appear in the Issues and Options document however they do provide the opportunity to test the potential implications of levels of development upon existing water infrastructure and environment.

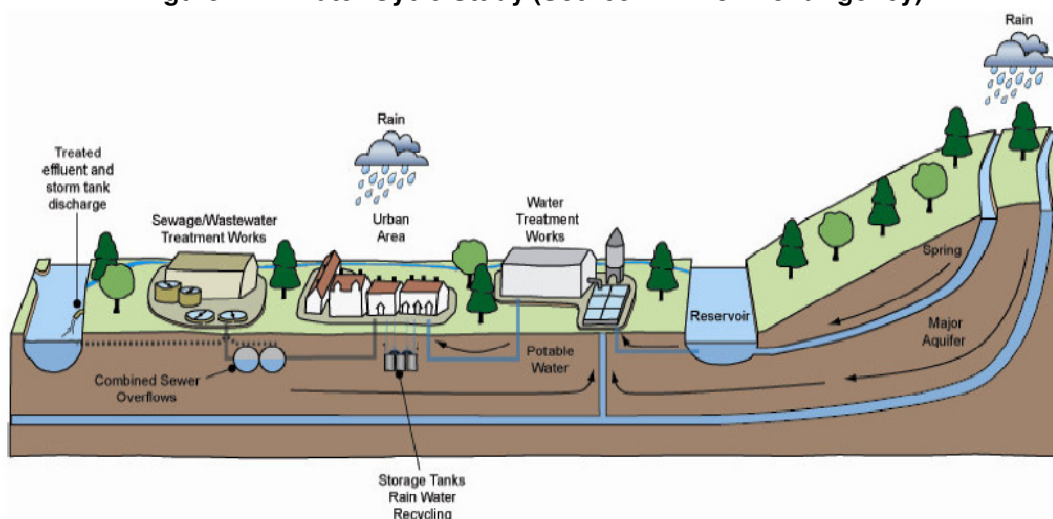
2 WATER CYCLE STUDIES

2.1 The Water Cycle

In its simplest form, the water cycle can be defined as ‘the process by which water is continually recycling between the earth’s surface and the atmosphere’. Without considering human influences, it is simply the process by which rain falls, and either flows over the earth’s surface or is stored (as groundwater, ice or lakes) and is then returned to the atmosphere (via evaporation from the sea, the soil, surface water or animal and plant life) ready for the whole process to repeat again.

In the context of this study, the ‘water cycle’ has a broader definition than the simple water or ‘hydrological’ cycle. The human influence on the water cycle introduces many new factors into the cycle through the need to abstract water from the natural environment, use it for numerous purposes and then return to the natural system (Figure 2-1). The development and introduction of technology such as pipes, pumps, drains, and chemical treatment processes has meant that human development has been able to manipulate the natural water cycle to suit its needs and to facilitate new development. ‘Water Cycle’ in this context is therefore defined as both the natural water related environment (such as rivers, wetland ecosystems, aquifers etc), and the water infrastructure (hard engineering focused elements such as: water treatment works, supply pipelines and pumping stations) which are used by human activity to manipulate the cycle.

Figure 2-1: Water Cycle Study (Source: Environment Agency)



2.2 Implications for Development

In directly manipulating elements of the water cycle, man affects many changes to the natural water cycle which can often be negative. To facilitate the proposed new development there is a requirement for clean water supply which is taken from natural sources (often depleting groundwater stores or surface systems); the treatment of waste water which has to be returned to the system (affecting the quality of receiving waters); and the alteration and management of natural surface water flow paths which has implications for flood risk. These impacts can indirectly affect ecology which can be dependent on the natural features of a water cycle for example wading birds and wetland habitat, or brown trout breeding in a Chalk stream which derives much of its flow from groundwater sources.

In many parts of the UK, some elements of the natural water cycle are considered to be at, or close to their limit in terms of how much more they can be manipulated. Further development will lead to an increase in demand for water supply and a commensurate increase in the requirement for waste water treatment; in addition, flood risk may increase if development is not planned for in a strategic manner. The sustainability of the natural elements of the water cycle is therefore at risk.

A WCS is an ideal solution to address this problem. It will ensure that the sustainability of new development is considered with respect to the water cycle, and that new water infrastructure introduced to facilitate new development is planned for in a strategic manner; in so doing, the WCS can ensure that provision of water infrastructure is sufficient such that it maintains a sustainable level of manipulation of the natural water cycle.

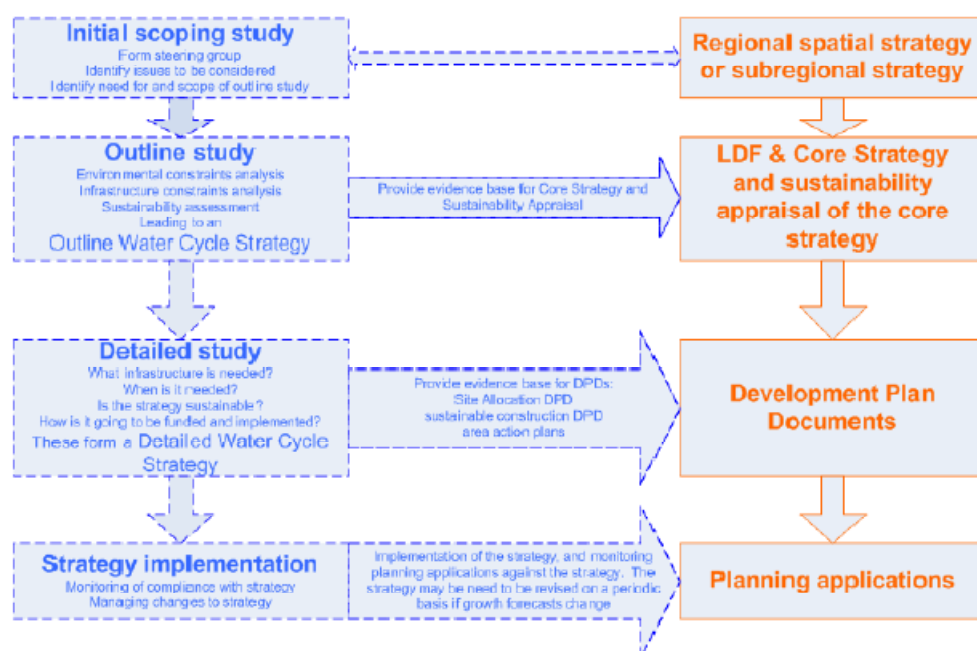
2.3 Stages of a Water Cycle Study

Current guidance on WCS⁶ suggests that they should generally be undertaken in three stages, dependent on the status of the various Local Development Documents (LDDs), as part of the wider LDF, being prepared by LPAs for submission. To coincide with Northumberland's responses and submissions the WCS is being undertaken in three distinct stages, Scoping, Outline and Detailed.

An initial scoping report was prepared and issued internally to NCC in July 2009. The Scoping report was not finalised and an agreement was reached with key stakeholders that the Outline WCS should be prepared as a base document rather than updating the Scoping report. The findings of the Scoping report have been used to inform this Outline WCS.

Figure 2-2 illustrates the three stages of the WCS and how they inform planning decisions and documents.

Figure 2-2: Stages of the Water Cycle Study Process (Source: Environment Agency)



⁶ WCS Guidance, Environment Agency 2009
FINAL REPORT
May 2012

2.3.1 *Scoping Water Cycle Study*

A Scoping WCS was drafted but not published in July 2009 but with key stakeholder agreement the findings have been used to inform this Outline WCS.

2.3.2 *Outline Water Cycle Study*

The Outline WCS considers all of the ways in which new development will impact on the water environment or water infrastructure specific to where the proposed new development is most likely to be targeted. It is usually undertaken during consideration of allocation sites such that it can inform the decision process in terms of where development will be targeted for each authority. The key aim of the Outline WCS is to provide LPAs with the evidence base which ensures that water issues have been taken into account when deciding the location and intensity of development within an authority's planning area as part of the development of the CS. It also aids in setting core policies related to water as part of the Development Control Policies Supplementary Planning Document (SPD). Finally, it gives the water company an evidence base to its business plans which determine how much they can charge customers to invest in upgrades and the provision new infrastructure required to service proposed development.

It could be that the Outline WCS identifies that water cycle issues are not significant, and that new development can be implemented without significant new investment. If this is the case, a Detailed WCS may not be required. However, if new infrastructure is required, or an impact on the water environment cannot be ruled out as significant, a Detailed WCS will need to be undertaken for site specific allocations, or for the authority as a whole.

2.3.3 *Detailed Water Cycle Study*

A Detailed WCS can vary significantly in terms of scope and remit. However, its key purpose is to define what specific infrastructure and mitigation is required to facilitate development, once the decisions have been made on the location of allocations and the likely intensity and type of development within them. Dependent on the findings of the Outline WCS, there could be the potential requirement to undertake detailed and complex studies in order to define exactly what infrastructure or mitigation is required.

The Detailed WCS should be undertaken in conjunction with the development of DPDs such as Area Action Plans and should provide the evidence base to site specific policies in SPDs.

2.4 **Integration with the Planning System**

As part of the LDF process, LPAs are required to produce evidence based studies which support the selection processes used in deciding on final development targets and areas to be promoted for this new development. The WCS is one such example of an evidence-based study which specifically addresses the impact of proposed new development on the 'water cycle'.

As part of NCC's overall strategy to meet future new development targets set out in the RSS in a sustainable way, the WCS will make up one of a number of strategic studies and plans which will form part of the evidence base supporting the production of NCC's emerging LDF. The WCS will also provide input to the development of SPDs to assist in ensuring the delivery of water cycle management requirements at the local planning application level. There is a strong inter-relationship between the WCS and other components of the LDF evidence base, e.g. the Site Allocations DPD and the Open Space and Green Infrastructure Study.

It is important that the findings of the WCS feed into, and make use of the findings of other LDF studies that NCC are undertaking. The studies that are particularly relevant include the

Northumberland SFRA, the Strategic Housing Land Availability Assessment (SHLAA) and the Sustainability Appraisal (SA).

2.5 Identification of Constraints

The Outline WCS identifies constraints in terms of proposed development within Northumberland in relation to the five key ‘water cycle’ areas. It is important to note that the matrix is a broad brush summary, and that a detailed assessment should be used to provide further analysis during any Detailed WCS, if required.

It is important to note that a colour coding of red does not mean that the proposed development cannot take place within the key development area or AAP, merely that if development were to take place here greater, more significant, constraints would have to be overcome which would likely involve a higher level of infrastructure investment or greater strategic planning.

2.5.1 *Constraints Matrix*

The most relevant and important constraints have been identified for each key development area to aid in the assessment of development within Northumberland. For the purpose of the constraints matrices these were amalgamated and put into generic categories as outlined in Table 2-1. The resultant outcome was the formulation of a constraints matrix for each of the key development areas, to which ‘traffic light’ colour coding was assigned.

The matrix is intended to provide a visual comparison of the appropriateness of development within each of the key development areas, with respect to the proposed housing numbers and phasing. For each of the areas a traffic light is applied, and the total number of “green” traffic lights can be directly compared to the total number of “red” traffic lights. Areas with a majority of “green” boxes would be considered as being more deliverable, especially when these are located in the early phasing of the development. The matrix has been designed so that the amount of subjective interpretation of the data is minimised, and hence the traffic lights allocated are based on factual and quantitative data where possible. A green traffic-light indicates no known constraint to development, an amber traffic light indicates that further investigation is required before development can take place and a red traffic light indicates significant existing constraint to development.

TABLE 2-1: GENERALISED CONSTRAINT TRAFFIC LIGHTS

Water Environment	Water Resources	Wastewater	Flood Risk	Ecology and Biodiversity
<ul style="list-style-type: none"> Proposed development poses little or no risk to the WFD status/potential of the receiving watercourse(s)/waterbody. 	<ul style="list-style-type: none"> There is an existing raw water source nearby with spare licence capacity. There is water available based on CAMS Methodology Classification. 	<ul style="list-style-type: none"> The development can be accommodated within existing available headroom at WwTW and in wastewater network. 	<ul style="list-style-type: none"> There is little or no perceived risk of flooding to the development area. The site is Groundwater Source Protection Zone 3 (therefore more suitable for infiltration SuDS). 	<ul style="list-style-type: none"> Dilution capabilities and/or distance d/s of development makes it unlikely that development will impact on international or national site.
<ul style="list-style-type: none"> Proposed development poses a potential risk to the WFD status/potential of the receiving watercourse(S)/waterbody. 	<ul style="list-style-type: none"> There is an existing raw water source nearby but with no spare capacity. There is no water available based on CAMS Methodology Classification. 	<ul style="list-style-type: none"> WwTW has capacity to accommodate the potential new development but the wastewater network is unlikely to have the capacity and therefore may need upgrading. Preliminary assessment suggests that minor upgrade of existing WwTW will suffice to accommodate housing option. 	<ul style="list-style-type: none"> There is a perceived medium risk of flooding to the development area. The site is in Groundwater Source Protection Zone 2. 	<ul style="list-style-type: none"> Site d/s or in close proximity to designated site(s) and could potentially be impacted upon if WwTW exceeds consent and is not mitigated.
<ul style="list-style-type: none"> Proposed development poses a high risk to the WFD status/potential of the receiving watercourse(S)/waterbody. 	<ul style="list-style-type: none"> There is no existing raw water source nearby. Water sources are over abstracted/over licensed based on CAMS Methodology Classification. 	<ul style="list-style-type: none"> Major/significant upgrade of WwTW and/or wastewater network is required to accommodate the potential new development. Pumping of wastewater is required to transfer it to a WwTW with spare capacity. 	<ul style="list-style-type: none"> There is a perceived high risk of flooding to the development area. The site is in Groundwater Source Protection Zone 1. 	<ul style="list-style-type: none"> Site d/s or in close proximity to designated site(s) and is very likely to be impacted upon if WwTW exceeds current consent and is not mitigated.

3 DEVELOPMENT IN NORTHUMBERLAND

3.1 Northumberland Study Area

Northumberland is predominantly a rural area located in the North East of England, to the north of Newcastle-upon-Tyne and to the south of the Scottish border and its administrative area covers approximately 500,000 hectares⁷. Northumberland's physical geography is characterised by upland moorland, hills, valleys, coastal lowlands and estuaries. It has a current population of approximately 310,600 but is the least densely populated county in England.

Over half of the population lives within the urbanised, former deep-coal mining, south east of the county which covers 5% of the total county area. Consequently, there is a very low population density in the rural north and west. Approximately 25% of the county is designated as part of the Northumberland National Park (NNP), which lies to the west of the county and is largely protected from development. Part of the Northumberland Coast is a designated Area of Outstanding Natural Beauty (AONB) - which covers 39 miles of coastline from Berwick-upon-Tweed in the north to the mouth of the River Coquet in the south. The North East Pennines AONB also encompasses a large proportion of the south west of Northumberland. There are also a large number of designated sites located within the study area.

The county is governed by NCC which was formed as a unitary authority in April 2009, when the former local authorities of Northumberland, Alnwick, Berwick-upon-Tweed, Blyth Valley, Castle Morpeth, Tynedale and Wansbeck were merged (Figure 3-1). It should be noted that NNP retains its statutory planning powers over the NNP area. As such, for the purposes of the WCS, the study area is considered to be county of Northumberland excluding the area covered by the NNP.

The south east of the county, which comprises the former Wansbeck and Blyth Valley districts and the eastern coastal villages of Castle Morpeth, contains the three largest towns of Ashington, Blyth and Cramlington. The rural north and west comprise the former district areas of Alnwick, Berwick-upon-Tweed, all of the former Tynedale district area and the north and west of the former Castle Morpeth area. Within this area there are four market towns including Alnwick, Berwick-upon-Tweed, Hexham and Morpeth as well as many dispersed small towns and villages. Within Northumberland there has been a steady increase in population and in total in 2008 there were approximately 144,168 dwellings⁸.

3.2 Planned New Development

Northumberland has been divided into three SHMAs as illustrated in Figure 3-2.

- North Northumberland SHMA - covering the former Alnwick and Berwick-upon-Tweed district areas,
- City Region Commuter SHMA - covering the former Castle Morpeth and Tynedale district areas,
- Urban Northumberland SHMA - covering the former Blyth Valley and Wansbeck district areas.

⁷ Northumberland County Council (December 2008) Northumberland County Council Annual Monitoring Report 1 April 2007 to 31 March 2008, <http://www.northumberland.gov.uk/idoc.ashx?docid=8519a951-5cf9-4095-86dc-5593e8cd0da6&version=-1>

⁸ Northumberland County Council (December 2009) Northumberland County Council Annual Monitoring Report 2009 to 2010 <http://www.northumberland.gov.uk/default.aspx?page=3459>

Within the SHMAs a number of settlements have been identified by NCC for potential new development up to 2031 (Figure 3-2), based on the RSS housing targets. These settlements, along with the remaining new development targets for the SHMA (combined totals for lower order settlements), have been strategically assessed as part of this Outline WCS.

Housing and employment development has been assessed in 5-year periods between 2011 and 2031, to identify any constraints in terms of water cycle study element infrastructure. The potential new housing and economic development figures and locations are based upon the RSS and Core Strategy allocations, projected forward to 2031; in addition, the economic locations have been informed by the Employment Sites Register 2009 and draft Employment Land Review.

For the purposes of this Outline WCS, planned new development has been assessed across all three levels of development (SHMA, Main Towns and Secondary Settlements) but focuses on strategic level development at the Main Town level. No site specific assessment has been undertaken for this study; if required, this should be undertaken during the Detailed WCS.

3.2.1 *Development Scenarios*

Two broad housing scenarios have been assessed as part of the Outline WCS:

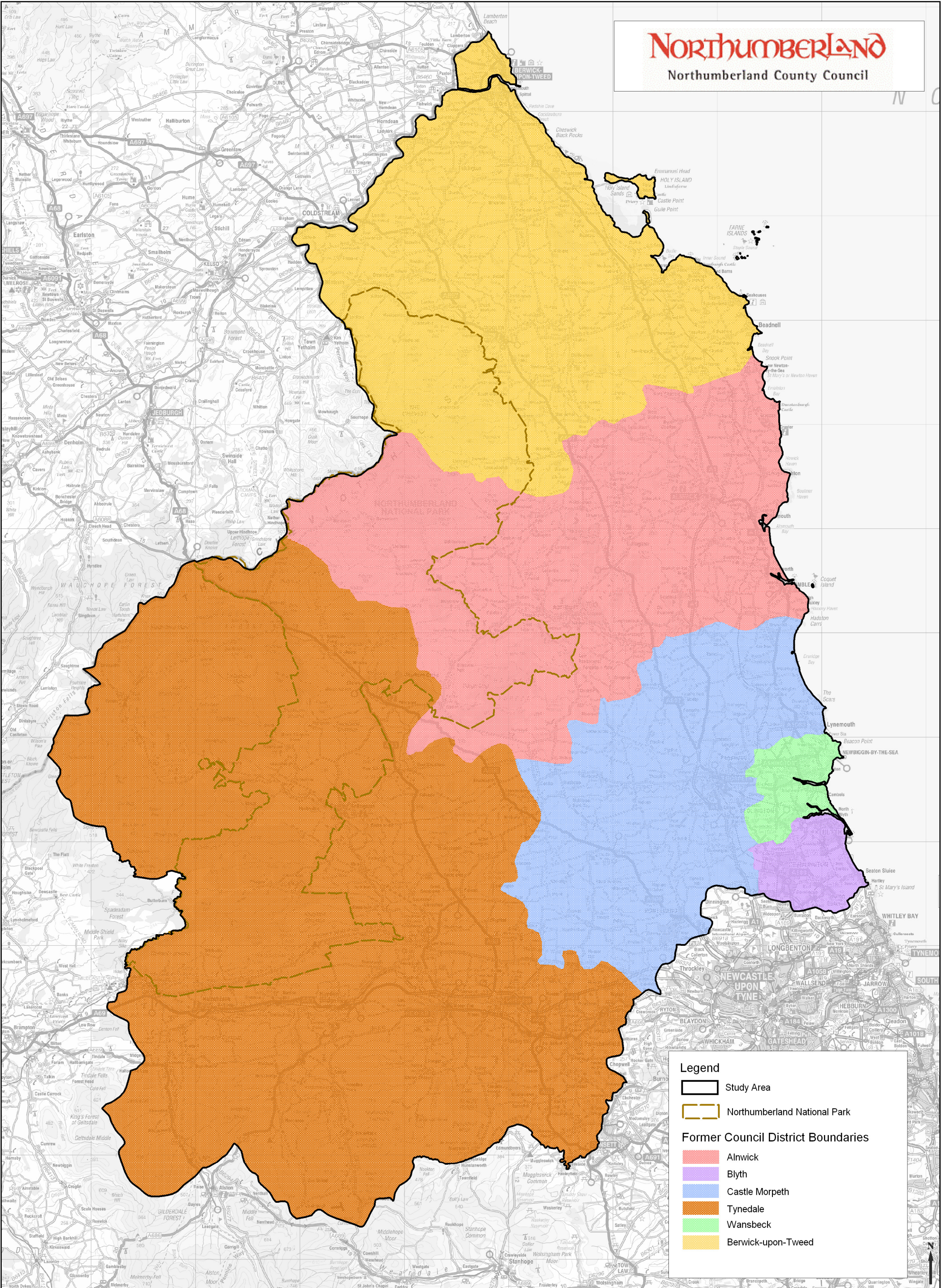
- Scenario 1 – Current (RSS) planned new development,
- Scenario 2 – Planned new development plus 20%.

Planned new development figures for Scenario 1 have been sub-divided to allow an assessment of the impacts of the new development in 5 year horizons to assist with planning for phasing of development (based on an assumed constant delivery rate of residential and non-residential development):

- 2010 – 2016,
- 2016 – 2021,
- 2021-2026,
- 2026-2031.

Cramlington, in the Urban Northumberland SHMA includes the South West Sector Growth Point Area, which has been identified as offering the potential to deliver a greater volume of housing than originally proposed.

Table 3-1, Table 3-2 and Table 3-3 provide the housing and employment land planned potential new development to be assessed in the Outline WCS. Figures in brackets are those for Scenario 2. Figure 3-3 shows the location of the potential development areas within Northumberland.




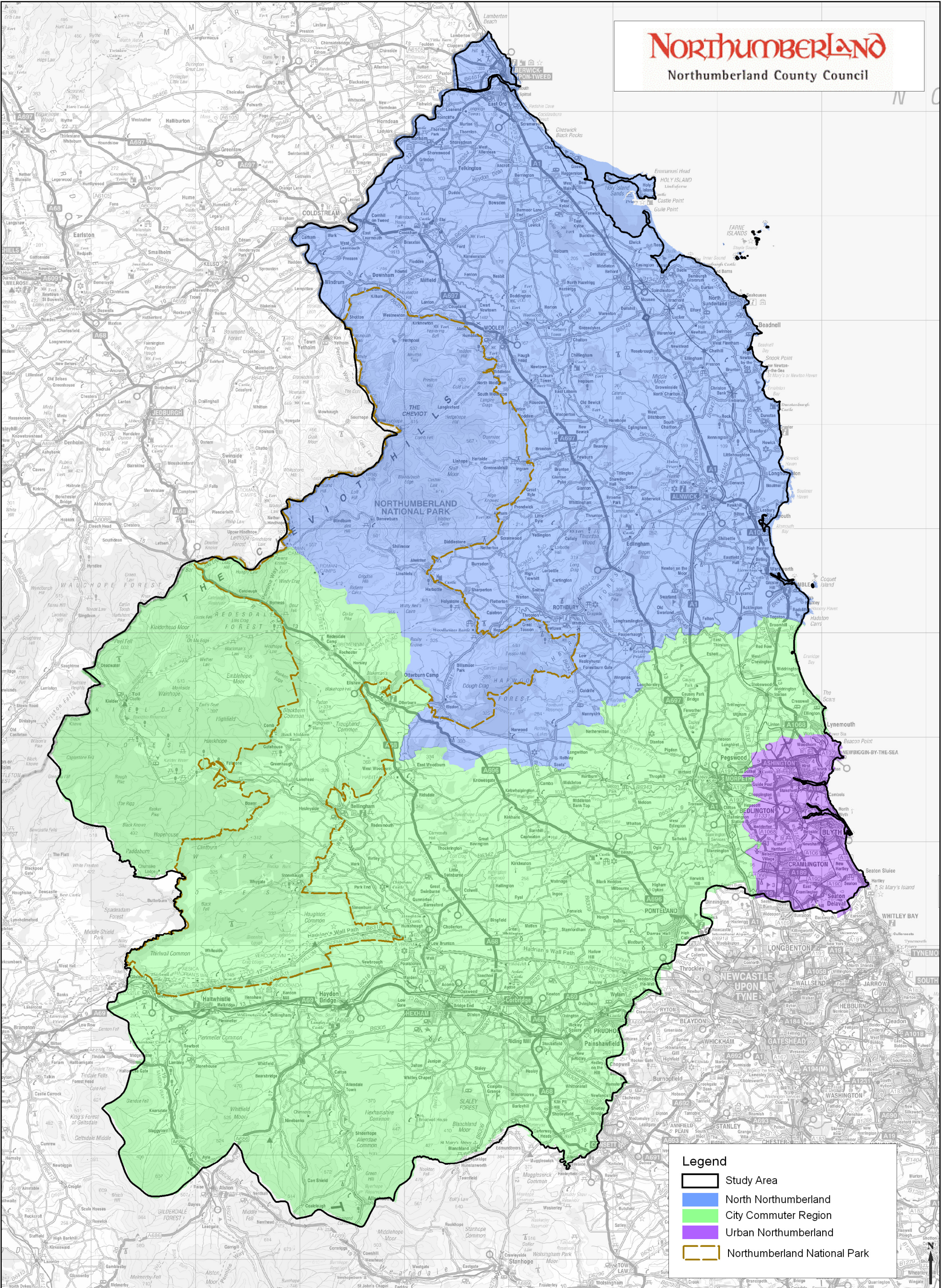
Northumberland

Northumberland County Council

Legend

- Study Area
- Northumberland National Park
- Former Council District Boundaries
 - Alnwick
 - Blyth
 - Castle Morpeth
 - Tynedale
 - Wansbeck
 - Berwick-upon-Tweed

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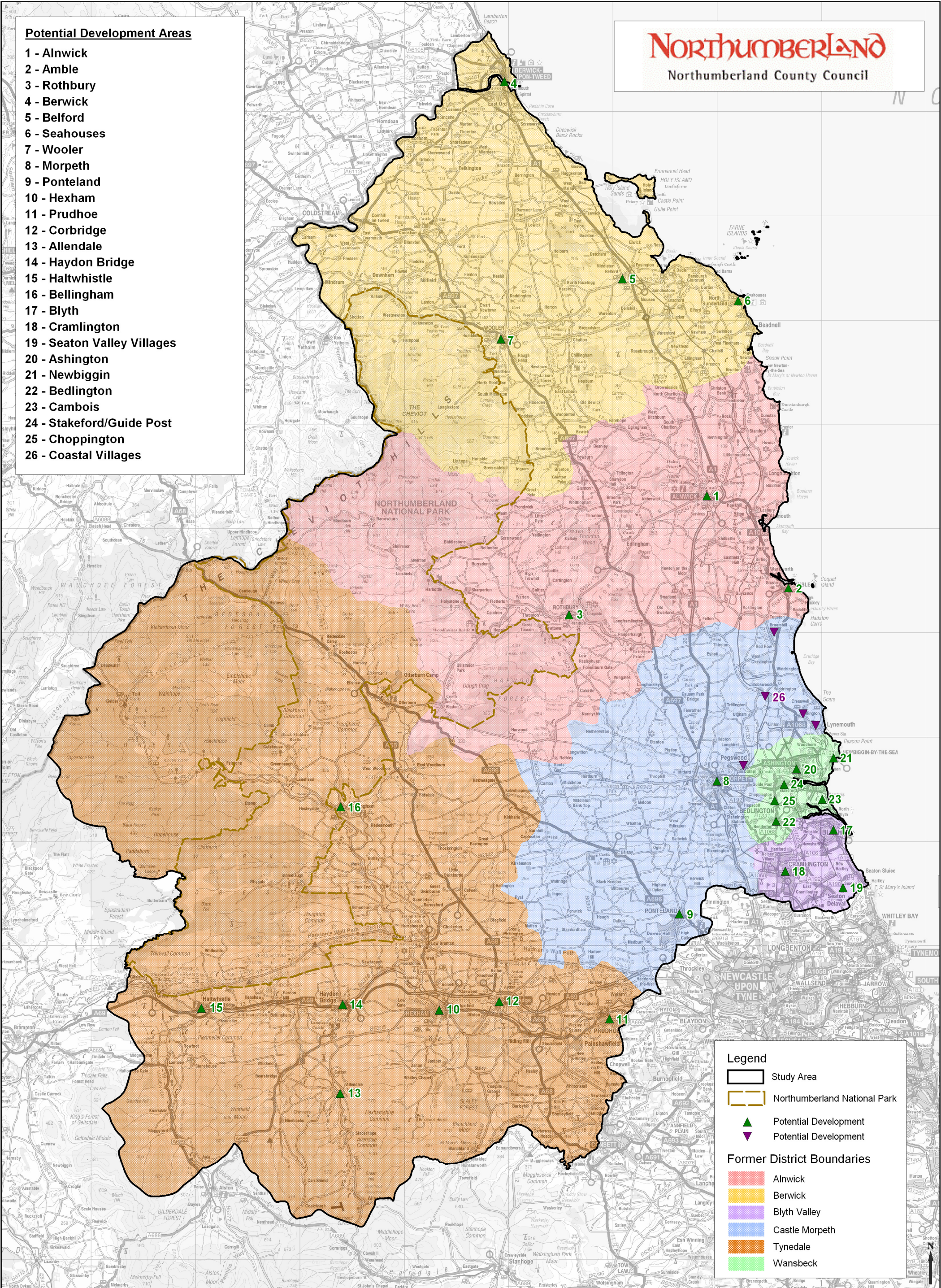
Northumberland

Northumberland County Council

Legend

- Study Area
- North Northumberland
- City Commuter Region
- Urban Northumberland
- Northumberland National Park

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										FIGURE 3-3	
										Rev	

TABLE 3-1: NORTH NORTHUMBERLAND SHMA, POTNETIAL DEVELOPMENT SCENARIOS FOR ASSESSMENT

Settlement	Potential Housing Land (Dwellings)					Potential Employment Land (ha)				
	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total (2011 - 2031)	2011 - 2016	2016 - 2016	2021 - 2026	2026 - 2031	Total (2011 - 2031)
Alnwick	155 (186)	140 (168)	140 (168)	140 (168)	575 (690)	4.2	4	4	4	16.2
Amble	155 (186)	140 (168)	140 (168)	140 (168)	575 (690)	2.6	2.6	2.6	2.6	10.4
Rothbury	50 (60)	45 (54)	45 (54)	45 (54)	185 (222)	1.2	1.2	1.2	1.2	4.8
Rest of Former Alnwick Area	115 (138)	100 (120)	100 (120)	100 (120)	415 (498)					
Berwick	225 (270)	225 (270)	225 (270)	225 (270)	900 (1,080)	7.5	7.5	7.5	7.5	30
Belford	35 (42)	30 (36)	30 (36)	30 (36)	125 (150)					
Seahouses	50 (60)	50 (60)	50 (60)	50 (60)	200 (240)					
Wooler	50 (60)	50 (60)	50 (60)	50 (60)	200 (240)					
Rest of Former Berwick Area	25 (30)	20 (24)	20 (24)	30 (36)	95 (114)					

**Figures in brackets are those that are used for Scenario 2*

TABLE 3-2: CITY COMMUTER REGION SHMA, POTENTIAL DEVELOPMENT SCENARIOS FOR ASSESSMENT

Settlement	Potential Housing Land (Dwellings)					Potential Employment Land (ha)				
	2011 - 2016	2016 - 2021	2011 - 2016	2016 - 2021	Total (2011 – 2031)	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total (2011 – 2031)
Morpeth	228 (274)	210 (252)	210 (252)	210 (252)	858 (1,030)	25				25
Ponteland	65 (78)	60 (72)	60 (72)	60 (72)	245 (294)	10				10
Coastal Villages - Widdrington Station, Ellington, Lynemouth, Pegswood and Hadston	260 (312)	240 (288)	240 (288)	240 (288)	980 (1,176)	1				1
Rest of Former Castle Morpeth	98 (118)	90 (108)	90 (108)	90 (108)	368 (442)	5				5
Hexham	125 (150)	105 (126)	105 (126)	105 (126)	440 (528)	10				10
Prudhoe	125 (150)	105 (126)	105 (126)	105 (126)	440 (528)	9				9
Corbridge	22 (26)	19 (23)	19 (23)	19 (23)	79 (95)	-				-
Allendale	22 (26)	19 (23)	19 (23)	19 (23)	79 (95)	1				1
Haydon Bridge	22 (26)	19 (23)	19 (23)	19 (23)	79 (95)	1				1
Rest of Commuter Pressure Area - Tynedale	134 (161)	114 (137)	114 (137)	114 (137)	476 (572)	-				-
Haltwhistle	73 (88)	63 (76)	63 (76)	63 (76)	262 (316)	5				5
Bellingham	20 (24)	17 (20)	17 (20)	17 (20)	71 (84)	0.5				0.5
Rest of Rural Area - Tynedale	39 (47)	34 (41)	34 (41)	34 (41)	141 (170)	-				-

**Figures in brackets are those that are used for Scenario 2*

TABLE 3-3: URBAN NORTHUMBERLAND SHMA, POTENTIAL DEVELOPMENT SCENARIOS FOR ASSESSMENT

Settlement	Potential Housing Land (Dwellings)					Potential Employment Land (ha)				
	2011 - 2016	2016 - 2021	2021 - 2026	2026 - 2031	Total (2011 - 2031)	2011 - 2016	2016 - 2016	2021 - 2026	2026 - 2031	Total (2011 - 2031)
Blyth	835 (1,002)	1,183 (1,420)	1,183 (1,420)	1,183 (1,420)	4,384 (5,262)	4 (General)	3 (General)	3 (General)	3 (General)	13
						17 (Mixed)	14 (Mixed)			31
Cramlington (Including East Hartford)	500 (600)	184 (221)	184 (221)	184 (221)	1,052 (1,263)	21 (General)	19 (General)	19 (General)	19 (General)	78
							51 (Prestige)			51
Cramlington – Secondary Option	500 (600)	600 (720)	600 (720)	600 (720)	2,300 (2,760)	-	-	-	-	-
Seaton Valley Villages – Seghill, New Hartley, Seaton Sluice/Old Hartley, Holywell, East Cramlington and Seaton Delaval	115 (138)	83 (100)	83 (100)	83 (100)	364 (438)	-				-
Ashington	600 (720)	600 (720)	600 (720)	600 (720)	2,400 (2,880)	45				45
Newbiggin-by-the-Sea						5				5
Bedlington / Bedlington Station	300 (360)	300 (360)	300 (360)	300 (360)	1,200 (1,440)	-				-
Guide Post / Stakeford						-				-
Choppington						-				-
Cambois	130 (156)		190 (228)		320 (384)	241.5				241.5

**Figures in brackets are those that are used for Scenario 2*

3.2.2 South East Northumberland New Growth Point

South East Northumberland (consisting of the former districts of Blyth Valley, Castle Morpeth and Wansbeck) was designated as a New Growth Point (NGP) by the Government in July 2008. The South East Northumberland NGP status means that an additional 1,180 dwellings (23% uplift over the RSS targets) are proposed for this area up to 2016/17. Extrapolating to 2026, this means that the NGP will provide an additional 2,655 dwellings within South East Northumberland (Table 3-4).

TABLE 3-4: HOUSING DEVELOPMENT IN NORTHUMBERLAND (2004-2021)			
Location	Total Dwellings		
	2008 -2016/17	2004-2021	2004-2026
South East Northumberland Development			
South East Northumberland (Net Total)	5,180	9,945	12,870
Additional Growth (above RSS targets)	1,200	2,055	2,655
<i>South East Northumberland (Net Total +NGP)</i>	<i>6,380</i>	<i>12,000</i>	<i>15,525</i>
Total Development in District			
Northumberland (Net Total)	-	14,960	19,360
Additional Development (above RSS targets)	1,200	2,055	2,655
<i>Development in Northumberland (Net Total +NGP)</i>	<i>-</i>	<i>17,015</i>	<i>22,015</i>

Note: *120 annual build rate based on average build rate 2004 - 2021

The NGP will aim to improve the quality and choice of housing within South East Northumberland and develop a flourishing economy, vibrant town centres, high quality local services and safe and well designed neighbourhoods, with the main focus for development being the main towns of Ashington, Blyth, Cramlington and Morpeth, supported by appropriate development elsewhere in the area.

The proposed development is planned for six defined areas:

- Development of South West Sector of Cramlington in the former Blyth Valley area,
- Mixed-use riverside development of 57 hectares of port and former colliery land in the Blyth Estuary in the former Blyth Valley area,
- Brownfield regeneration of the former Ellington and Lynemouth Collieries in the former Castle Morpeth area,
- Brownfield regeneration of the former St Georges Hospital in the former Castle Morpeth area,
- Eastward urban extension of Ashington in the former Wansbeck area,
- Creation of a sustainable settlement at Cambois in the former Wansbeck area.

Growth area proposals are generally consistent with strategic spatial planning priorities at the local level and are largely reflective of current regeneration priorities. However the Growth Point programme is not a statutory designation – as such its proposals (and the scale and phasing of delivery proposed) will be the subject of consultation, testing and examination through the preparation of Northumberland's LDF CS, which is currently scheduled for adoption in late 2013.

It is recognised that in current market conditions accelerated housing delivery will not be possible in the initial period up to 2011 and potentially beyond this and therefore the Partnership's current priority is to understand developer aspirations and ensure that growth areas are "development ready" for an upturn in the economy and the housing market.

4 POLICY REVIEW

National, regional, sub-regional and local planning policy and guidance documents provide both requirements and guidance for delivering sustainable development. The following is a summary of the main legislative, policy and guidance drivers which have informed and shaped the development of this WCS and its deliverables, and have been considered at all stages in the WCS process.

4.1 Legislation and Policy

4.1.1 *International and National*

WATER RELATED EUROPEAN AND NATIONAL LEGISLATION/POLICY/GUIDANCE	
Directive/Legislation /Guidance	Description
Code for Sustainable Homes	<p>The Code for Sustainable Homes has been introduced to drive a step-change in sustainable home building practice, providing a standard for key elements of design and construction which affect the sustainability of a new home. It will become the single national standard for sustainable homes, used by home designers and builders as a guide to development and by home-buyers to assist their choice of home.</p> <p>It will form the basis for future developments of the Building Regulations in relation to carbon emissions from, and energy use in homes, therefore offering greater regulatory certainty to developers. The Code sets out a minimum water demand per person as a requirement for different code levels. CLG is currently in consultation on proposals to make certain code levels mandatory for all new homes. At present, only affordable homes must reach a certain code.</p>
Environment Act 1995	Sets out the role and responsibility of the Environment Agency.
Environmental Protection Act 1990	Integrated Pollution Control (IPC) system for emissions to air, land and water.
Future Water, February 2008	Sets the Government's vision for water in England to 2030. The strategy sets out an integrated approach to the sustainable management of all aspects of the water cycle, from rainfall and drainage, through to treatment and discharge, focusing on practical ways to achieve the vision to ensure sustainable use of water. The aim is to ensure sustainable delivery of water supplies, and help improve the water environment for future generations.
Groundwater Directive 80/68/EEC	To protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.
Habitats Directive 92/44/EEC	To conserve the natural habitats and to conserve wild fauna and flora with the main aim to promote the maintenance of biodiversity taking account of social, economic, cultural and regional requirements. In relation to abstractions and discharges, the Directive can require changes to these through the Review of Consents (RoC) process if they are impacting on designated European Sites. In addition, the key requirement of the Directive is the need (or a screening exercise to determine the need) for an Appropriate Assessment of any new plan or permit.

UK Conservation of Habitats and Species Regulations 2010	These regulations are the principal means by which the Habitats Directive is transposed in England and Wales.
Making Space for Water, 2004	Outlines the Government's strategy for the next 20 years to implement a more holistic approach to managing flood and coastal erosion risks in England. The policy aims to reduce the threat of flooding to people and property, and to deliver the greatest environmental, social and economic benefit.
Planning Policy Statements and Planning Policy Guidance	<p>Until recently (March 2012), planning policy in the UK was set by Planning Policy Statements (PPSs) and Planning Policy Guidance (PPGs). They explained statutory guidelines and advise local authorities and others on planning policy and operation of the planning system. These have now largely been replaced by the National Planning Policy Framework.</p> <p>PPSs also explained the relationship between planning policies and other policies which have an important bearing on issues of development and land use. These must be taken into account in preparing development plans.</p> <p>A WCS helps to balance the requirements of various planning policy documents, and ensure that land-use planning and water cycle infrastructure provision is sustainable.</p> <p>The most relevant former PPS to a WCS were:</p> <ul style="list-style-type: none"> • PPS1 – Delivering Sustainable Development: • PPS3 – Housing, • PPS4 – Planning for Sustainable Economic Growth, • PPS9 – Biodiversity and Geological Conservation, • PPS12 – Local Development Frameworks, • PPS23 – Planning and Pollution control, • PPS25 – Development and Flood Risk.
National Planning Policy Framework	The Government has recently published (March 2012) and presented to Parliament a simple and consolidated national planning framework covering all forms of development and setting out national economic, environmental and social priorities. The NPPF has replaced the majority of PPSs and PPGs and is the key national planning policy document.
Pollution Prevention and Control Act (PPCA) 1999	Implements the IPPC Directive. Replaces IPC with a Pollution Prevention and Control (PPC) system, which is similar but applies to a wider range of installations.
Water Act 2003	Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.
Water Framework Directive (WFD) 2000/60/EC	The WFD was passed into UK law in 2003. The overall requirement of the directive is that all river basins must achieve 'Good ecological status' by 2015, or by 2027 if there are grounds for derogation. The WFD, for the first time, combines water quantity and water quality issues together. An

	<p>integrated approach to the management of all freshwater bodies, groundwaters, estuaries and coastal waters at the river basin level has been adopted. It effectively supersedes all water related legislation which drives the existing licensing and consenting framework in the UK.</p> <p>The Environment Agency is the body responsible for the implementation of the WFD in the UK. The Environment Agency have been supported by UKTAG⁹, an advisory body which has proposed water quality, ecology, water abstraction and river flow standards to be adopted in order to ensure that water bodies in the UK (including groundwater) meet the required status¹⁰. These have recently been finalised and issued within the River Basin Management Plans (RBMP).</p>
Bathing Waters Directive 76/160/EEC	To protect the health of bathers and maintain the aesthetic quality of inland and coastal bathing waters. Sets standards for variables and includes requirements for monitoring and control measures to comply with standards for bacterial levels within designated bathing waters.
Shellfish Waters Directive	To protect or improve shellfish waters in order to support shellfish life and growth, thereby contributing to the high quality of shellfish products directly edible by man. Sets physical, chemical and microbiological water quality requirements that designated shellfish waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards).
Water Resources Act 1991	Protection of the quantity and quality of water resources and aquatic habitats. Parts have been amended by the Water Act 2003.
Flood & Water Management Act 2010	<p>The Flood and Water Management Act 2010 is the outcome of a thorough review of the responsibilities of regulators, local authorities, water companies and other stakeholders in the management of flood risk and the water industry in the UK. The Pitt Review of the 2007 flood was a major driver in the forming of the legislation. Its key features relevant to this WCS are:</p> <ul style="list-style-type: none"> To give the Environment Agency an overview of all flood and coastal erosion risk management and unitary and county councils the lead in managing the risk of all local floods. To encourage the uptake of sustainable drainage systems by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SUDS for new developments and redevelopments. To widen the list of uses of water that water companies can control during periods of water shortage, and enable Government to add to and remove uses from the list. To enable water and sewerage companies to operate concessionary schemes for community groups on surface water drainage charges. To make it easier for water and sewerage companies to develop and implement social tariffs where companies consider there is a good cause to do so, and in light of guidance that will be issued

⁹ The UKTAG (UK Technical Advisory Group) is a working group of experts drawn from environment and conservation agencies. It was formed to provide technical advice to the UK's government administrations and its own member agencies. The UKTAG also includes representatives from the Republic of Ireland.

¹⁰ UK Environmental Standards and Conditions (Phase I) Final Report, April 2008, UK Technical Advisory Group on the Water Framework Directive

	by the SoS following a full public consultation.
Marine and Coastal Access Act 2009	<p>To help achieve clean, healthy, safe, productive and biologically diverse oceans and seas.</p> <p>Providing better protection for marine environment through guidance for the sustainable use of marine resources, an integrated planning system for managing seas coasts and estuaries, a robust legal framework for decision-making and streamlined regulation and enforcement.</p>
Marine Strategy Framework Directive 2010	<p>The directive came into force on 15th July 2008 and was transposed into UK law via the Marine Strategy Regulations and aims to achieve Good Environmental Status in Europe's seas by 2020. The directive sets out 11 high-level descriptors of Good Environmental Status that cover all key aspects of the marine ecosystem and the main human pressures on them.</p> <p>The key requirements of the directive are:</p> <ul style="list-style-type: none"> • An assessment of the current state of UK seas by July 2012; • A set of detailed characteristics of Good Environmental Status means for UK waters, and associated targets and indicators by July 2012; • Establishment of a monitoring programme to measure progress toward Good Environmental Status by July 2014; and • Establishment of a programme of measures for achieving Good Environmental Status by 2016.
EU Birds Directive 1979	<p>The directive (79/409/EEC) seeks to protect, manage and regulate all bird species naturally living in the wild in Europe. There are special measures for the protection of habitats for certain bird species identified by the Directives (Annex I) and migratory species.</p>

4.2 Local Drivers and Policies

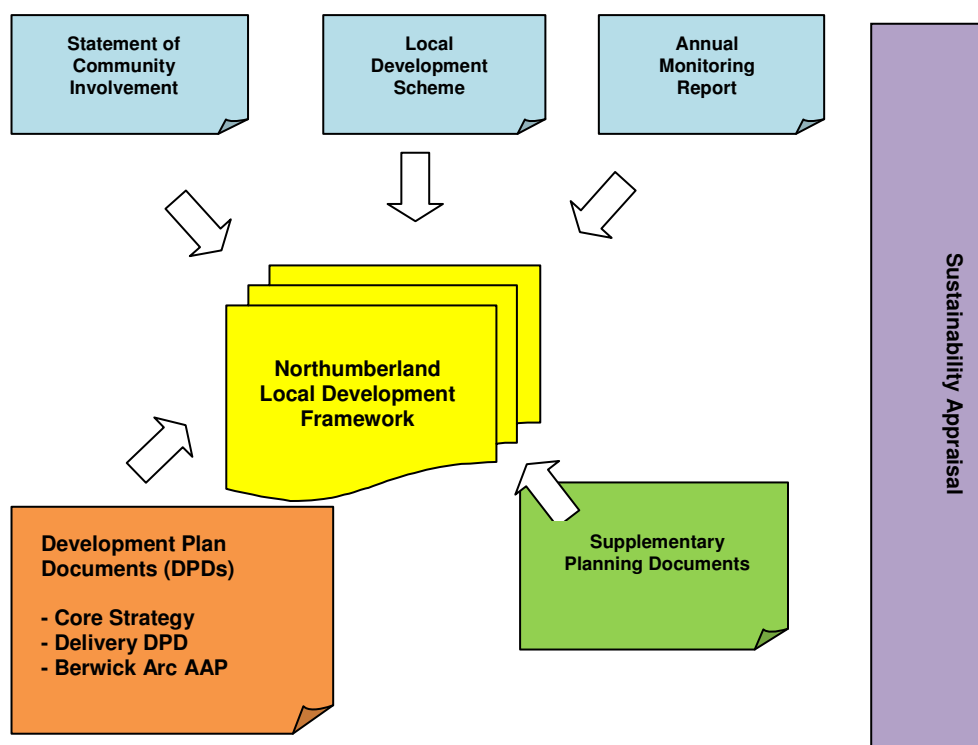
4.2.1 Local Development Framework

Work is in progress on the preparation of Northumberland's LDF, a suite of planning documents that will set out the Council's future planning policies and eventually replace the extant Local Plans and LDF documentation of the former District LPAs. The current policies in the adopted LDF document and the saved local plan policies will remain the statutory development plan until the new LDF is formally adopted.

The LDF for Northumberland is a statutory spatial development plan that comprises a portfolio of documents including the Core Strategy (CS) and the supporting DPDs. The LDF will set out the spatial strategy, policies and proposals to guide the future development and use of land in Northumberland up to the year 2031. NCC must ensure it coordinates and prepares LDF documents and policies, including preferred development locations, infrastructure and delivery plans that have had regard to the intent and steer from national policies, the RSS, as well as local aspirations, needs and demands.

Figure 4-1 below illustrates the key documents that feed into the LDF.

Figure 4-1: Local Development Framework Key Documents



The CS is the overarching DPD that provides the strategic framework for the other DPDs and SPDs, and sets out the vision, objectives and strategy for the spatial development of Northumberland. In particular, the Delivery DPD guides the future location of new development, contains proposals for new development and supports regeneration initiatives.

The Berwick Town Eastern Arc Area Action Plan (AAP) sets out the integrated policies including site-specific regenerative opportunities and strategic links in transport, urban design and townscape for the future regeneration and development of four areas. All these Plans must conform to the CS and help to deliver its strategic objectives and policies. The Council will also produce SPDs that provide further guidance to support policies in the DPDs.

It is essential that these are all informed using the findings and advice from a sound evidence base that examines economic, social and environmental needs and constraints. This must include the comprehensive planning, phasing, delivery and management of water, sewerage, flooding and drainage infrastructure, whilst not adversely affecting environmental capacity. A critical element is therefore to consider in greater detail, the risks associated from all forms of flooding and the existing state, limitations and future requirements of the water environment and water infrastructure in the context of future development.

Whilst NCC is currently working towards the adoption of the Core Strategy in late 2013, it should be noted, however, that the publication of the National Planning Policy Framework and the Localism Act may result in changes to the format and content of development plans in the future.

The LDF process involves an extensive process of consultation. This overall planning process supports a two stage strategy for the WCS, so that important considerations are not overlooked in-between the production of a Scoping/Outline WCS (which informs the draft LDDs), and the Detailed WCS which will ensure that the final LDF has sufficient detail to

ensure delivery of the WCS requirements. The WCS will also make recommendations on phasing for development.

The former districts within NCC reached different stages in the completion of their CSs before the amalgamation of the districts into NCC. A summary of the development of the individual CSs at the time of the amalgamation is provided below:

- Alnwick CS – Adopted in October 2007,
- Berwick CS – Reached Preferred Options before work was curtailed due to Local Government Reorganisation. The Berwick-upon-Tweed Local Plan was adopted in April 1999 and the saved policies of the Berwick Local Plan should be read in context. Where policies were originally adopted some time ago, it is likely that material considerations, in particular the emergence of new national policy and also new evidence, will be afforded considerable weight,
- Blyth Valley CS – Adopted in July 2007,
- Castle Morpeth CS – Reached Preferred Options/Submission stage before work was curtailed due to Local Government Reorganisation. The Castle Morpeth Local Plan was adopted in February 2003 and the saved policies of the Castle Morpeth Local Plan should be read in context. Where policies were originally adopted some time ago, it is likely that material considerations, in particular the emergence of new national policy and also new evidence, will be afforded considerable weight,
- Tynedale CS – Adopted in October 2007,
- Wansbeck CS – No CS developed but adopted Local Plan in July 2007.

Whilst these documents will be superseded by the new NCC LDF, until such time as the new LDF is produced and adopted, the existing plans offer guidance as to where new development is likely to be located within NCC. For the purposes of the Outline WCS the existing strategies have been used alongside the RSS targets to provide an indication of where new development within the County is likely to be directed, and the expected volume of dwellings to be produced in each of the key development towns.

4.3 Additional Strategies/Policies Considered

This Outline WCS also considers the following strategies, policies and planning documents:

- River Tyne Catchment Flood Management Plan (CFMP),
- River Eden CFMP,
- North East Northumberland CFMP,
- Wansbeck and Blyth CFMP,
- Till and Breamish CFMP,
- The River Tyne Catchment Abstraction Management Strategy (CAMS),
- The River Till CAMS,
- The Northumberland Rivers CAMS,

- Northumberland Green Infrastructure Strategy,
- North East England Habitats Regulations Assessment for RSS development,
- Northumbrian Water Limited (NWL) - Water Resources Management Plan (WRMP),
- NWL's Asset Management Programmes,
- Northumberland Level 1 Strategic Flood Risk Assessment (SFRA),
- Northumberland Level 2 SFRA,
- Northumberland Draft WCS Scoping Report,
- Northumberland Coast Shoreline Management Plan,
- Northumberland Coast Area of Outstanding Natural Beauty and the Berwickshire and North Northumberland Coast European Marine Site Management,
- Northumbria River Basin Management Plan,
- Solway Tweed River Basin Management Plan.

4.4 Water Company Planning

It is important to consider the planning timelines, both for NCC in terms of the LDF but also NWL (who provide water supply and wastewater services for the whole of Northumberland) in terms of the funding mechanisms for new water supply and water treatment infrastructure (the Asset Management Programme (AMP) process).

There are two elements of Water Company planning that are pertinent to the Northumberland WCS and specifically, with regard to integration with Spatial Planning timelines for LPAs and local government.

4.4.1 *Financial and Asset Planning*

Water Company planning for Asset Management and funding is governed by the AMP process which runs in five year cycles. The Office of Water Services (OFWAT) is the economic regulator of the water and sewerage industry in England and Wales, and regulates this overall process.

In order to undertake maintenance of its existing assets and to enable the building of new assets (asset investment), water companies seek funding by charging customers according to the level of investment they need to make. The process of determining how much asset investment required is undertaken in conjunction with:

- The Environment Agency (EA) as the regulator determining investment required to improve the environment,
- The Drinking Water Inspectorate (DWI) who determine where investment is required to improve quality of drinking water,
- OFWAT who along with the EA require water companies to plan sufficiently to ensure security of supply (of potable water) to customers during dry and normal years.

The outcome is a Business Plan which is produced by each Water Company setting out the required asset investment over the next five year period, the justification for it and the price increases required to fund it.

Overall, the determination of how much a Water Company can charge its customers is undertaken by OFWAT. OFWAT will consider the views of the Water Company, the other regulators (EA and DWI) and consumer groups such as the Consumer Council for Water when determining the price limits it will allow a Water Company to set in order to enable future asset investment. This process is known as the Price Review (PR) and is undertaken in five year cycles. When OFWAT make a determination on a Water Company's business plan, the price limits are set for the following five years allowing the Water Company to raise the funds required to undertake the necessary investment within the AMP round.

Water companies submitted their Final Strategic Business Plan in April 2009 as part of the Price Review 2009 (PR09), whereby they seek funding for asset investment for the five year period covering 2010 – 2015 (known as AMP5)¹¹. If significant water cycle infrastructure requirements were not included in this current PR (PR09), the funding cannot be sought for it until the next PR (in 2014) resulting in funding not being available until AMP6 (2015 – 2020). This ultimately means that there will be no funding available to undertake significant water cycle infrastructure upgrades until 2015 at the earliest. However, water companies are able to submit interim determinations within the five year AMP cycles to seek funding for unforeseen investment requirements.

4.4.2 *Water Resource Planning*

Water companies are now required to produce WRMPs on a statutory basis covering 25 year planning horizons. WRMPs set out how a water company plans to provide and invest in existing and new water resource schemes (e.g. reservoirs, desalination) to meet increases in demand for potable supply, as a result of new development, population growth and climate change over the next 25 year period. NWL's WRMP¹² was published in January 2010 and will be updated in five yearly cycles to coincide with the PR and AMP process.

The WCS is therefore essential for several reasons: It allows the discrepancies in the planning timeframes of NWL and NCC to be reconciled through strategic planning as well as providing sufficient evidence base for NCC's statutory LDF process and providing robust evidence and justification for NWL's Strategic Business Plan for investment required in AMP6 (2015-2020) and beyond. This Outline WCS has made use of NWL's WRMP to inform the water resources assessment for the proposed new development in Northumberland.

4.4.3 *Water Framework Directive and Water Company Planning*

An important consideration in the WFD planning process is the timing with respect to the statutory water company planning and funding process. At present, there is a discrepancy between the two planning timelines and therefore the information from the RBMP investigations is unlikely to be available before NWL develop and submit their next business plan.

The RBMPs are being undertaken in three stages. The present first stage is currently being undertaken to address some initial issues and to identify a programme of work to be done in the subsequent stages. This stage aims to get all waterbodies to achieve 'Good (ecological) Status' (or Good (ecological) Potential for Artificial or Heavily Modified waterbodies) by 2015, or if this is found to be technically infeasible or unreasonably costly, by 2027. The

¹¹ Northumbrian Water Limited (April 2009) Looking to the Future - Company Strategy North East Version – Final Business Plan. http://www.nwl.co.uk/nwl_business_plan_v409.pdf

¹² Northumbrian Water Limited (January 2010) Water Resources Management Plan., http://www.nwl.co.uk/NWL_Final_WRMP_V.9

further two iterations of the RBMPs, due to be issued in 2015 and 2021, aim to review the RBMPs and identify how to implement measures so that all water bodies reach 'Good (ecological) Status' by 2027 (or Good (ecological) Potential for Artificial or Heavily Modified waterbodies).

The RBMPs were finalised in December 2009 and therefore the Programme of Measures (PoM) which sets out what changes will need to be implemented in order to achieve 'Good Status' or 'Good Potential' in all waterbodies, was not known until this point. However, the current PR09 and AMP5 timelines are such that the water companies submitted their business plans, which set out the investment requirements for AMP5 (2010-2015), in early 2009 before the RBMPs were finalised. Therefore a limited amount of the investment required to meet with PoMs has been planned for and funded in the current AMP5 period and, as such, much of the investment required to meet 'Good Status' will not be forthcoming until AMP6 (2015-2020). The AMP5 programme did however include a number of investigations which may lead to further investment.

Whilst it is not just water companies which will be affected by the PoMs, it is considered that water companies, such as NWL, will have a role to play in implementing the measures and helping to achieve the desired WFD 'Good Status' in time for the 2015 deadline, or by 2027 as identified by the RBMP. However, within Northumberland, a number of watercourses are already achieving 'Good Status', (particularly in terms of ecological status) and as such, investment is likely to be required, not in improving the quality of the watercourse, but in ensuring that it does not deteriorate as a result of the proposed new development and increased wastewater discharges, particularly within the more urban areas of the study area.

5 WATER ENVIRONMENT

5.1 Introduction

This section provides an assessment of the current water environment within Northumberland, and in particular around the potential new development areas through:

- A review of the water quality of rivers, estuaries and sea likely to be directly impacted by potential new development in the area (i.e. downstream of a WwTW) identified to be discharging additional treated effluent as a result of the proposed new development),
- A review of existing and proposed green infrastructure – using the findings from the Northumberland Green Infrastructure Strategy to identify where opportunities for linkages to Green Infrastructure can be utilised/maximised.

A review of water-related environment baseline is essential to determine whether: the water related environment has the capacity to absorb further discharges (from WwTW and/or surface water) to the receiving waterbody and to determine whether there is likely to be an unacceptable deterioration in the quality of the water related environment as a result of the proposed development.

The water quality capacity of the receiving waterbody, i.e. how much more treated effluent and/or surface water can be discharged to the receiving waterbody before water quality standards are breached, has been assessed and constraints identified. This has identified where constraints are already present prior to the potential development and any proposed mitigation measures that may be required.

Information pertaining to the water quality of the smaller watercourses, ditches and drains within the study area is scarce and therefore for the purposes of this study, the water quality assessment will focus on the Main watercourses downstream of the WwTW that are likely to be impacted by proposed development.

5.2 Water Environment Background

5.2.1 *Climate*

Northumberland's physical geography is characterised by upland moorland, hills, valleys and coastal lowlands and estuaries and as such has a varied climate across the county.

However, the county lies on the east coast, and has relatively low rainfall with annual rainfall totals across Northumberland ranging from 1,400mm on the Cheviot Hills (northern border area of the county), to 850mm in the River Wansbeck and Pont catchments, to a little under 600mm near the coast¹³. To the south of Northumberland there is a climatic gradient from west to east reflecting the influence of the Pennines and coast respectively. The predominant westerly airstream is forced to rise as it reaches the Pennines resulting in heavy rainfall over the headwaters of the River North Tyne and River South Tyne. Precipitation declines steadily from west to east with an annual average of over 2,000mm in the headwaters of the River South Tyne and over 1,800mm in the headwaters of the River North Tyne decreasing to less than 650mm in the southeast of the county near the coastal plain.

The coastal plain, which sees little variation in precipitation, is drained by numerous rivers and small streams, principally the River Aln, River Coquet, River Wansbeck, River Blyth, River Pont and River Lyne.

¹³ Met Office, Annual Average Rainfall 1971-2000, <http://www.metoffice.gov.uk/climate/uk/averages/ukmapavge.html#>

5.2.2 *Geology and Groundwater*

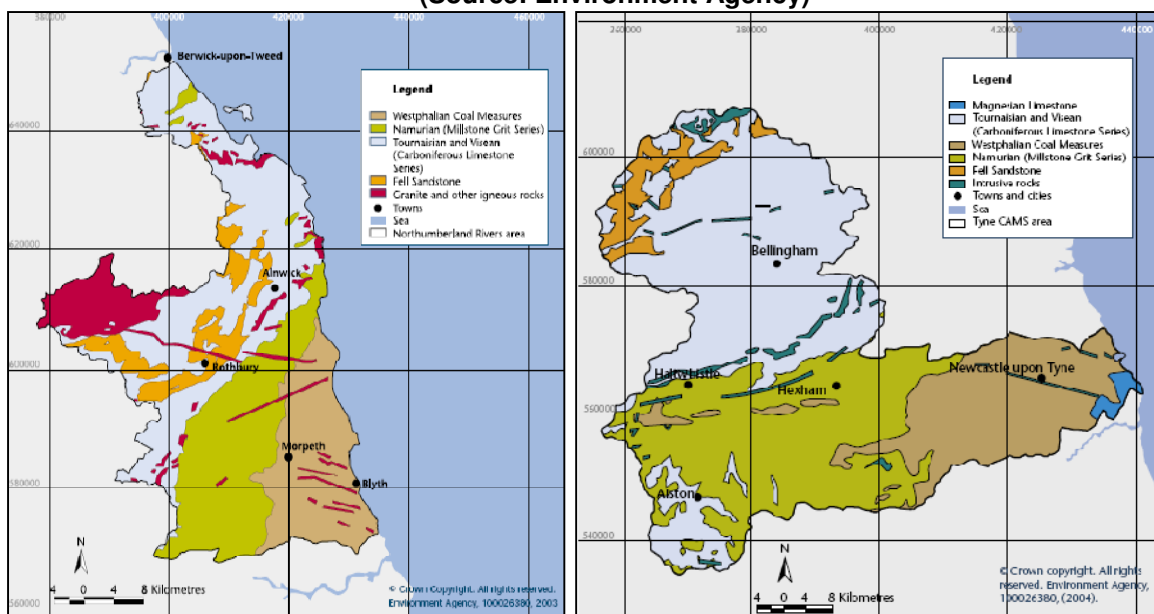
The solid geology of the Northumberland area consists of igneous and sedimentary rocks, with the oldest rocks to the North West and progressively younger rocks to the east and south east. Glacial and superficial deposits overlie much of the central and southern parts of the study area respectively (Figure 5-1).

Major aquifers are highly permeable rock formations, generally fractured, and capable of supporting large abstractions. The major aquifer in Northumberland is the Fell Sandstone, located in the north and central parts of the county, which produces a ridge of higher ground from Berwick-upon-Tweed extending southwards towards Rothbury then westwards towards Kielder¹⁴. The sandstone is capable of supporting large abstractions predominantly to the north of the county and there are some important water supply springs in the Rothbury area from this source.

Minor aquifers seldom produce large quantities of water but may be important for local supplies. The Middle Limestone, Upper Limestone and Millstone Grit, located across the central part of the study area, are classed as minor aquifers and the thicker limestones and sandstones are the source of numerous springs. These springs are widely used for rural private water supply, as are many small boreholes. Springs and groundwater also provide baseflow to the rivers. The Coal Measures, located to the southeast of Northumberland, are composed of shales, sandstones, fireclays and coal. Only the sandstones are capable of storing and transmitting appreciable volumes of water but as many have been affected by coal mining, their groundwater potential is limited due to the quality of the water.

Information on groundwater levels in central Northumberland are limited due to the scarcity of monitoring boreholes in the area.

Figure 5-1: Geology of Northumberland Rivers and Tyne CAMS Areas
(Source: Environment Agency)

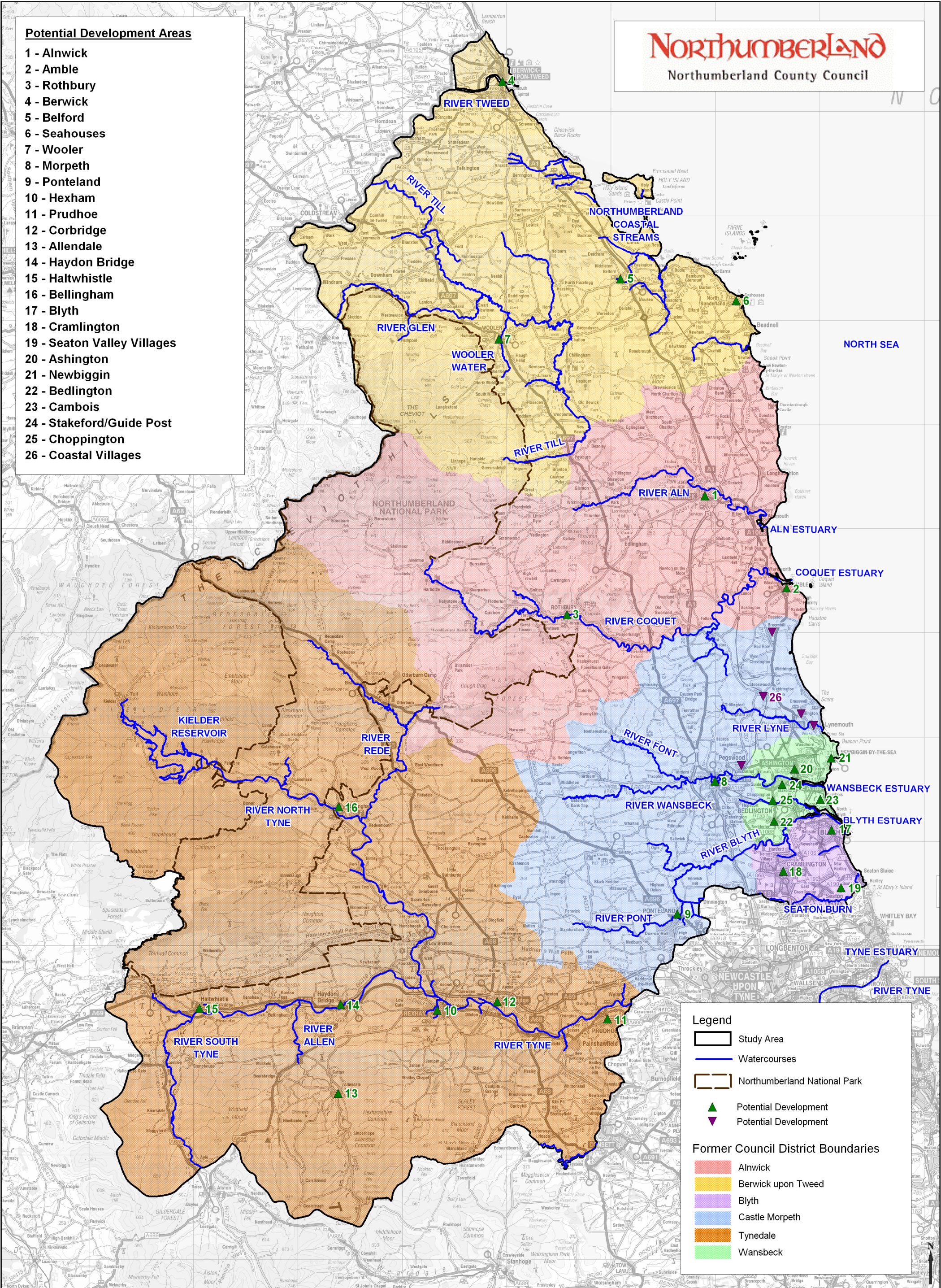


¹⁴ Environment Agency (2008) The Till Catchment Abstraction Management Strategy, <http://www.environment-agency.gov.uk/business/topics/water/119927.aspx>

5.2.3 *Rivers*

Outside of the coastal strip, the majority of the study area falls within the catchments of the River Tyne, River Coquet and River Tweed. In addition there are several larger watercourses located within the study area and these are listed below and shown on Figure 5-2.

- River Allen,
- River Aln,
- River Blyth,
- River Coquet,
- River Font,
- River Glen,
- River Lyne,
- River Pont,
- River North Tyne,
- River Rede,
- River South Tyne,
- River Till,
- River Tweed,
- River Wansbeck,
- Wooler Water.



Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

Northumberland

Northumberland County Council

Legend

- Study Area
- Watercourses
- Northumberland National Park
- Potential Development
- Potential Development

Former Council District Boundaries

- Alnwick
- Berwick upon Tweed
- Blyth
- Castle Morpeth
- Tynedale
- Wansbeck

Revision Details				Job Title		Drawing Title		Scale at A3: 1:33,333		URS Infrastructure & Environment UK Ltd	
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5.3 Water Framework Directive Baseline Assessment

The majority of Northumberland's river systems lie within Northumberland Rivers and Tyne catchments within the Northumbria River Basin District (RBD) (Figure 5-3). The remainder fall within the Tweed Catchment within the Solway Tweed RBD.

Figure 5-3: Northumbria River Basin Districts
(Source: Environment Agency, Northumbria RBMP)



The baseline water quality assessment for this Outline report has been undertaken using information provided in the Northumbria and the Solway Tweed RBMPs.

5.3.1 Water Framework Directive

The Water Framework Directive (WFD; 2000/20/EC) combines water quantity and water quality issues together providing an integrated approach to the management of all freshwater bodies, groundwaters, estuaries and coastal waters at the river basin level. The WFD requires all waterbodies to reach at least Good Status or Good Potential by 2015 unless there are grounds for derogation. However, provided that certain conditions are satisfied, in some cases the achievement of Good Status may be delayed until 2021 or 2027. The EA (England and Wales) and Scottish Environmental Protection Agency (SEPA;

Scotland) are the bodies responsible for the implementation of the WFD in the UK, and they survey all main waterbodies in England, Wales and Scotland on a regular basis, in order to analyse, monitor and review the status of the waterbodies against the WFD objectives set out for them.

For surface waters, Good Status is a statement of overall status consisting of a chemical and ecological component. Chemical status measures priority substances which present a significant risk to the water environment and is classified as 'good' or 'fail'. Ecological status is measured on a scale of 'high', 'good', 'moderate', 'poor' and 'bad'. The ecological status takes into account physico-chemical elements, biological elements, specific pollutants and hydromorphology. It should be noted that only biological elements can influence an overall ecological status below 'moderate'.

Some waterbodies are designated as 'artificial' or 'heavily modified' and are not able to achieve near natural conditions. The classification of these waterbodies and the biology they represent are measured against 'ecological potential' rather than status. For these waterbodies to reach Good Potential their chemistry must be good and the structural nature of the waterbody, which harms the biology, must be essential for its valid use.

A series of water quality standards for both fresh and transitional waters have been published by the United Kingdom Technical Advisory Group (UKTAG)¹⁵ and these have been used to classify the individual ecological and chemical elements as part of the River Basin Management Plans (RBMPs) to determine the current water quality status for each waterbody.

The number of water quality standards for transitional or tidal/estuarial waters are less compared to inland river systems, due in part due to the difficulty in assigning water quality objectives and monitoring water quality in these stretches of water which are typically affected by flow levels, tides and temperature. Within the WFD, only standards for Dissolved Oxygen and Dissolved Inorganic Nitrogen have been derived.

5.3.2 *Water Framework Directive Classification for Watercourses in Northumberland*

Information pertaining to the water quality of the smaller watercourses, ditches and drains within the study area is scarce and therefore for the purposes of this study, the water quality baseline assessment will focus on those watercourse/bodies monitored and classified by the Environment Agency under the WFD. Once spatial distribution of potential development has been determined in the broader development areas the impact on any other (smaller) watercourses can be more accurately determined. This should be further investigated at the Detailed stage of the WCS.

Table 5-1 provides a summary of the watercourses/bodies that receive discharge from the WwTW in Northumberland and their current WFD status (if assessed). Also refer to Figure 5-4.

¹⁵ The UKTAG (UK Technical Advisory Group) is a working group of experts drawn from environment and conservation agencies. It was formed to provide technical advice to the UK's government administrations and its own member agencies. The UKTAG also includes representatives from the Republic of Ireland.

TABLE 5-1: SUMMARY OF RECEIVING WATERCOURSES, THEIR WFD STATUS/POTENTIAL & RISK OF WWTW TO CURRENT WFD STATUS/POTENTIAL

Upstream WwTW	Waterbody WwTW discharges to	Current WFD Status/Potential	Risk from WwTW to Current WFD Status/Potential
Berwick	River Tweed	Moderate	G
Belford	Belford Burn	Poor	G
Seahouses *	North Sea	Good	A
Alnwick**	River Aln	Moderate	A
Amble	North Sea	Good	G
Morpeth*	River Wansbeck	Poor	A
Newbiggin	North Sea	Good	A
Cambois	North Sea	Good	G
Blyth**	Blyth Estuary	Good	A
Cramlington**	River Blyth	Poor	A
Broomhaugh	River Tyne	Good	G
Hexham	River Tyne	Good	G
Bellingham	River North Tyne	Moderate	G
Haydon Bridge	River South Tyne	Moderate	G
Haltwhistle**	River South Tyne	Good	A
Rothbury*	River Coquet	Moderate	A
Allendale**	River Allen	Moderate	A
Wooler*	Wooler Water (River Till)	Good	A
Howdon***	Tyne Estuary	Moderate	A
Matfen**	Marlpit Burn	Not assessed	A
Pegswood**	Bothal Burn	Not assessed	A
Lynemouth**	River Lyne/Lyne Estuary	Poor	A
Shilbottle**	Tyelaw Burn	Not assessed	A
Longhirst	Longhirst Burn	Not assessed	G

*WwTW will need to exceed consent to accommodate proposed development.

**WwTW has adequate headroom in the short-medium term but may require an increase in their consented discharge volumes at some point in the CS period.

***There are ongoing investigations and studies being undertaken at Howdon WwTW – Please refer to Chapter 7 for further information.

Table 5-3 provides a summary of the WFD classification for each of the waterbodies/courses likely to be impacted by proposed development through discharge of treated wastewater effluent and classified under the WFD within Northumberland (located at or downstream of proposed development); as provided in the Northumbria RBMP and the Solway Tweed RBMP (also refer to Figure 5-4).

Only ten of the watercourses/bodies within or bordering Northumberland (where assessed) are currently achieving Good Status or Potential as required by the WFD (Table 5-1 or Table 5-3). Biological elements including fish, invertebrates, macrophytes and phytobentos and hydromorphology are most commonly preventing Good Status or Potential by 2015 in failing waterbodies. It is expected that by 2015 this will still be the case with most waterbodies aiming to achieve Good Status or Potential by 2027. Reasons for not reaching the target by 2015 are that it would be technically infeasible or it would be disproportionately expensive.

Thirteen of the watercourses/bodies in Northumberland are currently classed as Heavily Modified Water Bodies (HMWBs), for reasons including navigation, water regulation, flood protection and urbanisation (see Table 5-3).

In accordance with WFD objectives, further investigations will be required to assess whether the ten HMWBs are currently failing to achieve Good Ecological Potential, or what mitigation measures would need to be implemented to rehabilitate or enhance (not necessarily restore) the physical habitats of the HMWBs to their maximum realistically achievable ecological conditions. The WFD allows appropriate governance to define ecological potential in terms of balancing the ecological and socio-economic uses of a waterbody, so these investigations will need to:

- Identify mitigation measures options that could secure the desired ecological outcomes but are not detrimental to the function of the modification,
- Identify mitigation measures that are technically feasible,
- Identify mitigation measures that are cost effective.

The main water quality concerns for the Northumbria and Solway Tweed RBDs are the combined impact of multiple development locations and ensuring no detracting from the high water quality that is currently seen in the majority of watercourses in the study area. To maintain high standards could potentially require more stringent consents in the future.

A summary of the WFD classification for each of the river catchments within Northumberland is provided in Table 5-2.

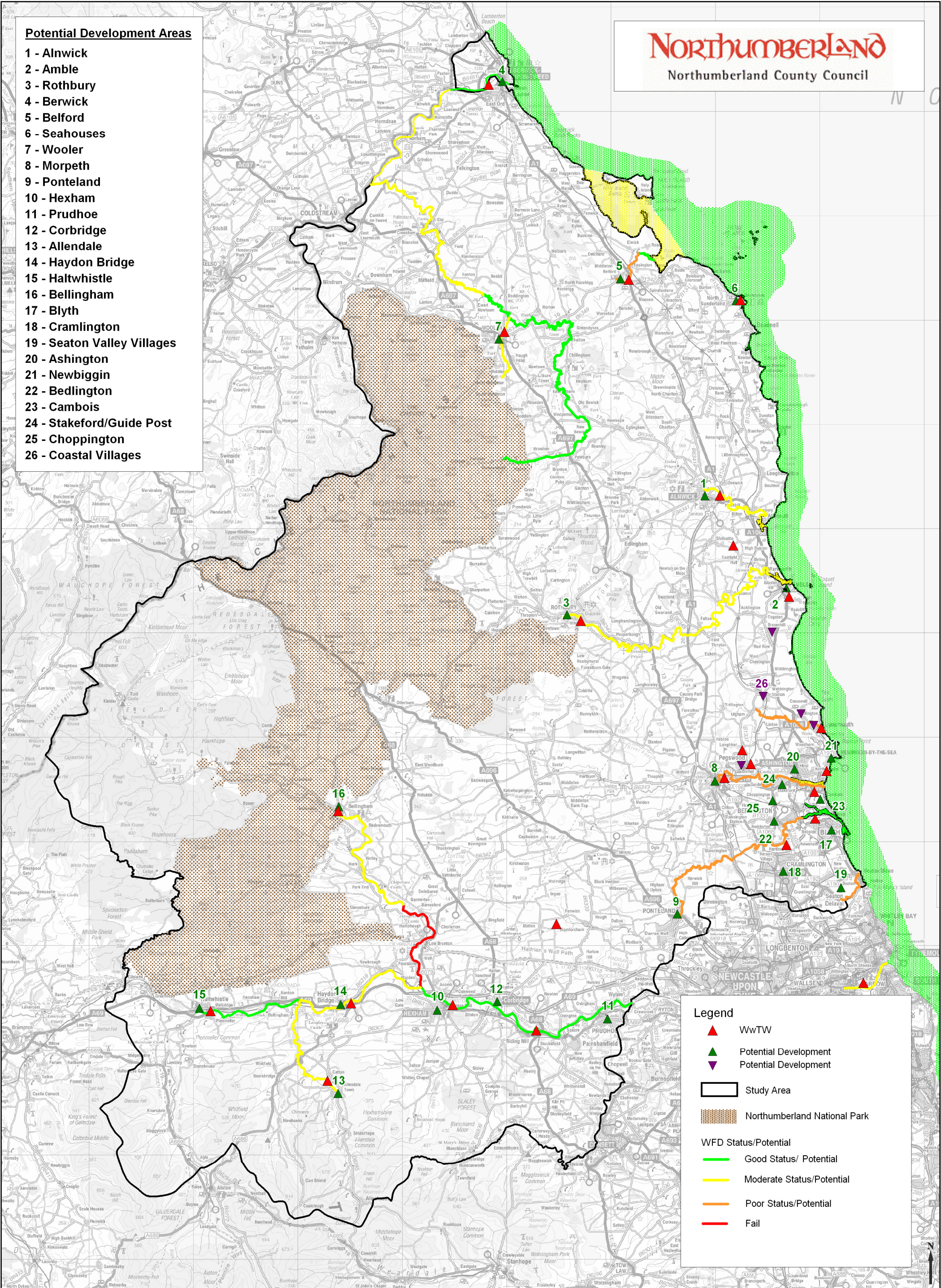
TABLE 5-2: WFD SUMMARY FOR RIVER CATCHMENTS IN NORTHUMBERLAND	
Catchment	Summary
Tyne	<ul style="list-style-type: none"> • Several of the rivers are recognised as having significantly high water quality which in turn supports a variety of flora and fauna. • The two groundwater bodies have been assessed as having poor chemical status, largely due to the history of heavy industry and mining in the area. • Physical modification to waterbodies and disused mines are key pressures within the catchment.
Northumberland Rivers	<ul style="list-style-type: none"> • Northumberland carboniferous Limestone and Coal Measures groundwater body classified as poor chemical status. • Northumberland Devonian and Lower Carboniferous groundwater body (northwest of catchment) classified as good chemical status. • Land drainage, flood defence and urbanisation cause physical modifications to waterbodies and are a key pressure in the catchment
Tweed	<ul style="list-style-type: none"> • The southern half of the catchment has an overall classification of good for surface waters, with the northern half being moderate. • The majority of groundwater in the catchment is classified as good, apart from a stretch to the south of Berwick along the eastern coastline which has been classified as poor. • All of the watercourses are rated high status for phosphorous. • Diffuse pollution from rural land management, river channel modification, water abstraction for public water supply and farming and the presence of invasive non-native species are key pressures and risks to the catchment.

TABLE 5-3: WATER FRAMEWORK DIRECTIVE WATER QUALITY ASSESSMENT

R B M P	Waterbody Name (ID)	Type	Designation	River	Current Overall Status / Potential	Current Ecological Status / Potential	Current Chemical Status / Potential	Biological	Ammonia	Dissolved Oxygen	Phosphate
Solway Tweed	Wooler Water from Harthope Burn to Till (GB102021072930)	River	HMWB	Wooler Water	Moderate	Moderate	Not Stated	Good	High	High	High
	Tweed (GB510202110000)	Transitional	×	Tweed Estuary	Good	Good	Not Stated	Not Stated	Not Stated	High	Not Stated
	Till from Glen to River Tweed (GB102021073050)	River	×	Till / Tweed	Moderate	Moderate	Good	Moderate	Not Stated	High	Not Stated
	Till Linhope Burn to Glen (GB102021073040)	River	×	Till / Tweed	Good	Good	High	High	High	High	Not Stated
	River Tweed Coldstream to Tidal Limit (5200)	River	×	Tweed	Moderate	Moderate	Good/Pass	Moderate	Pass	High	Not Stated
Northumbria	North Tyne from Tarsset Burn to River Rede (GB103023074960)	River	HMWB	North Tyne	Moderate	Moderate	Not Stated	Good	High	High	High
	Allen from Source to West Allen (GB103023074710)	River	×	East Allen	Moderate	Moderate	Not Stated	Good	High	High	High
	Aln from Edlingham Burn to Tidal Limit (GB103022076350)	River	×	Aln	Moderate	Moderate	Not Stated	Moderate	High	High	Good
	Belford Burn from Source to Ross Low (GB103022076460)	River	HWMB	Belford Burn	Poor	Poor	Not Stated	Poor	Good	High	Good
	Tyne from Watersmeet to Tidal Limit (GB103023075801)	River	HMWB	Tyne	Good	Good	Good	Good	High	High	High
	Pont/Blyth from Small Burn to Tidal Limit (GB103022077050)	River	HMWB	Pont / Blyth	Poor	Poor	Not Stated	Poor	High	Good	Good

South Tyne from Black Burn to Allen (GB103023075530)	River	×	South Tyne	Good	Good	Not Stated	High	High	High	High
Wansbeck from Font to North Sea (GB103022077060)	River	HWMB	Wansbeck	Poor	Poor	Fail	Poor	High	High	Good
Coquet from Ridlees Burn to Tidal Limit (GB103022076690)	River	×	Coquet	Moderate	Moderate	Not Stated	Moderate	High	High	High
Lyne from Source to Tidal Limit (GB103022076820)	River	×	Lyne	Poor	Poor	Not Stated	Poor	High	High	Good
Seaton Burn from Source to Tidal Limit (GB103022076190)	River	HWMB	Seaton Burn	Poor	Poor	Not Stated	Poor	High	High	Good
North Tyne from Barrasford to South Tyne (GB103023075802)	River	HMWB	North Tyne	Fail / Bad	Good	Fail	High	High	High	High
North Tyne from Rene to Gunnerton Burn (GB103023074920)	River	HMWB	North Tyne	Moderate	Moderate	Not Stated	Good	High	High	High
South Tyne from Allen to North Tyne (GB103023075710)	River	×	South Tyne	Moderate	Moderate	Fail	High	High	High	High
Allen from West Allen to South Tyne (GB103023074720)	River	×	Allen	Moderate	Moderate	Not Stated	Moderate	High	High	High
Elwick Burn from Source to Ross Low (GB103022076480)	River	HMWB	Elwick Burn	Good	Good	Not Stated	Moderate	High	High	Good
Holy Island & Budle Bay (GB680301430000)	Coastal	×	-	Moderate	Moderate	Not Stated	Moderate	Not Stated	High	Not Stated
Northumberland North (GB650301440000)	Coastal	×	-	Good	Good	Not Stated	Good	Not Stated	High	Not Stated
Farne Islands to Newton Haven (GB620301100000)	Coastal	×	-	Good	Good	Not Stated	Good	Not Stated	High	Not Stated
Tyne and Wear (GB650301500002)	Coastal	×	-	Good	Good	Good	Good	Not Stated	High	Not Stated
Northumberland South	Coastal	×	-	Good	Good	Not Stated	Good	Not Stated	High	Not Stated

	(GB650301500001)										
	Tyne (GB510302310200)	Transitional	HMWB	North Sea	Moderate	Moderate	Fail	Moderate	Not Stated	High	Not Stated
	Aln (GB510302203300)	Transitional	×	North Sea	Moderate	Moderate	Not Stated	Not Stated	Not Stated	Not Stated	Not Stated
	Coquet Estuary (GB510302203000)	Transitional	HMWB	North Sea	Moderate	Moderate	Not Stated	Good	Not Stated	Not Stated	Not Stated
	Wansbeck Estuary (GB510302210100)	Transitional	HMWB	North Sea	Moderate	Moderate	Not Stated	Poor	Not Stated	Not Stated	Not Stated
	Blyth (N) (GB510302203200)	Transitional	HMWB	North Sea	Good	Good	Not Stated	Not Stated	Not Stated	High	Not Stated



Waterbodies within Northumberland are currently protected by a number of designations including the Bathing Water Directive, Freshwater Fish Directive, Nitrates Directive, Natura 2000 and the Urban Waste Water Directive as shown in Table 5-4.

TABLE 5-4: APPLICABLE DIRECTIVE FOR WATERCOURSES/BODIES IN NORTHUMBERLAND

Waterbody ID	Directive						
	Bathing Water	Freshwater Fish	Nitrates	Drinking Water	Shellfish Waters	Urban Wastewater	Natura
GB102021072930	x	x	x	x	x	x	x
GB510202110000	x	x	x	x	x	x	✓
GB102021073050	x	x	x	x	x	x	x
GB102021073040	x	x	x	x	x	x	x
5200	x	✓	✓	x	x	✓	✓
GB103023074960	x	✓	x	x	x	x	x
GB103023074710	x	✓	x	x	x	x	x
GB103022076350	x	✓	x	x	x	x	x
GB103022076460	x	x	✓	x	x	x	x
GB103023075801	x	✓	✓	✓	x	x	x
GB103022077050	x	✓	✓	x	x	x	x
GB103023075530	x	✓	x	x	x	x	x
GB103022077060	x	✓	✓	x	x	✓	x
GB103022076690	x	✓	x	x	x	x	x
GB103022076820	x	x	✓	x	x	x	x
GB103022076190	✓	✓	✓	x	x	x	x
GB103023075802	x	✓	x	✓	x	x	x
GB103023074920	x	✓	x	x	x	x	x
GB103023075710	x	✓	x	x	x	x	x
GB103023074720	x	✓	x	x	x	x	x
GB103022076480	x	✓	✓	x	x	x	x
GB680301430000	x	x	✓	✓	✓	✓	✓
GB650301440000	✓	x	✓	x	x	✓	✓
GB620301100000	✓	x	x	x	x	x	✓
GB650301500002	✓	x	x	x	x	x	✓
GB650301500001	✓	x	x	x	x	x	✓
GB510302310200	✓	x	✓	x	x	✓	✓

5.3.3 WFD Proposed Actions for Moving Forward

Proposed actions (from the RBMPs) for moving forward to tackle failing waterbodies in the river catchments in Northumberland are described in Table 5-5.

TABLE 5-5: PROPOSED ACTIONS FOR TACKLING KEY ISSUES IN NORTHUMBERLAND

Catchment	Proposed Actions
Tyne	<ul style="list-style-type: none"> • Address land management issues. • Identify diffuse pollution from urban, agricultural, coal and metal mining sources e.g. identifying possible solutions from metal min pollution affecting the River South Tyne catchment. • Target pollution prevention campaigns. • Tackle barriers to fish migration e.g. by removing artificial obstructions of the River Tyne. • Encourage the use of SuDS.
Northumberland Rivers	<ul style="list-style-type: none"> • Address land management. • Focus on water usage and efficiency. • Reduce diffuse pollution from agriculture via the England Catchment Sensitive Farming Delivery Initiative. • Tackle mine water pollution by continuing to regulate mining and quarrying and managing future discharges to groundwater. • Tackle barriers to fish migration e.g. by the removal of artificial obstructions on the River Wansbeck.
Solway Tweed	<ul style="list-style-type: none"> • Reduce diffuse pollution from agriculture via the England Catchment Sensitive Farming Delivery Initiative and the Scotland Rural Development Programme. • Focus on water usage and efficiency. • Tackle modified waterbodies and make alterations to beds, banks and shores via restoration projects, cross border sustainable flood management and habitat compensation schemes. • Tackle non-native invasive species.

5.3.4 *WFD Assessment of Impact of Proposed Development on Receiving Waterbodies*

As described in Chapter 7 and Chapter 9 there are four WwTW that will need to exceed their consented discharge volumes to accommodate the planned levels of housing and a further eight WwTW that have adequate headroom in the short-medium term but may require an increase in their consented discharge volumes at some point in the CS period (please refer to Table 5-1). The risk to the WFD status of the receiving watercourse/waterbody (as defined in Table 5-1) is based on whether the flow consent of a WwTW is likely to be exceeded as a result of the proposed development in Northumberland. The risk has been calculated based on the following risk matrix:

TABLE 5-6: “TRAFFIC LIGHT” FOR DETERMINING RISK TO WFD STATUS

Explanation	RAG Status
WwTW is not likely to exceed the flow current flow consent.	G
WwTW likely to/ will need to exceed current flow consent. Current status for physico-chemical parameter is High or Good.	A
WwTW likely to/ will need to exceed flow consent. WwTW close to consent limit for BOD, Ammonia and P*. Dilution capacity of receiving watercourse/body considered poor*.	R*
*Further information and data required	

For watercourses/bodies that have High/Good Status for physicochemical parameters at present it is likely that maintaining the status downstream will be difficult without significant tightening of the current consent therefore these watercourses/bodies are likely to be at least at an amber risk of impact on their current WFD requirements.

All receiving waterbodies/courses that are located downstream of a WwTW that will or are likely to require an increase in their consented discharge volumes at some point in the CS period are considered to be a medium risk (as defined in Table 5-1 and Table 5-6). Once further information is made available about the spatial distribution of proposed development then further discussions with NWL will be required to more accurately determine the impacts of the receiving watercourses/waterbodies as a result of the Proposed Development. It is also recommended that the results of the RAG assessment are verified at the Detailed stage of the WCS using detailed River Quality Predictive (RQP) modelling of the actual consents required for the proposed development.

5.4 Baseline Coastal / Bathing Water Assessment

The WFD also sets targets and standards for coastal waterbodies. There are five coastal waters which are assessed by the WFD and fall within the Northumbria RBMP:

- Northumberland North,
- Holy Island and Budle Bay,
- Farne Islands to Newton Haven,
- Tyne and Wear,
- Northumberland South.

The WFD classification for the coastal waters that fall within the Northumbria RBMP and are likely to be impacted by proposed development are described in more detail in Table 5-3.

5.4.1 Bathing Water Directive

Bathing Waters are fresh or sea waters where bathing is either explicitly authorised or where bathing is permissible and practiced by large numbers of people.

The revised BWD (2006/7/EC), which came into force in March 2006 is an updated version of the current BWD (76/160/EEC) and aims to protect public health and the environment by

setting stringent water quality requirements for Bathing Waters and putting strong emphasis on beach management and public information.

The BWD lists 19 physical, chemical and microbiological parameters, some of which are Imperative (standards for total and faecal coliforms) and others which are Guideline values (standards for total and faecal coliforms and faecal streptococci). Bathing Waters must reach Imperative values, whilst Guideline values are desirable targets.

Bathing Water quality is affected by a variety of factors including run-off from agricultural and urban areas, seabird and dog fouling, intermittent discharges from sewerage networks and continuous discharge from a WwTW.

The revised Bathing Water Directive will repeal and replace the current BWD by 2015; a key requirement of the new BWD is that all Bathing Waters should be classed as sufficient by 2015.

The Northumberland Coast has thirteen local designated Bathing Waters as shown below:

- Spittal,
- Bamburgh Castle,
- Seahouse North,
- Beadnell,
- Low Newton,
- Warkworth,
- Amble Links,
- Druridge Bay North,
- Druridge Bay South,
- Newbiggin North,
- Newbiggin South,
- Blyth South beach,
- Seaton Sluice.

Eleven of the thirteen Bathing Waters within Northumberland achieved the strict Guideline Bathing Water standards under the BWD in 2011¹⁶; Spittal failed to achieve the Mandatory Standard and Low Newton failed to achieve the strict guideline standards for faecal streptococci. NWL discharges may be contributing to the bathing water quality at Spittal due to potential contribution of wastewater from Combined Sewer Overflows¹⁷ (CSOs). NWL have confirmed that:

“(NWL) has carried out improvement work on the Berwick sewerage network (moving an outfall away from the bathing water so it discharges into the estuary instead): this work started in October 2011 and was completed in April 2012. However, this is unlikely to be enough to make Spittal consistently comply as the major influence on the bathing water is the bacterial load from the River Tweed and by far the larger wastewater contribution of this is believed to come from the Scottish side of the river.”

5.4.2 Shellfish Water Directive

The Shellfish Waters Directive (SWD, 2006/113/EC) aims to protect or improve shellfish waters in order to support shellfish life and growth, thereby contributing to the high quality of shellfish products directly edible by man. The Directive sets physical, chemical and

¹⁶ Environment Agency (2011) Compliance Results for Bathing Waters in the UK http://maps.environment-agency.gov.uk/wiyby/wiybyController?latest=true&topic=coastalwaters&ep=query&lang=_e&x=425996.09375&y=606388.75&scale=7&layerGroups=1&queryWindowWidth=25&queryWindowHeight=25

¹⁷ SEPA (2009) Solway Tweed River Basin Management Plan http://www.sepa.org.uk/water/river_basin_planning.aspx

microbiological water quality requirements that designated shellfish waters must either comply with (mandatory standards) or endeavour to meet (guideline standards). The SWD is due to be replaced by the WFD in 2013 which will provide the same level of protection as the SWD.

The discharge of sewage effluent to designated Shellfish Waters requires additional treatment to meet bacteriological standards to ensure that the quality of edible shellfish does not pose a threat to human health. It is important that discharges from new development in Northumberland do not compromise the strict bacterial standards required in Shellfish Waters.

The EA monitor the quality of Shellfish Waters ensuring the standards of the SWD are met. A pollution plan for each Shellfish Water has been produced and sets out the quality of each Shellfish Water, stating whether they comply with the directive and outline any improvements that need to be made.

Holy Island Shellfish Water

The Northumberland Coast has one designated Shellfish Water and the EA have produced the Holy Island Pollution Reduction Plan¹⁸ to ensure that the designated water conforms to the SWD. Holy Island Shellfish Water is located in North East Northumberland and lies within the inter-tidal and sub-tidal areas of a shallow semi-enclosed embayment, sheltered from the North Sea by Holy Island. The embayment is thought to be at risk from diffuse water pollution from the surrounding predominately agricultural land use. Birds, which frequent the inter-tidal area are also thought to be another source of pollution to the Shellfish Water. The island has its own small WwTW but the treated sewage is discharged on the sea ward side of Holy Island, away from the Shellfish Water, and was upgraded in 2002.

The Holy Island settlement area is a settlement located within the rest of Berwick area and will be identified as settlement which could accommodate development to meet local needs. The level of new development is likely to be very small scale. Based on the figures used within this Outline WCS the rest of the Berwick area could potentially accommodate only approximately 95 dwellings between 2011 and 2031 and as such it is considered that there will be no direct impact on Shellfish Waters.

The Holy Island Shellfish Water was compliant with all mandatory standards of the SWD for the period 2004 – 2008 but failed to achieve guideline standards in 2004 and 2007. As the Holy Island Shellfish Water meets guideline standards and not mandatory standards then no specific actions are planned however the current monitoring plan will continue. The streams which drain Fenham Flats to the east of Holy Island lie within a Catchment Sensitive Farming (CSF) priority catchment. Although this CSF project is primarily aimed at reducing nutrient risks to Lindisfarne SPA on a precautionary basis, it should also reduce the risk of microbial contamination to the Shellfish Water from local agricultural land.

5.5 Green Infrastructure

Green Infrastructure is a network of protected sites, nature reserves and green spaces that occur at all scales from the urban centre to the rural countryside. It is important to consider linkages with Green Infrastructure at all stages of a WCS, as it plays a key role in the sustainable management of water.

The aim of the Northumberland Green Infrastructure study is to identify environmentally sensitive areas and provide a long term strategy for enhancing their ecosystems and recreational and cultural significance. One of the specific objectives is to undertake a

¹⁸ Environment Agency (2009) Directive (79/923/EEC) on the Quality Required of Shellfish Waters - Article 5 Programme Holy Island.
FINAL REPORT
May 2012

sensitivity analysis for the development sites to identify green infrastructure links from and to the rural and urban areas.

The WCS and the Northumberland Green Infrastructure Study are interlinked and any future development in Northumberland should take into account the recommendations of the emerging GI study and integrate, for example flood risk management with green infrastructure.

The emerging Northumberland Green Infrastructure Study has highlighted some key planning principles that will apply to new development. These principles include:

- All new development and redevelopment schemes will make a significant contribution to the county's GI network and will fully integrate into the surrounding landscape whilst providing links to existing communities and contributing to predicted climate change,
- Development and regeneration proposals will provide high quality open green space that promotes social cohesion and makes a positive contribution to the quality of life for local people while generating a net gain in the county's Biodiversity Action Plan (BAP) targets,
- Proposals will be designed to ensure that development is of high quality, contributes to combating predicted climate change and environmental sustainability, in order to support the economic, social and environmental aspirations for Northumberland,
- Use will be made of planning conditions and planning obligations (such as Section 106 or the newly introduced Community Infrastructure Levy) to secure the necessary and appropriate funds for the provision of high quality management and maintenance of green infrastructure,
- Protect and seek to improve the function and integrity of natural systems (soils, bio and geo diversity and hydrology).

The Detailed WCS should take into account the recommendations of the GI in identifying any new or upgraded infrastructure requirements and flood / surface water management.

5.6 Water Environment Summary

Studies such as the WCS have a role to play in identifying likely impacts of the WFD and where future investment is most likely to be required in order to move key water bodies towards Good Status or Potential based on the interim risk characterisations. Use of the RBMP is essential such that early decisions can be taken on where investment is most likely to be required in order to meet with the future programme of measures and attainment of Good Status or Potential.

The current quality of watercourses/bodies which could potentially be impacted by proposed development in Northumberland is variable with only four of the watercourses and five coastal waterbodies achieving the required Good Status or Potential by the WFD.

Future water quality within Northumberland is likely to be affected from the combined impact of multiple development locations, and as such it will be essential to ensure that, as a result of any potential development:

- There is no deterioration in the current water quality status,
- There is no prevention to the future achievement of Good Status or Potential within the waterbodies.

The Northumbria and Solway Tweed RBMP identifies a number of proposed actions for addressing failing waterbodies in the river catchments in Northumberland. Any proposed development in Northumberland should consider these objectives and, where possible, work towards improving the existing water environment through, for example, the use of SuDS within all developments.

Development within a WwTW catchment area could potentially overload a combined sewer system resulting in more frequent spillages which, if located near to a Bathing Water or Shellfish Water, could be seen as a constraint. Environmental compliance with the BWD and SWD is mandatory and any development or disposal of surface or wastewater in these areas must account for these directives. In close proximity to these environmental designations, new discharges of treated sewerage to the environment or increased development to existing sewered areas, which significantly increase storm operation, can increase bacterial load to the environment. These require consideration at the planning stage to avoid a potential impact on compliance.

Tables 5-7 to 5-9 provide a summary of the associated risk to the water environment from the proposed development in Northumberland based on the findings of this chapter.

Due to the constraints of the WFD which requires that the current status of a river must not deteriorate and should achieve Good Status or Potential by 2015, all waterbodies hydrologically linked to the proposed development sites downstream of WwTW that will or are likely to require an increase in their consented discharge volumes at some point in the CS period are considered to be at medium risk.

**TABLE 5-7: NORTH NORTHUMBERLAND SHMA,
WATER ENVIRONMENT CONSTRAINTS**

Settlement	Risk to Quality Consent Standard
Alnwick	A
Amble	G
Rothbury	A
Rest of Former Alnwick Area	A
Berwick	G
Belford	G
Seahouses	A
Wooler	A
Rest of Former Berwick Area	A

**TABLE 5-8: CITY COMMUTER REGION SHMA,
WATER ENVIRONMENT CONSTRAINTS**

Settlement	Risk to Quality Consent Standard
Morpeth	A
Ponteland	A
Widdrington Station	G
Ellington	A
Lynemouth	A
Pegswood	A

Hadston	A
Rest of Former Castle Morpeth	A
Hexham	G
Prudhoe	A
Corbridge	G
Allendale	A
Haydon Bridge	G
Rest of Commuter Pressure Area	A
Haltwhistle	A
Bellingham	G
Rest of Rural Area – Tynedale	A

**TABLE 5-9: URBAN NORTHUMBERLAND SHMA,
WATER ENVIRONMENT CONSTRAINTS**

Settlement	Risk to Quality Consent Standard
Blyth	A
Cramlington	A
Seaton Valley Villages	A
Ashington	A
Newbiggin-by-the-Sea	A
Bedlington / Bedlington Station	G
Guide Post / Stakeford	G
Choppington	G
Cambois	G

6 WATER RESOURCES AND SUPPLY

6.1 Introduction

This section identifies the water resource and supply constraints for development up to 2031 in Northumberland and includes:

- A review of the EA CAMS and any concerns/issues the EA have with water resources and supply in the Northumberland area,
- A review of the NWL WRMP (2010-2035) which plans for development in the county up to 2035 and available water resources to supply additional demands,
- Water demand forecasts from potential new development in Northumberland and how these can be managed to reduce demand, where required,
- A review of strategic water supply infrastructure serving Northumberland and potential new development, and potential upgrades required to serve the additional population.

6.2 Water Resources

Water stress occurs when water demand exceeds availability during a period of time. The basis of this assessment is the current water resources situation and the level of demand expected in the future. The aim of the water stress indicator is to make sure that water companies and water users do not disregard the environmental consequences of the abstractions taking place in their area.

The EA manages water resources at the local level through the use of CAMS. The NCC area lies within three CAMS areas:

- River Till (North Northumberland) – March 2008,
- Northumberland Rivers and update (Central Northumberland) – September 2003 / March 2008,
- River Tyne and update (South Northumberland) – March 2005 / March 2008,

Within these CAMS, the EA's assessment of the availability of water resources is based on a classification system that allocates a resource availability status indicating:

- The relative balance between the environmental requirements for water and how much is licensed for abstraction,
- Whether water is available for further abstraction,
- Areas where abstraction needs to be reduced.

The categories of resource availability status are shown in Table 6-1. The classification is based on an assessment of a river system's ecological sensitivity to abstraction-related flow reduction. This classification can then be used to assess the potential for additional water resource abstractions.

TABLE 6-1: CAMS RESOURCE AVAILABILITY STATUS CATEGORIES

Indicative Resource Availability Status	Licence Availability
Water Available	Water is likely to be available at all flows including low flows. Restrictions may apply.
No Water Available	No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions.
Over Licensed	Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions.
Over Abstracted	Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions.

Those catchments within the NCC area in which resource availability has been identified as being an issue are shown in Table 6-2.

TABLE 6-2: CAMS RESOURCES WITHIN NORTHUMBERLAND

WRMU	Associated Main River	Resource Availability Status		
		WRMU Status	Target Status in 2014/15	Target Status in 2018/20
River Lower Coquet ¹	River Lower Coquet	Over Licensed	Move towards 'No Water Available', subject to legislation changes	Move towards 'No Water Available', subject to legislation changes
River Upper Coquet ¹	River Upper Coquet	No Water Available	No Water Available	No Water Available
River Font ¹	River Font	No Water Available	No Water Available	No Water Available

Key: Integrated WRMU status in table refers to the availability status after downstream conditions have been taken into account and/or, in the case of groundwater, the status of an overlying river.

¹ The Northumberland Rivers CAMS update (Central Northumberland) – March 2008 (EA, 2008)

A number of catchments within Northumberland are classified by the EA as having 'Water Available' (Table 6-3). The aim for some of these catchments is that their strategy should move to 'No Water Available' before 2014/15 or 2019/20, subject to legislation changes as set out in the Water Act (2003). Other catchments are to maintain the resource availability status of 'Water Available' until they reach but not cross the ecological flow objectives (Table 6-3). Crossing the ecological flow objective would change the resource status to 'no water available' and risk causing adverse ecological consequences.

TABLE 6-3: RESOURCE AVAILABILITY FUTURE STATUS FOR CAMS CATCHMENTS WITH 'WATER AVAILABLE'

CAMS Area	WRMU Name	Resource Availability Status	
		WRMU Status	Future Target Status
River Till	River Till	Water Available	No Water Available
	River Glen	Water Available	No Water Available
	Fell Sandstone Resource Management Unit	Water Available	Move towards no Water Available
Northumberland	River Pont	Water Available	Water Available until reach ecological river flow objective
	Upper Wansbeck	Water Available	Water Available until reach ecological river flow objective
	Lower Wansbeck	Water Available	Water Available until reach ecological river flow objective
	Upper Blyth	Water Available	Water Available until reach ecological river flow objective
	Lower Blyth	Water Available	Water Available until reach ecological river flow objective
	River Lyne	Water Available	Water Available until reach ecological river flow objective
	River Aln	Water Available	Water Available until reach ecological river flow objective
River Tyne	River South Tyne	Water Available	No Water Available
	River Allen	Water Available	No Water Available
	Lower Tyne	Water Available	Water Available until reach ecological river flow objective
	River North Tyne	Water Available	Water Available until reach ecological river flow objective
	River Rede	Water Available	No Water Available

The Water Act (2003) introduces a new statutory framework for managing water resources in England and Wales. Important aspects of this legislation which may affect the NCC area include:

- In the future, all abstraction licences will become time-limited. This will be the case for all new and existing licences. From 2012, the EA will be able to amend or retract a permanent licence without paying compensation if it is deemed that the abstraction is causing serious damage to the environment,
- The EA also have powers under this legislation to consider revoking 'sleeper licences' i.e. those abstraction licences which have not been used for four years (and again after 2012, no compensation would be payable),
- Finally under the new Act, new provision for third parties to pursue claims against abstractors. This is a significant change. Under previous Water Resource Acts,

abstractors have been able to use the holding of an abstraction licence as a legal defence, this will no longer be the case as from 2012.

6.2.1 *Water Company Water Resource Management Plans*

NWL has two Water Resource Zones (WRZs) known as Kielder WRZ and the Berwick and Fowberry WRZ (Figure 6-1). Over 99% of the properties and population reside in the Kielder WRZ; the other 1% is primarily supplied by the groundwater fed Berwick and Fowberry WRZ and this includes the broad areas of Berwick-upon-Tweed to the North, Norham and West Larmouth to the west, Coupland and South Wooler to the south and Buckton and Scremerston to the east.

The majority of the proposed new development which falls within the Kielder WRZ is capable of being supported directly, or by substituting river compensation flows, with water derived from Kielder Reservoir and distributed via the local transfer networks. Within the Kielder WRZ the main urban conurbations are incorporated within three main supply zones, "Northern", "Central" and "Southern", which are discrete in terms of treatment capacity.

Based on information provided by the EA and NWL's WRMP, a review of current usage of licences has been undertaken. The purposes of this review has been to determine where spare licence capacity which may be available to NWL in order to meet future growth in demand.

The different types of licensed abstractions in Northumberland include:

- Groundwater (GW) – abstractions which take place from water-bearing rock either by capturing a natural outlet e.g. spring or a from a well sunk into rock from which water is pumped,
- Surface Water (SW) – abstractions which take place from either rivers or waterbodies e.g. lakes and reservoirs,
- SW/Reservoir – abstractions which take place from supported rivers, typically released from reservoirs at the top end of catchments and re-abstracted further downstream. These combined or conjunctive use systems, using different sources of water at different times of years, are designed to achieve a higher overall Deployable Output¹⁹ than could be achieved from the individual use of sources.

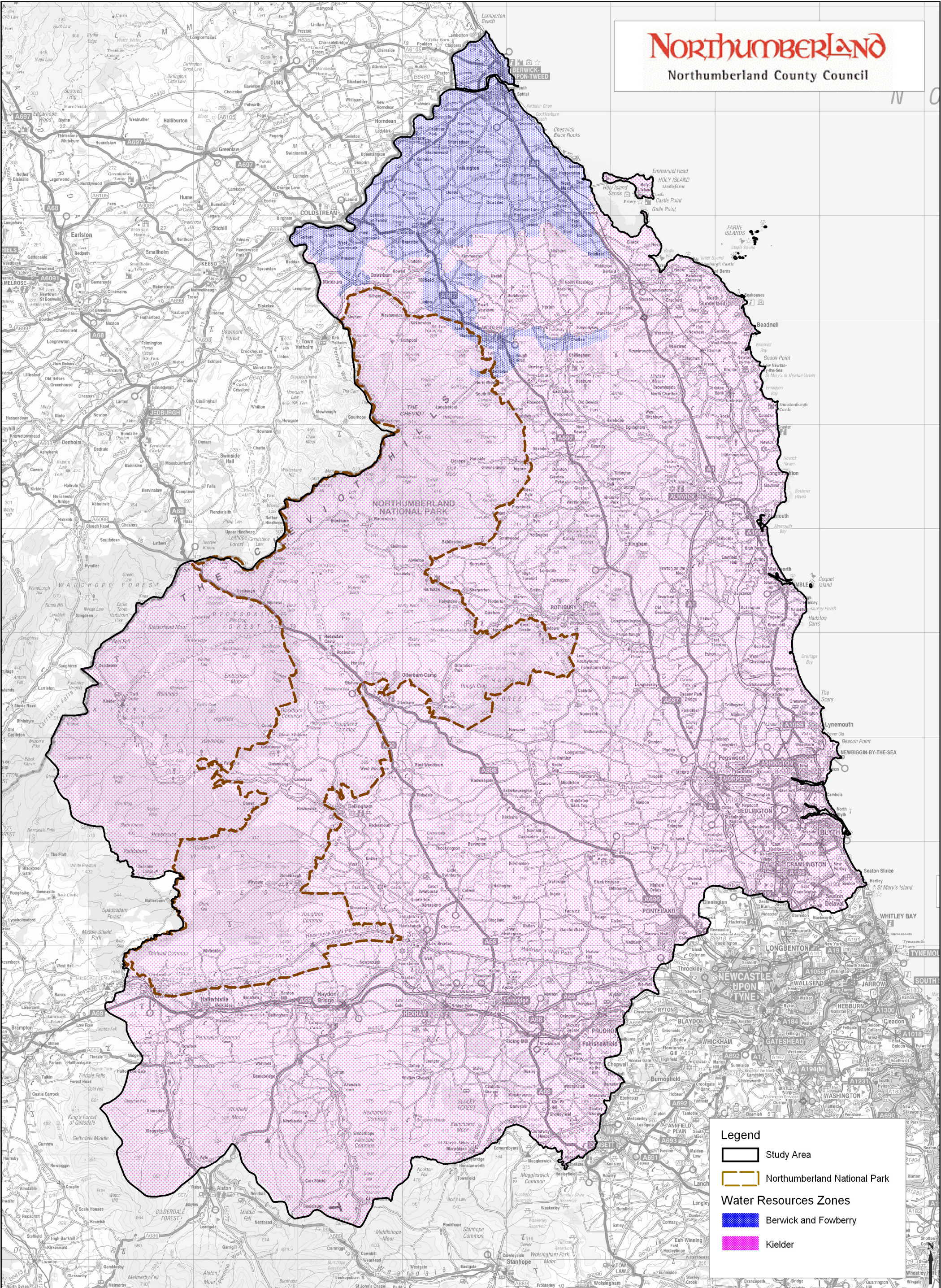
Table 6-4 contains a summary for the different types of licences and also the approximate amounts of spare capacity in Megalitres per day (Mld¹) in each of the two supply zones – Kielder and Berwick and Fowberry.

¹⁹ Deployable Output - The output of a commissioned source or group of sources or of bulk supply as constrained by the following for specified conditions and demands: environment; licence, if applicable; pumping plant and/or well/aquifer properties; raw water mains and/or aqueducts; transfer and/or output main; treatment; and, water quality

TABLE 6-4: NORTHUMBERLAND WATER SOURCES – SPARE CAPACITY			
Water Resource Zone	Type of Source	% Utilisation	Approximate Spare Capacity (Mld ⁻¹)
Berwick and Fowberry	SW/Res	0	0
	GW	49	8.4
Kielder	SW/Res	76	147.2
	GW	40	5.1
Total	SW/Res	76	147.2
	GW	46	13.5

In general, Table 6-4 shows:

- Approximately 76% of SW licences (including reservoir licences) are utilised, whereas only 46% of GW licences are utilised,
- In terms of spare licence capacity, then this equates to approximately 147 Mld⁻¹ of spare SW licences (on average) and 13.5 Mld⁻¹ of spare GW licences (on average). In terms of locations, then although the spare GW licence is split 60:40 between the Berwick and Fowberry WRZ and the Kielder WRZ; in the case of SW licences, the spare capacity is all concentrated in the Kielder WRZ,
- The reasons for these large spare licence volumes in the Kielder WRZ, is due to the concentration of industries with high historical water demands in this area.



Northumberland

Northumberland County Council

Legend

- Study Area
- Northumberland National Park
- Water Resources Zones
 - Berwick and Fowberry
 - Kielder

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FIGURE 6-1

6.2.2 *Water Demand Forecasts and Management*

It is important to assess the future water demand forecasts from new development to compare the likely amount of water demand against the available water resources throughout the study area. The water resources assessment identified that within Northumberland, water resource availability is not a major concern. However, it is still important to assess where within the catchment water demand is likely to be greatest, and options available to manage water demand through sustainable development. With climate change over the next 50-100 years water resources within the United Kingdom are likely to become more scarce with warmer, drier summers being predicted throughout the country.

For the purposes of the Northumberland WCS, five water demand scenarios have been modelled to identify the likely water demand from new residential and non-residential development and how this demand could be managed:

- Scenario 1 - Water Company (NWL) current non-metered demand forecast,
- Scenario 2 - 125 l/h/d – Buildings Regulations Part G,
- Scenario 3 - 120 l/h/d - Code for Sustainable Homes (CSH) Level 1 and Level 2,
- Scenario 4 - 105 l/h/d – CSH Level 3 and Level 4,
- Scenario 5 - 80 l/h/d – CSH Level 5 and Level 6.

Residential Demands

To calculate residential demands, it is necessary to multiply the number of new homes to be built in an area by the average occupancy rate (OR) and in turn by the average water use per person. In the case of the Northumberland area, NWL's unmeasured households, typically have an OR of 2.35 to 2.26 over the planning period and their average water consumption rates for its metered customers is 129 litres/head/day ($l h^{-1} d^{-1}$).

In summary, the demand calculations for the housing scenarios, provided in Table 3-1 to Table 3-3, show:

- Using the NWL forecast, the total water demand for the NCC area up to 2031 would be an additional 9.5 Mld-1 for Housing Scenario 1 and 11.5 Mld-1 for Housing Scenario 2. Broken down into the SHMA areas, then the demands are (Scenario 1 / Scenario 2):
 - Urban Northumberland - 5.7 Mld-1 / 7.0 Mld-1,
 - City Region Commuter - 2.2 Mld-1 / 2.6 Mld-1,
 - North Northumberland - 1.6 Mld-1 / 1.9 Mld-1.
- Using the Building Regulations Part G forecast, the total water demand for the NCC area up to 2031 would be an additional 9.2 Mld⁻¹ for Housing Scenario 1 and 11.2 Mld⁻¹ for Housing Scenario 2. Broken down into the SHMA areas, then the demands are (Scenario 1 / Scenario 2):
 - Urban Northumberland - 5.6 Mld-1 / 6.9 Mld-1,
 - City Region Commuter - 2.1 Mld-1 / 2.5 Mld-1,
 - North Northumberland - 1.5 Mld-1 / 1.8 Mld-1.

- Using the CSH forecasts, the total water demand for the NCC area up to 2031 ranges from 7.2 Mld⁻¹ for CSH Level 5 and Level 6 for Housing Scenario 1, to 11.0 Mld⁻¹ for CSH Level 1 and Level 2 for Housing Scenario 2. As an example, of the water savings CSH could deliver, the water demand for CSH Level 3 and CSH Level 4 is forecast as (Scenario 1 / Scenario 2):
 - Northumberland County Council - 8.3 Mld-1 / 10.2 Mld-1,
 - Urban Northumberland SHMA - 5.0 Mld-1 / 6.2 Mld-1,
 - City Region Commuter SHMA - 1.9 Mld-1 / 2.3 Mld-1,
 - North Northumberland SHMA - 1.4 Mld-1 / 1.7 Mld-1.

Non-Residential Demands

The RSS contained a figure of 535 hectares (ha) of key employment land to be developed between 2004 and 2021. The majority of employment developed will take place in South East Northumberland. At the present, the various previous CSs contain allocations of 344 ha (excluding Wansbeck for which no information is available). The estimates of non-residential demand should therefore be considered provisional at this stage.

The UK Water Industry has traditionally used complex econometric forecasting models to assess what may happen to the demands from industry in the future. For the Northumberland WCS, URS has based its estimates of non-residential demand on the relationship which exists between non-residential and residential water demands as reported by OFWAT. In the case of NWL, the non-residential metered demand is around 78% of the residential metered demand. This high figure reflects the importance of industries such as Chemical, Brewing, Micro-component and Food Processing/Distribution. Assuming the Northumberland area to be similar to the wider areas served by NWL, then the non-residential demand will be approximately three quarters of the residential demand.

In order to apportion which areas will see the highest non-residential demands, then information on the amount of land area to be used for employment purposes is taken into account.

Total Water Demands

Factoring in an allowance of 78% (non-residential demand) at the county-wide strategic scale, total increases in water demand across Northumberland would range from:

- 12.8 Mld⁻¹ for Scenario 1, Level 5 and Level 6 of the CSH, to
- 20.5 Mld⁻¹ for Scenario 2, using NWL consumption estimates.

These figures equate to between 8% and 13% of NWLs current forecast water supply surplus.

NWL and the EA have both previously noted that although there is a surplus to supply water within the Berwick and Fowberry WRZ, based on peak demand, there may be a deficit.

According to NWL the installation of improved aquifer level monitoring equipment at all sites in the Berwick and Fowberry WRZ zone is nearing completion. This will allow substantial data holdings to be re-evaluated against an accurate datum. The scope for a further project feasibility study as to water production within current licence conditions, via new infrastructure between networks, is nearing completion. This will ensure both the Berwick and Fowberry (Wooler) areas have an improved resilience in supply to help meet projected needs.

In addition to this NWL are working with the EA to assess the long term sustainability of the Berwick and Fowberry WRZ and its impact on the ecological status of the connected surface watercourses.

NWL are currently are also considering other options to address this deficit and potential water management schemes include:

- Metering,
- Improved infrastructure,
- Demand management,
- Leakage control.

If the above options are not sufficient to address the potential shortfall, then the following contingency plans are also suggested:

- Capital investment in a transfer scheme – to allow water to be routed within the Berwick and Fowberry WRZ,
- Implementation of contingency plans (i.e. tankering) – to bridge the deficit on the limited number of occasions it may occur every year.

6.3 Water Supply

6.3.1 *Strategic Water Supply and Infrastructure*

Information has been provided by NWL on the water supply network within the NCC area. The information presented in this section of the report is sourced mainly from their WRMP, the CAMS documents for the various catchment areas and published map information e.g. EA Aquifer maps and Source Protection Zone Maps.

The WFD status of a surface waterbody can be determined or impacted by the level of groundwater abstraction. The ecological status of a surface water body can therefore constrain the availability of groundwater for abstraction.

NWL's WRMP refers to a large amount of effort which has been put into investigating the whole resilience²⁰ of their water supply and treatment network over the preceding few years to ensure that they can transfer and treat water to match their customer's demands. The outcome of this work does not appear directly in the WRMP, which considers mainly the supply/demand balance, but which has been used to better define the DO and Outage²¹ of each of the water treatment works and will better focus their capital maintenance spending in the future. During the AMP5 period (2010-15), NWL are planning to abandon two very small spring sources within the Kielder WRZ (Swan Well and Tosson) that can no longer be considered reliable given that they now serve areas of fairly modest increase in housing which has put pressure on the supply. These springs will therefore be "piped out" by bringing in alternate supplies from other surface water treatment works (WTW).

In a similar fashion work has also been directed by NWL to the Berwick and Fowberry WRZ to gain a better understanding of the total number of properties and the split between measured and unmeasured customers. This greater understanding of this zone has led to a

²⁰ Water supply resilience – All new (and existing) water supplies should be resilient, whereby if the standard means of water provision is interrupted (be that from physical or chemical mechanisms) then there are alternative means by which supplies of potable water can be maintained.

²¹ Outage - A temporary loss of output from a water treatment works, which may either be planned or unplanned.

temporary variation of a licence that supplies the Fowberry area of this WRZ and during the early part of AMP5 it is intended to link the Berwick supply directly to the Fowberry supply thereby bringing even greater resilience to this overall zone. The Berwick and Fowberry areas are therefore considered as one WRZ in the NWL's WRMP.

The overall result of the WRMP is that NWL remains with a comfortable surplus of water supplies to the demand for water over the next 25 years in all of its WRZs and under all forecast conditions. Despite this comfortable position, there may still be areas within the NCC area where development is more advisable than in others.

To help make a judgement between the different areas, a "traffic-light" indicator has been developed to integrate the different strands of information available (Table 6-5). This system asks a number of questions about a given area in which development is proposed. For example:

TABLE 6-5: WATER SUPPLY OPTIONS – “TRAFFIC LIGHT” EXPLANATIONS			
Q	Water Supply Issue	Options	“Traffic Light” Indicator
1	Is there an existing raw water source, either surface water or groundwater, with spare licence quantity available?	Source nearby with spare licence capacity	
		Source nearby but with no spare capacity	
		No source available	
2	Is any spare water resource available based on CAMS methodology classification?	Water Available	
		No Water Available	
		Over Abstracted/Over Licensed	
3	What is the Groundwater Vulnerability ²² classification for the location?	Non-aquifer/Minor aquifer Low LP	
		Major aquifer - Low LP	
		Major aquifer - High/Intermediate LP	
4	Is there a Groundwater Source Protection Zones ²³ Types I, II and III close by the area?	No SPZ	
		SPZ III	
		SPZ I and II	

Note: A green traffic-light indicates no known constraint to development, an amber traffic light indicates that further investigation is required before development can take place and a red traffic light indicates significant existing constraint to development.

Table 6-6 shows the "Traffic-light" indicator applied to the three SHMAs identified within NCC area. The main findings are as follows:

- NWL have confirmed that all of the proposed new development areas appear to have sufficient raw water sources with spare licence quantity available,

²² Environment Agency/National Rivers Authority; Groundwater Vulnerability 1:100,000 Map Series, Sheet 1 – West Northumberland and Sheet 2 – Coastal Northumberland

²³ Environment Agency Source Protection Zone Maps; <http://www.environment-agency.gov.uk/>

- Groundwater Vulnerability mapping shows the presence of more vulnerable strata i.e. more porous ground conditions. Whilst not a “show-stopper” in its self, it is important that these groundwater conditions are fully taken into account when the types of Sustainable Urban Drainage Systems (SuDS) techniques are being considered for these development areas,
- In the area around Berwick, the presence of SPZs around several abstraction sources upstream of the town, means that there will need to be consideration given to the siting of development areas to ensure that adequate protection of existing abstraction sources,
- In general, the NWL’s water supply system is well connected (at least within the Kielder Zone), allowing the ready re-distribution of potable water. The principle of water resilience is something which must be incorporated into the design of any new development areas which are being proposed within the NCC area.

TABLE 6-6: WATER SUPPLY BASELINE ASSESSMENT FOR NORTHUMBERLAND

Water Resource Questions	North Northumberland	City Commuter	Urban Northumberland	Comments
Is there an existing raw water source with spare licence quantity available?				-
Is there spare water resource available based on CAMS Methodology Classification?				River Coquet – OL/NWA (Red). River Font – NWA (Amber)
What is the groundwater vulnerability classification for the location?				Mainly Minor Aquifer but with some patches of Major Aquifer -High/Low LP
Is there a groundwater source protection zone 1/2/3 local to the area?				Both SPZ I and II occur upstream of Berwick and around Wooler

6.3.2 Potential Risks to Water Supplies

In the preparation of its WRMP, NWL will have assessed the potential risks to water supplies in the NCC area, through a measure known as Target Headroom. Target Headroom has been defined as:

“the minimum buffer that a prudent water company should allow between supply (including raw-water imports and excluding raw-water exports) and demand to cater for specified uncertainties (except those due to outages) in the overall supply-demand resource balance”.

The methodologies which are used to define this term are standardised across the water industry and take into account a number of factors including:

Supply Related

- Vulnerable surface water licences,

- Vulnerable groundwater licences,
- Time limited licences,
- Bulk imports,
- Gradual pollution causing a reduction in abstraction,
- Accuracy of supply side data,
- Uncertainty of impacts of climate change on source yield,
- Uncertain output from new resource developments.

Demand Related

- Accuracy of sub-component data,
- Demand forecast variation,
- Uncertainty of impacts of climate change on demand,
- Uncertain outcome from demand management measures.

6.4 Water Resources and Water Supply Summary

The overall picture indicates:

- Most of the river catchments in NCC are classified by the EA as having some 'Water Available'. The EA aim to categorise these catchments in the future as either having 'No Water Available', 'move towards No Water Available' or 'Water Available until the unit reaches ecological river flow objectives',
- Two catchments, the River Coquet (upper and lower) and River Font both have issues to do with the water resources at certain times of year,
- In terms of NWL existing abstraction licences, 76% of their surface water licences (including reservoir licences) are utilised, whereas only 46% of groundwater licences are utilised,
- A large volume of spare licence quantity is held by NWL, mainly within the Kielder WRZ. This large extra volume was granted to enable NWL to supply the heavy industries in the North East but which have now declined and hence reducing water demands in this area,
- Under the proposed development figures from NCC and based on Water Company consumption figures, the maximum total water demand for the NCC area up to 2031 under Housing Scenario 1 would be 9.5 Mld⁻¹. Broken down into the individual proposed new development areas, then the demands are highest in Urban Northumberland followed by City Commuter area and North Northumberland. Under Housing Scenario 2 the figure is 11.5 Mld⁻¹,
- Using the CSH estimates of water consumption, the minimum total water demands would be 7.2 Mld⁻¹ under Housing Scenario 1 (CSH Level 5 and CSH Level 6). Under Housing Scenario 2 the figure is 8.6 Mld⁻¹,

- Making a broad scale allowance of 78% for non-residential demand, the total additional demand for water in Northumberland post development would range from 12.8 Mld⁻¹ and 20.5 Mld⁻¹, which equates to between 8% and 13% of NWLs current total surplus,
- NWL's WRMP shows a comfortable surplus of water supplies over demand for water over the next 25 years in all of its water resource zones and under all forecast conditions,
- Certain other areas, such as upstream of Berwick, where the town's water supply is abstracted from groundwater sources, consideration will need to be given to the siting of development areas to ensure the adequate protection of existing abstraction sources.

7

WASTEWATER COLLECTION, TREATMENT AND DISPOSAL
POSITION STATEMENT (MAY 2012)

At this stage, due to the uncertainties over the scale and location of the proposed new development across Northumberland and the availability of suitable data a number of assumptions have been made for the purpose of the report.

It is essential that the wastewater assessment is continually reviewed in detail by NCC and NWL to ensure that any constraints to new development are fully identified at an early stage.

Consultation between NCC, NWL and URS will also allow the screening out of areas (networks and/or WwTW) that have been considered to be approaching, at, or exceeding their capacity (headroom) – during this initial assessment.

As part of this assessment, the following datasets and information has been used:

Northumberland County Council

- Broad locations for new development across the three SHMAs,
- Proposed development figures (residential and employment) for each area.

Northumbrian Water

- Limited sewer network data (no detail of pipe inverts and/or gradients),
- Sewer flooding risk GIS layer highlighting areas currently at risk from network flooding,
- Locations across the network where schemes are planned to take place during AMP5,
- Comment on the headroom at each of the WwTW identified as likely to accept new proposed new development.

Environment Agency

- Details of consents for WwTW across Northumberland,
- Comment on which WwTW are approaching their consented limits.

7.1

Introduction

This section will identify the wastewater collection, treatment and disposal for those settlements identified as proposed development areas up to 2031 and any constraints associated with these. This will include:

- At a strategic/town-wide level, where and how wastewater will be collected and any overriding constraint issues with the existing wastewater network i.e. from known sewer flooding hotspots, and constraints identified by NWL,
- Based on the identified Wastewater Treatment Works (WwTW) serving each proposed new development area, identify any known or expected constraints for these works based on the hydraulic, process and treatment constraints of the individual works,

- An assessment of whether there are likely to be major constraints to the disposal of additional wastewater into the existing water environment (river, estuary and sea) and associated ecological sites and likely mitigation measures required,
- Based on the above assessments, a consideration of likely strategic wastewater infrastructure and funding required to serve potential new development and timescales for delivery of this.

Municipal WwTW that serve a domestic population of <250 do not normally have a numerical limit for sanitary parameters of SS (Suspended Solids), Biochemical Oxygen Demand (BOD) and ammonia. The WwTW are designed and maintained to avoid a significant environmental impact upon the receiving watercourses and due to their size, these assets present a lower risk to the environment. Although the normal cut off for transfer to numerical limits is a population of 250 these assets vary in design sizing according to the population served. Acceptance of new development to a catchment served by a WwTW will depend upon design sizing and performance of the asset and therefore development in these catchments is restricted.

Proposed development in Northumberland is widespread, and covers the three strategic housing market areas (SHMAs) of:

- North Northumberland,
- City Commuter Region,
- Urban Northumberland.

Within each of the SHMAs, development figures for the RSS targets for proposed residential development (Scenario 1) and the RSS targets plus 20% (Scenario 2) have been tested. An assessment of the proposed employment development has also been considered.

7.1.1 *North Northumberland SHMA*

Total development figures within the North Northumberland SHMA are 3,270 properties under Scenario 1, increasing to 3,924 properties under Scenario 2, with an allowance for 61.4 ha of employment land. Within the North Northumberland SHMA, development is focused on the following areas:

- | | |
|--------------------------------|--------------------------------|
| • Alnwick, | • Rest of former Berwick Area, |
| • Rest of former Alnwick Area, | • Rothbury, |
| • Amble, | • Seahouses, |
| • Belford, | • Wooler. |
| • Berwick, | |

7.1.2 *City Commuter Region SHMA*

Total proposed figures for new development within the City Commuter Region SHMA are 4,518 properties under Scenario 1, increasing to 5,422 properties under Scenario 2, with an allowance for 67.5 ha of employment land. Within the City Commuter Region SHMA, development is focused on the following areas:

- | | |
|--------------|---------------|
| • Allendale, | • Bellingham, |
|--------------|---------------|

- Coastal Villages,
- Corbridge,
- Haltwhistle,
- Haydon Bridge,
- Hexham,
- Morpeth,
- Ponteland,
- Prudhoe,
- Rest of Commuter Pressure Area (Tynedale),
- Rest of former Castle Morpeth,
- Rest of Rural Area (Tynedale).

7.1.3 *Urban Northumberland SHMA*

Total proposed new development figures within the Urban Northumberland SHMA are 16,820 properties under Scenario 1, increasing to 20,184 properties under Scenario 2, with an allowance for 509.5 ha of employment land.

Within the Urban Northumberland SHMA, development is focused on the following areas:

- Ashington,
- Bedlington/Bedlington Station,
- Blyth,
- Cambois,
- Choppington,
- Cramlington,
- Cramlington
(additional Housing Scenario),
- Guide Post/Stakeford,
- Newbiggin-by-the-Sea,
- Seaton Valley Villages.

7.2 Wastewater Network Summary

NWL are responsible for the wastewater network serving Northumberland. For the purpose of this Outline WCS, NWL have provided a GIS layer of the sewer network, though this limited information and contains no invert/gradient information. As such, a 'high level' assessment of the broad network constraints has been undertaken for this Outline WCS. Figure 7-1 shows the location of wastewater treatment works (WwTW) and sewer networks across Northumberland. Figure 7-2 is an overview map of Northumberland showing the location of areas at risk of DG5 sewer flooding and the location of NWL schemes currently planned to reduce the risk of flooding in Northumberland. The associated insets that follow Figure 7-2 are zoomed in locations of where there is a current risk of DG5 sewer flooding incidents.

The following 'high level' assessments set out the foul flows constraints from the new development. The Flood and Water Management Act (2010) removes the automatic right of connection for surface waters and therefore surface water flows should be managed by using the hierarchy of preference in Part H of Schedule 1 of the Building Regulations²⁴. (Refer to Table 2.1) for an explanation of the Constraint Traffic Lights.

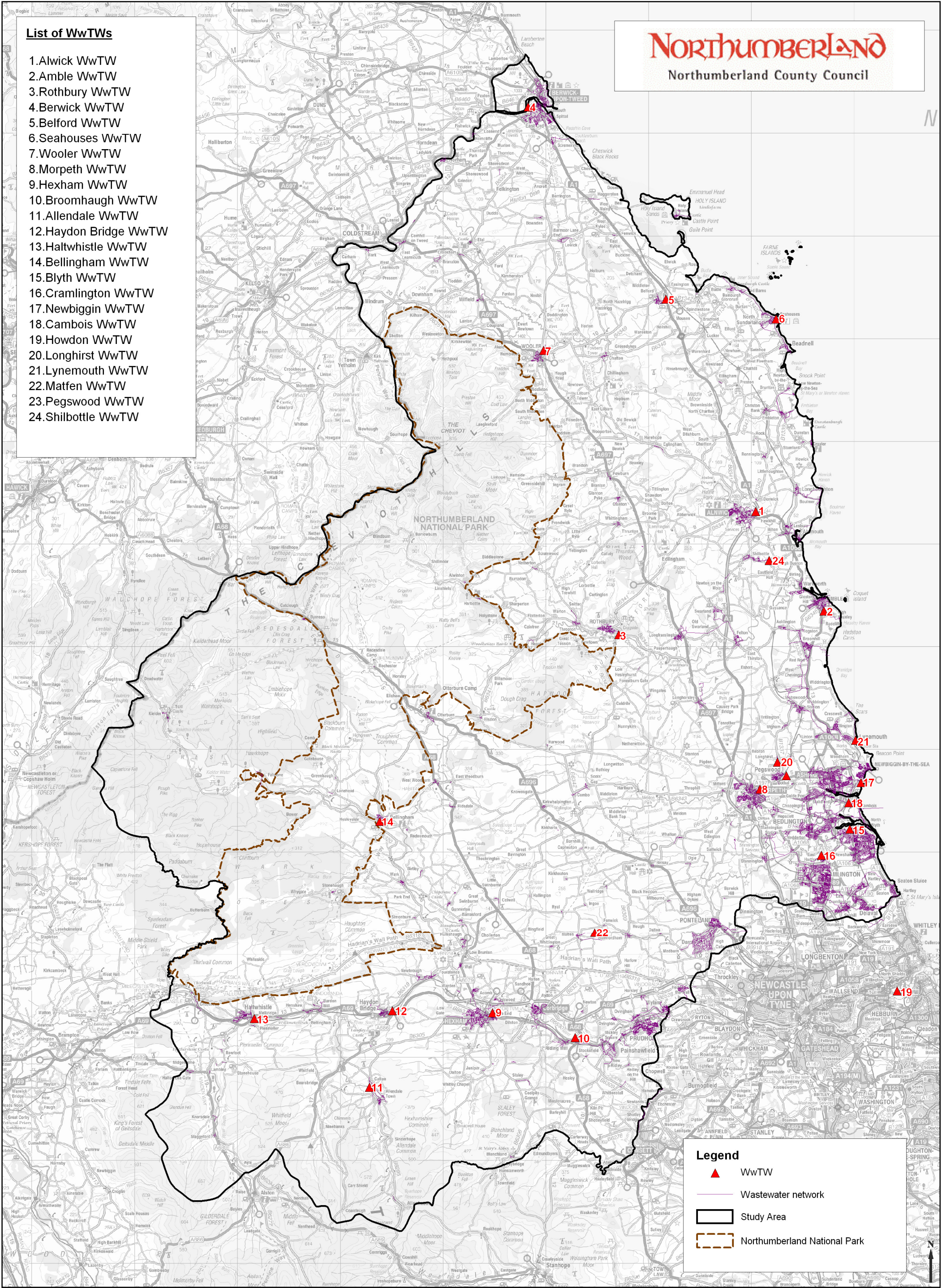
²⁴ Office of Deputy Prime Minister (2002) The Building Regulations. 2000. Drainage and waste disposal, Approved document H. Available online http://www.planningportal.gov.uk/uploads/br/BR_PDF_ADH_2002.pdf

List of WwTWs

- 1.Alwick WwTW
- 2.Amble WwTW
- 3.Rothbury WwTW
- 4.Berwick WwTW
- 5.Belford WwTW
- 6.Seahouses WwTW
- 7.Wooler WwTW
- 8.Morpeth WwTW
- 9.Hexham WwTW
- 10.Broomhaugh WwTW
- 11.Allendale WwTW
- 12.Haydon Bridge WwTW
- 13.Haltwhistle WwTW
- 14.Bellingham WwTW
- 15.Blyth WwTW
- 16.Cramlington WwTW
- 17.Newbiggin WwTW
- 18.Cambois WwTW
- 19.Howdon WwTW
- 20.Longhirst WwTW
- 21.Lynemouth WwTW
- 22.Matten WwTW
- 23.Pegswood WwTW
- 24.Shilbottle WwTW

NORTHUMBERLAND

Northumberland County Council



Legend



WwTW



Wastewater network

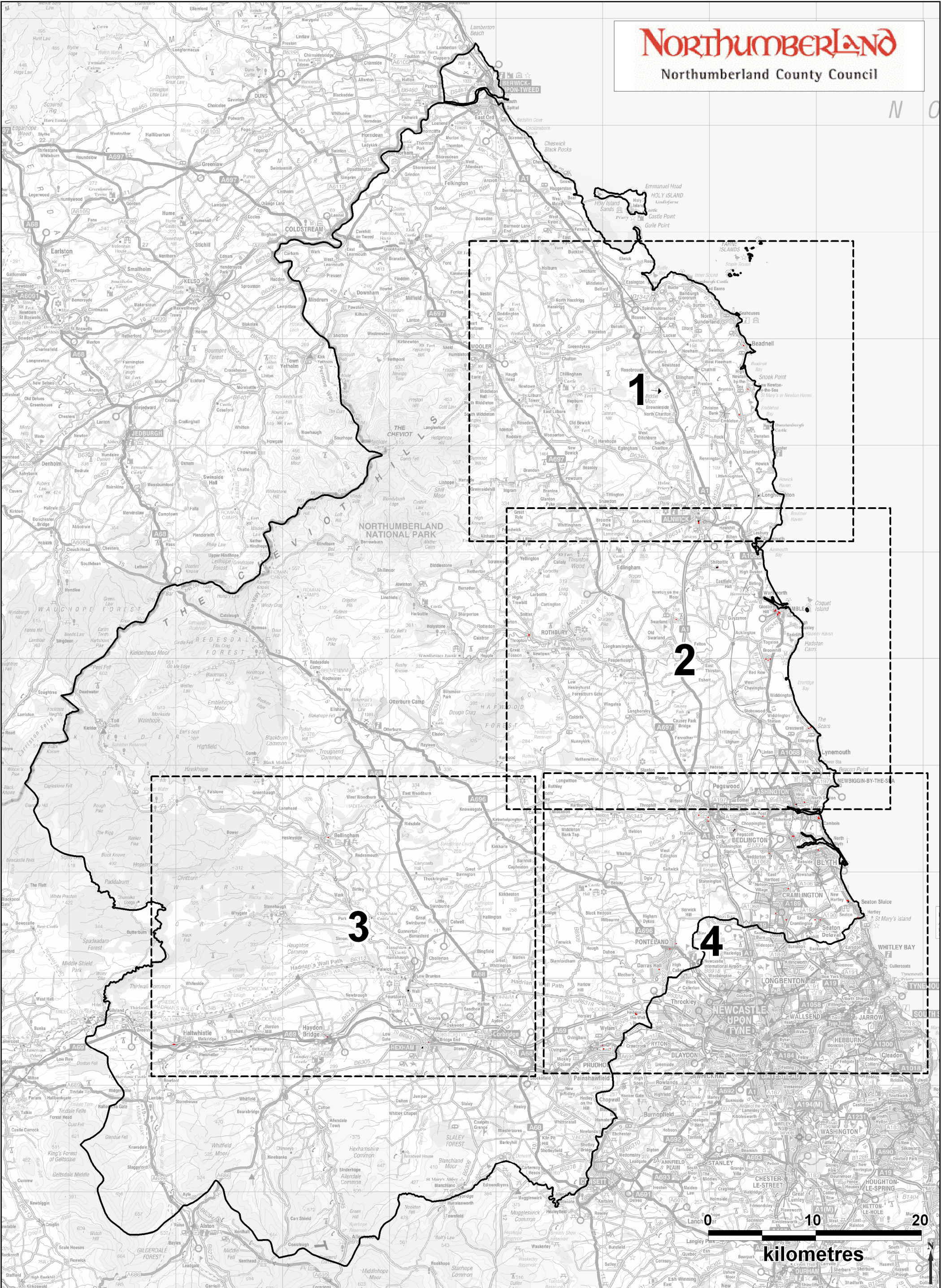



Study Area

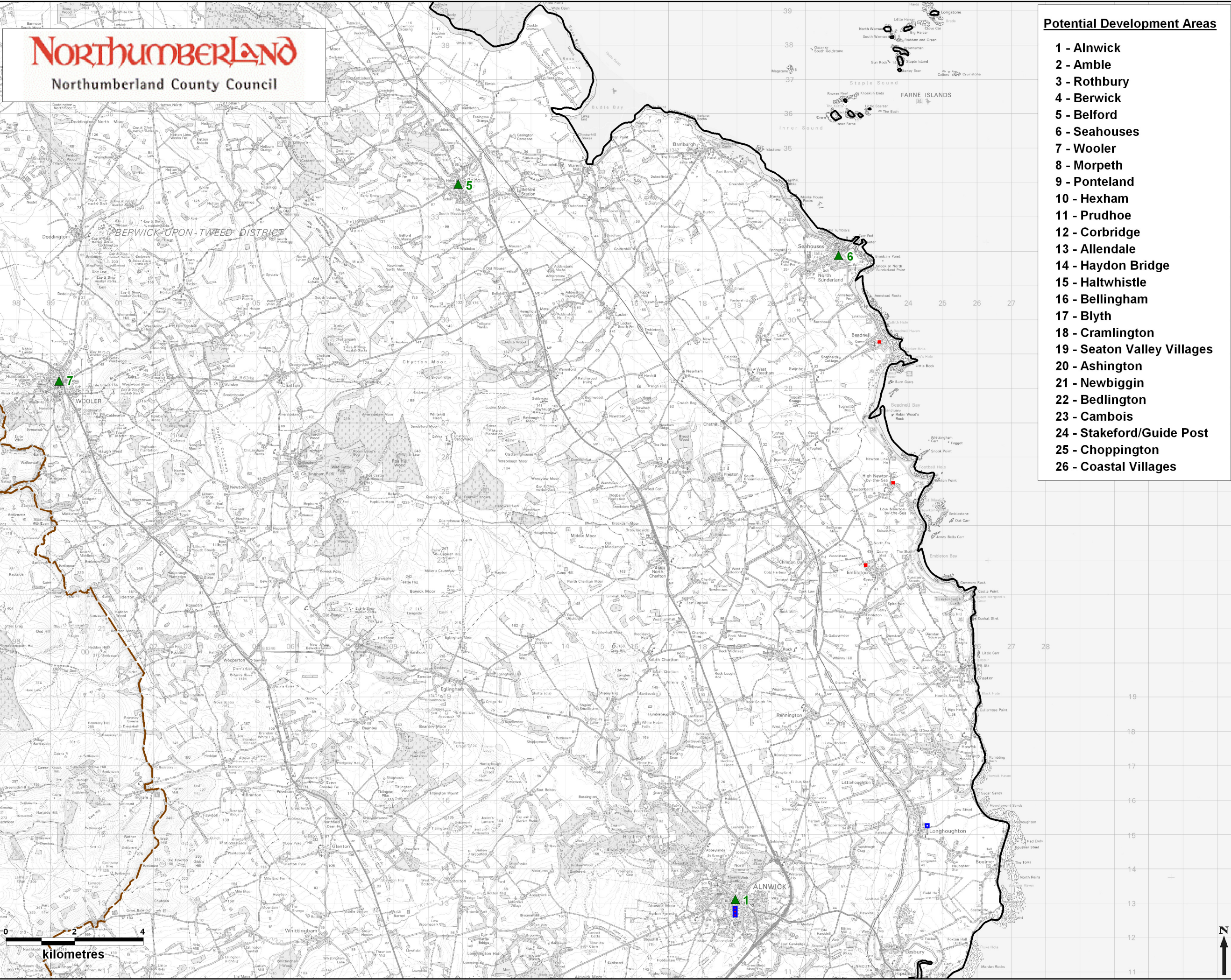


Northumberland National Park

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										FIGURE 7-1	
										Rev	



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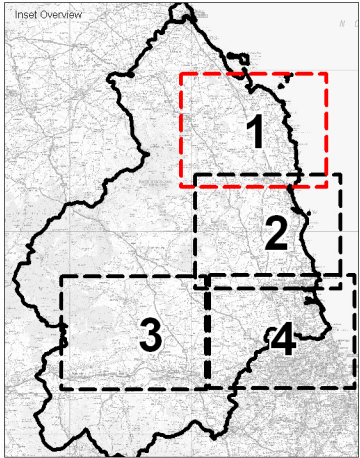


Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

KEY:

- Sewer Flooding Incidents reported to NWL (100m square)
- NWL AMP Scheme
- ▲ Potential Development
- ▼ Potential Development
- Study Area
- Northumberland National Park

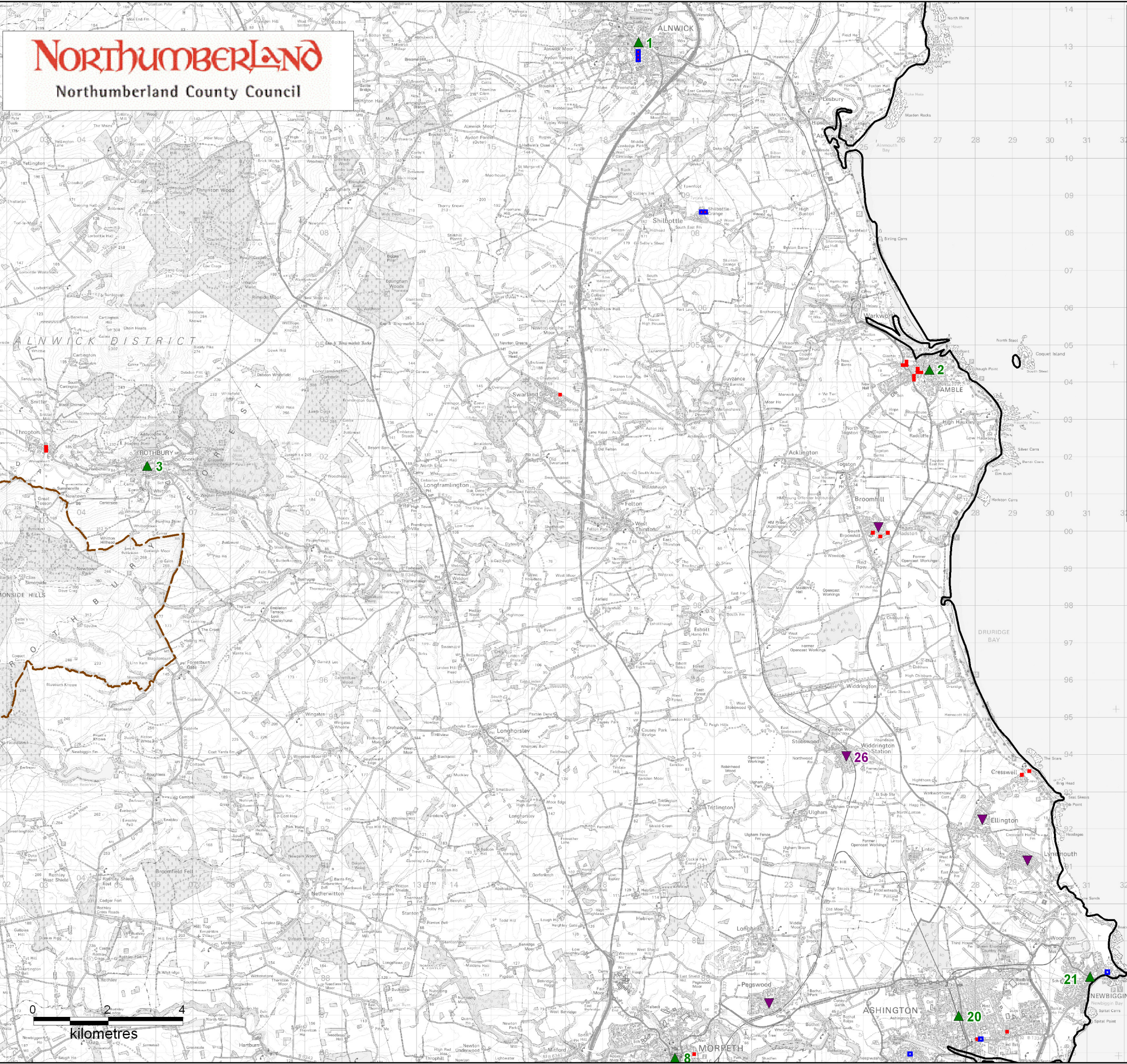


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Northumberland

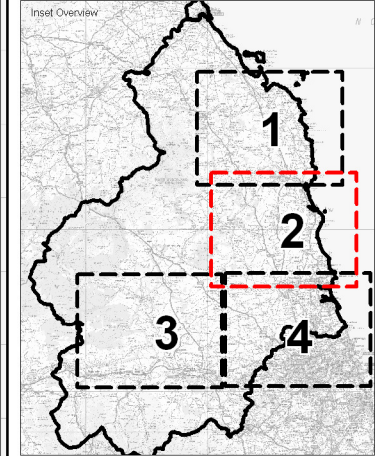
Northumberland County Council

Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
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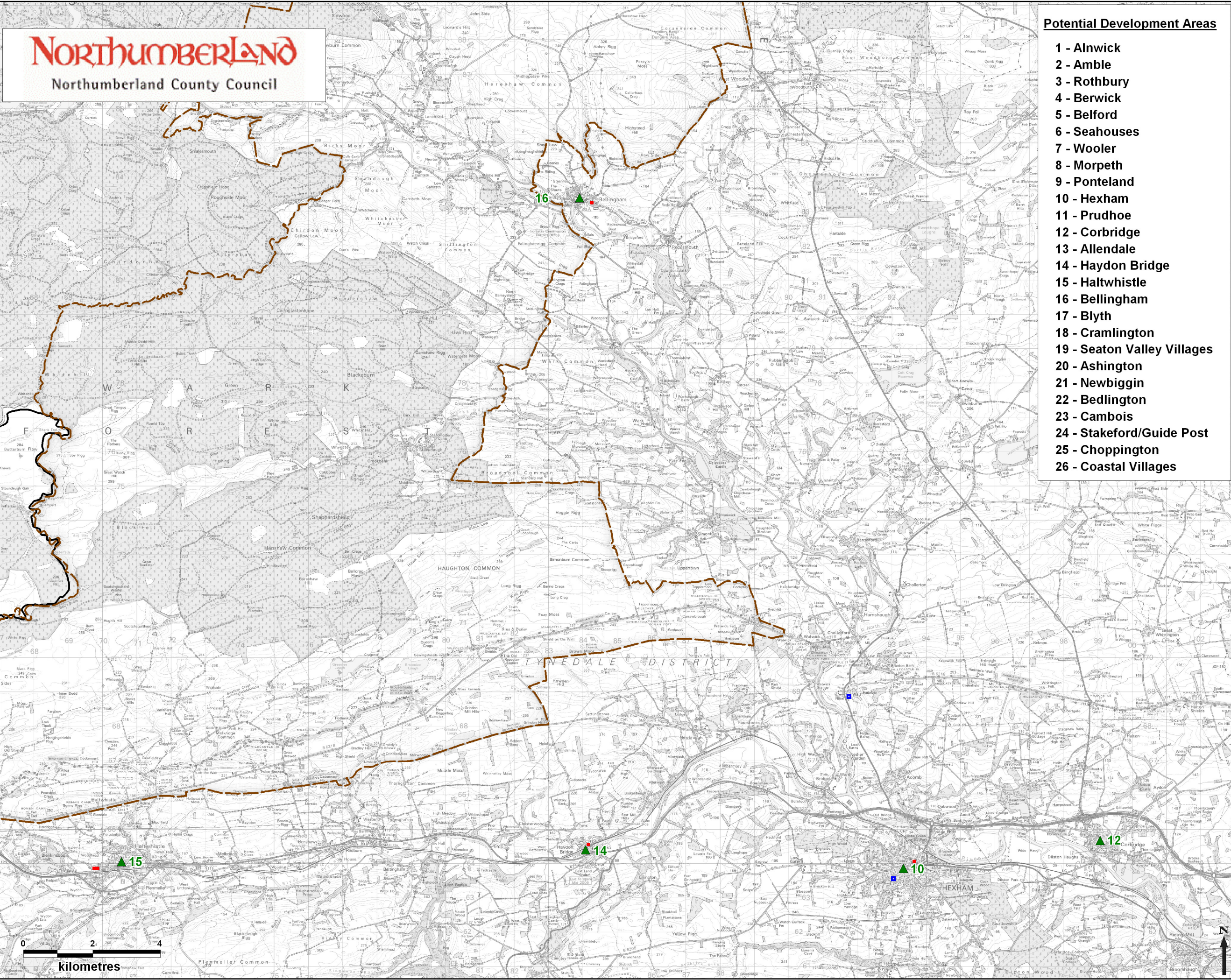


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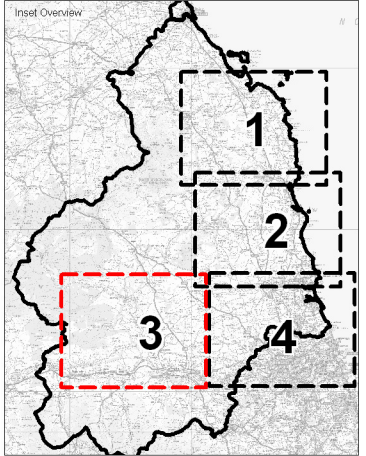


Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

KEY:

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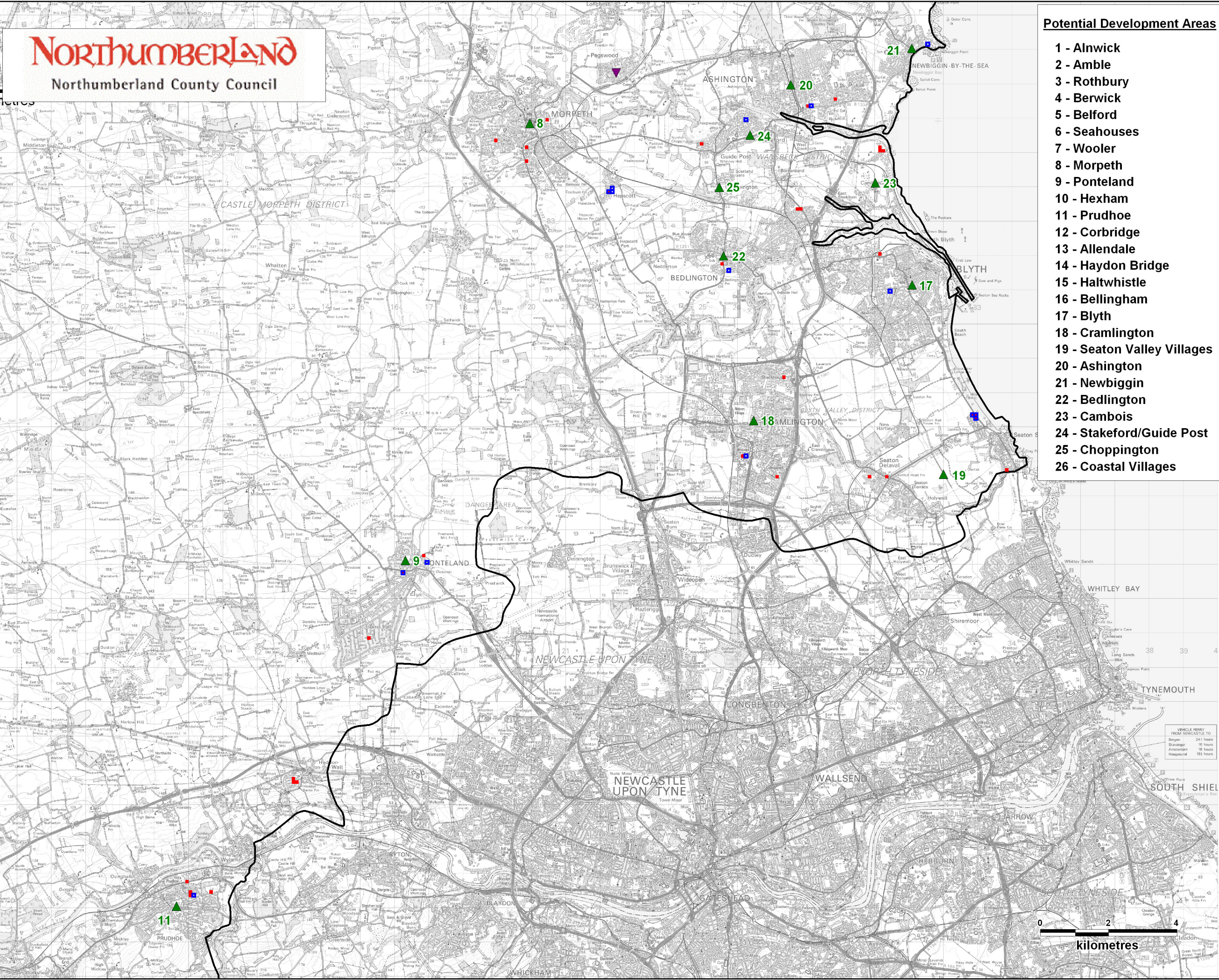
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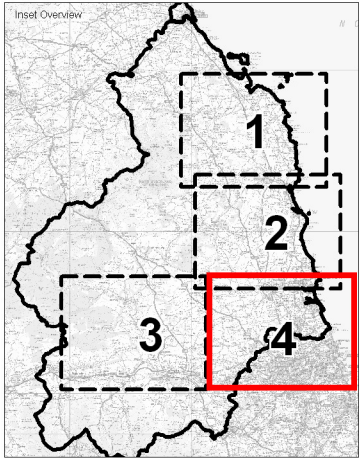
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Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
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- KEY:
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Revision				

7.3 North Northumberland SHMA

7.3.1 *Alnwick*

- Under Scenario 1, 575 new dwellings are proposed within Alnwick and this increases to 690 new dwellings under Scenario 2. In addition, 16.2 ha of employment land are also planned for Alnwick.
- Development within Alnwick will drain to Alnwick WwTW which is situated to the east of Alnwick, immediately west of the A1. Alnwick WwTW discharges treated effluent into the River Aln.
- Three main combined sewer pipes converge west of the WwTW. A 900mm diameter sewer drains the central eastern area of Alnwick, a 525mm diameter draining the north western and central southern areas and a 300mm diameter draining the south eastern area.
- **East of Alnwick** - Local connections may be required into the 300mm diameter combined sewer to the west of the A1.
- **North of Alnwick** - Local connections may be required into the combined sewers in the vicinity of the Council Offices (525mm diameter) and slaughter house (900mm/300 mm diameter).
- **South of Alnwick** - Local connections into the existing 150mm diameter foul sewer adjacent the Lionheart Enterprise Park or the 225mm diameter foul sewer beneath Weavers Way may be required.
- **West of Alnwick** - Local connections may be required into the 225mm diameter combined sewers beneath Chapel Lands and Lower Barresdale.
- Generally, development to the north and east of Alnwick would be most favoured as it is in closer proximity to Alnwick WwTW and would be less problematic to provide new sewers or connect into/increase the capacity of the existing trunk sewers. Discussions should be held with NWL to confirm that there is sufficient capacity, without reinforcements to the network.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that areas in central Alnwick have experienced sewer flooding indicating that there may be limited capacity in the existing network in these parts of Alnwick. Investment to the network at Alnwick is currently taking place.

Alnwick Sewer Network Risk - AMBER

7.3.2 *Rest of former Alnwick area*

- Under Scenario 1, 415 new dwellings are proposed within the rest of the former Alnwick area and this increases to 498 new dwellings under Scenario 2. In addition, up to 4.8 ha of employment land is also planned for the rest of the former Alnwick area (in combination with Rothbury).

Summary

Without details of the spatial distribution of development across the rest of the former Alnwick area, it is not possible to assess the impact on the wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Rest of former Alnwick Area Sewer Network Risk - GREEN

7.3.3

Amble

- Under Scenario 1, 575 new dwellings are proposed within Amble and this increases to 690 new dwellings under Scenario 2. In addition, 10.4 ha of employment land are also planned for Amble.
- Development within Amble will drain to Amble WwTW which is situated to the south of Amble, adjacent to Percy Drive. Amble WwTW discharges treated effluent into the North Sea via a long sea outfall.
- **East of Amble** - Local connections may be required into the combined sewer to south of the New Park Caravan Site.
- **North of Amble** - Local connections may be required into the 250mm diameter combined sewer to the south west of the River Coquet.
- **South of Amble** - Local connections may be required into the 225mm diameter combined sewer to the south of the Amble Industrial Estate.
- **West of Amble** - Local connections may be required into the combined sewer to the west of the Amble Industrial Estate adjacent the running track.
- Generally, development to the south west and south east of Amble would be most favoured as it is in closer proximity to Amble WwTW and would be less problematic to provide new sewers or connect into/increase the capacity of the existing trunk sewers. Discussions should be held with NWL to confirm that there is sufficient capacity, without reinforcements to the network.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

However, information provided by NWL has confirmed that areas in north-west Amble are currently at risk from sewer flooding indicating that there may be limited capacity in the existing network in the north-west areas of Amble.

Amble Sewer Network Risk - AMBER

7.3.4 *Belford*

- Under Scenario 1, 125 new dwellings are proposed within Belford and this increases to 150 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Belford (in combination with Berwick, Seahouses, Wooler and the rest of the former Berwick area).
- Development within Belford will drain to Belford WwTW which is situated to the east of Belford, immediately west of the A1. Belford WwTW discharges treated effluent into Belford Burn.
- **East of Belford** - In addition to the pipe connecting into the Belford WwTW, the largest existing combined sewer in the east is located in the vicinity of The Limes (300mm diameter). An existing 225mm diameter combined sewer is also located in the vicinity of Gibsons Cottage. Local connections would be required.
- **North of Belford** - Local connections into the existing 150mm diameter combined sewer along North Bank would be required.
- **South of Belford** - Local connections into the existing 150mm diameter foul sewers south of Rogerson Road and Raynhan Way would be required.
- **West of Belford** - Local connections into the existing 150mm diameter combined sewer along West Street would be required.
- Generally, development to the north, east and south of Belford would be most favoured being in closer proximity to Belford WwTW and would be less problematic to provide new sewers or connect into/increase the capacity of the existing trunk sewers. Discussions should be held with NWL to confirm that there is sufficient capacity, without reinforcements to the network.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Belford.

Belford Sewer Network Risk - GREEN

7.3.5 *Berwick*

- Under Scenario 1, 900 new dwellings are proposed within Berwick and this increases to 1,080 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Berwick (in combination with Belford, Seahouses, Wooler and the rest of the former Berwick area).
- Development within Berwick will drain to Berwick WwTW which is situated to the west of Berwick on the south bank of the River Tweed. Berwick WwTW discharges treated effluent into the tidal River Tweed.
- **East of Berwick** - N/A.

- **North of Berwick** - Local connections into the existing combined sewers along Duns Road (150mm diameter) or beneath the A1 (225mm diameter) would be required.
- Alternatively, local connections into 150mm diameter foul water sewers beneath either Castle Terrace, Meadow Grange the North Road Industrial Estate.
- **South of Berwick** - Local connections into either the existing 150mm diameter foul water sewers south of Cemetery Lane or into a 225mm diameter combined sewer beneath Sunnyside Cut (A1167) would be required.
- **West of Berwick** - Local connections into the existing combined or foul water sewers (both 150mm diameter) in the vicinity of East Ord would be required.
- Generally, development to the south and west of Berwick would be most preferable as it is in closer proximity to Berwick WwTW and would be less problematic to provide new sewers or connect into/increase the capacity of the existing trunk sewers, however potential development is planned in the Berwick Town Eastern Arc AAP. As the AAP progresses discussions should be held with NWL to confirm that there is sufficient capacity to accommodate the potential development, without reinforcements to the network.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Berwick.

Berwick Sewer Network Risk - GREEN

7.3.6

Rest of former Berwick area

- Under Scenario 1, 95 new dwellings are proposed within the rest of the former Berwick area and this increases to 114 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for the rest of the former Berwick area (in combination with Belford, Berwick, Seahouses and Wooler).

Summary

Without details of the spatial distribution of development across the rest of the former Berwick area, it is not possible to assess the impact on the wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity.
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Rest of former Berwick Area Sewer Network Risk - GREEN

7.3.7 *Rothbury*

- Under Scenario 1, 185 new dwellings are proposed within Rothbury and this increases to 222 new dwellings under Scenario 2. In addition, up to 4.8 ha of employment land is also planned for Rothbury (in combination with the rest of the former Alnwick area).
- Development within Rothbury will drain to Rothbury WwTW which is situated to the south east of Rothbury, between the River Coquet and Mill Lane. Rothbury WwTW discharges treated effluent into the River Coquet.
- **East of Rothbury** - N/A.
- **North of Rothbury** - Local connections could be made into the existing combined sewers on the opposite bank to the caravan park (300mm diameter), beneath Hillside Road, beneath the Woodlands (150mm diameter) and in the vicinity of Black Crofts.
- Alternatively, local connections could be made into 150mm diameter foul sewers east of Addycombe Close and beneath Blaeberry Hill
- **South of Rothbury** - Local connections could be made into the existing combined sewers beneath Croft Road and Jubilee Crescent (both 150mm diameter), or east of Mill Lane (450mm diameter).
- **West of Rothbury** - Local connections could be made into the existing combined sewers beneath Gravelly Bank (150mm diameter) or south of High Street (225mm diameter).
- Generally, development to the south and west of Rothbury would be most favoured as it is in closer proximity to Rothbury WwTW and would be less problematic to provide new sewers or connect into/increase the capacity of the existing trunk sewers. Discussions should be held with NWL to confirm that there is sufficient capacity, without reinforcements to the network.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Rothbury.

Rothbury Sewer Network Risk – GREEN

7.3.8 *Seahouses*

- Under Scenario 1, 200 new dwellings are proposed within Seahouses and this increases to 240 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Seahouses (in combination with Belford, Berwick, Wooler and the rest of the former Berwick area).
- Development within Seahouses will drain to Seahouses WwTW which is situated to the east of Seahouses. Seahouses WwTW discharges treated effluent into the North Sea.
- Development in Seahouses will drain via the existing sewer network, however discussions should be held with NWL to confirm that there is sufficient capacity, without reinforcements to the network.

- **East of Seahouses** - N/A.
- **North of Seahouses** - N/A.
- **South of Seahouses** - Development to the south of Seahouses will drain via the existing network to Seahouses WwTW on the coast, with connection to the sewers at North Sunderland or the pumped sewer along the coast road taking flow from Beadnell to Seahouses WwTW.
- **West of Seahouses** - Development to the west of Seahouses will drain via the existing network to Seahouses WwTW on the coast, with connection to the sewers at North Sunderland. Although development to the North West of Seahouses may also connect into the pumped sewer running along the coast road, taking wastewater from Bamburgh to the north.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Seahouses.

Seahouses Sewer Network Risk - GREEN

7.3.9

Wooler

- Under Scenario 1, 200 new dwellings are proposed within Wooler and this increases to 240 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Wooler (in combination with Belford, Berwick Seahouses and the rest of the former Berwick area).
- Development within Wooler will drain to Wooler WwTW which is situated to the north east of Wooler. Wooler WwTW discharges treated effluent into Wooler Water, a tributary of the River Till.
- All development in Wooler will drain to Wooler WwTW via the existing 375mm diameter sewer, subject to capacity.
- Development to the north of Wooler is likely to be pumped under Wooler Water.
- **East of Wooler** - Development to the east of Wooler will connect into the existing network and drain via the existing 375mm diameter sewer which runs parallel with Wooler Water.
- **North of Wooler** - Development to the north and North West of Wooler is likely to be pumped under Wooler Water, connecting directly to the 375mm diameter sewer which runs parallel to Wooler Water.
- Local connections to the network will be required and capacity checks will also need to be made.
- **South of Wooler** - Development to the south and south west of Wooler is likely to drain via the 300mm diameter gravity sewer to the north of Weetwood Road Bridge or the 225mm diameter gravity sewer to the south of Weetwood Road Bridge.

- Local connections to the network will be required and capacity checks will also need to be made.
- **West of Wooler** - Development to the west of Wooler will drain via the existing network and either via the pumped sewer under Wooler Water to the north east of Wooler, or the gravity sewers to the north and south of Weetwood Road Bridge.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Wooler.

Wooler Sewer Network Risk - GREEN

7.4 City Commuter Region SHMA

7.4.1 Allendale

- Under Scenario 1, 79 new dwellings are proposed within Allendale and this increases to 95 new dwellings under Scenario 2. 1.0 ha of employment land is also planned for Allendale,
- Development within Allendale will drain gravitationally via combined sewers to Allendale WwTW which is situated to the north west of Allendale, to the south of Catton. Allendale WwTW discharges treated effluent into the River East Allen.
- There are two main sewers draining from existing developments approximately parallel to the River East Allen and along the B6303, so development in the lower part of the network, i.e. north of Allendale and east of the river, would be preferable. New development east of Allendale could probably also connect to the trunk sewer that drains along the B6303. The B6303 drain is a single pipe (150mm diameter). Parallel to the river there is a dual drain and it is assumed that both are 150 mm diameter (data is only available for one).
- South of the town, sewerage from any new development may be constrained according to the capacity of the existing network in the town, although the 150mm diameter trunk sewer appears to extend south to Shilburn Road
- To the west, there is potential connectivity to the sewer draining along the B6295 at Thornley Gate (size / capacity data are not available), although this sewer does not extend south of Ashleigh House. Because this sewer crosses the River East Allen before connecting to the WwTW, capacity upgrades may be difficult.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Allendale.

Allendale Sewer Network Risk - GREEN

7.4.2 *Bellingham*

- Under Scenario 1, 71 new dwellings are proposed within Bellingham and this increases to 85 new dwellings under Scenario 2. In addition, 0.5 ha of employment land is also planned for Bellingham.
- Development within Bellingham will drain to Bellingham WwTW which is situated to the south of Bellingham, immediately south of Boat Road. Bellingham WwTW discharges treated effluent into the River North Tyne.
- Given the proximity of the WwTW to the River North Tyne, development would be not preferable to the south west of Bellingham, but there are no obvious drainage constraints elsewhere. The drainage networks from both eastern and western sides of the existing town converge into 225mm diameter combined sewers that in turn converge at Boat Road to deliver wastewater to the WwTW.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

However, information provided by NWL has confirmed that areas in east are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the east areas of Bellingham.

Bellingham Sewer Network Risk - AMBER

7.4.3 *Coastal Villages*

Under Scenario 1, 980 new dwellings are proposed within the Coastal Villages and this increases to 1,176 new dwellings under Scenario 2. In addition, 1.0 ha of employment land is also planned for the Coastal Villages.

Development within the Coastal Villages is likely to drain to a number of different WwTW, dependant upon the spatial distribution of development. However without more detail on the distribution of development it is difficult to assess the impact any development would have on network capacity. However it is anticipated that areas of development will be steered to areas of lowest risk avoiding areas of known capacity issues.

Ellington

It is proposed that 200 dwellings will be constructed in Ellington under both Scenarios. Development within Ellington will drain to the Lynemouth WwTW which discharges treated effluent to the Lyn Estuary.

Lynemouth

It is proposed that 300 dwellings will be constructed in Lynemouth under both Scenarios. Development within Lynemouth will drain to the Lynemouth WwTW which discharges treated effluent to the Lyn Estuary.

Others (Including Widdrington Station, Pegswood and Hadston)

It is proposed that under Scenario 1 480 dwellings will be constructed within the other Coastal Villages and under Scenario 2 676 dwellings. Without details of the spatial distribution of development across the other Coastal Villages, it is not possible to assess the impact on the

wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues such as areas to the south of Hadston. Where this is not feasible, local upgrades may be required.

Coastal Villages Network Risk - GREEN

7.4.4 *Corbridge*

- Under Scenario 1, 79 new dwellings are proposed within Corbridge and this increases to 95 new dwellings under Scenario 2. No employment land is proposed.
- Development within Corbridge will drain to Broomhaugh WwTW which is situated on the south bank of the River Tyne, to the east of Broomhaugh and the immediate west of the A68. Broomhaugh WwTW serves Corbridge, Riding Mill and Painshawfield / Park Estate discharges treated effluent into the River Tyne.
- The whole of the Corbridge drainage network drains to a 375 mm combined sewer crossing under the River Tyne at Well Bank / St Andrew's Well (north west of Corbridge Bridge), and this is a potential constriction to any new development north of the river. The network drains to St Andrews Well from a 300mm diameter pipe northern Corbridge and a 225mm diameter pipe from the east.
- South of the River Tyne, a 375mm combined sewer drains gravitationally from Farnley to Riding Mill. Drainage from Riding Mill and Broomhaugh is then pumped to the WwTW via 375mm and 450mm diameter pipes. The larger pipe diameters reflect the absence of gravitational drainage. Pumping capacity is therefore also a potential constraint at this point.

Summary

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Corbridge.

A more detailed examination of the potential throttling points in the existing drainage network (the crossing and pumping station described above) should however be undertaken to inform the capacity to accept new drainage connections in this area.

Corbridge Sewer Network Risk - GREEN

7.4.5 *Haltwhistle*

- Under Scenario 1, 262 new dwellings are proposed within Haltwhistle and this increases to 316 new dwellings under Scenario 2. In addition, 5.0 ha of employment land are also planned for Haltwhistle.
- Development within Haltwhistle will drain to Haltwhistle WwTW which is situated to the south east of Haltwhistle, between the railway and the River South Tyne. Haltwhistle WwTW discharges treated effluent into Haltwhistle Burn, which flows into the River South Tyne.

Summary

The drainage network north of the river is dominated by gravitational combined sewers, but capacity data is limited. In terms of drainage networks though, development is clearly more favourable north of the River South Tyne, since this would preclude the need for installation of new infrastructure and river crossings.

However, information provided by NWL has confirmed that areas in south-west of Haltwhistle are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the south-west areas of Haltwhistle.

Haltwhistle Sewer Network Risk - AMBER

7.4.6

Haydon Bridge

- Under Scenario 1, 79 new dwellings are proposed within Haydon Bridge and this increases to 95 new dwellings under Scenario 2. In addition, 1.0 ha of employment land is also planned for Haydon Bridge.
- Development within Haydon Bridge will drain to Haydon Bridge WwTW which is situated to the east of Haydon Bridge, immediately north of the A69. Haydon Bridge WwTW discharges treated effluent into the River South Tyne.

Summary

In general development to the south of the River South Tyne is likely to be more favourable as it does not need to pass under the river via the 150mm diameter inverted siphon.

Due to the limited development aspirations in Haydon Bridge it is likely that development can be supported by the existing network. However, information provided by NWL has confirmed that areas in north-east of Haydon Bridge have experienced sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Haydon Bridge.

Haydon Bridge Sewer Network Risk - AMBER

7.4.7

Hexham

- Under Scenario 1, 440 new dwellings are proposed within Hexham and this increases to 528 new dwellings under Scenario 2. In addition, 10.0 ha of employment land are also planned for Hexham.
- Development within Hexham will drain to Hexham WwTW which is situated to the east of Hexham, between an industrial area and the River Tyne at Anickgrange Haugh. Hexham WwTW discharges treated effluent into the River Tyne.
- **East of Hexham** - Development to the east of Hexham is in close proximity to Hexham WwTW, however would be reliant on local connections to the sewer network and capacity in the sewers crossing the River Tyne.
- **North of Hexham** - Development to the north of Hexham is likely to be most favourable due to the proximity of the development to Hexham WwTW. Also, development to the north of Hexham is unlikely to need to utilise the 375mm diameter pumped sewer and syphon which pass flow under the River Tyne to the immediate west of Hexham WwTW.
- **South of Hexham** - Development to the south and west of Hexham would be more reliant on existing sewer networks and further discussions with NWL and a more detailed assessment of capacity are recommended due to the proposed new development

(residential and employment) figures for Hexham. Development would also be reliant on available capacity in the sewers crossing the River Tyne.

- **West of Hexham** - Development to the south and west of Hexham would be more reliant on existing sewer networks and further discussions with NWL and a more detailed assessment of capacity are recommended due to the proposed new development (residential and employment) figures for Hexham. Development would also be reliant on available capacity in the sewers crossing the River Tyne.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

However, information provided by NWL has confirmed that areas in north-east Hexham are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Hexham.

Hexham Sewer Network Risk - AMBER

7.4.8

Morpeth

- Under Scenario 1, 858 new dwellings are proposed within Morpeth and this increases to 1,030 new dwellings under Scenario 2. In addition, 25.0 ha of employment land are also planned for Morpeth.
- Development within Morpeth will drain to Morpeth WwTW which is situated to the east of Morpeth at Parish Haugh. Morpeth WwTW discharges treated effluent into the River Wansbeck.
- **East of Morpeth** - Development to the east and north of Morpeth would be most favourable due to the proximity of Morpeth WwTW. Location connections to the sewer network will be required.
- **North of Morpeth** - Development to the east and north of Morpeth would be most favourable due to the proximity of Morpeth WwTW. Location connections to the sewer network will be required.
- **South of Morpeth** - Development to the south and west of Morpeth would be more reliant on existing sewer networks and further discussions with NWL and a more detailed assessment of capacity are recommended due to the proposed new development (residential and employment) figures for Morpeth.
- **West of Morpeth** - Development to the south and west of Morpeth would be more reliant on existing sewer networks and further discussions with NWL and a more detailed assessment of capacity are recommended due to the proposed new development (residential and employment) figures for Morpeth.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

However, information provided by NWL has confirmed that areas in south-east/west Morpeth are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the south-east/west areas of Morpeth.

Morpeth Sewer Network Risk - AMBER

7.4.9 Ponteland

- Under Scenario 1, 245 new dwellings are proposed within Ponteland and this increases to 294 new dwellings under Scenario 2. In addition, 10.0 ha of employment land are also planned for Ponteland.
- Development within Ponteland will drain to Howdon WwTW which is situated on the north bank of the River Tyne in North Tyneside. Howdon WwTW discharges treated effluent into the tidal River Tyne.
- In total an additional 1,049 new dwellings will drain via the sewer network to Howdon WwTW from development within Northumberland (Ponteland, Prudhoe, Seaton Valley Villages and potentially parts of south-west Cramlington) under Scenario 1 and this increases to 1,259 dwellings under Scenario 2. Under Scenario 1, 685 additional dwellings will drain from the west (Ponteland and Prudhoe) and this number increases to 822 additional dwellings under Scenario 2.
- In addition, 19 ha of employment land will also drain to Howdon WwTW from proposed development in Ponteland and Prudhoe.

Summary

Information provided by NWL has confirmed that areas in north-east Ponteland are currently at risk of sewer flooding indicating that there may be limited sewer capacity in these areas.

Network data extending into the Howdon WwTW catchment (outside of Northumberland) has not been provided by NWL for the Outline WCS. It is therefore recommended that a more detailed assessment of the network capacity, including modelling (if appropriate) is undertaken as part of the Detailed WCS.

Ponteland (Local) Sewer Network Risk - AMBER

7.4.10 Prudhoe

- Under Scenario 1, 440 new dwellings are proposed within Prudhoe and this increases to 528 new dwellings under Scenario 2. In addition, 9.0 ha of employment land are also planned for Prudhoe.
- Development within Prudhoe will drain to Howdon WwTW which is situated on the north bank of the River Tyne in North Tyneside. Howdon WwTW discharges treated effluent into the tidal River Tyne.
- In total an additional 1,049 new dwellings will drain via the sewer network to Howdon WwTW from development within Northumberland (Ponteland, Prudhoe, Seaton Valley Villages and potentially south-west parts of Cramlington) under Scenario 1 and this increases to 1,259 dwellings under Scenario 2. Under Scenario 1, 685 additional dwellings will drain from the west (Ponteland and Prudhoe) and this number increases to 822 additional dwellings under Scenario 2.
- In addition, 19 ha of employment land will also drain to Howdon WwTW from proposed development in Ponteland and Prudhoe.

Summary

Information provided by NWL (based on DG5 records) has confirmed that areas in north-east Prudhoe are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Prudhoe.

However, network data extending into the Howdon WwTW catchment (outside of Northumberland) has not been provided by NWL for the Outline WCS. It is therefore recommended that a more detailed assessment of the network capacity, including modelling (if appropriate) is undertaken as part of the Detailed WCS.

Prudhoe (Local) Sewer Network Risk - AMBER

7.4.11

Rest of Commuter Pressure Area (Tynedale)

- Under Scenario 1, 476 new dwellings are proposed within the rest of the Commuter Pressure Area and this increases to 571 new dwellings under Scenario 2.
- Without details of the spatial distribution of development across the rest of the Commuter Pressure Area, it is not possible to assess the impact on the wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:
 - Steer development to areas with capacity,
 - Determine scale of upgrades required to facilitate new development in areas with network capacity issues.
- As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Rest of Commuter Pressure Area (Tynedale) Network Risk - GREEN

7.4.12

Rest of former Castle Morpeth area

- Under Scenario 1, 368 new dwellings are proposed within the rest of the former Castle Morpeth area and this increases to 442 new dwellings under Scenario 2. In addition, up to 5.0 ha of employment land is also planned for the rest of the former Castle Morpeth area.
- Without details of the spatial distribution of development across the rest of the former Castle Morpeth area, it is not possible to assess the impact on the wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:
 - Steer development to areas with capacity,
 - Determine scale of upgrades required to facilitate new development in areas with network capacity issues.
- As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Rest of former Castle Morpeth Area Network Risk - GREEN

7.4.13 *Rest of Rural Area (Tynedale)*

- Under Scenario 1, 141 new dwellings are proposed within the rest of the Rural Area and this increases to 169 new dwellings under Scenario 2.
- Without details of the spatial distribution of development across the rest of the rural area, it is not possible to assess the impact on the wastewater network, or determine the receiving WwTW(s). However across the broad area proposed for potential development there is scope to:
 - Steer development to areas with capacity,
 - Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Rest of Rural Area Network Risk - GREEN7.5 **Urban Northumberland SHMA**7.5.1 *Ashington*

- Under Scenario 1, a combined total of 2,400 new dwellings are proposed within Ashington and Newbiggin-by-the-Sea and this increases to 2,880 new dwellings under Scenario 2. In addition, a combined total of 45.0 ha of employment land are also planned for Ashington and Newbiggin-by-the-Sea.
- Development within Ashington will drain to Newbiggin WwTW which is situated to the south of Newbiggin-by-the-Sea and the east of North Seaton. Newbiggin WwTW discharges treated effluent into the North Sea via a long sea outfall.
- **East of Ashington** - Generally, development to the east of Ashington would be most favoured as it is less problematic to connect to the existing trunk sewers. Local connections may be required, but there are two 900mm diameter sewers to the west of the A189 which drain the northern and southern parts of Ashington.
- **North of Ashington** - Development to the north of Ashington would require local connections to the 900mm diameter sewer which passes to the south of Wansbeck Hospital.
- **South of Ashington** - Development to the south of Ashington would require local connections to the 900mm diameter sewer which passes through North Seaton.
- **West of Ashington** - Dependant upon the local of any development to the west of Ashington, this could be served by the sewers which serve either the north or south of Ashington.

Summary

All development in Ashington will ultimately drain via the sewer beneath the A189 to the east of North Seaton and to Newbiggin WwTW.

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS. However, information provided by

NWL has confirmed that areas in south-east Ashington are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the south-east areas of Ashington.

Ashington Sewer Network Risk - AMBER

7.5.2

Bedlington/Bedlington Station

- Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Bedlington/Bedlington Station, Choppington and Guide Post/Stakeford and this increases to 1,440 new dwellings under Scenario 2. In addition, 5.0 ha of employment land are also planned for Bedlington/Bedlington Station.
- Development within Bedlington/Bedlington Station will drain to Cambois WwTW which is situated to the north of Cambois and south of North Seaton Colliery, immediately east of the A189 and north of a mineral railway. Cambois WwTW discharges treated effluent into the North Sea via a long sea outfall.
- **East of Bedlington** - Development to the east and north of Bedlington is generally more favourable due to the relative proximity of development to the WwTW. However local connections would be required and also confirmation of the capacity of the lower network is critical.
- **North of Bedlington** - Development to the east and north of Bedlington is generally more favourable due to the relative proximity of development to the WwTW. However local connections would be required and also confirmation of the capacity of the lower network is critical.
- **South of Bedlington** - Development to the south and west of Bedlington will require local network capacity checks. All additional flows are then likely to flow through the existing network. As noted above, the capacity of the lower network is also critical to development aspirations in Bedlington.
- **West of Bedlington** - Development to the south and west of Bedlington will require local network capacity checks. All additional flows are then likely to flow through the existing network. As noted above, the capacity of the lower network is also critical to development aspirations in Bedlington.

Summary

Development in Bedlington will generally drain north east towards Cambois WwTW. In the lower reaches of the network, flow from Bedlington will share the same network (525mm diameter) as flow from Choppington. Given the significant level of development proposed for Bedlington and Choppington and the lack of pipe gradients (at this stage) it is recommended that the capacity of the lower network to serve the proposed levels of development is assessed in more detail.

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS. However, information provided by NWL has confirmed that areas in central Bedlington have experienced sewer flooding indicating that there may be limited capacity in the network in the central areas of Bedlington.

Bedlington Sewer Network Risk - AMBER

7.5.3 *Blyth*

- Under Scenario 1, 4,384 new dwellings are proposed within Blyth and this increases to 5,261 new dwellings under Scenario 2. In addition, 13.0 ha of employment land and 31.0 ha of mixed-use land are also planned for Blyth.
- Development within Blyth will drain to Blyth WwTW which is situated in the northern part of Blyth on the south bank of the River Blyth at Cowpen. Blyth WwTW discharges treated effluent into the tidal River Blyth.
- **East of Blyth** - N/A
- **North of Blyth** - N/A
- **South of Blyth** - Significant development in Blyth is likely to be steered to the south and west of Blyth due to land availability and transport links. Development to the south of Blyth will require local connections to the existing sewer network and flows will then utilise the existing network, where capacity is available.
- **West of Blyth** - Significant development in Blyth is likely to be steered to the south and west of Blyth due to land availability and transport links.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS. However, information provided by NWL has confirmed that areas in north-west Blyth are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-west areas of Blyth.

Blyth Sewer Network Risk - AMBER

7.5.4 *Cambois*

- Under Scenario 1, 320 new dwellings are proposed within Cambois and this increases to 384 new dwellings under Scenario 2. In addition, 241.5 ha of employment land are also planned for Cambois.
- Development within Cambois will drain to Cambois WwTW which is situated to the north of Cambois and south of North Seaton Colliery, immediately east of the A189 and north of a mineral railway. Cambois WwTW discharges treated effluent into the North Sea via a long sea outfall.
- Significant employment development is planned for Cambois (241.5 ha), primarily on the former colliery site, to the south and to the west of the A189, east of Cambois. All development will be within close proximity of the WwTW, which has capacity to support the proposed new development. However as the majority of the development areas are not currently served by sewers, then new sewers will need to be provided to support the proposed new development.
- **East of Cambois** - N/A
- **North of Cambois** - Development to the north of Cambois is likely to be able to drain directly to Cambois WwTW.

- **South of Cambois** - Development to the south of Cambois is likely to require a series of new sewers to drain to Cambois WwTW.
- **West of Cambois** - Development to the west of Cambois is likely to drain to Cambois WwTW, via the 525mm diameter sewer which passes diagonally beneath the A189 or the 375mm diameter sewer which passes perpendicularly beneath the A189 (parallel to the railway). Although where there are potential network constraints, new connections to Cambois WwTW may be feasible.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS. However, Information provided by NWL has confirmed that there have been no reported sewer flooding incidents in Cambois.

Cambois Sewer Network Risk - GREEN

7.5.5

Choppington

- Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Choppington, Bedlington/Bedlington Station and Guide Post/Stakeford and this increases to 1,440 new dwellings under Scenario 2.
- Development within Choppington will drain to Cambois WwTW which is situated to the north of Cambois and south of North Seaton Colliery, immediately east of the A189 and north of a mineral railway. Cambois WwTW discharges treated effluent into the North Sea via a long sea outfall.

Summary

Development in Choppington will generally drain east towards Cambois WwTW. In the lower reaches of the network, flow from Choppington will share the same network (525mm diameter) as flow from Bedlington. Given the significant level of development proposed for Choppington and Bedlington and the lack of pipe gradients (at this stage) it is recommended that the capacity of the lower network to serve the proposed levels of development is assessed in more detail.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Choppington.

Choppington Sewer Network Risk - GREEN

7.5.6

Cramlington

- Under Scenario 1, 1,052 new dwellings are proposed within Cramlington and this increases to 1,262 new dwellings under Scenario 2. A secondary option is also proposed whereby under Scenario 1 there are 2,300 new dwellings proposed which increases to 2,760 proposed new dwellings. In addition, 78.0 ha of employment land and 51.0 ha of 'prestige' employment are also planned for Cramlington.
- Development within the majority of Cramlington will drain to Cramlington WwTW which is situated to the immediate north of East Hartford. Cramlington WwTW discharges treated effluent into the River Blyth estuary in dry conditions and into the River Blyth during storm conditions allowing storm flows to go to the estuary. Development within the south western part of Cramlington is likely to drain to Howdon WwTW in North Tyneside, which discharges into the tidal River Tyne.

- **East of Cramlington** - Flows from development to the east of Cramlington will need to pass beneath the A189, either via the 825mm diameter sewer to the north of East Cramlington or a new sewer if development were located further north towards the A1061.
- **North of Cramlington** - Development to the north of Cramlington is likely to be more favourable given the proximity of the development to Cramlington WwTW. However NWL have confirmed that Cramlington WwTW only has capacity to serve 100 dwellings per annum – which is potentially a significant constraint.
- **South of Cramlington** - Development to the south of Cramlington may drain to either Cramlington WwTW or Howdon WwTW, dependant on the location of the proposed development. Both options are likely to lead to a significant increase in load on the respective networks and a more detailed analysis is recommended as part of the Detailed WCS.
- **West of Cramlington** - Development to the North West of Cramlington would be more favourable than development to the south west due to the potential to connect to the existing network further downline. Development to the south west would either need to utilise the existing network, increasing loadings through Cramlington, or be served by a new sewer connecting further downline.

Summary

At this stage, neither a complete record of pipe sizes nor gradients are available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of the Detailed WCS.

However, information provided by NWL has confirmed that some areas in north and south of Cramlington are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north and south areas of Cramlington.

Cramlington Sewer Network Risk - AMBER

7.5.7

Guide Post/Stakeford

- Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Guide Post/Stakeford, Bedlington/Bedlington Station and Choppington and this increases to 1,440 new dwellings under Scenario 2.
- Development within Guide Post/Stakeford will drain to Cambois WwTW which is situated to the north of Cambois and south of North Seaton Colliery, immediately east of the A189 and north of a mineral railway. Cambois WwTW discharges treated effluent into the North Sea via a long sea outfall.
- **East of Guide Post/Stakeford** - Development to the east of Guide Post and Stakeford would be most favourable due to the proximity of the development to Cambois WwTW.
- **North of Guide Post/Stakeford** - N/A.
- **South of Guide Post/Stakeford** - Development to the south of Guide Post and Stakeford is likely to be served by the same sewer that drains through West Sleekburn.
- **West of Guide Post/Stakeford** - Development to the west of Guide Post and Stakeford would drain through Guide Post and then Stakeford and is likely to increase any local pressures in relation to network capacity.

Summary

All development in Guide Post and Stakeford will flow through a 675mm diameter pipe through West Sleekburn and under the A189 before draining to Cambois WwTW. Without information on the pipe gradients it is not possible at this stage to confirm the capacity of the 675mm diameter pipe to serve the proposed development.

Information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in the Guide Post/Stakeford area.

Guide Post/Stakeford Sewer Network Risk - GREEN

7.5.8

Newbiggin-by-the-Sea

- Under Scenario 1, a combined total of 2,400 new dwellings are proposed within Newbiggin-by-the-Sea and Ashington and this increases to 2,880 new dwellings under Scenario 2. In addition, a combined total of 45.0 ha of employment land are also planned for Newbiggin-by-the-Sea and Ashington.
- Development within Newbiggin-by-the-Sea will drain to Newbiggin WwTW which is situated to the south of Newbiggin-by-the-Sea and the east of North Seaton. Newbiggin WwTW discharges treated effluent into the North Sea via a long sea outfall.
- **East of Newbiggin-by-the-Sea** - N/A.
- **North of Newbiggin-by-the-Sea** - Development to the north of Newbiggin-by-the-Sea is likely to flow via the sewer beneath High Street/Front Street, which is >1000mm – although this is dependant upon the exact location.
- **South of Newbiggin-by-the-Sea** - Development to the south of Newbiggin-by-the-Sea is likely to be most favourable due to the close proximity of the WwTW, where a series of pipes (>1000mm diameter) flow towards the WwTW.
- **West of Newbiggin-by-the-Sea** - Development to the west of Newbiggin-by-the-Sea will either need local connections to the existing wastewater network, or will need a new sewer along the western fringe of Newbiggin-by-the-Sea, connecting into the sewer which drains North Seaton, to the east of the A189.

Summary

Information provided by NWL has however confirmed that there are no areas currently at risk of sewer flooding in the Newbiggin-by-the-Sea area.

Newbiggin-by-the-Sea Sewer Network Risk - GREEN

7.5.9

Seaton Valley Villages (Seghill, New Hartley, Seaton Sluice/Old Hartley, Holywell, East Cramlington and Seaton Delaval)

- Under Scenario 1, 364 new dwellings are proposed within the Seaton Valley Villages and this increases to 437 new dwellings under Scenario 2. In addition, 16.2 ha of employment land are also planned for the Seaton Valley Villages.
- Development within the Seaton Valley Villages is likely to drain towards Howdon WwTW which is situated on the north bank of the River Tyne in North Tyneside. Howdon WwTW discharges treated effluent into the tidal River Tyne.

- In total an additional 1,049 new dwellings will drain via the sewer network to Howdon WwTW from development within Northumberland (Ponteland, Prudhoe, Seaton Valley Villages and potentially south-west parts of Cramlington) under Scenario 1 and this increases to 1,259 dwellings under Scenario 2. Under Scenario 1, 364 additional dwellings will drain from the north (Seaton Valley Villages) and this new development increases to 437 additional dwellings respectively under Scenario 2.
- Network data extending into the Howdon WwTW catchment (outside of Northumberland) has not been provided by NWL for the Outline WCS. It is therefore recommended that a more detailed assessment of the network capacity, including modelling (if appropriate) is undertaken as part of the Detailed WCS.
- In addition there are uncertainties in relation to the spatial distribution of development within the Seaton Valley Villages (Seghill, New Hartley, Seaton Sluice, Old Hartley, Holywell, East Cramlington and Seaton Delaval) and is therefore not possible to assess the likely impact of development on the local wastewater network.
- Across the broad area proposed for potential development there is scope to:
 - Steer development to areas with capacity,
 - Determine scale of upgrades required to facilitate new development in areas with network capacity issues.
- As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Seaton Valley Villages Network Risk – GREEN

A summary of the 'high level' network constraints are included in Section 7.5 (Wastewater Matrix) and Section 10 (Proposed New Development Area Assessments).

7.6

Wastewater Treatment Works Analysis

Development will increase wastewater flows to twenty-four WwTW across Northumberland and these are listed below:

- | | |
|----------------|------------------|
| • Allendale, | • Haydon Bridge, |
| • Alnwick, | • Haltwhistle, |
| • Amble, | • Hexham, |
| • Belford, | • Howdon, |
| • Bellingham, | • Longhirst, |
| • Berwick, | • Lynemouth, |
| • Blyth, | • Matfen, |
| • Broomhaugh, | • Morpeth, |
| • Cambois, | • Newbiggin, |
| • Cramlington, | • Pegswood, |

- Rothbury,
- Seahouses,
- Shilbottle,
- Wooler.

Of the 24 WwTW, 23 are located within Northumberland. Howdon WwTW is located on the banks of the River Tyne in North Tyneside and serves existing and proposed development within the following local authority areas:

- Gateshead,
- Newcastle,
- North Tyneside,
- Northumberland,
- South Tyneside,
- Sunderland.

Figure 7-1 shows the location of the WwTW across Northumberland.

7.7 Volumetric Capacity

7.7.1 *Allendale WwTW*

NWL have confirmed that Allendale WwTW currently has headroom to serve an additional 79 dwellings, however there is insufficient headroom to accept Scenario 2 which indicates an increase in 95 dwellings and additional employment land of 1.0ha, without a review of this permit and potential investment at this WwTW.

The exceedance of the consent would be exacerbated by the proposed new development within Allendale. Under Scenario 1 it is proposed that 79 dwellings are developed in Allendale and this increases to 95 dwellings under Scenario 2. In addition, 1.0 ha of employment land is also proposed for Allendale over the plan period of the Northumberland LDF.

At this stage it is considered that Allendale WwTW has little or no headroom to serve the proposed development and this should be investigated further. Discussions should therefore be held with NWL and the EA to confirm the DWF values and also determine whether there is any scope to extend the current consent (if required).

Allendale WwTW Risk - RED (subject to the potential extension of consent)

7.7.2 *Alnwick WwTW*

NWL have confirmed that Alnwick WwTW currently has a headroom to serve an additional 400 new dwellings without a permit review and potential investment at this WwTW. Under Scenario 1, it is proposed that 575 dwellings are developed in Alnwick and increases to 690 dwellings under Scenario 2. In addition 16.2 ha of employment land are also proposed for Alnwick over the plan period of the Northumberland LDF.

Initial calculations undertaken as part of this study suggest that there is sufficient headroom at the WwTW; however this makes no account of existing or future employment served by the works, which would reduce the headroom and may account for NWLs projected shortfall in headroom.

It is considered that in the short term, Alnwick WwTW has headroom to serve the proposed development, however additional headroom may be required to serve development in the medium to longer term (i.e. the later stages of the LDF plan period) dependant upon build rates (residential and employment land).

Also without upgrades (and/or consent extensions) Alnwick WwTW may have insufficient capacity to serve Scenario 1 and Scenario 2 housing figures and the planned employment development. Discussions should be held with NWL to confirm the actual headroom at the WwTW, as the initial assessment undertaken as part of this study would suggest there is sufficient headroom at the works.

Alnwick WwTW Risk - AMBER

7.7.3 *Amble WwTW*

NWL have confirmed that at the Amble WwTW currently has headroom to serve an additional 200 new dwellings without a permit review and potential investment at this WwTW. Under Scenario 1 it is proposed that 575 dwellings are developed in Amble and increases to 690 dwellings under Scenario 2. In addition 10.4 ha of employment land are also proposed over the plan period of the Northumberland LDF.

NWL have confirmed that a major trader has ceased operation within the catchment which provides increased headroom to the Amble WwTW. This however requires further understanding in terms of flow and load availability which will be undertaken by monitoring the flows at this site.

It is considered that Amble WwTW has the headroom to serve the proposed development based on the outcome of the investigations into the flow and load availability due to the closure of a major trader in the catchment.

Amble WwTW Risk - GREEN

7.7.4 *Belford WwTW*

NWL have confirmed that Belford WwTW currently has no headroom to serve additional development and the EA have also confirmed this to be the case.

Under Scenario 1 there are 125 proposed new dwellings and under Scenario 2 this increases to 150 dwellings. In addition, 30.0 ha of employment land is also proposed across a combination of Belford, Berwick, Seahouses, Wooler and the rest of the former Berwick area over the plan period of the Northumberland LDF.

NWL have confirmed that:

“Belford WWTW has been included in the current NWL Asset Management Programme and investment is planned to be undertaken prior to 2015, to treat increased flows and meet the associated tighter permit limits. The feasibility exercise for this investment scheme will consider planned development in the catchment and the assets will be designed to include this.”

Belford WwTW Risk – GREEN (subject to WwTW upgrade)

7.7.5 *Bellingham WwTW*

NWL have confirmed that there is a capital project currently on site to upgrade Bellingham WwTW. Under Scenario 1 it is proposed that 71 dwellings are developed in Bellingham and this increases to 85 dwellings under Scenario 2. In addition, 0.5 ha of employment land is also proposed for Bellingham over the plan period of the Northumberland LDF.

NWL have confirmed that as part of the upgrade, additional capacity has been provided to ensure there is sufficient headroom at the works to support the level of proposed new development within Scenarios 1 and 2.

Bellingham WwTW Risk – GREEN (subject to WwTW upgrade)

7.7.6 *Berwick WwTW*

Under Scenario 1 it is proposed that 900 dwellings are developed in Berwick and this increases to 1,080 dwellings under Scenario 2. In addition, 30.0 ha of employment land is also proposed across a combination of Belford, Berwick, Seahouses, Wooler and the rest of the former Berwick area over the plan period of the Northumberland LDF.

Based on the assessment by NWL, Berwick WwTW has headroom to support the proposed new development without upgrades or extensions to existing consents.

Given constraints to other WwTW locally, it is also recommended that the majority of the 30.0 ha of employment land is steered towards Berwick.

Berwick WwTW Risk - GREEN

7.7.7 *Blyth WwTW*

NWL have confirmed that there is capacity to support future housing development in the short term based on an average build rate per annum of 100 units. It is NWL's intention to implement a scheme at the works during AMP6 (2015 - 2020) which will increase capacity to support the proposed levels of development.

Blyth WwTW Risk - AMBER

7.7.8 *Broomhaugh WwTW*

NWL have confirmed that Broomhaugh WwTW currently has a headroom to serve all proposed development.

Under Scenario 1 it is proposed that 79 dwellings are developed in Corbridge, which is served by Broomhaugh WwTW and this increases to 95 dwellings under Scenario 2 are proposed in Corbridge.

It is therefore considered that Broomhaugh WwTW has sufficient capacity to support the proposed new development in Corbridge.

Broomhaugh WwTW Risk - GREEN

7.7.9 *Cambois WwTW*

NWL have confirmed that Cambois WwTW has headroom to serve an additional 8,100 population - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Under Scenario 1 it is proposed that 1,520 dwellings are developed in Bedlington/Bedlington Station, Cambois, Choppington and Guide Post/Stakeford and this increases to 1,824 dwellings under Scenario 2. In addition, 246.5 ha of employment land are also proposed for Cambois over the plan period of the Northumberland LDF.

Given the significant headroom at Cambois WwTW to support future development (7,933 dwellings in excess of Scenario 2), then is considered that Cambois WwTW has sufficient capacity to serve both the residential and employment development, however confirmation of the proposed employment development type should be taken into consideration as certain employment development types generate greater flows.

Cambois WwTW Risk - GREEN

7.7.10 *Cramlington WwTW*

NWL have confirmed that Cramlington WwTW has headroom to support future development at a build rate of 100 dwellings per annum, however have not confirmed actual headroom numbers. Initial calculations undertaken as part of this study (exclusive of employment, existing and proposed) suggest that there is significant headroom at the WwTW.

The majority of development within Cramlington will drain to Cramlington WWTW, except development in the south west which will drain to Howdon WwTW. It was however agreed in consultation with the EA and NWL that development in the south west sector could possibly be drained (using pumps) to Cramlington WwTW should there be an issue with capacity at Howdon WwTW.

Under Scenario 1 it is proposed that 1,052 dwellings are developed in Cramlington, increasing to 1,263 dwellings under Scenario 2. A secondary option is also proposed in Cramlington whereby under Scenario 1 there are 2,300 proposed new dwellings and under Scenario 2 this goes up to 2,760. In addition, 78.0 ha of employment land and 51.0 ha of prestige employment land are also proposed for Cramlington over the plan period of the Northumberland LDF.

Based on the (residential) proposed new development figures for Cramlington, pro-rata build rates across the plan period are between 53 dwellings per annum (Scenario 1) and 63 dwellings per annum (Scenario 2). Under the secondary option these increase to 115 (Scenario1) and 138 (Scenario 2).

Comparing NWL advised headroom/build rates with the pro-rata (residential) build rates and area of employment land, without upgrades or extensions to existing consents there will be a significant shortfall in capacity at Cramlington – which given the proposed scale of development is considered to be a significant constraint. The headroom at the works should be considered in further detail during the Detailed WCS; however in the mean time discussions should take place with NWL to determine why it is considered that the WwTW can only accommodate 100 dwellings per annum.

Cramlington WwTW Risk - AMBER

7.7.11 *Haydon Bridge WwTW*

NWL have confirmed that Haydon Bridge WwTW has headroom to serve an additional 168 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Under Scenario 1 it is proposed that 79 dwellings are developed in Haydon Bridge and this increases to 95 dwellings under Scenario 2. In addition, 1.0 ha of employment land is also proposed for Haydon Bridge over the plan period of the Northumberland LDF.

It is therefore considered that Haydon Bridge WwTW has sufficient capacity to support the proposed new development in Haydon Bridge.

Haydon Bridge WwTW Risk - GREEN

7.7.12 *Haltwhistle WwTW*

NWL have confirmed that Haltwhistle WwTW currently has a headroom to serve an additional 260 dwellings

Under Scenario 1 it is proposed that 262 dwellings are developed in Haltwhistle and this increases to 314 dwellings under Scenario 2. In addition, 5.0 ha of employment land are also proposed for Haltwhistle over the plan period of the Northumberland LDF.

It is therefore considered that in the short term, Haltwhistle WwTW has headroom to serve the proposed development, however additional headroom (and/or consent extensions) are required to serve development in the medium to longer term.

Haltwhistle WwTW Risk - AMBER

7.7.13 *Hexham WwTW*

NWL have confirmed that Hexham WwTW currently has a headroom to serve an additional 2,542 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Under Scenario 1 it is proposed that 440 dwellings are developed in Hexham and this increases to 528 dwellings under Scenario 2. In addition, 10.0 ha of employment land are also proposed for Hexham over the plan period of the Northumberland LDF.

It is therefore considered that Hexham WwTW has sufficient capacity to support the proposed new development in Hexham.

Hexham WwTW Risk - GREEN

7.7.14 *Howdon WwTW*

See Section 7-9 for further details on the issues surrounding Howdon WwTW.

7.7.15 *Longhirst WwTW*

At this stage NWL have not confirmed any capacity issues at Longhirst.

Longhirst WwTW Risk - GREEN

7.7.16 *Lynemouth WwTW*

NWL have confirmed that there are capacity issues at Lynemouth. It is believed that the capacity issues at Lynemouth are also caused by surface water ingress into the upstream network.

Lynemouth WwTW Risk – AMBER

7.7.17 *Matfen WwTW*

NWL have confirmed that there are capacity issues at Matfen. It is believed that the capacity issues at Matfen are caused by surface water ingress into the upstream network.

Matfen WwTW Risk - AMBER

7.7.18 *Morpeth WwTW*

NWL have confirmed that Morpeth WwTW currently has no headroom to serve new development within Morpeth. NWL have confirmed that:

“There is a fully developed solution to expand capacity at the (Morpeth) WwTW which is due to commence in January 2013 and take up to eighteen months to complete construction.”

Under Scenario 1 it is proposed that 858 dwellings are developed in Morpeth and this increases to 1,030 dwellings under Scenario 2. In addition, 25.0ha of employment land are also proposed for Morpeth over the plan period of the Northumberland LDF. Development

which is located on the periphery of Morpeth town, rather than other parts of the former Castle Morpeth area, are very unlikely to drain to the Morpeth WwTW.

The current NWL project to expand the capacity of the works caters for an additional 700 homes initially and the design allows for additional capacity to be installed at the appropriate time in future Asset Management Programmes in line with actual housing development numbers.

Morpeth WwTW Risk - RED

7.7.19 *Newbiggin WwTW*

NWL have confirmed that Newbiggin WwTW has headroom to serve an additional 5,496 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

The consented headroom is 4000 dwellings. There are no issues in terms of consented headroom and OSM standards however care is needed with UWWTD standards.

Under Scenario 1 it is proposed that 2,400 dwellings are developed in Ashington and Newbiggin-by-the-Sea and this increases to 2,880 dwellings under Scenario 2. In addition, 45.0 ha of employment land are also proposed for Ashington and Newbiggin-by-the-Sea over the plan period of the Northumberland LDF.

Given the significant headroom at Newbiggin WwTW to support proposed new development (2,616 dwellings in excess of Scenario 2), then is considered that Newbiggin WwTW has sufficient capacity to serve both the residential and employment development, however confirmation of the proposed employment development type should be taken into consideration as certain employment development types generate greater flows.

Newbiggin WwTW Risk – GREEN

7.7.20 *Pegswood WwTW*

NWL have confirmed the following:

"Flow measurement data suggests that Pegswood WwTW has little or no headroom available. Additional monitoring is being carried out to confirm the current situation."

Pegswood WwTW Risk - AMBER

7.7.21 *Rothbury WwTW*

NWL have confirmed that Rothbury WwTW currently has a headroom to serve an additional 90 dwellings, however initial 'high level' calculations (exclusive of employment figures) undertaken as part of this study suggest that Rothbury WwTW is currently exceeding its dry weather flow (DWF) consent.

The exceedance of the consent would be exacerbated by the proposed new development within Rothbury. Under Scenario 1 it is proposed that 185 dwellings are developed in Rothbury and this increases to 222 dwellings under Scenario 2. In addition, 4.8 ha of employment land are also proposed for a combination of Rothbury and the rest of the former Alnwick area over the plan period of the Northumberland LDF.

At this stage it is considered that Rothbury WwTW has little or no headroom to serve the proposed development and this should be investigated further. Discussions should therefore be held with NWL and the EA to confirm the DWF values and also determine whether there is any scope to extend the current consent (if required).

Rothbury WwTW Risk - RED

7.7.22 *Seahouses WwTW*

NWL have confirmed that Seahouses WwTW currently has a limited headroom for allowance for new development without a review of the existing permit. NWL are presently investigating this matter to assess treatment capability.

Under Scenario 1 it is proposed that 200 dwellings are developed in Seahouses and this increases to 240 dwellings under Scenario 2. In addition, 30.0 ha of employment land is also proposed across a combination of Belford, Berwick, Seahouses, Wooler and the rest of the former Berwick area over the plan period of the Northumberland LDF.

As such, without upgrades (and/or consent extensions) Seahouses WwTW there is unlikely to be sufficient capacity to serve the proposed new development.

Seahouses WwTW Risk - RED (subject to the potential extension of consent)

7.7.23 *Shilbottle WwTW*

NWL have confirmed the following:

“Flow measurement data suggests that Shilbottle WwTW has little or no headroom available. Additional monitoring is being carried out to confirm the current situation.”

Shilbottle WwTW Risk – AMBER

7.7.24 *Wooler WwTW*

NWL have confirmed that Wooler WwTW currently has no headroom to serve the proposed level of development.

NWL have confirmed that there are issues with groundwater and/or surface water infiltration in the network upstream of the WwTW.

Under Scenario 1 it is proposed that 200 dwellings are developed in Wooler and this increases to 240 dwellings under Scenario 2. In addition, 30.0 ha of employment land is also proposed across a combination of Belford, Berwick, Seahouses, Wooler and the rest of the former Berwick area over the plan period of the Northumberland LDF.

As such, without upgrades (and/or consent extensions) Wooler WwTW there is unlikely to be sufficient capacity to serve the proposed new development.

Wooler WwTW Risk - RED (subject to the potential extension of consent)

7.8 Water Quality Consents

7.8.1 *Urban Wastewater Treatment Directive*

There are several pieces of legislation which are relevant to WwTW; of these the Urban Wastewater Treatment Directive (UWwTD) is particularly important in terms of the setting of quality consents for WwTW.

The UWwTD is designed to make sure all wastewater in the EU is treated to the appropriate standard. An essential element of the Directive is that quality standards for effluent fall into categories depending on size of the WwTW and the sensitivity of the receiving water. As

populations grow in each sewerage catchment, some WwTW may exceed the UWwTD threshold that requires nutrient removal.

For works discharging into a Sensitive Area (Eutrophic) a population equivalent exceeding 10,000 will require phosphate removal to a standard of 2 mg/l (as an annual average). If however the population equivalent is increased to exceed 100,000, then a tighter standard of 1 mg/l (as an annual average) phosphorous is required. It is clear that proposed new development in some areas could result in tighter limits on the quality of the effluent and this could have implications for investment in new sewage treatment infrastructure.

7.8.2 *Current Flow / Quality Consents*

The current DWF and quality consents for the WwTW principally serving the future development in Northumberland have been provided by the EA. Data provided confirms the current consented levels for DWF, suspended solids (SS), biological oxygen demand (BOD) and nitrate (N).

Chemical/Loading Consents

Table 7-1 shows the current water quality consents as provided by the EA, although it is noted that not all WwTW have water quality consents.

Through the initial volumetric capacity assessment and consultation with NWL and the EA, it has been confirmed that a number of WwTW are either approaching, or will soon exceed their consented limits and these are highlighted amber or red.

Following further discussions with the EA and NWL, those WwTW highlighted amber and red should be screened further in the early stages of the Detailed WCS. Those works which are identified as likely to exceed their existing DWF consent will have their new DWF consent requirements assessed through calculating the future DWF from the works and determining the associated water quality consents using the EA's River Quality Planning (RQP) software to ensure no deterioration in existing water quality. The proposed methodology should be discussed with the EA at the start of the Detailed WCS.

Results from the modelling exercise will need to be discussed with NWL and the EA to determine whether wastewater from future proposed new development in Northumberland can be adequately treated and discharged at the existing works without causing deterioration in the downstream water environment.

TABLE 7-1: CURRENT WATER QUALITY CONSENTS			
WwTW	SS	BOD	N
	Mg/l		
Allendale	45	25	10
Alnwick	35	20	15
Amble	-	-	-
Belford	50	30	11
Bellingham	50	25	25
Berwick	60	40	-
Blyth	30	20	10

Broomhaugh	100	80	-
Cambois	-	-	-
Cramlington	80	50	-
Haltwhistle	50	30	30
Haydon Bridge	50	33	-
Hexham	50	25	-
Morpeth	35	25	11
Newbiggin	-	-	-
Rothbury	50	25	-
Seahouses	-	-	-
Wooler	35	25	40
Matfen*	50	25	-
Shilbottle*	65	32	10
Pegswood*	55	22	7
Lynemouth*	60	40	-
Longhirst**	-	-	-
* Assuming development across the coastal villages can be distributed to other WwTW that can accommodate the additional flow.			
** No consented values due to size of population served by WwTW.			

Flow Consents

Current DWF consents are based on a comparison with former consent values. There was a national review exercise undertaken in early 2010 which identified this.

Table 7-2 shows the current DWF consents as provided by the EA. In addition the EA have confirmed that a number of the WwTW are close to their consent flows (within 75% of their maximum capacity) these being:

- Belford,
- Haltwhistle,
- Rothbury,
- Seahouses,
- Wooler.

At this stage no measured DWF data has been provided by NWL and as such 'high level' calculations have been undertaken to provide an approximation of current (and future) DWF at the relevant WwTW. It is however recommended that a more detailed assessment of DWF and subsequent headrooms are confirmed as part of the Detailed WCS and in addition, measure DWF is obtained from NWL where available.

It is also recommended that discussions are held between NCC, NWL and the EA to determine whether there is scope to extend the flow consents at all five of the WwTW noted by

the EA. Given the scale of proposed development, an increase in consented flows at Haltwhistle WwTW and Rothbury WwTW seem to be the most critical.

TABLE 7-2: CURRENT DRY WEATHER FLOW CONSENTS

WwTW	DWF (m ³ /day)
Allendale	324
Alnwick	3,322
Amble	2,512
Belford*/**	200
Bellingham	346
Berwick	8,100
Blyth	11,664
Broomhaugh	2,704
Cambois	10,573
Cramlington	9,600
Haltwhistle	1284
Haydon Bridge	518
Hexham	4,960
Morpeth	4,400
Newbiggin	12,200
Rothbury	512
Seahouses	1,463
Wooler	578
Pegswood	738
Lynemouth	3030
Shilbottle	354
Matfen	50
Longhirst	-

* Denotes that the DWF is out of date however it does not affect the overall results.

** EA have confirmed WwTW is at its limit however NWL have confirmed that it has been included in the current AMP and investment is planned prior to 2015.

7.9 Howdon WwTW

POSITION STATEMENT (MAY 2012)

The following information regarding Howdon WwTW is correct as of 1st May 2012 and should be updated as and when the status of the WwTW changes.

Howdon WwTW currently serves a population equivalent of 960,000. Over the current planning horizon, development across the Howdon WwTW catchment is likely to increase pressure on the capacity at the WwTW, as in excess of 40,000 new dwellings could potentially drain to the WwTW. At present parts of southern Northumberland (south east parts of the former Tynedale area, southern parts of former Castle Morpeth and parts of the former Blyth Valley areas, including Cramlington south west sector, Prudhoe, Ponteland and Seaton Valley Villages) are served by the Howdon WwTW.

Due to the scale of the potential development across the Howdon WwTW catchment and the potential future capacity issues, AECOM (on behalf of Newcastle City Council and Gateshead Metropolitan Borough Council) have drawn together a position statement in relation to Howdon WwTW and it has been agreed that this can be replicated in all WCSs that cover the Howdon catchment and this is included as Appendix B.

However in summary, NWL have confirmed that the current headroom at the works is estimated to be between 13,000 and 27,000 homes, dependant on the flow data used to make the assessment. Over the next 5 years the EA will be monitoring flows to get a better understanding of the actual headroom.

Howdon WwTW currently serves all of the administrative area of Newcastle, South Tyneside and North Tyneside. In addition it serves most of Gateshead and smaller proportions of southern Northumberland and northern Sunderland.

A number of studies are on-going including investigations into the separation of surface water from the combined system, application of SUDS solutions, development of tools and strategies and also development of relevant planning documents.

NWL believe that the findings of the EA monitoring and on-going studies may feed into schemes within AMP6. In addition, quick wins may also be considered to increase the headroom at Howdon WwTW and these include things such as:

- Reduction in the amount of infiltration into the network (i.e. seepage of groundwater),
- Reduction of other inflows into the network (i.e. culverted watercourses and lakes),
- Management of tidal ingress.

7.10**Wastewater Matrix**

Using data provided by NWL and the EA and the high level assessment of WwTW capacities undertaken as part of this study, Table 7-3, Table 7-4 and Table 7-5 provide an overview of wastewater constraints within Northumberland. Section 10 provides a more detailed indication of the capacity at each WwTW in relation to the three proposed development time periods.

TABLE 7-3: NORTH NORTHUMBERLAND SHMA, WASTEWATER CONSTRAINTS

Settlement	Wastewater	
	Sewer	WwTW
Alnwick	A	A
Amble	A	G
Rothbury	G	R
Rest of Former Alnwick Area*	G	G
Berwick	G	G
Belford	G	G
Seahouses	G	R
Wooler	G	R
Rest of Former Berwick Area*	G	G

*Assumed that development will be steered to areas with headroom in these broad locations

TABLE 7-4: CITY COMMUTER REGION SHMA, WASTEWATER CONSTRAINTS

Settlement	Wastewater	
	Sewer	WwTW
Morpeth	A	R
Ponteland**	A	A
Widdrington Station*	G	G
Ellington*	G	A
Lynemouth*	G	A
Pegswood*	G	A
Hadston*	G	G
Rest of Former Castle Morpeth*	G	G
Hexham	A	G
Prudhoe **	A	A
Corbridge	G	G
Allendale	G	R
Haydon Bridge	A	G
Rest of Commuter Pressure Area*	G	G
Haltwhistle	A	A
Bellingham	A	G
Rest of Rural Area – Tynedale*	G	G

*Assumed that development will be steered to areas with headroom in these broad locations
 ** Drains to Howdon

TABLE 7-5: URBAN NORTHUMBERLAND SHMA, WASTEWATER CONSTRAINTS

Settlement	Wastewater	
	Sewer	WwTW
Blyth	A	A
Cramlington**	A	A

Seaton Valley Villages*/***	G	G
Ashington	A	G
Newbiggin-by-the-Sea	G	G
Bedlington / Bedlington Station	A	G
Guide Post / Stakeford	G	G
Choppington	G	G
Cambois	G	G
* Assumed that development will be steered to areas with headroom in these broad locations		
** South west parts drain to Howdon		
*** Drains to Howdon		

8 FLOOD RISK, SURFACE WATER MANAGEMENT AND SUSTAINABLE DRAINAGE

8.1 Introduction

The aim of identifying the potential sources of flood risk to the study areas is to assess the risks of all forms of flooding to and from development, in order to identify any potential development constraints with respect to flood risk. PPS25, which has now been superseded by the National Planning Policy Framework (NPPF) emphasised the need for a risk-based approach to be adopted by LPAs through the application of the Source-Pathway-Receptor model.

The Source-Pathway-Receptor model firstly identifies the causes or 'sources' of flooding to and from a development. The identification is based on a review of local conditions and consideration of the effects of climate change. The nature and likely extent of flooding arising from any one source is considered, e.g. whether such flooding is likely to be localised or widespread. The presence of a flood source does not always infer a risk. The exposure pathway or 'flooding mechanism' determines the risk to the receptor and the effective consequence of exposure. For example, sewer flooding does not necessarily increase the risk of flooding unless the sewer is local to the site and ground levels encourage surcharged water to accumulate. The varying effect of flooding on the 'receptors' depends largely on the sensitivity of the target. Receptors include any people or buildings within the range of the flood source, which are connected to the source by a pathway.

In order for there to be a flood risk, all the elements of the model must be present. Furthermore effective mitigation can be provided by removing one element of the model, for example by removing the pathway or receptor. In the case of Northumberland, the general consensus is the receptor (i.e. new development) is steered from the exposure pathway to a flood source, where feasible. Where this is not feasible, then appropriate measures should be put in place to ensure that:

- New development is safe,
- New development does not increase flood risk elsewhere.

URS have completed a Level 1 Strategic Flood Risk Assessment (SFRA) for the whole of Northumberland and are in the process of finalising a Level 2 SFRA for Northumberland. As such, this assessment confirms the potential risk to and from new development as identified in the Level 1 SFRA and Level 2 SFRA.

8.2 Strategic Flood Risk Assessment

A Level 1 SFRA was completed by URS for NCC and was published in September 2010 and a Level 2 SFRA is currently being finalised by URS. The findings of the Level 1 SFRA and Level 2 SFRA have formed the basis of the assessment of flood risk presented in this WCS.

The SFRA considered and mapped the sources of flood risk to potential development throughout the authority area according to the requirements of PPS25.

The Flood Zone maps in Appendix B of the Level 1 SFRA show that fluvial flood risk across Northumberland is generally quite low. This is mainly due to steep topography and floodplains that are confined to associated narrow and incised valleys. There are however exceptions to this general rule and certain areas of the county that have been affected by a long history of flooding.

8.3 Flood Risk Summary

This assessment covers the risk of flooding and hence flood risk constraints posed to the potential development sites. In line with the newly released NPPF (and also in accordance with the former PPS25), the Sequential Test should be applied at all stages of the planning process. The aim of this is to direct new development towards areas that have a low probability of flooding.

8.3.1 *Fluvial Flooding*

Fluvial flooding is a direct consequence of flooding from watercourses that have no tidal influence and are a result of flows within the watercourses exceeding the capacity of the channel.

EA Flood Zone maps for Northumberland (Figure 8-1 and Appendix B of the Level 1 SFRA) show that fluvial flood risk across Northumberland is generally quite low. This is mainly due to steep topography and flood plains that are confined to associated narrow and incised valleys. There are however exceptions to this general rule and certain areas of the county that have been affected by a long history of flooding. These are namely:

- Belford,
- Hexham,
- Morpeth,
- Ponteland,
- Rothbury,
- Wooler.

Perhaps more significantly is the presence of many smaller settlements in steep flashy catchments that are susceptible to flash flooding in so-called 'rapid response catchments'. Very often the time to peak of the flood wave is so small (less than an hour in some instances) that it is not possible to offer a flood warning to such settlements. These settlements include:

- Bellingham,
- Buttery Haugh (Kielder),
- Rothbury (Coplith Burn).

8.3.2 *Tidal Flooding*

Tidal flooding is a direct consequence of flooding from the sea, either directly (overtopping of the coast and propagating inland) or indirectly (whereby water inundates the downstream reaches of watercourses, causing an exceedance of channel capacity – resulting in flooding).

There are areas with a history of tidal flooding across Northumberland and these include:

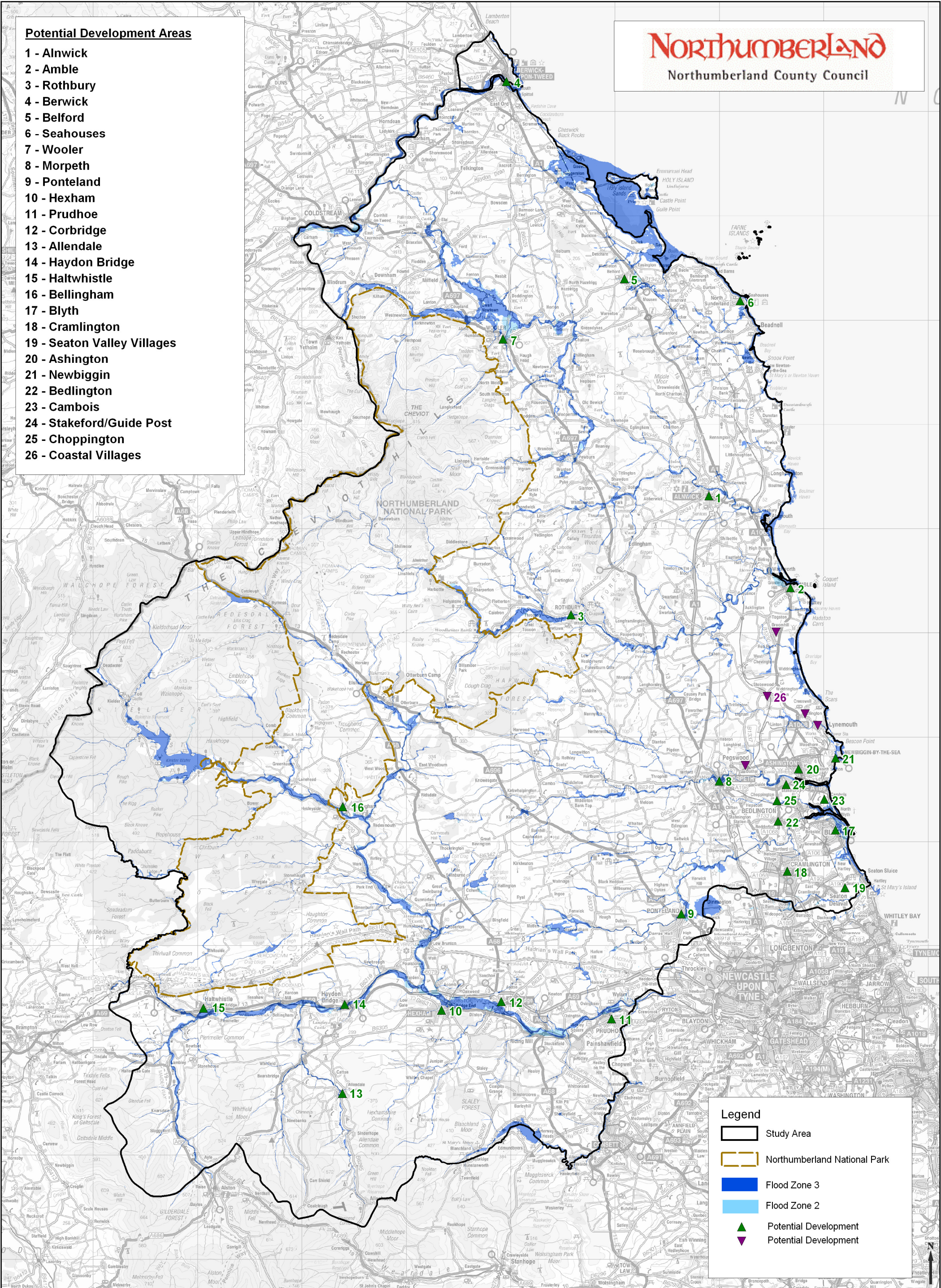
- Amble,
- Alnmouth,
- Berwick upon Tweed,
- Blyth,
- Seahouses,
- Warkworth.

8.3.3 *Surface Water Flooding*

Surface water flooding, also known as pluvial or overland flooding can occur as a result of a number of factors. During periods of prolonged rainfall events and intense downpours, overland flow from adjacent higher ground may 'pond' in low-lying areas of land without draining into watercourses, surface water drainage systems or the ground. In general, newly constructed surface water drainage systems are only required to be designed to contain a 1 in

30 year rainfall event (as a maximum), during higher intensity events, surface water drainage systems become overwhelmed often resulting in surface water flooding.

Figure 8-2 (Areas Susceptible to Surface Water Flooding (ASTSWF)) shows the extent of surface water flooding across Northumberland. Whilst these figures reflect the work undertaken as part of the Level 1 SFRA, NCC have commissioned work on the Level 2 SFRA and accompanying Flood Maps for Surface Water. Once the Level 2 SFRA has been published this information will be made available.



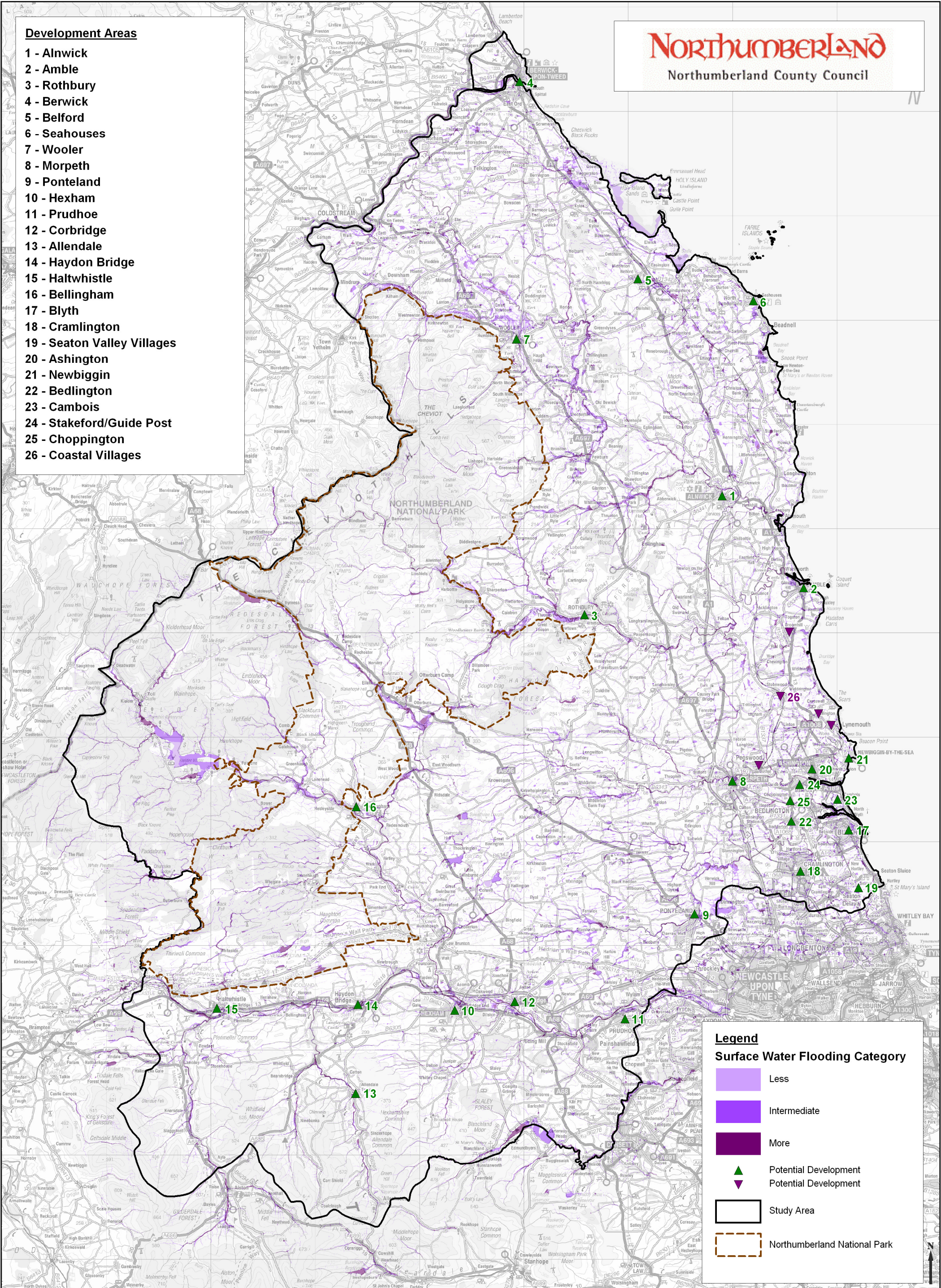
Revision Details				Job Title		Drawing Title		Scale at A3: 1:33,333		URS Infrastructure & Environment UK Ltd	
By				NORTHUMBERLAND		FLOOD ZONES		Drawn - V Raiment		Royal Court	
Date				OUTLINE WATER CYCLE STUDY				Approved - A Woodliffe		Basildon, Chelmsford	
Suffix								Copyright		Derbyshire, S41 7SL	
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										Drawing Number	
										Rev	
										FIGURE 8-1	

Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

NORTHUMBERLAND

Northumberland County Council



Legend

Surface Water Flooding Category

- Less
- Intermediate
- More
- Potential Development
- Potential Development
- Study Area
- Northumberland National Park

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Revision Details				By	Date	Suffix	NORTHUMBERLAND OUTLINE WATER CYCLE STUDY		SURFACE WATER FLOODING		Drawn - V Raiment	Approved - A Woodliffe	URS Royal Court Basil Close, Chesterfield Derbyshire, S41 7SL Telephone +44 (0)1246 209 221 Fax +44 (0)1246 209 229 www.ursglobal.com	
Drawing Status							© URS INFRASTRUCTURE & ENVIRONMENT UK LTD 2012				Copyright		This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. NORTHUMBERLAND COUNTY COUNCIL 05 Licence No. 100049048	
FINAL													Drawing Number FIGURE 8-2	
													Rev	

One of the main issues with surface water flooding is that in areas with no history, relatively small changes to hard surfacing and surface gradients can cause flooding (garden loss and reuse of brownfield sites for example). As a result, continuing development could mean that pluvial and surface water flooding can become more frequent and although not on the same scale as fluvial flooding, it can still cause significant disruption. This Outline study

Surface water flooding remains a key issue across the UK, and has been highlighted by the Pitt Report and UKCIP as the type of flooding that is likely to get worse. According to Areas Susceptible to Surface Water Flooding maps in Appendix B of the Level 1 SFRA, the Surface water flooding is most serious in urban areas such as:

- Cramlington,
- Hexham,
- Morpeth,
- Ponteland.

8.3.4 *Sewer Flooding*

Normally, flooding from sewers occurs as a result of exceedance of the capacity of the sewer system from heavy rainfall or if the system becomes blocked and will continue to remain flooded until the water drains away. Modern sewer systems are typically designed to accommodate rainstorms with a 30 year return period, whilst older sewer systems were often constructed without consideration of a design standard and may in some areas may have an effective design standard of less than 30 years.

DG5 records provided by NWL (10th November 2011) (Figure 7-2 and associated insets) have revealed that there is a current risk of sewer flooding incidents in the following development areas.

- Central Alnwick,
- South West Haltwhistle,
- North West Amble,
- South Hadston,
- South East Ashington,
- North East Prudhoe,
- North East Ponteland,
- North and South Cramlington,
- North West Blyth,
- North East Hexham,
- Central Bedlington,
- East Bellingham.
- North East of Haydon Bridge,
- Several areas of South Morpeth.

8.3.5 *Other Sources of Flooding – Groundwater*

Groundwater flooding occurs when groundwater levels rise above prevailing ground levels.

From a review of EA groundwater vulnerability (GWV) maps (Figure 8-3), it is noted that the majority of development areas within Northumberland are underlain by 'minor aquifers'. However to the south bank of the River Tweed in Berwick there is a 'major aquifer'.

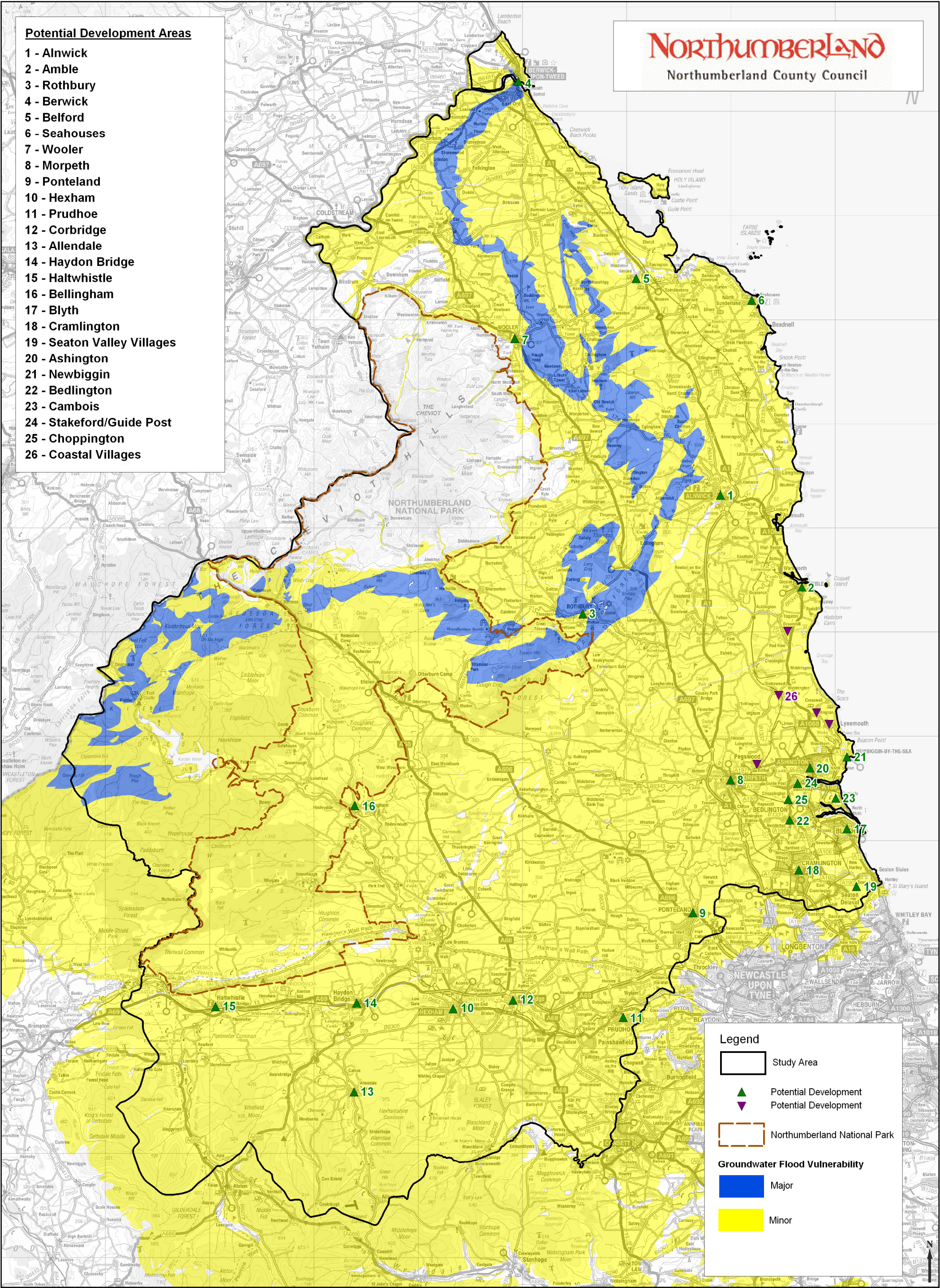
As such, the flood risk from groundwater across the development areas is generally considered to be low, with the exception of Berwick – where a more detailed assessment of groundwater flood risk is required as part of the Detailed WCS.

For all other development areas an assessment of groundwater flood risk should be considered on a site-by-site basis as development comes forward.

8.3.6 *Other Sources of Flooding – Artificial*

Artificial flood sources include raised channels such as canals, or storage features such as ponds and reservoirs. Breach or overtopping of reservoirs may also pose a risk to existing and future development.

Breach modelling of 'high risk' reservoirs was undertaken by the EA in 2009. This determined the flood extent and flood hazard associated with the breach of considered reservoirs. The NCC Emergency Planning Team should hold copies of all data associated with any breach modelling undertaken within Northumberland and this data should be reviewed by NCC as part of their Site Allocation.



Potential Development Areas

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

Legend

- Study Area
- Potential Development
- Potential Development
- Northumberland National Park
- Groundwater Flood Vulnerability
 - Major
 - Minor

Revision Details				Job Title		Drawing Title		Scale at A3: 1:33,333		URS Environment and Infrastructure Ltd	
By				NORTHUMBERLAND		GROUNDWATER		Drawn - V Raiment		Royal Court	
Date				OUTLINE WATER CYCLE STUDY		VULNERABILITY		Approved - A Woodliffe		Basil Close, Chesterfield	
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Drawing Status										Telephone +44 (0)1246 209 221	
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										Drawing Number	
										FIGURE 8-3	
										Rev	

8.4 Flood Risk Matrix

Using data presented above from the Level 1 SFRA and the updated sewer flooding data (10th November 2011), it has been possible to determine the general level of flood risk associated with the proposed development areas across Northumberland. Table 8-1, Table 8-2 and Table 8-3 provide an overview of constraints. (Refer to Table 2-1 for an explanation of the Constraint Traffic Lights).

TABLE 8-1: NORTH NORTHUMBERLAND SHMA, FLOOD RISK CONSTRAINTS					
Settlement	Flood Risk				
	Fluvial	Coastal	Surface Water	Sewer	Other Sources
Alnwick	G	G	G	A	G
Amble	G	A	G	A	G
Rothbury	A	G	G	G	G
Rest of Former Alnwick Area*	G	G	G	G	G
Berwick	G	A	G	G	A
Belford	A	G	G	G	G
Seahouses	G	A	G	G	G
Wooler	A	G	G	G	G
Rest of Former Berwick Area*	G	G	G	G	G
*Assumed that development will be steered to areas with headroom in these broad locations					

TABLE 8-2: CITY COMMUTER REGION SHMA, FLOOD RISK CONSTRAINTS

Settlement	Flood Risk				
	Fluvial	Coastal	Surface Water	Sewer	Other Sources
Morpeth	A	G	A	A	G
Ponteland	A	G	A	A	G
Coastal Villages - Widdrington Station, Ellington, Lynemouth and Pegswood *	G	G	G	G	G
Coastal Village - Hadston	G	G	G	A	G
Rest of Former Castle Morpeth*	G	G	G	G	G
Hexham	A	G	A	A	G
Prudhoe	G	G	G	A	G
Corbridge	G	G	G	G	G
Allendale	G	G	G	G	G
Haydon Bridge	G	G	G	A	G
Rest of Commuter Pressure Area*	G	G	G	G	G
Haltwhistle	G	G	G	A	G
Bellingham	A	G	G	A	G

*Assumed that development will be steered to areas with headroom in these broad locations

TABLE 8-3: URBAN NORTHUMBERLAND SHMA, FLOOD RISK CONSTRAINTS

Settlement	Flood Risk				
	Fluvial	Coastal	Surface Water	Sewer	Other Sources
Blyth	G	A	G	A	G
Cramlington	G	G	A	A	G
Seaton Valley Villages*	G	G	G	G	G
Ashington	G	G	G	A	G
Newbiggin-by-the-Sea	G	A	G	G	G
Bedlington / Bedlington Station	G	G	G	A	G
Guide Post / Stakeford	G	G	G	G	G
Choppington	G	G	G	G	G
Cambois	G	G	G	G	G

*Assumed that development will be steered to areas with headroom in these broad locations

8.5 Surface Water Management and Sustainable Drainage

8.5.1 *Surface Water Management*

Surface Water Management is a key consideration when assessing development within large areas. The NPPF requires that new development does not increase the risk of flooding elsewhere by managing surface water runoff generated as a result of developing land. Altering large areas of land by urbanisation fundamentally alters the way in which rainfall drains to watercourses and has the potential to increase the rate and amount of water that enters watercourses, causing an increase in flood risk. In many cases, the management of surface water is achieved via a requirement to restrict runoff from developed sites to that which occurs from the pre-development land-use, and this is achieved by incorporating a range of SuDS. These aim to maximise the amount of rainwater which is returned to the ground (infiltration) and then to hold back (attenuate) excess surface water. Incorporating SuDS often requires a large amount of space and for large developments often requires the consideration of large scale strategic features, such as balancing ponds, which can attenuate and store large volumes of water generated during very heavy rain storms to prevent flood risk downstream.

The management of surface water has the potential to act as a constraint to development within Northumberland, particularly within South East Northumberland, not just because of space requirements, but because the reduction in runoff rates and volumes is likely to be onerous. This is because discharge of surface water to tidal reaches can be restricted during 'tide-locked' conditions, where the water level in the reaches at high tides prevents surface water drains from discharging. Pumping is often required; but with expected increases in tidal water levels as a result of climate change, there is likely to be an increase in the length of time during which surface water discharges are tide-locked, or require pumping. These issues should be further investigated as part of the Detailed stage of the WCS.

Where the Coal Authority have reduced abstraction, especially on the Carboniferous Coal Measures outcrop/subcrop area within the county the unsaturated zone has reduced and there is the potential for groundwater flooding. This needs to be taken into account when considering the use of SuDS at each development site. Groundwater bodies in the Tyne catchment are currently failing to achieve 'Good (chemical quality) Status' due to the natural concentrations of metals, from the historic mining activities in the county, e.g. Lead, Zinc. SuDS in these areas could potentially create new pathways and exacerbate the surface waters in the upper Tyne which are supported by baseflow from these contaminated groundwaters.

8.5.2 *Surface Water Management Plan*

A SWMP is a framework through which key local partners with responsibility for surface water in their area work together to understand the causes of surface water flooding and agree the most cost effective way of managing surface water flood risk. The purpose is to make sustainable surface water management decisions that are evidence and risk based, whilst taking climate change into account, and are inclusive of stakeholder views and preferences (Defra, 2010). The Pitt Review (2008) recommends SWMPs are adopted where surface water flood risk is high:

Recommendation 18: *"Local Surface Water Management Plans, as set out in PPS25 and coordinated by local authorities, should provide the basis for managing all local flood risk."*

"Surface Water Management Plans (SWMPs) are referred to in PPS25 as a tool to manage surface water flood risk on a local basis by improving and optimising coordination between relevant stakeholders. SWMPs will build on Strategic Flood Risk Assessments (SFRAs) and provide the vehicle for local organisations to develop a shared understanding of local flood risk,

including setting out priorities for action, maintenance needs and links into local development frameworks and emergency plans.”

Based on the Flood Map for Surface Water outputs, and historical flooding incidents within Northumberland, it is recommended that a SWMP is carried out for the South East Northumberland Growth Point at the Detailed WCS stage. In addition, consideration should be given to undertaking a SWMP for other development areas within Northumberland considered to be at risk of surface water flooding and these include:

- Cramlington,
- Hexham,
- Morpeth,
- Ponteland.

It has become common practice since the SWMP Technical Guidance²⁵ was published that SWMPs should identify and define Critical Drainage Areas (CDAs) in detail. A SWMP would therefore provide more detailed and accurate information for the areas in Northumberland where multiple and interlinked sources of flood risk threaten people, property or local infrastructure.

Any required SWMP should:

- Deliver a plan that follows the Defra Technical Guidance (March 2010) and is tailored to meet the specific requirements for the study area,
- Inform investment decisions that lead to the most sustainable form of development and surface water risk management,
- Ensure links are made between the SWMP and the Green Infrastructure Strategy,
- Provide a robust evidence base for NCC's CS that will inform the new statutory development plan,
- Identify opportunities to reduce existing surface water flood risk downstream or to create capacity in the drainage system through betterment of existing runoff,
- Identify the types of SuDS that should be promoted, including reference to infiltration assessment and water neutrality,
- Enable planning policies to be identified to minimise and manage surface water and groundwater flood risk for the study area,
- Identify potential constraints and opportunities for development in terms of surface water and groundwater flooding, its management and control infrastructure,
- Inform emergency planning and response in the event of surface water flooding,
- Identify whether joint solutions exist to address any issues in water cycle capacity (e.g. flood/surface water balancing which would also act as water supply for population growth),

²⁵ Defra (2010) Surface Water Management Plan Technical Guidance.
<http://archive.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-guidance.pdf>

- Identify the need for a surface water separate sewerage separation system, where possible on brownfield sites.

8.5.3 *Sustainable Drainage Systems Potential*

In many cases, the management of surface water is achieved via a requirement to restrict runoff from developed sites to that which occurs from the pre-development site usage and this is achieved by incorporating a range of SuDS which aim to maximise the amount of rainwater which is returned to the ground (infiltration) and then to hold back (attenuate) excess surface water. Incorporating SuDS often requires a large amount of space and for large developments often requires the consideration of large scale strategic features such as balancing ponds which can attenuate and store large volumes of water generated during very heavy rain storms to prevent flood risk downstream. It is therefore essential that surface water drainage is managed separately from wastewater, both to reduce impact on the existing combined system and to meet the requirements of national and regional policy.

A strategic scale SuDS suitability assessment has been undertaken for proposed new development as part of the Level 1 SFRA.

In order to give an indication of SuDS suitability for the WCS, the likely capacity for infiltration type SuDS for the proposed new development has been considered. A high level assessment has therefore been made based on the geological conditions of the proposed new development areas as a whole. In summary the assessment has been made on the following criteria:

- The presence of an aquifer underneath the site and the requirement to protect groundwater used as potable supply through the designation of SPZs,
- The rate at which water is able to pass through the soil and underlying geology (referred to as its permeability).

Appendix C in the Level 1 SFRA shows visually the types of SuDS potential in particular areas. In summary, infiltration systems were limited to only being suitable in a few small isolated locations near Prudhoe. Attenuation systems are suitable for the majority of the area but require detailed ground investigations prior to their design and construction.

9 ECOLOGY AND BIODIVERSITY

9.1 Introduction

The Ecology and Biodiversity assessment includes a review of the statutory designated ecological sites that could be impacted by potential new development in the identified areas of Northumberland.

This chapter identifies and reviews any water dependent sites within and linked to Northumberland and assesses whether abstraction for the public water supply or increased discharge from WwTW associated with the proposed development within Northumberland is likely to impact upon any of these sites, thereby presenting a constraint to development.

An Appropriate Assessment (AA) of the RSS for the North East was prepared for the Government Office for the North East in 2007²⁶. This identified a number of key issues which could influence water dependent sites, and the extent to which they can currently be managed, to meet their objectives. In relation to water and future development, these included:

- Sea level rise and coastal squeeze which can reduce certain intertidal habitats,
- Water supply and quality (a particular issue for sites with fens, bogs and wet heathland).

These issues were reviewed to determine whether the RSS²⁷ (either alone or in combination with other plans or projects) might influence key ecological processes and functions²⁸ or exacerbate any existing adverse trends.

9.2 Background

Northumberland and the surrounding area has a number of European designated sites which are designated as such to protect Europe's rare and endangered habitats and species and have the potential to be affected by development within Northumberland, especially those sites located downstream along the Northumberland coastline. A number of these are designated for habitats or species that are water dependent and are therefore more likely to be impacted by changes in the volume (through additional discharges or abstractions) or quality of watercourses in the region.

There are also a number of nationally important designated sites located in Northumberland which could potentially be impacted by development in Northumberland.

The main potential sources of effects relating to water as identified in the AA of the RSS are essentially:

- The promotion of development in coastal districts and the growth of ports which may affect the ability of certain intertidal habitats to migrate naturally landward as sea level rises,
- Development of housing, increase in hard standing areas and promotion of bio fuel crops which may affect water quality at European sites through an increase in nutrient loading or contamination by toxic substances.

²⁶ Government office for the North East (February 2007) Draft Appropriate Assessment of the Regional Spatial Strategy for the North East - Non Technical Summary. http://www.gos.gov.uk/nestore/docs/planning/rss_documents/k.pdf

²⁷ Although the RSS is likely to be revoked, Northumberland County Council are using these growth projections to plan for growth in their County over the next 10-15 years, so the findings from the Draft AA are still valid for the purposes of this Outline WCS.

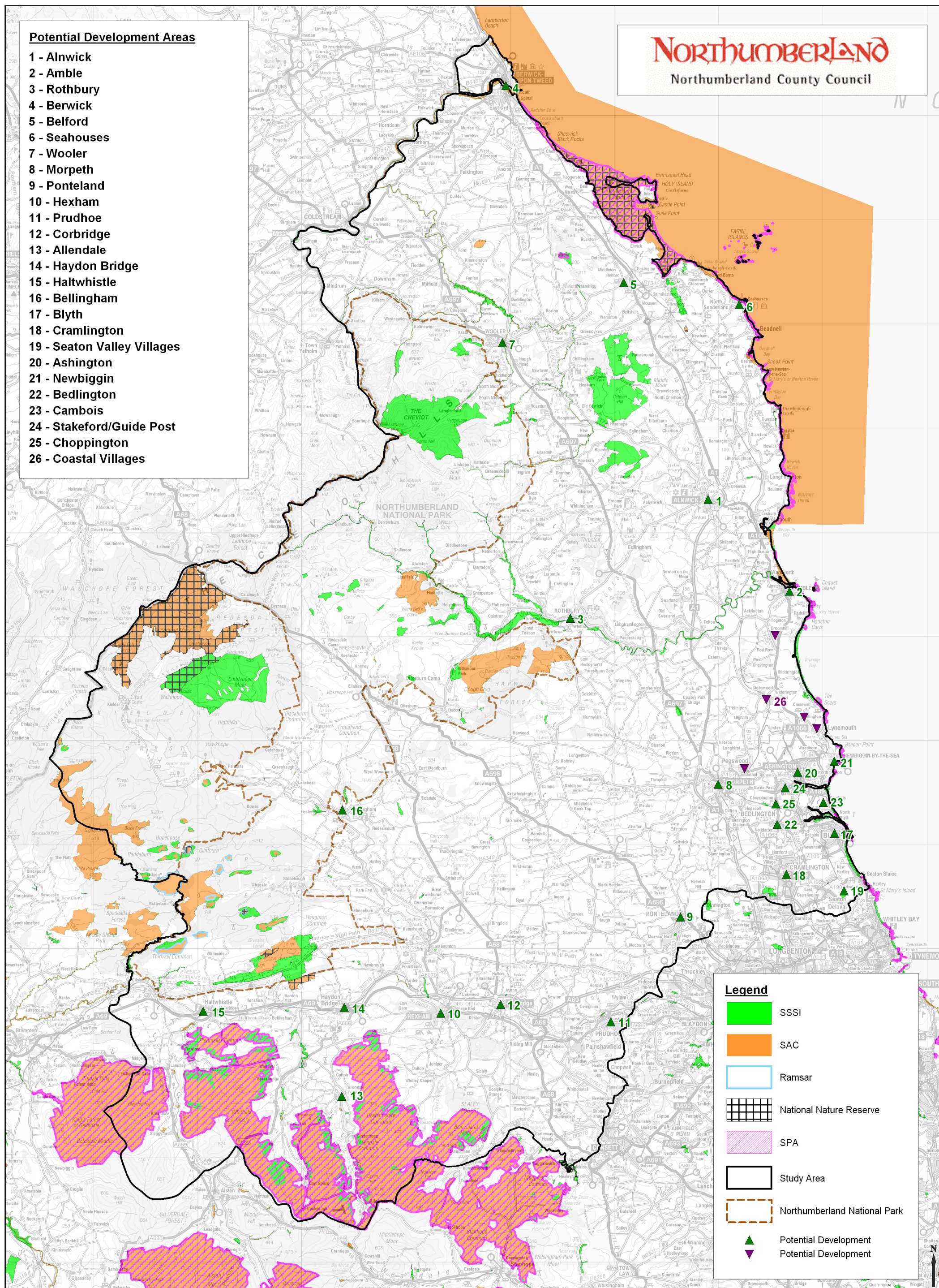
²⁸ EC guidance (2000) or Article 6 of the Habitats Directive, indicates that the ecological functions/requirements of a site "involve all the ecological needs of abiotic and biotic factors necessary to ensure the favourable conservation status of the habitat types and species, including their relations with the environment (air, water, soil, vegetation, etc.)".

To this list can also be added drawdown of water levels as a result of excessive abstraction, hypernutrification resulting from increased phosphorus (in freshwater systems) and nitrogen (in marine systems) due to WwTW discharges which can lead to eutrophication and localised changes in scour patterns if WwTW discharge volumes increase significantly. These three impacts are the focus of the analysis in the WCS.

Figure 9-1 shows the distribution of designated sites across Northumberland.

- 1 - Alnwick
- 2 - Amble
- 3 - Rothbury
- 4 - Berwick
- 5 - Belford
- 6 - Seahouses
- 7 - Wooler
- 8 - Morpeth
- 9 - Ponteland
- 10 - Hexham
- 11 - Prudhoe
- 12 - Corbridge
- 13 - Allendale
- 14 - Haydon Bridge
- 15 - Haltwhistle
- 16 - Bellingham
- 17 - Blyth
- 18 - Cramlington
- 19 - Seaton Valley Villages
- 20 - Ashington
- 21 - Newbiggin
- 22 - Bedlington
- 23 - Cambois
- 24 - Stakeford/Guide Post
- 25 - Choppington
- 26 - Coastal Villages

Northumberland County Council



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<p>Revision Details</p> <p>By: _____ Date: _____ Suffix: _____</p> <p>Chk: _____</p>								<p>Copyright</p> <p>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings NORTHUMBERLAND COUNTY COUNCIL. O.S. Licence No. 100049048</p>		<p>Drawing Number</p> <p>FIGURE 9-1</p>	
<p>Drawing Status</p> <p>FINAL</p>										<p>Rev</p>	

9.3 Objectives and Approach

There is no statutory requirement for a WCS to be subject to Habitat Regulations Assessment/Appropriate Assessment since it is part of the plan making evidence base rather than a plan or project in itself. However, a WCS should ensure that any proposed development protects and enhances all important conservation features and as such consideration needs to be given to designated ecological sites that are located within the WCS study area. Additionally, sites outside the study area that may be affected by the proposed new development (e.g. by increases in abstraction or discharge through identified pathways²⁹) should be considered. In order to ensure compliance with the Habitats Directive, it is necessary to have consideration for the impacts of water resource and disposal options when developing a WCS. The purpose of this assessment is therefore to identify if there are any ecological constraints to the proposed development within the study area.

9.3.1 Methodology

The need for Appropriate Assessment is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010 (Table 9-1). The ultimate aim of appropriate assessment is to “maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest” (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

Table 9-1: The legislation basis for "Appropriate Assessment"

<p style="text-align: center;">Habitats Directive 1992</p> <p style="text-align: center;">Article 6 (3) states that:</p> <p style="text-align: center;"><i>“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.”</i></p>
<p style="text-align: center;">Conservation of Habitats and Species Regulations 2010</p> <p style="text-align: center;">The regulations state that:</p> <p style="text-align: center;"><i>“A competent authority, before deciding to ... give any consent for a plan or project which is likely to have a significant effect on a European site ... shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives”.</i></p> <p style="text-align: center;"><i>“... The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site”.</i></p>

In the past, the term “Appropriate Assessment” has been used to describe both the overall process and a particular stage of that process (see below). Within recent months, the term Habitat Regulations Assessment has come into use in order to refer to the process that leads to an “Appropriate Assessment”, thus avoiding confusion. Throughout this report, Habitat Regulations Assessment is used to refer to the overall procedure required by the Conservation of Habitats and Species Regulations 2010.

²⁹ A pathway can be defined as a route by which a change in activity within the development area can lead to an effect upon a European site. These pathways, in terms of water related impacts, could include recreational impacts, water resources, water quality and coastal squeeze.

In practice, Habitats Regulations Assessment can be broken down into three discrete stages, each of which effectively culminates in a test. The stages are sequential, and it is only necessary to progress to the following stage if a test is failed. The stages are:

Stage 1 – Likely Significant Effect Test

This is essentially a risk assessment, typically utilising existing data, records and specialist knowledge. The purpose of the test is to decide whether 'full' Appropriate Assessment is required. The essential question is:

"Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant adverse effect upon European sites?"

If it can be demonstrated that significant effects are unlikely, no further assessment is required.

Stage 2 – Appropriate Assessment

If it cannot be satisfactorily demonstrated that significant effects are unlikely, a full "Appropriate Assessment" will be required. In many ways this is analogous to an Ecological Impact Assessment, but is focussed entirely upon the designated interest features of the European sites in question. Bespoke survey work and original modelling and data collation are usually required. The essential question here is:

"Will the project, either alone or in combination with other relevant projects and plans, actually result in a significant adverse effect upon European sites, without mitigation?"

If it is concluded that significant adverse effects will occur, measures will be required to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant. Note that, unlike standard Ecological Impact Assessment, compensation for significant adverse effects (i.e. creation of alternative habitat) is not permitted at the Appropriate Assessment stage.

Stage 3 – Imperative Reasons of Overriding Public Interest (IROPI) Test

If a project will have a significant adverse effect upon a European site, and this effect cannot be either avoided or mitigated, the project cannot proceed unless it passes the IROPI test. In order to pass the test it must be objectively concluded that no alternative solutions exist. The project must be referred to Secretary of State on the grounds that there are Imperative Reasons of Overriding Public Interest as to why the plan should nonetheless proceed. The case will ultimately be decided by the European Commission.

Although there is no legal requirement for HRA/AA, the analysis in this report is essentially analogous to the first stage of Habitat Regulations Assessment – the Likely Significant Effect Test.

9.3.2 *Pathways of Impact*

A pathway can be defined as a route by which a change in activity within the development area can lead to an effect upon a European site. While the AA of the Northumberland LDF CS considers wider issues such as recreational pressure and coastal squeeze, the WCS is entirely concerned with abstraction, treated effluent discharge and flood risk. As such, this report concerns itself exclusively with those pathways of impact.

9.3.3 *Assessment of Other Designated Sites*

This assessment does not confine itself exclusively to sites of international importance. Consideration is also given to discussing the potential impacts of development on other designated sites in Northumberland including SSSIs. This assessment of these designated sites will follow a similar methodology to that undertaken for the European protected sites.

Since this is an Outline WCS the assessment involves an identification of risks based upon interest feature sensitivity (within the context of the conservation objectives for the sites), pathways connecting WwTW discharge/abstraction to designated sites, current baseline as set out in the Environment Agency's Review of Consents (RoC) assessments and potential for future impact based upon any need for relevant WwTW to increase their consented discharge volumes. Since the Environment Agency Review of Consents work will have already analysed the impact of consented abstraction/discharge volumes, it is assumed in this analysis that WwTW that do not need to exceed their consented volumes will have already been fully considered in the RoC process.

9.3.4 *Other Projects and Plans*

The other projects and plans that will need consideration in combination with the impacts of development within Northumberland are the development to be delivered in other authorities that will be serviced by Kielder Reservoir and the other CSs of surrounding authorities who will also discharge a large proportion of their treated effluent to the River Tyne. This must however also include the numerous schemes that are being delivered by NWL.

The AA of the CS for Northumberland discusses the 'in combination' effects of other projects and plans (including other non-water related impacts) which may impact designated sites at the same time as the potential impacts of the new development in Northumberland. Therefore the WCS only identifies other potential sources of impact, which are not discussed in this analysis further.

9.4 Proximity of WwTW to Sensitive Designated/Protected Sites

Table 9-2 provides a summary of the connections between WwTW in the study area and designated sites with interest features sensitive to water levels or quality. Note that listing the sites within the table does not imply an adverse effect but simply seeks to identify linkages.

TABLE 9-2: SUMMARY OF PROTECTED SITES AND THEORETICAL LINKS TO WWTW

WwTW	Waterbody WwTW discharges to	Designated/Protected Sites Potentially Impacted
Berwick	River Tweed	<ul style="list-style-type: none"> • River Tweed SAC/ SSSI, • Tweed Estuary SAC /SSSI, • Berwickshire and North Northumberland Coast SAC, • Northumberland Shore SSSI, • Lindisfarne SSSI/ SPA /Ramsar, • Coquet Island SSSI /SPA, and • Farne Islands SSSI /SPA.
Belford	Belford Burn	<ul style="list-style-type: none"> • Berwickshire and North Northumberland Coast SAC, • Northumberland Shore SSSI, • Northumbria Coast SPA, • Farne Islands SSSI SPA, • Bamburgh Coast and Hills SSSI, and • Lindisfarne SSSI /SPA /Ramsar
Seahouses	North Sea	<ul style="list-style-type: none"> • Berwickshire and North Northumberland Coast SAC, • Northumbria Coast SPA /Ramsar, • Northumberland Shore SSSI, • Lindisfarne SSSI /SPA/ Ramsar, • Coquet Island SSSI /SPA, and • Farne Islands SSSI /SPA.
Alnwick	River Aln	<ul style="list-style-type: none"> • Berwickshire and North Northumberland Coast SAC, • Alnmouth Saltmarsh and Dunes SSSI, • Northumberland Shore SSSI, • Lindisfarne SSSI /SPA/ Ramsar, • Northumbria Coast SPA /Ramsar,

		<ul style="list-style-type: none"> • Coquet Island SSSI /SPA, and • Farne Islands SSSI /SPA.
Amble	North Sea	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumberland Coast SPA /Ramsar, • Coquet Island SSSI/ SPA, • Farne Islands SSSI /SPA, and • Warkworth Dunes and Saltmarsh SSSI.
Morpeth	River Wansbeck	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, and • Cresswell and Newbiggin Shore SSSI.
Newbiggin	North Sea	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA /Ramsar, and • Cresswell and Newbiggin Shore SSSI.
Cambois	North Sea	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA /Ramsar, and • Cresswell and Newbiggin Shore SSSI.
Blyth	Blyth Estuary	<ul style="list-style-type: none"> • Northumberland Shore SSSI, and • Northumbria Coast SPA /Ramsar.
Cramlington	River Blyth / Blyth Estuary	<ul style="list-style-type: none"> • Northumberland Shore SSSI, and • Northumbria Coast SPA /Ramsar.
Broomhaugh	River Tyne	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • Ryton Willows SSSI, • Close House Riverside SSSI, • Durham Coast SSSI, and • Northumbria Coast SPA /Ramsar.
Hexham	River Tyne	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • Ryton Willows SSSI, • Close House Riverside SSSI; • Durham Coast SSSI, and • Northumbria Coast SPA /Ramsar.
Bellingham	River North Tyne	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • *Ryton Willows SSSI, • *Close House Riverside SSSI, • *Durham Coast SSSI, and • Northumbria Coast SPA /Ramsar.
Haydon Bridge	River South Tyne	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • *Ryton Willows SSSI, • *Close House Riverside SSSI, • *Durham Coast SSSI, • Northumbria Coast SPA /Ramsar, • Wharmley Riverside SSSI, and • Tyne Watersmeet SSSI.
Haltwhistle	River South Tyne	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • *Ryton Willows SSSI, • *Close House Riverside SSSI, • *Durham Coast SSSI, • Beltingham River Shingle SSSI, • Wharmley Riverside SSSI, • Tyne Watersmeet SSSI, and • Northumbria Coast SPA Ramsar.
Rothbury	River Coquet	<ul style="list-style-type: none"> • River Coquet and Coquet Valley SSSI, • Northumberland Shore SSSI, • Northumbria Coast SPA/ Ramsar, • Coquet Island SSSI /SPA, and • Warkworth Dunes and Saltmarsh SSSI.
Allendale	River East Allen	<ul style="list-style-type: none"> • River Tyne at Ovingham SSSI, • *Ryton Willows SSSI, • *Close House Riverside SSSI, • *Durham Coast SSSI,

		<ul style="list-style-type: none"> • Northumbria Coast SPA /Ramsar, • Wharmley Riverside SSSI, • Tyne and Allen River Gravels SAC, • Tyne Watersmeet SSSI, • Allen Confluence Gravels SSSI, and • Briarwood Banks SSSI.
Wooler	Wooler Water (River Till)	<ul style="list-style-type: none"> • Till River Banks SSSI, • Till Catchment SSSI, • Northumberland Shore SSSI, • Lower Tweed and Whiteadder SSSI, • River Tweed SAC, • Tweed Estuary SAC, and • Berwickshire and North Northumberland Coast SAC.
*Howdon	*Tyne Estuary	<ul style="list-style-type: none"> • *Durham Coast SSSI; and • Northumbria Coast SPA /Ramsar.
Matfen	Marlipit Burn	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, and • Cresswell and Newbiggin Shore SSSI.
**Pegswood	Bothal Burn	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, and • Cresswell and Newbiggin Shore SSSI.
**Lynemouth	Lyne Estuary	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, and • Cresswell and Newbiggin Shore SSSI.
Shilbottle	Tyelaw Burn	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, • Coquet Island SSSI /SPA, • Lindisfarne SSSI /SPA /Ramsar, • Farne Islands SSSI /SPA, • Cresswell and Newbiggin Shore SSSI, and • Lower Hauxley Shore SSSI.
**Longhirst	Longhirst Burn	<ul style="list-style-type: none"> • Northumberland Shore SSSI, • Northumbria Coast SPA, and • Cresswell and Newbiggin Shore SSSI.
*Located outside of Northumberland ** Coastal Villages		

St Abbs to Fast Castle Head SPA in Scotland has been considered as part of the ecological assessment. This site lies approximately 20km north along the coast from the point of confluence of the River Tweed with the North Sea. As such the dilution factors will be sufficiently large that fluvial nitrogen inputs will be so small compared to marine sources that the contributions of the WwTW that input upstream of the site will be effectively inconsequential. Therefore this site has been excluded from Table 9-2 and is not considered further.

9.5 Screening Assessment – European Sites

There are seven European sites that are water dependent and theoretically linked to WwTW in Northumberland that are a risk of exceeding their consented capacity as a result of the proposed development (Table 9-3). These are Berwickshire and North Northumberland Coast SAC, Northumbria Coast SPA/Ramsar site, River Tweed SAC, Coquet Island SPA, Farne Islands SPA, Lindisfarne SPA/Ramsar/SSSI, Tyne and Allen River Gravels SAC and Tweed Estuary SAC.

Once again, it must be noted that listing the sites within this table does not imply an adverse effect but simply seeks to identify linkages. The Tyne and Allen River Gravels is located downstream from the Allendale WwTW that would have to exceed its current consent limit to accommodate the proposed level of development, however it has been excluded from further assessment as the site is important for geological reasons and the nature of the calaminarian grasslands for which the site was designated is that they grow on heavy metal contaminated

sediments where no competing species can grow. Eutrophication is therefore not a concern for the site. Coquet Island SPA and Farne Islands SPA are considered in this section as although they are located offshore, the bird interest features, for designation of the sites, are heavily dependant on shallow inshore waters for food. Therefore WwTW that discharge to waters that are linked to the sites have the potential to impact these sites.

TABLE 9-3: SUMMARY OF PROTECTED SITES AND THEORITICAL LINKS TO WWTW

Site	Features	Proposed Development Area Upstream of Site	Key Factors to Maintain Integrity
Berwickshire and North Northumberland Coast SAC	<ul style="list-style-type: none"> Intertidal and subtidal rocky reefs. Intertidal sand and mud flats. Submerged and partly submerged sea caves. Large, shallow inlets and bays. Grey seal. 	<ul style="list-style-type: none"> Berwick on Tweed Belford Seahouses Alnwick Amble Wooler 	<ul style="list-style-type: none"> Integrity depends on maintaining the extent of the Annex I habitats and a good environmental quality to support them. This depends primarily on maintenance of sediment dynamics and good water quality as well as protection from disturbance for the Grey seal colony.
Northumbria Coast SPA & Ramsar	<ul style="list-style-type: none"> Important dune habitats, Eelgrass and Mussel bed communities. Breeding populations of little tern <i>Sterna albifrons</i>. Over wintering populations of purple sandpiper <i>Calidris maritime</i> and turnstone <i>Arenaria interpres</i>. 	<ul style="list-style-type: none"> Coastal Villages Newbiggin Ashington Morpeth Stakeford/Guide Post Choppington Bedlington Cambois Blyth Cramlington Seaton Valley Villages 	<ul style="list-style-type: none"> Maintain diversity of infaunal communities. Control disturbance.
River Tweed SAC & SSSI	<ul style="list-style-type: none"> River supports water crowfoot communities as well as Atlantic salmon, Otter, Sea Brook and River lamprey. 	<ul style="list-style-type: none"> Berwick on Tweed Wooler 	<ul style="list-style-type: none"> Maintain characteristic flow regime and appropriate water quality, in particular regulate levels of phosphorus. It is also important to regulate escapes and releases of farmed fish from fish farms and to restrict introduction of hard structures.
Tweed Estuary SAC & SSSI	<ul style="list-style-type: none"> Estuaries, mudflats and sandflats not covered by seawater at low tide. Sea lamprey <i>Petromyzon marinus</i> and River lamprey <i>Lampetra fluviatilis</i>. 	<ul style="list-style-type: none"> Berwick on Tweed Wooler 	<ul style="list-style-type: none"> Restriction of nutrient inputs, restriction of coastal protection works and dredging. Lamprey are vulnerable to effects of river engineering and pollution. Variety of cumulative impacts possible from flood management measures proposed through the Tweed Catchment Plan and waste facilities in Berwick-on-Tweed and Wooler.
Coquet Island SPA/SSSI	<ul style="list-style-type: none"> Resident and migratory sea bird species (some, Tern and Puffin, of European Importance). 	<ul style="list-style-type: none"> Amble Shilbottle 	<ul style="list-style-type: none"> Regulation of disturbance to breeding and feeding areas.
Farne Islands SPA/	<ul style="list-style-type: none"> Resident and migratory bird species (some, 	<ul style="list-style-type: none"> Belford 	<ul style="list-style-type: none"> Regulation of disturbance to breeding colonies and feeding areas.

SSSI	<ul style="list-style-type: none"> Terns, Puffin, Cormorant, Kitiwake and Guillemot, of European Importance). Breeding habitat for Grey seals. 	<ul style="list-style-type: none"> Seahouses 	<ul style="list-style-type: none"> Regulation of disturbance to Grey seal colonies. Maintenance of areas of reef and their diversity. Maintenance of water quality (especially clarity and levels of sediment).
Lindisfarne SPA/ SSSI /Ramsar	<ul style="list-style-type: none"> Large assemblages of European significant winter bird species (Annex I species Golden Plover, Bar-tailed Godwit, Little Tern and Roseate Tern and a number of other migratory species). 	<ul style="list-style-type: none"> Belford 	<ul style="list-style-type: none"> Maintenance of good water quality (management of sewage discharges and run-off). Control of colonization by Spartina. Regulation of disturbance from recreational use, wildfowling and bait digging. Appropriate management to maintain habitats. <p><i>Sewage discharges, agricultural run-off, wildfowling and recreational disturbance are existing problems. A metalled road to Holy Island across intertidal area has had localised effects on the saltmarsh, intertidal flats and sand dunes and may result in longer-term changes to sediment patterns within Fenham Flats area of SPA.</i></p>

9.5.1 *Wastewater Treatment Works*

There are four WwTW that will need to exceed their consented discharge volumes to accommodate the planned levels of housing. Therefore without an associated tightening of the permissible water quality parameters that could result in a net increase in nutrients entering the system and a decline in water quality downstream:

- Morpeth - WwTW is approximately 10km upstream of Northumbria Coast SPA/Ramsar site,
- Rothbury –WwTW is approximately 20km upstream of Northumbria Coast SPA/Ramsar site and approximately 20km upstream of Coquet Island SPA,
- Seahouses –WwTW is immediately adjacent to the Berwickshire & North Northumberland Coast SAC and Northumbria Coast SPA/Ramsar. It is also located approximately 13km from Lindisfarne SPA/ Ramsar/ SSSI, approximately 27km from Coquet Island SPA and 5km from the Farne Islands SPA,
- Wooler - WwTW is approximately 30km upstream of Berwickshire and North Northumberland Coast SAC, the River Tweed SAC and Tweed Estuary SAC.

There are a further eight WwTW that have adequate headroom in the short-medium term but may require an increase in their consented discharge volumes at some point in the CS period:

- Alnwick – NWL suggest that Alnwick has the capacity to serve an additional 400 dwellings and development figures for each Scenario exceed this. WwTW is approximately 8km upstream of the Berwickshire & North Northumberland Coast SAC and Northumbria Coast SPA/Ramsar site. It is also located approximately 11km upstream of Coquet Island SPA, 25km upstream of the Farne Islands SPA and 30km upstream of Lindisfarne SPA/Ramsar/SSSI,
- Blyth - NWL suggest it has headroom to accept 100 additional dwellings per year; development rates exceed this. WwTW is less than 1km upstream of the Northumbria Coast SPA/Ramsar site,
- Cramlington - NWL suggest it has headroom to accept 100 additional dwellings per year; development rates exceed this. WwTW is 5km upstream of Northumbria Coast SPA/Ramsar site,
- Allendale – NWL have confirmed that Allendale has the capacity to serve an additional 79 dwellings; it is considered that Allendale therefore has little or no room to serve the proposed development. WwTW is at least 4km upstream of the Northumbria Coast SPA/Ramsar ,
- Haltwhistle – NWL have confirmed that Haltwhistle has headroom for additional 260 dwellings; proposed development numbers exceed this. WwTW is approximately 60km upstream of Northumbria Coast SPA/Ramsar,
- Shillbottle - WwTW is approximately 5km upstream of Northumbria Coast SPA/Ramsar, approximately 6km upstream of Coquet Island SPA and approximately 30 km from the Farne Islands SPA,
- Pegswood - WwTW is approximately 8km upstream of Northumbria Coast SPA/Ramsar,

- Lynemouth - WwTW is approximately 1km upstream of Northumbria Coast SPA/Ramsar.

In summary therefore, there are five European sites - Berwickshire & North Northumberland Coast SAC, Northumbria Coast SPA/Ramsar site, Lindisfarne SPA /Ramsar /SSSI, River Tweed SAC and Tweed Estuary SAC— which may receive discharge volumes in excess of that currently consented (See Table 9-3). The bird features of two other European sites (Coquet Island SPA and Farne Islands SPA) may be impacted by the increase in discharge volumes in excess of what is currently consented since information supplied by the Berwickshire and North Northumberland Coast European Site Implementation Officer indicates that the birds for which these sites are designated forage over inland waters along the Northumberland coast.

Having established this it is now necessary to establish what their current vulnerabilities are based upon the RoC analyses.

9.5.2 *Habitats Directive Review of Consents*

The Habitats Directive came in to force in 1992 requiring the Environment Agency to review the impacts of all permissions that had been granted to emit to air, land and water without consideration of the Habitats Directive. This Review of Consents (RoC) was undertaken to ensure there were no adverse effects on the nature conservation interests of designated sites.

The RoC process was undertaken in four stages. Stages One and Two looked at all the consents and identified those that had the potential to have a significant effect. Stage Three looked at whether the consents affected special sites and Stage Four investigated those consents which had an adverse effect. Four RoC fact sheets have been produced for protected sites within Northumberland.

9.5.3 *Berwickshire and North Northumberland Coast*

The mud and sandflat features of the Berwickshire and North Northumberland Coast are potentially at risk from excess levels of nutrients. The Stage Three model from the EA identified elevated levels of phosphorous in waters over the mud and sandflat interest feature within Budle Bay. This could cause excessive growth of opportunistic green macroalgae and deteriorate the quality of the interest feature by smothering and depleting oxygen and adversely affecting invertebrates that live in the sediments, plants, fish and other animals. A significant proportion of the phosphorous was identified to come from unregulated background sources such as agriculture. Therefore the EA reduced the phosphorous limit in discharged effluent from one of the consents which is now treated to remove the phosphorous. The other consent discharges to soak-away and therefore excessive nutrients are not contributed to the Budle Bay area.

The conclusion is therefore that nutrient inputs to this site are overwhelmingly dominated by sources other than WwTW discharge and that WwTW discharge are currently only affecting small parts of the SAC. However, since Seahouses WwTW, Wooler WwTW and Alnwick WwTW are all connected with this site and may need to increase their consented discharge volumes the impacts of such an increase on the SAC will require further assessment in the detailed WCS.

9.5.4 *Northumbria Coast*

The Northumbria Coast is designated for breeding populations of little tern and over wintering populations of purple sandpiper. Therefore the habitats of these interest species have the potential to be adversely effected by nutrient enrichment. It was concluded that although the threshold concentrations for nitrogen were significantly exceeded and the contribution from regulated inputs could not be regarded as trivial in some coastal areas, there was no evidence to show that the current water quality discharges to Northumbria Coast adversely effect on the integrity of the site alone or in combination.

Byth, Cramlington, Morpeth, Seahouses and Alnwick WwTW all drain into this European site although Cramlington and Morpeth are both over 5km upstream such that there will be a very substantial dilution factor to their discharges before they reach the SPA. Despite hypereutrophication this does not appear to be having a significant effect upon the interest features of the SPA. Therefore further nitrogen inputs from WwTW discharges are also unlikely to change this situation. As such, it is considered that significant effects are unlikely on the SPA and further analysis at detailed WCS level should be targeted on the overlapping SAC (Berwickshire & North Northumberland Coast).

Increases in the volume of discharge released from the WwTW that discharge to European protected sites, due to the proposed development in Northumberland, could potentially result in the need to alter these current licences. An increase in the volume of discharge could result in higher levels of phosphorous and or nitrogen being released which could affect the integrity of the protected sites. It would be required that the volume of discharge to be released matches the current discharge consent limits for phosphorus and nitrogen or potentially reduces the levels.

There may be a requirement for further investigation to consider the impacts of water quality and sediment regime on European Sites dependent on the findings of the NWL investigation into the capacity at Howdon WwTW. The requirement for further investigation will need to be reviewed when confirmation of capacity at Howdon WwTW is known.

9.5.5 *River Tweed*

All features of the River Tweed SAC are potentially sensitive to nutrients in the water; the feature identified as being most sensitive to impact from waste water discharges is the submerged and floating plants (water crowfoot species which is important for invertebrates and fish). Downstream of the discharge some of the plants and algae did show a response to the higher levels of nutrients, however there was no evidence that they were being adversely affected. The level of phosphorous in the water was found to be lower than the current guideline standard and therefore no changes were needed to the current consented discharges.

The River Tweed SAC is located approximately 30km downstream of the Wooler WwTW; this provides a large amount of dilution capacity and therefore if the WwTW is likely to exceed consent then there is not likely to be an impact on this site however this should be further investigated at the Detailed stage of the WCS.

9.5.6 *Tweed Estuary*

A number of consented discharges were identified to have a likely significant effect on the estuary and the intertidal mudflats and sandflats due to their contribution to nutrient enrichment and toxic contamination. Although nutrient levels are naturally high in the Tweed Estuary, no adverse effects were identified due to the tidal flushing nature of the estuary reducing nutrient levels on every tidal cycle. Toxic chemical levels were found to be high in the sediment of the estuary due to the past high degree pollution from heavy industrialisation however the invertebrates identified to be living in the sediment were found to show no significant response to the toxic chemicals. The consented discharges were therefore currently not adversely impacting the Tweed Estuary.

The Tweed Estuary SAC is located approximately 30km downstream of the Wooler WwTW; this provides a large amount of dilution capacity and therefore if the WwTW is likely to exceed consent then there is not likely to be an impact on this site however this should be further investigated at the Detailed stage of the WCS.

9.5.7 *Lindisfarne*

Lindisfarne SPA/Ramsar/SSSI is located approximately 13km from the Seahouses WwTW which discharges directly to the North Sea and 30km from Alnwick WwTW which discharges to the River Aln. However, as has already been noted, the birds for which the SPA is designated fish in the waters around the Northumberland coast. Lindisfarne SPA itself is not assessed singularly under the EA RoC process however it is assessed under the Berwickshire and North Northumberland Coast RoC and the Northumbria Coast RoC. The RoC for the Northumbria Coast SPA has already identified that despite hypereutrophication actual eutrophication (e.g. smothering macroalgal growth and algal bloom development) does not occur such that there is no adverse effect on the Northumbria Coast SPA. Since the same waters are used by Lindisfarne SPA/Ramsar birds the same conclusion can be drawn for that site. In addition, although excess ammonia can be toxic to fish (a key food group for the birds for which Lindisfarne SPA/Ramsar was designated) the RoC considered that ammonia levels were acceptable. However, provided that current consented discharges are deemed acceptable (which is beyond the scope of this study) then provided that the Seahouses and Alnwick WwTW can comply with the policy of no deterioration downstream then there should be no likely significant effect from potential development.

9.5.8 *Farne Islands*

The Farne Islands are located 5km downstream of the Seahouses STW which discharges directly to the North Sea, 25km from Alnwick WwTW which discharges to the River Aln and 30km from Shilbottle which discharges to Tyelaw Burn. Although this site is located offshore from the WwTWs the bird interest features of this site are heavily dependent on the shallow inshore waters for food. However, as has already been noted, the birds for which the SPA is designated fish in the waters around the Northumberland coast. The Farne Islands itself is not assessed singularly under the EA RoC process however it is assessed under the Berwickshire and North Northumberland Coast RoC and the Northumbria Coast RoC. The RoC for the Northumbria Coast SPA has already identified that despite hypereutrophication actual eutrophication (e.g. smothering macroalgal growth and algal bloom development) does not occur such that there is no adverse effect on the Northumbria Coast SPA. Since the same waters are used by Farne Islands SPA/Ramsar birds the same conclusion can be drawn for that site. In addition, although excess ammonia can be toxic to fish (a key food group for the birds for which Farne Islands SPA/Ramsar was designated) the RoC considered that ammonia levels were acceptable. However, provided that current consented discharges are deemed acceptable (which is beyond the scope of this study) then provided that the Seahouses, Shilbottle and Alnwick WwTW can comply with the policy of no deterioration downstream then there should be no likely significant effect from potential development.

9.5.9 *Coquet Island*

Coquet Island is located approximately 6km downstream of Shilbottle WwTW which discharges to Tyelaw Burn, 11km from Alnwick WwTW which discharges to the River Aln, 20km downstream of Rothbury WwTW which discharges to the River Coquet and 27km from Seahouses WwTW which discharges directly to the North Sea. Although this site is located offshore from the WwTWs the bird interest features of this site are heavily dependent on the shallow inshore waters for food. However, as has already been noted, the birds for which the SPA is designated fish in the waters around the Northumberland coast. Coquet Island itself is not assessed singularly under the EA RoC process however it is assessed under the Berwickshire and North Northumberland Coast RoC and the Northumbria Coast RoC. The RoC for the Northumbria Coast SPA has already identified that despite hypereutrophication actual eutrophication (e.g. smothering macroalgal growth and algal bloom development) does not occur such that there is no adverse effect on the Northumbria Coast SPA. Since the same waters are used by Coquet Island SPA/Ramsar birds the same conclusion can be drawn for that site. In addition, although excess ammonia can be toxic to fish (a key food group for the

birds for which Coquet Island SPA/Ramsar was designated) the RoC considered that ammonia levels were acceptable. However, provided that current consented discharges are deemed acceptable (which is beyond the scope of this study) then provided that the Seahouses, Shilbottle, Rothbury and Alnwick WwTW can comply with the policy of no deterioration downstream then there should be no likely significant effect from potential development.

9.6 Screening Assessment – National Sites

The Sites of Special Scientific Interest (SSSI) that are water dependent and theoretically linked to WwTW in Northumberland that are a risk of exceeding consent capacity if proposed development is undertaken that are not described in Table 9-3 are shown in Table 9-4. Cresswell and Newbiggin Shore SSSI is located downstream from various WwTW that would have to exceed their current consent limits to accommodate the proposed level of development however it has been excluded from further assessment as the site is important for geological reasons and not likely to be impacted by water quality deterioration.

TABLE 9-4: SUMMARY OF PROTECTED SITES AND THEORITICAL LINKS TO WWTW WHICH MAY NEED TO EXCEED CONSENTED DISCHARGE VOLUMES

Site	Features	Proposed Development Area Upstream of Site	Key Factors to Maintain Integrity
Till River Banks SSSI	<ul style="list-style-type: none"> Important invertebrate site supporting very rich nationally important ground and water beetle communities. Important geomorphological features which support specialist invertebrate species. 	<ul style="list-style-type: none"> Wooler 	<ul style="list-style-type: none"> Maintain characteristic flow regime and appropriate water quality. Ensure maintenance of suitable habitat for beetle and invertebrate species.
River Coquet and Coquet Valley SSSI	<ul style="list-style-type: none"> Important game fishery – trout and salmon. Rich mayfly species diversity. Supports otters. High diversity of breeding birds. 	<ul style="list-style-type: none"> Rothbury 	<ul style="list-style-type: none"> Maintain characteristic flow regime and appropriate water quality. Maintain good breeding habitat/redds for trout and salmon and maintain good habitat for mayfly species. Fish are vulnerable to the effects of river engineering and pollution.
River Tyne at Ovingham SSSI	<ul style="list-style-type: none"> Important for fluvial geomorphology. 	<ul style="list-style-type: none"> Corbridge Hexham Haydon Bridge Haltwhistle Bellingham Allendale 	<ul style="list-style-type: none"> Maintain characteristic flow regime and appropriate water quality, in particular regulate levels of phosphorus.
Alnmouth Saltmarsh and Dunes SSSI	<ul style="list-style-type: none"> Large expanse of saltmarsh with varied expanse of plant communities including the transition zone along the saltmarsh interface. 	<ul style="list-style-type: none"> Alnwick 	<ul style="list-style-type: none"> Hypernutrification could lead to changes in saltmarsh quality.
Northumberland Shore SSSI	<ul style="list-style-type: none"> Important wintering grounds for international and national significant birds purple sandpiper, turnstone, sanderling, golden plover, ringed plover and redshank. 	<ul style="list-style-type: none"> Coastal Villages Newbiggin Ashington Morpeth Stakeford/Guide Post Choppington Bedlington Cambois Blyth Cramlington Seaton Valley Villages 	<ul style="list-style-type: none"> Regulation of disturbance to breeding and feeding areas. Hypernutrification could potentially result in smothering macroalgal growth that would reduce the value of the area for foraging. However, the RoC report for the overlapping Ramsar site indicates this may not be a problem in this specific case.

Warkworth Dunes and Saltmarsh SSSI	<ul style="list-style-type: none"> Sand dunes which support a rich diversity of plants and invertebrates. Third largest saltmarsh in the UK. 	<ul style="list-style-type: none"> Amble Coastal Village at Broomhill 	<ul style="list-style-type: none"> Hypernutrification could lead to changes in saltmarsh quality
Ryton Willows SSSI	<ul style="list-style-type: none"> Flooded borrow-pit ponds which support wetland habitat of reedswamp, tall fen and alder/willow carr. The Curling Pond supports frog-bit <i>Hydrocharis morsus-ranae</i> which is at its most northern locality in Britain in Ryton Willows. 	<ul style="list-style-type: none"> Prudhoe Allendale Corbridge Hexham Haydon Bridge Haltwhistle Bellingham 	<ul style="list-style-type: none"> Maintain unique river shingle conditions that support the rare plant species assemblage and associated invertebrate species.
Close House Riverside SSSI	<ul style="list-style-type: none"> An unusual community of metal-tolerant plants that thrive in alluvial deposits contaminated by heavy metals derived from the North Pennine Orefield upstream of the site. 	<ul style="list-style-type: none"> Prudhoe Allendale Corbridge Hexham Haydon Bridge Haltwhistle Bellingham 	<ul style="list-style-type: none"> Maintain unique river shingle conditions that support the rare plant species assemblage and associated invertebrate species.
Durham Coast SSSI	<ul style="list-style-type: none"> Supports a number of British Red Data Book bird species including a number of nationally important numbers of wintering shore birds. Contains most of the paramaritime Magnesian Limestone vegetation in Britain. A species rich dune system. 	<ul style="list-style-type: none"> Corbridge Hexham Haydon Bridge Haltwhistle Bellingham Prudhoe 	<ul style="list-style-type: none"> Ensure maintenance of suitable habitat for bird species. Maintain good water quality.
Beltingham River Shingle SSSI	<ul style="list-style-type: none"> Hostile river shingle conditions due to toxic effects of metals derived from the North Pennine Orefield upstream and the poor water retention capacity of coarse-grained gravels. Supports an unusual plant community comprising species that are usually found in upland or coastal areas. 	<ul style="list-style-type: none"> Haltwhistle 	<ul style="list-style-type: none"> Maintain unique river shingle conditions that support the rare plant species assemblage and associated invertebrate species.
Wharmley Riverside SSSI	<ul style="list-style-type: none"> Hostile river shingle conditions due to toxic effects of metals derived from the North Pennine Orefield upstream and the poor water retention capacity of coarse-grained gravels. Supports an unusual plant community comprising species that are usually found in upland or coastal areas. 	<ul style="list-style-type: none"> Allendale Haltwhistle Haydon Bridge 	<ul style="list-style-type: none"> Maintain unique river shingle conditions that support the rare plant species assemblage and associated invertebrate species.
Tyne Watersmeet SSSI	<ul style="list-style-type: none"> Diverse habitat of particular interest for invertebrate fauna (ground beetles). Varied flora including some uncommon plants. 	<ul style="list-style-type: none"> Allendale Haltwhistle Haydon Bridge Bellingham 	<ul style="list-style-type: none"> Maintain current good water quality as not to impact unusual flora on the periodically flooded riverside rock outcrop and a community of beetles adapted to life on the alluvium and unstable sand river banks.

Till Catchment SSSI	<ul style="list-style-type: none"> Rivers are clean of high conservation and ecological value Good succession of vegetation due to variation in mineral content of the catchment. Internationally important floating beds of water crowfoot (Annex 1). Nationally important blooming diatom <i>Didymosphenia</i> at the headwaters of the Cheviot. Important game fishery. Diverse fish fauna with large migrations of salmon (Annexes IIa, IVa and Schedule 2) and three British species of Lamprey (Annex IIa). Rich insect fauna. Important habitat for otters (Annexes IIa, IVa and Schedule 2). 	<ul style="list-style-type: none"> Wooler 	<ul style="list-style-type: none"> Maintain current water quality conditions to protect the rich plant, invertebrate and fish fauna. Ensure maintenance of suitable habitat for all key protected and important species Maintain quality of breeding and feeding areas.
Lower Tweed and Whiteadder SSSI	<ul style="list-style-type: none"> Internationally important estuary, intertidal mud and sandflats and its riverine floating vegetation communities. Internationally important river lamprey, sea lamprey, Atlantic salmon and common otter (one of the richest in Great Britain). Nationally important lowland river on rich geological strata. Nationally important invertebrate assemblage. Nationally important populations of wintering goldeneye and moulting mute swans. 	<ul style="list-style-type: none"> Wooler Berwick 	<ul style="list-style-type: none"> Maintain current water quality conditions to protect the rich plant, invertebrate and fish fauna. Maintenance of nationally important exposed river sediments that support the nationally important invertebrate assemblage. Maintain quality of breeding and feeding areas.
Allen Confluence Gravels SSSI	<ul style="list-style-type: none"> Outstanding assemblage of river margin invertebrates including some nationally rare spiders. 	<ul style="list-style-type: none"> Allendale 	<ul style="list-style-type: none"> Maintenance of wide ranging and good quality breeding and feeding habitat for invertebrates. Maintain current water quality conditions to protect the rich invertebrate fauna.
Briarwood Banks SSSI	<ul style="list-style-type: none"> Varied flora on banks of River Allen 	<ul style="list-style-type: none"> Allendale 	<ul style="list-style-type: none"> Maintain good water quality so as not to impact the river margin flora community.

There are four WwTW that will need to exceed their consented discharge volumes to accommodate the planned levels of housing:

- Morpeth - WwTW is approximately 7km upstream of the Northumberland Shore SSSI,
- Rothbury – connected to the River Coquet & Coquet Valley SSSI and approximately 18km upstream of Northumberland Shore SSSI and Warkworth Dunes and Saltmarsh SSSI,
- Seahouses – WwTW is immediately adjacent to the Northumberland Shore SSSI,
- Wooler - WwTW is connected to the Till River Banks SSSI, Till Catchment SSSI & Lower Tweed and Whiteadder SSSI.

There are a further eight WwTW that have adequate headroom in the short-medium term but may require an increase in their consented discharge volumes towards the end of the CS period:

- Cramlington – WwTW is located approximately 5km upstream of the Northumberland Shore SSSI,
- Alnwick - WwTW is located approximately 5km upstream of the Alnmouth Saltmarsh Dunes SSSI and the Northumberland Shore SSSI,
- Blyth – WwTW is located approximately 1km upstream of the Northumberland Shore SSSI,
- Allendale – WwTW is located approximately 3km upstream of the Allen Confluence Gravels, 6km upstream of Briarwood Banks, 10km upstream of Tyne Watersmeet and at least 10km upstream of Ryton Willows SSSI, Close House Riverside SSSI, Tynemouth to Seaton Sluice SSSI, Northumberland Shore SSSI and Durham Coast SSSI,
- Haltwhistle – WwTW is approximately 7km upstream of Beltingham River Shingle SSSI and at least 10km upstream of Tyne Watersmeet SSSI, Ryton Willows SSSI, Close House Riverside SSSI, Tynemouth to Seaton Sluice SSSI, Northumberland Shore SSSI and Durham Coast SSSI,
- Shilbottle - WwTW is located approximately 3km upstream of Northumberland Shore SSSI,
- Pegswood – WwTW is located approximately 8km upstream of the Northumberland Shore SSSI,
- Lynemouth – WwTW is located approximately 1km upstream of the Northumberland Shore SSSI.

In summary therefore, there are a range of SSSIs which may receive discharge volumes in excess of that currently consented. Unlike internationally important sites, there is no background analysis available through the RoC process for SSSI specifically, so it must be assumed that impacts on these sites cannot be dismissed and will need to be investigated in more detail in the Detailed WCS. In many cases however, provided that the WwTW discharges can achieve 'no deterioration downstream,' with regard to water quality they should be able to avoid adverse effects on any of these sites.

9.6.1 *Water Quality Conclusion and Recommendations*

There are a range of SSSIs which may receive discharge volumes in excess of that currently consented. Unlike internationally important sites, there is no background analysis available through the RoC process for SSSI specifically, so it must be assumed that impacts on these sites cannot be dismissed and will need to be investigated in more detail in the detailed WCS.

Northumberland Shore and Tynemouth to Seaton Sluice SSSIs are coastal or estuarine/tidal in nature and therefore unlikely to be adversely impacted by water quality issues. Additional discharge as a result of development is likely to be diluted by the tidal volume of the North Sea and therefore it is unlikely that the connected SSSIs will be impacted.

9.6.2 *Local Erosion*

Increased volumes of effluent being discharged to watercourses may have an effect on local sediment regimes principally through increased erosion. However, this effect is likely to be very locally restricted to the immediate vicinity of the outfalls, none of which are located within designated sites. This issue does not therefore require further investigation as part of this WCS.

9.6.3 *Water Resources*

The potable water for most of Northumberland is currently sourced from Kielder Water or existing groundwater abstractions in the Berwick area.

The NWL WRMP sets out how the company intends to meet the water demand over the next 20 years. According to the WRMP any possible (and unlikely) shortfall in the potable water supply needs of Northumberland in the long run will be met through Kielder Reservoir. NWL are optioneering a series of transfer methods from Kielder to the Berwick/Fowberry Zone to solve issues with supply to some areas of Northumberland failing to meet demand at certain peak times.

It has therefore been possible to conclude that there is no requirement to consider impacts the impacts of water resources on European sites any further in this WCS for the following reasons:

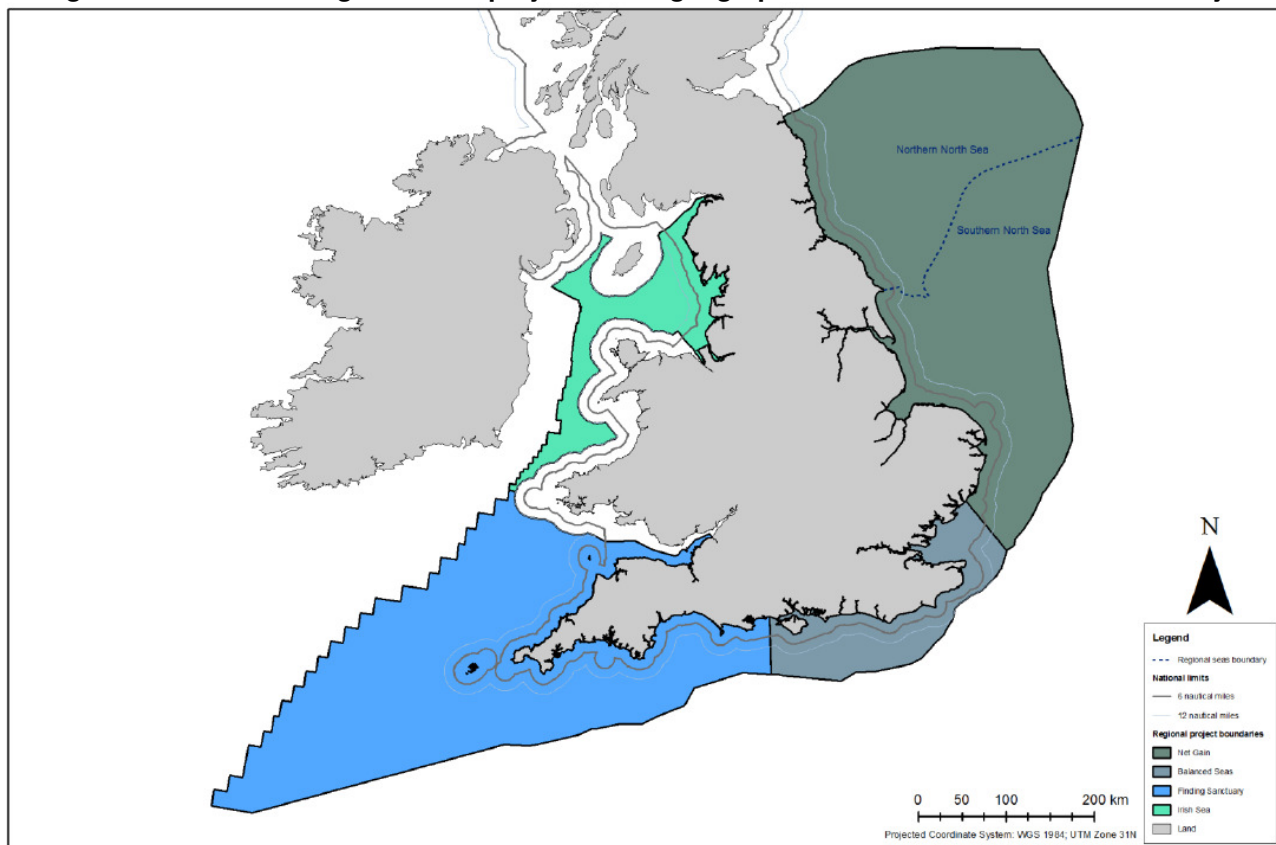
- The long-term water supply strategy for Northumberland will be reliant on Kielder Reservoir,
- While Northumberland will continue to rely on water supplied from Kielder Reservoir, there will be no requirement for current licensed abstraction volumes to be increased. As such, impacts on European sites will have already been covered by the Environment Agency RoC process.

9.7 **Screening Assessment - Marine Conservation Zones**

The Marine Conservation Project was set up in 2009 to identify Marine Conservation Zones (MCZs) for English inshore waters and the offshore waters around England, Wales and Northern Ireland. The Net Gain Regional MCZ Project area encompasses the part of the North Sea which is located next to Northumberland (see Figure 9-2). At present there are three recommended MCZs (NG13, NG13a and NG14) adjacent to the Northumberland Coast that could potentially be impacted by the development (see Figure 9-3 and Table 9-5). There are also two recommended Reference Areas (RA11 and RA12) which may also be impacted should the sites be designated. Reference Areas will be highly managed and will act as baseline sites from which the condition of other MCZs can be measured. There are a number of other MCZs (NG15, NG16, NG17 and RA13) located offshore of Northumberland; however, due to their distance from the shore, the dilution effects of the North Sea are considered to be

so great that these MCZs are unlikely to be impacted and have been scoped out of further investigation..Full designation of the sites is not expected to be until 2013. The MCZs fall within an area which could potentially be impacted by the development in Northumberland and these are described in Table 9-5. There are a number of other MCZs located in proximity to Northumberland further at sea however due to their location, the dilution effects of the North Sea are considered to be so great that they are not likely to be impacted and therefore have been scoped out of further investigation.

Figure 9-2: Net Gain Regional MCZ project within geographical context of the entire MCZ Project



MCZ project boundaries: largely based on political and administrative boundaries, the exact limits of the UK Continental Shelf are set out in orders made under section 1(7) of the Continental Shelf Act 1964 (© Crown copyright). Land: based on OS boundary line (Mean High Water Mark). © Crown copyright. All rights reserved. Regional seas: ©JNCC (2009). National limits: UKHO. Contains UKHO Law of the Sea data © Crown copyright and database right.

Source: Net Gain Final Recommendations – Submission to NE and JNCC Document³⁰

³⁰ <http://www.netgainmcz.org> (August 2011) – Net Gain Final Recommendations – Submission to NE and JNCC

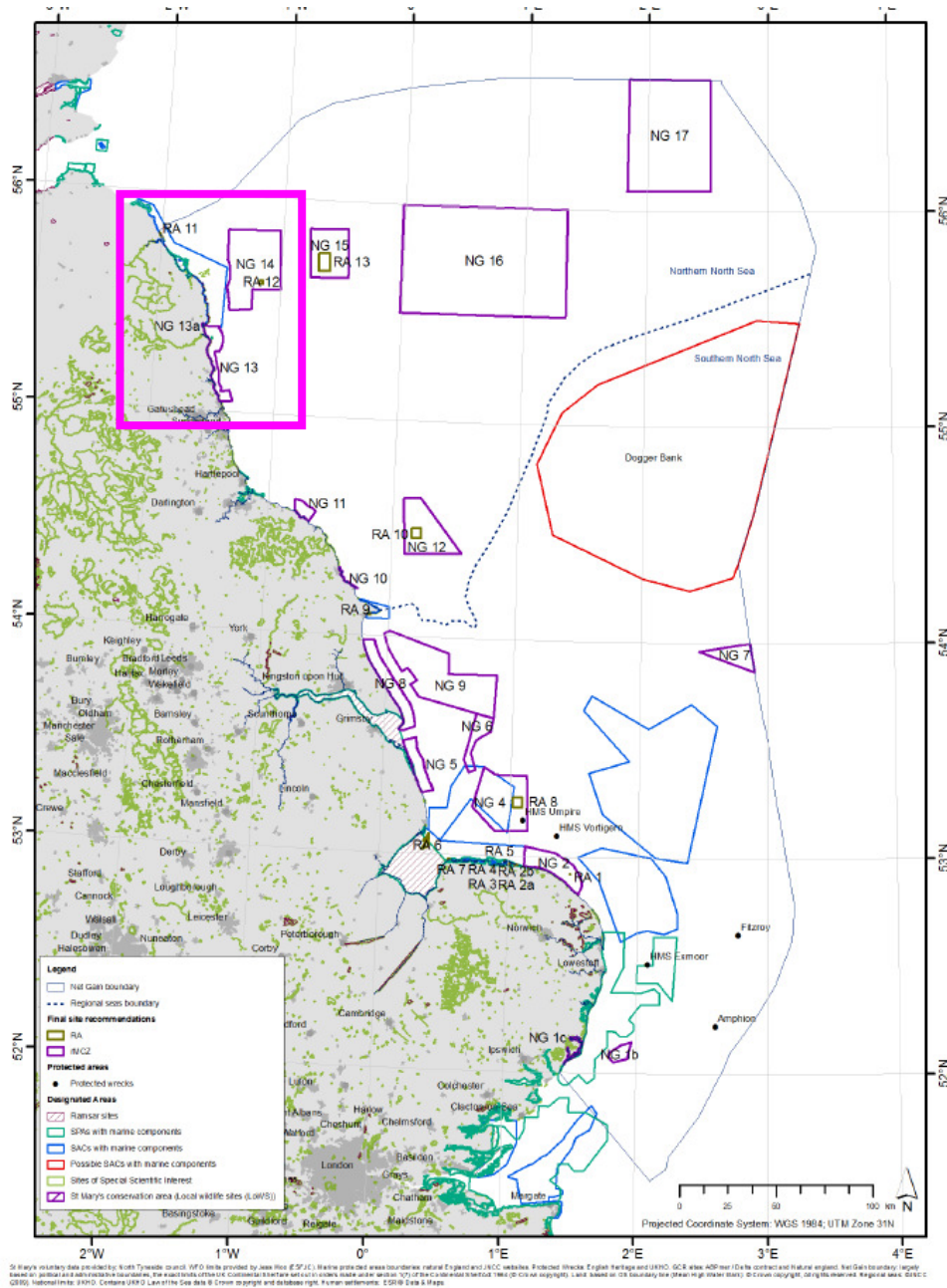
TABLE 9-5: SUMMARY OF MCZS WHICH COULD POTENTIALLY BE IMPACTED BY PROPOSED DEVELOPMENT IN NORTHUMBERLAND

Site ID	Site Name	Important Features	WwTW u/s of site
NG13	Coquet to St Mary's	Seabed represents a mosaic of intertidal and subtidal rock and sediment features that support diverse underboulder communities, Includes 9 SSSIs including Northumberland Coast and Coquet Island.	<ul style="list-style-type: none"> Amble, Shilbottle, <i>Lynemouth</i>, Newbiggin, Cambois, <i>Blyth</i>, Alnwick, Longhirst, <i>Pegswood</i>, Morpeth, <i>Cramlington</i>, Matfen, Howdon, Broomhaugh, Hexham, Haydon Bridge, Allendale, Haltwhistle, <i>Bellingham</i>.
NG13a	Aln Estuary	Coastal saltmarsh and saline reedbed, sheltered muddy gravels and estuarine rocky habitats, Includes Alnmouth Saltmarsh and Dunes SSSI	<ul style="list-style-type: none"> <i>Alnwick</i>, Shilbottle.
NG14	Farnes East	Circalltural rock with areas of subtidal coarse sediment, mud, sand and mixed sediment, Breeding habitat for Grey Seals and is in close proximity to Berwickshire and North Northumberland Coast SAC.	<ul style="list-style-type: none"> Seahouses, Belford.
rRA 11	Berwick Coast	Mosaic of high, moderate and low energy intertidal rock habitats, Overwintering birds populations significant to the area (important feeding/breeding areas), Site falls within Berwickshire and North Northumberland Coast SAC and Northumberland Shore SSSI.	<ul style="list-style-type: none"> Wooler, Berwick.
rRA 12	Farnes Clay	Subtidal Peat and Clay exposures which provides habitat.	<ul style="list-style-type: none"> Seahouses.

Bold - signifies that WwTW will need to exceed consented discharge volumes to accommodate the planned levels of housing

Italic - signifies that WwTW has adequate headroom in the short-medium term but may require an increase in their consented discharge volumes at some point in the CS period

Figure 9-3: Location of MCZs and Reference Areas which could potentially be impacted by proposed development in Northumberland (Pink Box)



Source: Net Gain Final Recommendations – Submission to NE and JNCC Document³¹

Table 9-5 shows that two out of the three proposed MCZs and both of the Reference Areas in Northumberland are located downstream of WwTWs that will need to exceed consented discharge volumes to accommodate the planned levels of housing. The A166 Estuary is located downstream of a WwTW that currently has adequate headroom in the short-medium term but may require an increase in consented discharge volumes at some point in the CS period.

³¹ <http://www.netgainmcz.org> (August 2011) – Net Gain Final Recommendations – Submission to NE and JNCC

Further investigation will be required at the Detailed stage of the WCS but provided that the WwTWs can all comply with the policy of 'no deterioration downstream' there should be no likely significant effect from delivery of the proposed development in Northumberland.

9.8 Coastal Waters and Eutrophication

As the RoC process for the Northumbria Coast SPA has identified, hypernutrification of coastal waters does not necessarily lead to eutrophication. For example: a mixture of high sediment loading, wave action and low water temperatures could prevent the build up of extensive algal blooms should a high nutrient load occur and therefore preventing the occurrence of an adverse ecological effect. A target of 'no deterioration downstream' for all WwTW should prevent an adverse effect as a result of the proposed development in Northumberland. Further investigations should be undertaken at the Detailed stage of the WCS once more accurate information regarding potential development is available.

9.9 Ecology and Biodiversity Summary

Tables 9-6 – 9-8 provide a summary of the risk ratings to the International and National sites presented by the proposed development and employment areas in Northumberland. When further information is made available about the spatial distribution of the potential development then a more detailed assessment of the risk to the ecological sites in Northumberland can be undertaken.

TABLE 9-6: – NORTH NORTHUMBERLAND SHMA, ECOLOGY CONSTRAINTS	
Settlement	Risk to International/National Site
Alnwick	A
Amble	G
Rothbury	A
Rest of Former Alnwick Area*	A
Berwick	G
Belford	G
Seahouses	A
Wooler	A
Rest of Former Berwick Area*	A
* Low availability of information regarding spatial distribution of proposed development therefore settlement poses an amber risk.	

**TABLE 9-7: CITY COMMUTER REGION SHMA,
ECOLOGY CONSTRAINTS**

Settlement	Risk to International/National Site
Morpeth	A
Ponteland**	A
Widdrington Station	A
Ellington	A
Lynemouth	A
Pegswood	A
Hadston	A
Rest of Former Castle Morpeth*	A
Hexham	G
Prudhoe **	A
Corbridge	G
Allendale	A
Haydon Bridge	G
Rest of Commuter Pressure Area*	A
Haltwhistle	A
Bellingham	G
Rest of Rural Area – Tynedale*	A

* Low availability of information regarding spatial distribution of proposed development therefore settlement poses an amber risk.

** There are ongoing investigations and studies being undertaken at Howdon WwTW – Please refer to Chapter 7 for further information.

**TABLE9-8:URBAN NORTHUMBERLAND SHMA,
ECOLOGY CONSTRAINTS**

Settlement	Risk to International/National Site
Blyth	A
Cramlington*	A
Seaton Valley Villages*	A
Ashington	G
Newbiggin-by-the-Sea	G
Bedlington / Bedlington Station	G
Guide Post / Stakeford	G
Choppington	G
Cambois	G

* There are ongoing investigations and studies being undertaken at Howdon WwTW – Please refer to Chapter 7 for further information.

10 PROPOSED NEW DEVELOPMENT AREA ASSESSMENTS

10.1 Introduction

This section provides a summary of the findings for each of the SHMAs in terms of the main water cycle constraints:

- Water Environment,
- Water Resources,
- Wastewater,
- Ecology and Biodiversity,
- Flood Risk.

Table 2-1 provides an overview of the traffic light matrix used to assess the different aspects of the water cycle in relation to the proposed development sites/areas.

10.2 North Northumberland SHMA

10.2.1 Alnwick

Overview

Under Scenario 1, 575 new dwellings are proposed within Alnwick and this increases to 690 new dwellings under Scenario 2. In addition, 16.2 ha of employment land are also planned for Alnwick.

Water Environment

The River Aln is currently of *Moderate Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Alnwick WwTW currently has a headroom to serve an additional 400 dwellings. Under Scenario 1 it is proposed that 575 dwellings are developed in Alnwick and this increases to 690 dwellings under Scenario 2. In addition, 16.2 ha of employment land are also proposed for Alnwick over the plan period of the Northumberland LDF.

Initial calculations undertaken as part of this study suggest that there is sufficient headroom at the WwTW; however this makes no account of existing or future employment served by the works, which would reduce the headroom and may account for NWLs projected shortfall in headroom.

Sewer - information provided by NWL has confirmed that areas in central Alnwick have experienced sewer flooding indicating that there may be limited capacity in the existing network. Investment to the network at Alnwick is currently taking place.

Flood Risk

There is generally a low risk of flooding across Alnwick and flood risk should not be viewed as a major constraint to development. NWL have confirmed

that there is a medium risk of flooding from sewers and this should be considered in more detail.

With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources are not considered an issue as there is sufficient supply in the Kielder WRZ throughout the planning timeframe.

Ecology and Biodiversity

The proposed development in Alnwick could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-1: ALNWICK SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	G	A
2016–2021	A	G	G	A	G	A
2021–2026	A	G	G	A	G	A
2026–2031	A	G	A	A	G	A
+20%	A	G	A	A	G	A

10.2.2 *Rest of former Alnwick Area*

Overview

Under Scenario 1, 415 new dwellings are proposed within the rest of the former Alnwick area and this increases to 498 new dwellings under Scenario 2. In addition, up to 4.8 ha of employment land is also planned for the rest of the former Alnwick area (in combination with Rothbury).

However at this stage there is no guidance in relation to the spatial distribution across the rest of the former Alnwick area.

Water Environment

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

The overall impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However, new development should be steered towards the parts of the wastewater network (sewers and *WwTW*) that has capacity.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity; and
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources are not considered an issue as there is sufficient supply in the Kielder WRZ throughout the planning timeframe.

Ecology and Biodiversity

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-2: REST OF FORMER ALNWICK AREA SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	A
2016–2021	A	G	G	G	G	A
2021–2026	A	G	G	G	G	A
2026–2031	A	G	G	G	G	A
+20%	A	G	G	G	G	A

10.2.3 *Amble*

Overview

Under Scenario 1, 575 new dwellings are proposed within Amble and this increases to 690 new dwellings under Scenario 2. In addition, 10.4 ha of employment land are also planned for Amble.

Water Environment

The North Sea at Amble is currently of *Good Status* and increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced. Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Amble WwTW currently has a headroom to serve an additional 200 dwellings. Under Scenario 1 it is proposed that 575 dwellings are developed in Amble and this increases to 690 dwellings under Scenario 2. In addition, 10.4 ha of employment land are also proposed for Alnwick over the plan period of the Northumberland LDF.

Initial calculations undertaken as part of this study suggest that there is sufficient headroom at the WwTW; however this makes no account of existing or future employment served by the works, which would reduce the headroom and may account for NWLs projected shortfall in headroom.

Sewer - however, information provided by NWL has confirmed that areas in north-west Amble are currently at risk from sewer flooding indicating that there may be limited capacity in the existing network in the north-west areas of Amble.

Flood Risk

There is generally a medium risk of flooding across Amble, with a medium risk from coastal sources. NWL have also confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources are not considered an issue as there is sufficient supply in the Kielder WRZ throughout the planning timeframe.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-3: AMBLE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	A	A	G
2016–2021	G	G	G	A	A	G
2021–2026	G	G	G	A	A	G
2026–2031	G	G	G	A	A	G
+20%	G	G	G	A	A	G

10.2.4 Belford

Overview

Under Scenario 1, 125 new dwellings are proposed within Belford and this increases to 150 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Belford (in combination with Berwick, Seahouses, Wooler and the rest of the former Berwick area).

Water Environment

Belford Burn is currently of *Poor Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to ensure *Good Ecological Status* is reached by 2015.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Belford WwTW currently has no headroom to serve no development and the EA have also confirmed this to be the case.

Investment is planned to be undertaken prior to 2015 and assets of the Belford WwTW will be designed to include the planned levels of development in Belford.

Sewer - information provided by NWL (based on DG5 records) has confirmed that there have been no reported sewer flooding incidents in Belford.

Flood Risk

There is generally a low risk of flooding across Belford, with a medium risk of potential fluvial flooding. However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent

flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Belford presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-4: BELFORD SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	G	G	G
2016–2021	G	G	G	G	G	G
2021–2026	G	G	G	G	G	G
2026–2031	G	G	G	G	G	G
+20%	G	G	G	G	G	G

10.2.5 Berwick

Overview

Under Scenario 1, 900 new dwellings are proposed within Alnwick and this increases to 1,080 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Berwick (in combination with Belford, Seahouses, Wooler and the rest of the former Berwick area).

Water Environment

The River Tweed is currently of *Moderate Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Berwick WwTW has headroom to support new development, however have not confirmed actual headroom numbers - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Berwick.

Flood Risk

Across Berwick there is a low risk of flooding from fluvial, sewer and surface water sources, with a medium risk from coastal flooding. In addition, GWV maps from the EA show that parts of Berwick (to the south of the River Tweed) sit on top of a major aquifer, which increases the risk of groundwater flooding and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular,

and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

There are issues regarding groundwater quality and supply in the Berwick and Fowberry WRZ.

This is unlikely to be a major constraint to proposed development as NWL have sufficient resources in the Kielder WRZ and are currently considering several transmission options.

Ecology and Biodiversity

The proposed development in Berwick presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-5: BERWICK SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	A	G	G	A	G
2016–2021	G	A	G	G	A	G
2021–2026	G	A	G	G	A	G
2026–2031	G	A	G	G	A	G
+20%	G	A	G	G	A	G

10.2.6 *Rest of former Berwick Area*

Overview

Under Scenario 1, 95 new dwellings are proposed within the rest of the former Berwick area and this increases to 114 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for the rest of the former Berwick area (in combination with Belford, Berwick, Seahouses and Wooler).

However at this stage there is no guidance in relation to the spatial distribution across the rest of the former Berwick area.

Water Environment

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

The overall impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. However, new development should be steered towards the parts of the wastewater network (sewers and WwTW) that has capacity.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity; and
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

There are issues regarding groundwater quality and supply in the Berwick and Fowberry WRZ, however this is unlikely to be a major constraint to proposed development as NWL have sufficient resources in the Kielder WRZ and are currently considering several transmission options.

Ecology and Biodiversity

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-6: REST OF FORMER BERWICK AREA SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	A	G	G	G	A
2016–2021	A	A	G	G	G	A
2021–2026	A	A	G	G	G	A
2026–2031	A	A	G	G	G	A
+20%	A	A	G	G	G	A

10.2.7 Rothbury

Overview

Under Scenario 1, 185 new dwellings are proposed within Rothbury and this increases to 222 new dwellings under Scenario 2. In addition, up to 4.8 ha of employment land is also planned for Rothbury (in combination with the rest of the former Alnwick area).

Water Environment

The River Coquet is currently of *Moderate Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Rothbury WwTW currently has a headroom to serve an additional 90 dwellings, however initial 'high level' calculations (exclusive of employment figures) undertaken as part of this study suggest that Rothbury WwTW is currently exceeding its dry weather flow (DWF) consent.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Rothbury.

Flood Risk

There is generally a low risk of flooding across Rothbury, with a medium risk of fluvial flooding.

However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Rothbury could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-7: ROTHBURY SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	A	G	G	A
2016–2021	A	G	R	G	G	A
2021–2026	A	G	R	G	G	A
2026–2031	A	G	R	G	G	A
+20%	A	G	R	G	G	A

10.2.8 Seahouses

Overview

Under Scenario 1, 200 new dwellings are proposed within Seahouses and this increases to 240 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Seahouses (in combination with Belford, Berwick, Wooler and the rest of the former Berwick area).

Water Environment

The North Sea at Seahouses is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced. Overall the impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches. Care should also be taken so as not to prevent the Holy Island Shellfish Water reaching the standards of the SWD and the WFD (in 2013 when revoked).

Wastewater

WwTW - NWL have confirmed that Seahouses WwTW currently has no headroom to serve the proposed level of development. However NWL have confirmed that they are currently assessing the treatment capabilities at Seahouses WwTW. Initial 'high level' calculations undertaken as part of this study appear to suggest that there may be sufficient headroom. Although the high level assessment has made no allowance for holiday flows, which are likely to have been considered in the NWL assessment and this may account for the headroom differences.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Seahouses.

Flood Risk

There is generally a low risk of flooding across Seahouses, with a medium risk of coastal flooding.

However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Seahouses could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-8: SEAHOUSES SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	A	G	G	A
2016–2021	A	G	R	G	G	A
2021–2026	A	G	R	G	G	A
2026–2031	A	G	R	G	G	A
+20%	A	G	R	G	G	A

10.2.9 Wooler

Overview

Under Scenario 1, 200 new dwellings are proposed within Wooler and this increases to 240 new dwellings under Scenario 2. In addition, up to 30.0 ha of employment land is also planned for Wooler (in combination with Belford, Berwick Seahouses and the rest of the former Berwick area).

Water Environment

Wooler Water is currently of *Moderate Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Wooler WwTW currently has no headroom to serve the proposed development. The EA have also confirmed that the measured flows at Wooler exceed the current consent limit.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Wooler.

Flood Risk

There is generally a low risk of flooding across Wooler, with a medium risk of fluvial flooding.

However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

There are issues regarding groundwater quality and supply in the Berwick and Fowberry WRZ, however this is unlikely to be a major constraint to proposed development as NWL have sufficient resources in the Kielder WRZ and are currently considering several transmission options.

Ecology and Biodiversity

The proposed development in Wooler could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-9: WOOLER SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	A	R	G	G	A
2016–2021	A	A	R	G	G	A
2021–2026	A	A	R	G	G	A
2026–2031	A	A	R	G	G	A
+20%	A	A	R	G	G	A

10.3 City Commuter Region SHMA

10.3.1 Allendale

Overview

Under Scenario 1, 79 new dwellings are proposed within Allendale and this increases to 95 new dwellings under Scenario 2. 1.0 ha of employment land is also planned for Allendale.

Water Environment

The River Allen is currently of *Moderate Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Allendale WwTW currently has a headroom to serve an additional 79 dwellings, however there is insufficient headroom to accept Scenario 2 without a permit review and investment.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Allendale.

Flood Risk

There is a low risk of flooding across Allendale and therefore with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Allendale could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-10: ALLENDALE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	R	G	G	A
2016–2021	A	G	R	G	G	A
2021–2026	A	G	R	G	G	A
2026–2031	A	G	R	G	G	A
+20%	A	G	R	G	G	A

10.3.2 Bellingham

Overview

Under Scenario 1, 71 new dwellings are proposed within Bellingham and this increases to 85 new dwellings under Scenario 2. In addition, 0.5 ha of employment land is also planned for Bellingham.

Water Environment

The River North Tyne is currently of *Moderate* Potential. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that there is a capital project currently on site to upgrade Bellingham WwTW. Under Scenario 1 it is proposed that 71 dwellings are developed in Bellingham and this increases to 85 dwellings under Scenario 2. In addition, 0.5 ha of employment land is also proposed for Bellingham over the plan period of the Northumberland LDF.

NWL have confirmed that as part of the upgrade, additional capacity has been provided to ensure there is sufficient headroom at the works to support the level of growth within scenarios 1 and 2.

Sewer - information provided by NWL has confirmed that areas in east are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the east areas of Bellingham.

Flood Risk

Across Bellingham there is a low risk of flooding from coastal, groundwater, and tidal sources with a medium risk of fluvial flooding. Information provided by NWL (based on DG5 records) has also confirmed that areas in east

Bellingham have experienced sewer flooding indicating that there may be limited sewer capacity in these areas. This should be further investigated at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Bellingham presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-11: BELLINGHAM SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	A	A	A	G
2016–2021	G	G	A	A	A	G
2021–2026	G	G	A	A	A	G
2026–2031	G	G	A	A	A	G
+20%	G	G	A	A	A	G

10.3.3 Coastal Villages

Overview

Under Scenario 1, 980 new dwellings are proposed within the Coastal Villages and this increases to 1,176 new dwellings under Scenario 2. In addition, 1.0 ha of employment land is also planned for the Coastal Villages.

Water Environment

The River Lyne is currently of *Poor Status*. The other potentially impacted watercourses/bodies are not currently assessed under the WFD. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

There should also be careful consideration of cumulative impacts to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that there are capacity issues at Lynemouth and Matfen³² and that there is little or no headroom at Pegswood and Shillbottle³³. No capacity issues have however been confirmed for Longhirst.

Sewer - across the broad areas proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

³² Although Matfen and Shillbottle WWTW are not located in the coastal villages area they do serve some of the coastal villages.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in the Coastal Villages could pose as a risk to international or nationally designated sites. However due to the designated sites being tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from proposed development. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-12: COASTAL VILLAGES SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	A	G	G	A
2016–2021	A	G	A	G	G	A
2021–2026	A	G	A	G	G	A
2026–2031	A	G	A	G	G	A
+20%	A	G	A	G	G	A

10.3.4 Corbridge

Overview

Under Scenario 1, 79 new dwellings are proposed within Corbridge and this increases to 95 new dwellings under Scenario 2. No employment land is proposed.

Water Environment

The River Tyne is currently of *Good Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Broomhaugh WwTW currently has a headroom to serve an additional 8,100 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Corbridge.

Flood Risk

There is generally a low risk of flooding across Corbridge. With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

FINAL REPORT

May 2012

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Corbridge presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-13: CORBRIDGE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	G	G	G
2016–2021	G	G	G	G	G	G
2021–2026	G	G	G	G	G	G
2026–2031	G	G	G	G	G	G
+20%	G	G	G	G	G	G

10.3.5 Haltwhistle

Overview

Under Scenario 1, 262 new dwellings are proposed within Haltwhistle and this increases to 316 new dwellings under Scenario 2. In addition, 5.0 ha of employment land are also planned for Haltwhistle.

Water Environment

The River South Tyne at Haltwhistle is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Haltwhistle WwTW currently has a headroom to serve an additional 260 dwellings. Additional headroom will be required in the medium to long term to serve proposed development.

Sewer - information provided by NWL has confirmed that areas in south-west of Haltwhistle are currently at risk of sewer flooding indicating that there may be limited capacity in the network in those areas.

Flood Risk

There is generally a low risk of flooding across Haltwhistle. However NWL have confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Haltwhistle could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-14: HALTWHISTLE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	G	A
2016–2021	A	G	G	A	G	A
2021–2026	A	G	G	A	G	A
2026–2031	A	G	A	A	G	A
+20%	A	G	A	A	G	A

10.3.6 Haydon Bridge

Overview

Under Scenario 1, 79 new dwellings are proposed within Haydon Bridge and this increases to 95 new dwellings under Scenario 2. In addition, 1.0 ha of employment land is also planned for Haydon Bridge.

Water Environment

The River South Tyne at Haydon Bridge is currently of *Moderate Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Haydon Bridge WwTW has headroom to serve an additional 168 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Sewer - due to the limited development aspirations in Haydon Bridge it is likely that development can be supported by the existing network. However, information provided by NWL has confirmed that areas in north-east of Haydon Bridge have experienced sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Haydon Bridge.

Flood Risk

There is generally a low risk of flooding across Haydon Bridge. However NWL have confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and

the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Haydon Bridge presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-15: HAYDON BRIDGE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	A	G	G
2016–2021	G	G	G	A	G	G
2021–2026	G	G	G	A	G	G
2026–2031	G	G	G	A	G	G
+20%	G	G	G	A	G	G

10.3.7 Hexham

Overview

Under Scenario 1, 440 new dwellings are proposed within Hexham and this increases to 528 new dwellings under Scenario 2. In addition, 10.0 ha of employment land are also planned for Hexham.

Water Environment

The River Tyne is currently of *Good Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

Overall the impacts of development on the water environment can be screened out at this stage as the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Hexham WwTW currently has a headroom to serve an additional 2,542 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Sewer - information provided by NWL has confirmed that areas in north-east Hexham are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Hexham.

Flood Risk

There is generally a medium risk of flooding across Hexham with a medium risk of surface water flooding. NWL have also confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Hexham presents little or no risk to international or nationally designated sites, however once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-16: HEXHAM SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	A	A	G
2016–2021	G	G	G	A	A	G
2021–2026	G	G	G	A	A	G
2026–2031	G	G	G	A	A	G
+20%	G	G	G	A	A	G

10.3.8 Morpeth

Overview

Under Scenario 1, 858 new dwellings are proposed within Morpeth and this increases to 1,030 new dwellings under Scenario 2. In addition, 25.0 ha of employment land are also planned for Morpeth.

Water Environment

The River Wansbeck is currently of *Poor Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Morpeth WwTW currently has no headroom to serve new development within Morpeth. Although there is potential to extend Morpeth WwTW (in relation to consents), there are currently issues with land purchase which may prevent any extension. If the land purchase issues cannot be resolved, then this will have major implications for future development within Morpeth and the parts of the former Castle Morpeth area that would drain to Morpeth WwTW – essentially preventing short term development.

Sewer - information provided by NWL has confirmed that areas in south-east/west Morpeth are currently at risk of sewer flooding indicating that there may be limited capacity in the network in these areas of Morpeth.

Flood Risk

There is generally a medium risk of flooding across Morpeth, with a medium risk of surface water flooding. NWL have also confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular,

and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Morpeth could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-17: MORPETH SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	R	A	A	A
2016–2021	A	G	R	A	A	A
2021–2026	A	G	R	A	A	A
2026–2031	A	G	R	A	A	A
+20%	A	G	R	A	A	A

10.3.9 Ponteland

Overview

Under Scenario 1, 245 new dwellings are proposed within Ponteland and this increases to 294 new dwellings under Scenario 2. In addition, 10.0 ha of employment land are also planned for Ponteland.

Water Environment

The Tyne Estuary is currently of *Moderate Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - Howdon WwTW currently has the headroom to support between a further 13,000 and 27,000 new homes but serves all of the administrative area of Newcastle, South Tyneside and North Tyneside. In addition it serves most of Gateshead and smaller proportions of southern Northumberland and northern Sunderland. NWL are currently undertaking a capacity study at Howdon WwTW to determine exact headroom figures. A number of studies are being undertaken including the investigation into the separation of surface water from the combined systems. In addition, quick wins are also being considered to increase the headroom at Howdon WwTW. NWL believe that the findings of the EA monitoring and on-going studies may feed into schemes within AMP6.

Sewer - information provided by NWL has confirmed that areas in north-east Ponteland are currently at risk of sewer flooding indicating that there may be limited sewer capacity in these areas.

Flood Risk

There is generally a medium risk of flooding from fluvial, surface water and sewer sources across Ponteland. NWL have confirmed that there is a

medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Ponteland could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-18: PONTELAND SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	A	A
2016–2021	A	G	A	A	A	A
2021–2026	A	G	A	A	A	A
2026–2031	A	G	A	A	A	A
+20%	A	G	A	A	A	A

10.3.10 Prudhoe

Overview

Under Scenario 1, 440 new dwellings are proposed within Prudhoe and this increases to 528 new dwellings under Scenario 2. In addition, 9.0 ha of employment land are also planned for Prudhoe.

Water Environment

The Tyne Estuary is currently of *Moderate Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - Howdon WwTW currently has the headroom to support between a further 13,000 and 27,000 new homes but serves all of the administrative area of Newcastle, South Tyneside and North Tyneside. In addition it serves most of Gateshead and smaller proportions of southern Northumberland and northern Sunderland. NWL are currently undertaking a capacity study at Howdon WwTW to determine exact headroom figures. A number of studies are being undertaken including the investigation into the separation of surface water from the combined systems. In addition, quick wins are also being considered to increase the headroom at Howdon WwTW. NWL believe that the findings of the EA monitoring and on-going studies may feed into schemes within AMP6.

Sewer - information provided by NWL (based on DG5 records) has confirmed that areas in north-east Prudhoe are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-east areas of Prudhoe.

Flood Risk

There is generally a low risk of flooding across Prudhoe. However NWL have confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Prudhoe could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-19: PRUDHOE SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	G	A
2016–2021	A	G	A	A	G	A
2021–2026	A	G	A	A	G	A
2026–2031	A	G	A	A	G	A
+20%	A	G	A	A	G	A

10.3.11 *Rest of Commuter Pressure Area*

Overview

Under Scenario 1, 476 new dwellings are proposed within the rest of the Commuter Pressure Area and this increases to 571 new dwellings under Scenario 2.

However at this stage there is no guidance in relation to the spatial distribution across the rest of the Commuter Pressure Area.

Water Environment

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

The overall impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However, new development should be steered towards the parts of the wastewater network (sewers and WwTW) that has capacity.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-20: REST OF COMMUTER PRESSURE AREA SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	A
2016–2021	A	G	G	G	G	A
2021–2026	A	G	G	G	G	A
2026–2031	A	G	G	G	G	A
+20%	A	G	G	G	G	A

10.3.12 *Rest of former Castle Morpeth Area*

Overview

Under Scenario 1, 368 new dwellings are proposed within the rest of the former Castle Morpeth area and this increases to 442 new dwellings under Scenario 2. In addition, up to 5.0 ha of employment land is also planned for the rest of the former Castle Morpeth area.

However at this stage there is no guidance in relation to the spatial distribution across the rest of the former Castle Morpeth area.

Water Environment

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

The overall impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. Any new development should be steered towards the parts of the wastewater network (WwTW) that has capacity.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-21: REST OF COMMUTER PRESSURE AREA SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	A
2016–2021	A	G	G	G	G	A
2021–2026	A	G	G	G	G	A
2026–2031	A	G	G	G	G	A
+20%	A	G	G	G	G	A

10.3.13 *Rest of Rural Area (Tynedale)*

Overview

Under Scenario 1, 141 new dwellings are proposed within the rest of the Rural Area and this increases to 169 new dwellings under Scenario 2.

However at this stage there is no guidance in relation to the spatial distribution across the rest of the Rural Area.

Water Environment

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

The overall impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However, new development should be steered towards the parts of the wastewater network (sewers and WwTW) that has capacity.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-22: REST OF RURAL AREA (TYNEDALE) SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	A
2016–2021	A	G	G	G	G	A
2021–2026	A	G	G	G	G	A
2026–2031	A	G	G	G	G	A
+20%	A	G	G	G	G	A

10.4 Urban Northumberland SHMA

10.4.1 Ashington

Overview

Under Scenario 1, a combined total of 2,400 new dwellings are proposed within Ashington and Newbiggin-by-the-Sea and this increases to 2,880 new dwellings under Scenario 2. In addition, a combined total of 45.0 ha of employment land are also planned for Ashington and Newbiggin-by-the-Sea.

Water Environment

The North Sea at Newbiggin is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced.

Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Newbiggin WwTW has headroom to serve an additional 5,496 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Sewer - information provided by NWL has confirmed that areas in south-east Ashington are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the south-east areas of Ashington.

Flood Risk

There is generally a low risk of flooding across Ashington. However NWL have confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-23: ASHINGTON SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	G	G
2016–2021	A	G	G	A	G	G
2021–2026	A	G	G	A	G	G
2026–2031	A	G	G	A	G	G
+20%	A	G	G	A	G	G

10.4.2 *Bedlington / Bedlington Station*

Overview

Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Bedlington/Bedlington Station, Choppington and Guide Post/Stakeford and this increases to 1,440 new dwellings under Scenario 2. In addition, 5.0 ha of employment land are also planned for Bedlington/Bedlington Station.

Water Environment

The North Sea at Cambois is currently of *Good Status* and increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced.

Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Cambois WwTW has headroom to serve an additional 8,100 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Under Scenario 1 it is proposed that 1,520 dwellings are developed in Bedlington/Bedlington Station, Cambois, Choppington and Guide Post/Stakeford and this increases to 1,824 dwellings under Scenario 2. In addition, 246.5 ha of employment land are also proposed for Cambois over the plan period of the Northumberland LDF.

Sewer - information provided by NWL has confirmed that areas in central Bedlington have experienced sewer flooding indicating that there may be limited capacity in the network in the central Bedlington.

Flood Risk

There is generally a low risk of flooding across Bedlington. However NWL have confirmed that there is a medium risk of flooding from sewers and this should be considered in more detail.

With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-24: BEDLINGTON / BEDLINGTON STATION SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	A	G	G
2016–2021	G	G	G	A	G	G
2021–2026	G	G	G	A	G	G
2026–2031	G	G	G	A	G	G
+20%	G	G	G	A	G	G

10.4.3 Blyth

Overview

Under Scenario 1, 4,384 new dwellings are proposed within Blyth and this increases to 5,261 new dwellings under Scenario 2. In addition, 13.0 ha of employment land and 31.0 ha of mixed-use land are also planned for Blyth.

Water Environment

The River Blyth is currently of *Poor Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that there is capacity to support future housing development in the short term based on an average build rate per annum of 100 units. It is NWL's intention to implement a scheme at the works during AMP6 (2015 - 2020) which will increase capacity to support the proposed levels of development.

Sewer - information provided by NWL has confirmed that areas in north-west Blyth are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north-west areas of Blyth.

Flood Risk

There is generally a medium risk of flooding across Blyth, with a medium risk from coastal sources. NWL have also confirmed that there is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Blyth could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-25: BLYTH SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	A	A	A	A
2016–2021	A	G	A	A	A	A
2021–2026	A	G	A	A	A	A
2026–2031	A	G	A	A	A	A
+20%	A	G	A	A	A	A

10.4.4 *Cambois*

Overview

Under Scenario 1, 320 new dwellings are proposed within Cambois and this increases to 384 new dwellings under Scenario 2. In addition, 241.5 ha of employment land are also planned for Cambois.

Water Environment

The North Sea at Cambois is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced.

Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Cambois WwTW has headroom to serve an additional 8,100 population - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Under Scenario 1 it is proposed that 1,520 dwellings are developed in Bedlington/Bedlington Station, Cambois, Choppington and Guide Post/Stakeford and this increases to 1,824 dwellings under Scenario 2. In addition, 246.5 ha of employment land are also proposed for Cambois over the plan period of the Northumberland LDF.

Sewer - information provided by NWL has confirmed that there have been no reported sewer flooding incidents in Cambois.

Flood Risk

There is generally a low risk of flooding across Cambois.

With careful planning flood risk is not considered a constraint to development, but careful management of surface water runoff in particular,

and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-26: CAMBOIS SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	G	G	G
2016–2021	G	G	G	G	G	G
2021–2026	G	G	G	G	G	G
2026–2031	G	G	G	G	G	G
+20%	G	G	G	G	G	G

10.4.5 Choppington

Overview

Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Choppington, Bedlington/Bedlington Station and Guide Post/Stakeford and this increases to 1,440 new dwellings under Scenario 2.

Water Environment

The North Sea downstream of the Cambois WwTW is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced.

Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Cambois WwTW has headroom to serve an additional 8,100 population - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Under Scenario 1 it is proposed that 1,520 dwellings are developed in Bedlington/Bedlington Station, Cambois, Choppington and Guide Post/Stakeford and this increases to 1,824 dwellings under Scenario 2. In addition, 246.5 ha of employment land are also proposed for Cambois over the plan period of the Northumberland LDF.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in Choppington.

Flood Risk

There is generally a low risk of flooding across Choppington.

With careful planning flood risk is not considered a constraint to development, but careful management of surface water runoff in particular,

and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-27: CHOPPINGTON SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	G	G	G
2016–2021	G	G	G	G	G	G
2021–2026	G	G	G	G	G	G
2026–2031	G	G	G	G	G	G
+20%	G	G	G	G	G	G

10.4.6 Cramlington (Excluding Secondary Option)

Overview

Under Scenario 1, 1,052 new dwellings are proposed within Cramlington and this increases to 1,263 new dwellings under Scenario 2. In addition, 78.0 ha of employment land and 51.0 ha of 'prestige' employment are also planned.

Water Environment

The River Blyth is currently of *Poor Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Cramlington WwTW has headroom to support new development at a build rate of 100 dwellings per annum, however have not confirmed actual headroom numbers. Initial calculations undertaken as part of this study (exclusive of employment, existing and proposed) suggest that there is significant headroom at the WwTW.

Based on the proposed new (residential) development figures for Cramlington, pro-rata build rates across the plan period are between 53 dwellings per annum (Scenario 1) and 63 dwellings per annum (Scenario 2). In addition, development in the southern part of Cramlington could also drain to Howdon WwTW, which is subject to monitoring and assessment to confirm the long-term capacity at the WwTW.

Sewer - information provided by NWL has confirmed that some areas in north and south of Cramlington are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north and south areas of Cramlington.

Flood Risk

There is generally a medium risk of flooding across Cramlington, with a medium risk of surface water flooding. NWL have also confirmed that there

is a medium risk of flooding from sewers and this should be considered further at the Detailed stage of the WCS, along with the recorded surface water flooding problems.

With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Cramlington could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-28: CRAMLINGTON SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	A	A	A
2016–2021	A	G	G	A	A	A
2021–2026	A	G	G	A	A	A
2026–2031	A	G	G	A	A	A
+20%	A	G	G	A	A	A

10.4.7 Cramlington (Secondary Option)

Under Scenario 1, 2,300 new dwellings are proposed within Cramlington and this increases to 2,700 new dwellings under Scenario 2.

Water Environment

The River Blyth is currently of *Poor Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives.

The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - NWL have confirmed that Cramlington WwTW has headroom to support new development at a build rate of 100 dwellings per annum, however have not confirmed actual headroom numbers. Initial calculations undertaken as part of this study (exclusive of employment, existing and proposed) suggest that there is significant headroom at the WwTW.

Based on the proposed new (residential) development figures for Cramlington, pro-rata build rates across the plan period are between 115 dwellings per annum (Scenario 1) and 138 dwellings per annum (Scenario 2). In addition, development in the southern part of Cramlington could also drain to Howdon WwTW, which is subject to monitoring and assessment to confirm the long-term capacity at the WwTW.

Sewer - information provided by NWL has confirmed that some areas in north and south of Cramlington are currently at risk of sewer flooding indicating that there may be limited capacity in the network in the north and south areas of Cramlington.

Flood Risk

There is generally a medium risk of flooding across Cramlington, with a medium risk of surface water flooding. NWL have also confirmed that there is a medium risk of flooding from sewers and this should be considered

further at the Detailed stage of the WCS, along with the recorded surface water flooding problems.

However with careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in Cramlington could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-29: CRAMLINGTON SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	A	A	A	A
2016–2021	A	G	A	A	A	A
2021–2026	A	G	A	A	A	A
2026–2031	A	G	A	A	A	A
+20%	A	G	A	A	A	A

10.4.8 *Guide Post / Stakeford*

Overview

Under Scenario 1, a combined total of 1,200 new dwellings are proposed within Guide Post/Stakeford, Bedlington/Bedlington Station and Choppington and this increases to 1,440 new dwellings under Scenario 2.

Water Environment

The North Sea downstream of the Cambois WwTW is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced.

Overall the impacts of development on the water environment can be screened out at this stage due to the large dilution capabilities of the North Sea and because the discharging WwTW is not likely to be required to increase its consented discharge to accommodate proposed development. Further investigations should however be undertaken as part of the Detailed WCS. Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Cambois WwTW has headroom to serve an additional 8,100 population - initial 'high level' calculations undertaken as part of this study appear to confirm this.

Under Scenario 1 it is proposed that 1,520 dwellings are developed in Bedlington/Bedlington Station, Cambois, Choppington and Guide Post/Stakeford and this increases to 1,824 dwellings under Scenario 2. In addition, 246.5 ha of employment land are also proposed for Cambois over the plan period of the Northumberland LDF.

Sewer - information provided by NWL has confirmed that there are no areas currently at risk of sewer flooding in the Guide Post/Stakeford area.

Flood Risk

There is generally a low risk of flooding across Guide Post / Stakeford.

With careful planning, flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future.

Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-30: GUIDE POST/STAKEFORD SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	G	G	G	G	G	G
2016–2021	G	G	G	G	G	G
2021–2026	G	G	G	G	G	G
2026–2031	G	G	G	G	G	G
+20%	G	G	G	G	G	G

10.4.9 *Newbiggin-by-the-Sea*

Overview

Under Scenario 1, a combined total of 2,400 new dwellings are proposed within Newbiggin-by-the-Sea and Ashington and this increases to 2,880 new dwellings under Scenario 2. In addition, a combined total of 45.0 ha of employment land are also planned for Newbiggin-by-the-Sea and Ashington.

Water Environment

The North Sea at Newbiggin is currently of *Good Status*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced. Overall the impacts of development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Careful consideration should also be undertaken to ensure no degradation in the bathing water status of the local beaches.

Wastewater

WwTW - NWL have confirmed that Newbiggin WwTW has headroom to serve an additional 5,496 dwellings - initial 'high level' calculations undertaken as part of this study appear to confirm that there is sufficient headroom.

Sewer - information provided by NWL has however confirmed that there are no areas currently at risk of sewer flooding in the Newbiggin-by-the-Sea area.

Flood Risk

There is generally a low risk of flooding across Newbiggin-by-the-Sea; however there is a medium risk of coastal flooding.

Assuming that development is steered away from areas that are known to flood, flood risk is not considered a constraint to development. Careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Where practicable, any development should be steered sequentially to areas of lowest flood risk.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

Ecology and biodiversity is not considered to be a major constraint to proposed development as the nearby designated sites are tidal in nature and due to the large volume of water exchanged during a tidal cycle, dilution and dispersion effects could mitigate potential increases in chemical and nutrients from development. The overall impacts of proposed development on designated sites cannot be screened out at this stage and should be considered further as part of the Detailed WCS.

TABLE 10-31: NEWBIGGIN-BY-THE-SEA SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	G
2016–2021	A	G	G	G	G	G
2021–2026	A	G	G	G	G	G
2026–2031	A	G	G	G	G	G
+20%	A	G	G	G	G	G

10.4.10 Seaton Valley Villages

Overview

Under Scenario 1, 364 new dwellings are proposed within the Seaton Valley Villages and this increases to 437 new dwellings under Scenario 2. In addition, 16.2 ha of employment land are also planned.

Water Environment

The Tyne Estuary is currently of *Moderate Potential*. Increases in chemical and nutrient discharge from proposed development should be kept to a minimum to avoid deterioration in the water quality currently experienced, and to not prevent the watercourse reaching its WFD status objectives. The impacts of proposed development on the water environment cannot be screened out at this stage due to the requirements of the WFD and should be considered further as part of the Detailed WCS.

Wastewater

WwTW - Howdon WwTW currently has the headroom to support between a further 13,000 and 27,000 new homes but serves all of the administrative area of Newcastle, South Tyneside and North Tyneside. In addition it serves most of Gateshead and smaller proportions of southern Northumberland and northern Sunderland. NWL are currently undertaking a capacity study at Howdon WwTW to determine exact headroom figures. A number of studies are being undertaken including the investigation into the separation of surface water from the combined systems. In addition, quick wins are also being considered to increase the headroom at Howdon WwTW. NWL believe that the findings of the EA monitoring and on-going studies may feed into schemes within AMP6.

Sewer - across the broad area proposed for potential development there is scope to:

- Steer development to areas with capacity,
- Determine scale of upgrades required to facilitate new development in areas with network capacity issues.

As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

Flood Risk

Until further details of the spatial distribution are determined by NCC, it is not possible to determine the potential effects with any certainty. Flood risk is not considered a constraint to development, but careful management of surface water runoff in particular, and the use of SUDS will be necessary to prevent flood risk becoming an issue in the future. Also, new development should be steered towards areas of low flood risk, as advocated in NPPF and the SFRA.

Water Resources

Water resources and supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

Ecology and Biodiversity

The proposed development in the Seaton Valley Villages could pose as a risk to international or nationally designated sites. Once more detail has been made available regarding the exact location of proposed development further investigation into the potential impact should be undertaken.

TABLE 10-32: SEATON VALLEY VILLAGES SUMMARY

Development Period	Water Environment	Water Resources	Wastewater		Flood Risk	Ecology
			WwTW	Sewer		
2011–2016	A	G	G	G	G	A
2016–2021	A	G	A	G	G	A
2021–2026	A	G	A	G	G	A
2026–2031	A	G	A	G	G	A
+20%	A	G	A	G	G	A

INFRASTRUCTURE FUNDING OPTIONS

It is important that the Outline WCS considers mechanisms for obtaining and securing funding toward water infrastructure that the developers can contribute to. The following sections describe possible options in relation to limitations placed on (obligatory) developer contribution to water services under the Water Resources Act 1991, which NCC should consider. The WCS has highlighted that there is a need for expenditure on new infrastructure in the following areas:

- Water supply and water resources,
- Wastewater treatment and sewerage,
- Flood risk management (surface water attenuation).

Water supply and wastewater across Northumberland is the responsibility of NWL. These elements of the WCS will be funded by customer charges which are set by OFWAT over the 5 year AMP periods through the Periodic Review process (PR process).

Water supply and wastewater services across Northumberland are provided by NWL and the charges that NWL make to their customers are regulated by OFWAT. In order to determine the charges to be made to their customers NWL review these charges on a cyclical basis through the PR Process. As part of the PR process, NWL determine schemes to be undertaken in the next AMP cycle, which are funded by customer payments.

Figure 11-1: PR/AMP Timeline

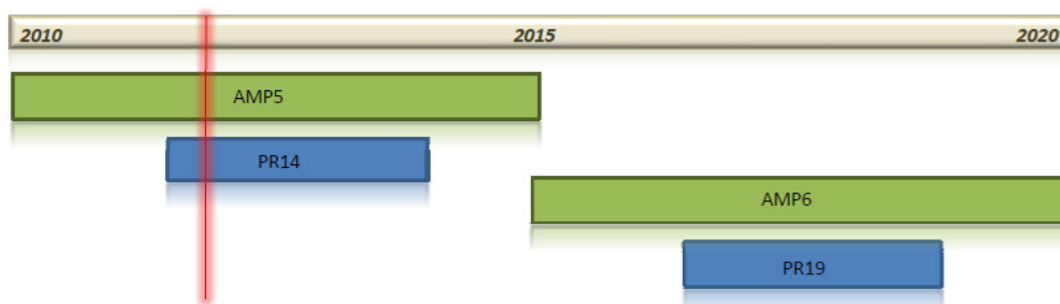


Figure 11-1 shows that NWL are currently in the early stages of AMP5 and commencing PR14 which will determine the schemes to be planned for submission to OFWAT for consideration during AMP6 (2015 – 2020).

Despite this, there are mechanisms that would allow developer contributions, through the requisition process, to be made towards the funding of water supply and wastewater networks or mains infrastructure on a scale commensurate with the number of houses proposed by each developer. If investment is required to local water or wastewater networks, OFWAT takes the view that water and wastewater companies should seek to finance this work through contributions from developers. This reduces the financing burden on existing customers, who would otherwise have to pay through increases in general charges. Developer contributions should be sought for this infrastructure and the options for it are detailed below. Developer contributions however cannot be sought where an Section 106 sewer connection application is associated with a Section 104 adoption process.

In addition, flood risk infrastructure required to service a development can be entirely funded from developer contributions. Although the level of this study has meant that it has not been appropriate to identify specific flood risk infrastructure such as flood defences, it has

highlighted that the provision of SuDS and surface water attenuation will be required for development areas to minimise flood risk elsewhere and comply with NPPF and formerly PPS25. Developer contributions can be sought for this infrastructure and the options for it are detailed below.

If schemes which are needed in the AMP6 process are not identified in PR14 it is unlikely that they could be delivered.

11.1 Suggested Developer Contribution Options

11.1.1 *Section 106 Contributions*

Under Section 106 of the Town and Country Planning Act 1990, developer contributions, also known as planning obligations, may be sought when planning conditions are inappropriate to enhance the quality of development and to enable proposals that might otherwise have been refused to go ahead in a sustainable manner.

Developer contributions are intended to ensure that developers make appropriate provision for any losses or supply additional facilities and services that are required to mitigate the impact of a development. For example affordable housing, school places, roads, pedestrian crossings and other transport facilities, open spaces or equipped playgrounds or new long term maintenance of open space, travel plans, residents parking schemes, public art, libraries and other community buildings.

Government Circular 05/2005 includes a necessity test that ensures that all developer contributions are directly linked to a specific impact of the development and that the funds acquired are to be used for that purpose. The circular states that the obligations will be:

- Necessary,
- Relevant to planning,
- Directly related to the proposed development,
- Fairly and reasonably related in scale and kind to the proposed development,
- Reasonable in all other respects.

Planning permission cannot be granted without a completed agreement in place. Developer contributions may be used to:

- Restrict development or use of the land in a specified way,
- Require specified operations or activities to be carried out on the land,
- Require land to be used in any specified way,
- Require a sum or sums to be paid to the authority on a specified date or dates.

Section 106 agreements are very frequently used in the strategic planning process for provision of key infrastructure requirements. However, in general the charge levied is required to be commensurate with the developer's impact.

Therefore, In the case of wastewater network, water supply network and surface water attenuation provision, a single Section 106 levy cannot be applied to all new development and a cost apportionment mechanism would have to be derived dependent on the level of impact each development is likely to have and this is not always a straightforward process.

11.1.2 *Community Infrastructure Levy*

The Community Infrastructure Levy (CIL) regulations came into force on 6th April 2010 and give local councils the power to apply a levy on new developments to support infrastructure delivery within their authority³⁴. The money can be used to support development by funding infrastructure that the council, local community and neighbourhoods want. Authorities that wish to charge a CIL need to develop and adopt a CIL charging schedule.

In implementing a CIL, the Councils will need to ensure that the processes for infrastructure planning (e.g. through the Infrastructure Delivery Plan (IDP)) and development of the CIL charging schedule are fully integrated, involving the full range of partners, including the local strategic partnership, and with clear governance arrangements. The output should be a rolling delivery programme which will provide the basis for the CIL schedule and for review and monitoring of infrastructure delivery.

The Newark and Sherwood District Council and the Shropshire Council CILs are the first to be publicly examined. Charges will be imposed upon land per square metre at differential rates according to the type of proposed development. In Shropshire these charges will be implemented on eligible developments that received planning consent on or after the 1st January 2012; in Newark and Sherwood the charges will be implemented on proposed development in December 2011.

At present the adoption of CIL regulations remains voluntary. These detailed regulations which govern CILs have the potential to significantly impact on how local authorities use the Section 106 Agreement to fund the delivery of infrastructure in the future. In time the updated regulations will make it impossible for local authorities to fund infrastructure through the planning system without adopting CIL (In April 2014 the CIL regulations will prevent Section 106 Agreements from funding any infrastructure regardless of whether policy tests are met.).

In recent years local authorities have obtained funding via adopting a tariff based approach requiring non-specific general education or transport financial contributions. CIL Regulation 122 states that

“a planning obligation may only constitute a reason for granting planning permission if the obligation is:

- *Necessary to make the development acceptable in planning terms,*
- *Directly related to the development,*
- *Fairly and reasonably related to the scale and kind of the development.”*

Regulation 122 therefore requires that future planning obligations are “necessary” and “directly related to development” and forces a greater scrutiny of financial contributions within Section 106 Agreements.

11.1.3 *Tariff System*

Similar to a Section 106 agreement and used successfully by the Milton Keynes Partnership and Sedgemoor District Council, a tariff system charges a single per dwelling fee to a developer to contribute towards the strategic infrastructure required to service it. Generally, this does not include for water infrastructure but several WCSs are considering this as a potential option for providing a pot of funds to pay for strategic flood risk management infrastructure such as strategic SuDS and greywater recycling systems on a community level.

³⁴ Planning Advisory Service, Community Infrastructure Levy, <http://www.pas.gov.uk/pas/core/page.do?pagelid=122677>

Milton Keynes Infrastructure Tariff Scheme, which means that for every property built within the defined Urban Development Area (UDA), the developer will pay £18,500 to Milton Keynes Partnership for each new house or around £260,000 per hectare of employment space. All told, developers will provide over £310 million which will be used to help fund community facilities and infrastructure. By topping up this funding with money from Central Government, Milton Keynes Partnership and its delivery partners can ensure that new communities will have the infrastructure they need.

The overarching legal agreement which sets out the facilities required and how they will be provided is the Framework Section 106 Agreement. Each development in the UDA will be linked to this agreement.

11.1.4 *Unilateral Undertaking*

A Unilateral Undertaking is an offer of specific undertaking from a developer. It is usually considered to be quicker, less costly and advantageous to the applicant/owner, as the council does not need to be a party to such a deed. It is preferable to use this rather than Section 106 when:

- There is a straightforward contribution required,
- There is no requirement for the Council to covenant to do something,
- No payback requirement is necessary,
- No affordable housing is required.

This system could work well for providing developer sums towards strategic wastewater and water supply network infrastructure as the Council do not necessarily need to covenant to provide the funding mechanism for water company infrastructure.

11.2 **Proposed Funding Process**

Section 106 or tariff systems are likely to be the best mechanism for providing funding to pay for strategic level flood risk management infrastructure such as SuDS. However, for funding the strategic wastewater mains, the situation is not so straightforward.

Under the Water Industry Act 1991, an infrastructure charge may be levied on new and existing property connected to the public sewerage system for the first time. In cases where this is required in the Northumberland area, this charge will be applied directly by NWL for new development that does not need new offsite infrastructure.

However, if the existing network infrastructure (water supply or wastewater) is not adjacent to a proposed site, the developer will be required to fund or at least contribute to this infrastructure through the requisition process under the Water Industry Act. The formal requisition procedures as set out in the Act (sections 41 and 98) a legal mechanism for developers to provide the necessary infrastructure to service their site.

11.3 **Further Cost Considerations**

11.3.1 *Minimisation of Cost*

Even where direct funding of infrastructure is not an option, developers can at least contribute to minimising the capital cost of water infrastructure and policy can be developed to ensure that this be achieved.

It can be seen from this WCS that a key variable to provision of water services infrastructure is water consumption. To a large extent, developers can be encouraged to reduce this through

applying the Code for Sustainable Homes, initiatives such as grey water recycling, having developments with less impermeable surfaces, specifying higher quality materials for pipework etc. By way of example, if the percentage return to sewer can be reduced from 90% to 75%, the number of additional properties that can be accommodated per 1 m³/d headroom at an existing sewage treatment works is 0.8. If reducing the infiltration of ground water into drains supports the reduction in percentage return to drain by using higher quality drain pipes, the number of additional properties that can be supported per 1 m³/d headroom at the same WwTW can be further increased.

In the case of Northumberland this would reduce the amount of capital expenditure required to serve potential new development and also free up capacity in areas of high stress essentially giving NCC more leeway in determining preferred options.

11.3.2 *Water Resource Provision – Employment*

Since December 2005, non-household customers who are likely to be supplied with at least 50 mega litres of water per year at their premises are now able to benefit from a new Water Supply Licensing mechanism. If eligible, they may be able to choose their water supplier from a range of new companies entering the market. The Water Supply Licensing mechanism enables new companies to supply water once OFWAT has granted them a licence. These companies can compete in two ways:

- Developing their own water source and using the supply systems of appointed water companies (such as NWL) to supply water to customers' premises. This would be carried out under the combined water supply licence,
- Buying water 'wholesale' from appointed water companies (such as NWL) and selling it on to customers. This would be done under a retail water supply licence.

12

DEVELOPER CHECKLIST

It is recommended that all developers use the water cycle Developer Checklist as part of the planning application process and submit a completed version with their planning applications. The EA is a statutory consultee with regards to flood risk and the water environment and as such it will need to sign up to the checklist, as will NCC, Natural England and the local water undertaker (NWL). The checklist provided in this WCS has been developed from examples used in previous WCS as well as the EAs national standard checklist available on their website. The checklist refers to different levels of policy to make it clearer to the developer as to which are driven by mandatory national policy, which are driven by EA requirements and which are driven by local policy.

This checklist has been provided as a 'working document' which should be revised in the Detailed WCS, once more is known about the development scenarios and housing numbers to be taken forward for detailed assessment. More relevant site specific details can then be included to make it a document which can be used as part of the planning process for developers.

Key

	Water Cycle Strategy Recommended Policy
	Environment Agency and Natural England policy and recommendations
	National Policy or Legislation

TABLE 13.1: FLOOD RISK ASSESSMENT REQUIREMENT CHECKLIST

			Policy or Legislation
1	Is the Development within Flood Zones 2 or 3 as defined by the flood zone mapping in the relevant SFRA?	Y - go to 5 N - go to 2	
2	Development is within Flood Zone 1: <ul style="list-style-type: none"> Site larger than 1 Ha? Site smaller than 1 Ha? Site smaller than 1 Ha but in a CDA? 	go to 5 go to 3 go to 5	
3	Is the development residential with 10 or more dwellings or is the site between 0.5Ha and 1Ha?	Y - go to 6 N - go to 4	
4	Is the development non-residential where new floorspace is 1,000m ² or the site is 1 Ha or more	Y - go to 6 N - go to 7	
5	The development constitutes major development and requires a Flood Risk Assessment (in accordance with the NPPF and the relevant SFRA) and the Environment Agency are required to be consulted.	Go to 8	
6	The development constitutes major development and is likely to require a Flood Risk Assessment (in accordance with the NPPF and the relevant SFRA) but the Environment Agency may not be required to be consulted.	Go to 8	
7	An FRA is unlikely to be required for this development, although a check should be made against the SFRA and the LPA to ensure that there is no requirement for a FRA on the grounds of critical drainage issues identified in the SWMP. Does the SFRA or does the LPA consider a Flood Risk Assessment (FRA) is required?	Y – go to 8 N – go to 9	
8	Has an FRA been produced in accordance with the NPPF and the relevant SFRA?	Y/N or N/A	

Surface Water Runoff			
9	A) What was the previous use of the site?		EA requirement for FRA.
	B) What was the extent of impermeable areas both before and after development?	% before % after	
10	If development is on a greenfield site, have you provided evidence that post development run-off will not be increased above the greenfield runoff rates and volumes using SuDS attenuation features where feasible (see also 18 onwards).	Y/N or N/A	NPPF
	If development is on a brownfield site, have you provided evidence that the post development run-off rate has not been increased, and as far as practical, will be decreased below existing site runoff rates using SuDS attenuation features where feasible (see also 17 onwards).	Y/N or N/A	
11	Is the discharged water only surface water (e.g. not foul or from highways)?	Y/N	Water Resources Act 1991
	If no, has a discharge consent been applied for?	Y/N	
12	A) Does your site increase run-off to other sites?	Y/N	NPPF
	B) Which method to calculate run-off have you used?		
13	Have you confirmed that any surface water storage measures are designed for varying rainfall events, up to and including, a 1 in 100 year + climate change event?	Y/N	NPPF
14	For rainfall events greater than the 1 in 100 year + climate change, have you considered the layout of the development to ensure that there are suitable routes for conveyance of surface flows that exceed the drainage design?	Y/N	NPPF
15	Have you provided layout plans, cross section details and long section drawings of attenuation measures, where applicable?	Y/N	
16	If you are proposing to work within 8 m of a watercourse have you applied, and received Flood Defence Consent from the Environment Agency?	Y/N or N/A	Water Resources Act 1991 Land Drainage Act 1991
17	The number of outfalls from the site should be minimised. Any new or replacement outfall designs should adhere to standard guidance form SD13, available from the local area Environment Agency office. Has the guidance been followed?	Y/N	Guidance Driven by the Water Resources Act 1991
Sustainable Drainage Systems (SuDS)			
18	A) Has the SuDS hierarchy been considered during the design of the attenuation and site drainage? Provide evidence for reasons why SuDS near the top of the hierarchy have been disregarded.	Y/N	NPPF
	B) Have you provided detail of any SuDS proposed with supporting information, for example, calculations for sizing of features, ground investigation results and soakage tests? See CIRIA guidance for more information.		
	http://www.ciria.org.uk/suds/697.htm		

19	A) Are Infiltration SuDS to be promoted as part of the development? If Yes, the base of the system should be set at least 1m above the groundwater level and the depth of the unsaturated soil zones between the base of the SuDS and the groundwater should be maximised.	Y/N	
	B) If Yes – has Infiltration testing been undertaken to confirm the effective drainage rate of the SuDS?	Y/N	
20	A) Are there proposals to discharge clean roof water direct to ground (aquifer strata)?	Y/N	
	B) If Yes, have all water down-pipes been sealed against pollutants entering the system from surface runoff or other forms of discharge?	Y/N	
21	Is the development site above a Source Protection Zone (SPZ)?	If Y go to 22 If N go to 23	Groundwater Regulations 1998
22	A) Is the development site above an inner zone (SPZ1)?	Y/N	Groundwater Regulations 1998
	B) If yes, discharge of Infiltration of runoff from car parks, roads and public amenity areas is likely to be restricted – has there been discussion with the Environment Agency as to suitability of proposed infiltration SuDS?	Y/N	
23	A) For infill development, has the previous use of the land been considered?	Y/N	NPPF
	B) Is there the possibility of contamination?	Y/N	
	C) If yes, infiltration SuDS may not be appropriate and remediation may be required. A groundwater Risk Assessment is likely to be required (formerly under PPS23) Has this been undertaken before the drainage design is considered in detail?	Y/N	
24	Have oil separators been designed into the highway and car parking drainage? Formerly under PPG23: http://publications.environment-agency.gov.uk/pdf/PMHO0406BIYL-e-e.pdf	Y/N	NPPF
Water Consumption			
26	A) Have you provided the expected level of water consumption and hence the level to be attained in the Code for Sustainable Homes B) Have you considered whether the development can achieve a water consumption lower than 120 l/h/d (105 l/h/d for Levels 3 & 4 in the Code for Sustainable Homes, or the Environment Agency target of 95l/h/d as required for Levels 5 & 6)	Y/N	Outline WCS 2012
28	Have you Provided details of water efficiency methods to be installed in houses?	Y/N	
Pollution Prevention			
33	Have you provided details of construction phase works method statement, outlining pollution control and waste management measures?	Y/N	NPPF
Water Supply and Wastewater Treatment			
35	Have you provided evidence to confirm that water supply capacity is available, and that demand can be met in accordance with the Northumberland Water Cycle Strategy?	Y/N	Outline WCS 2012

36	Have you provided evidence to confirm that sewerage and wastewater treatment capacity is available, and that demand can be met in accordance with the Northumberland Outline Water Cycle Strategy?	Y/N	
Conservation / Enhancement of Ecological Interest			
39	A) Have you shown the impacts your development may have on the water environment?	Y/N	Town and Country Planning Regulations 1999.
	B) Is there the potential for beneficial impacts?	Y/N	

APPENDIX A – DATA CATALOGUE



Northumberland Outline Water Cycle Study Data Catalogue

Data Type	Stakeholder source
PLANNING AND BACKGROUND	
OS Basemapping	Council
Emerging Local Development Framework	Council
Local Plans	Council
Development Plan Documents	Council
Other relevant planning documents relating to development i.e. SPDs	Council
WATER ENVIRONMENT	
WFD Status/Information	EA
Geology for the area	EA
Information pertaining to the SWD	EA
Information pertaining to the BWD	EA
WATER RESOURCES AND SUPPLY	
Data from Water Resources Management Plan	NWL
Catchment Abstraction Management Strategy - information about water resources in Northumberland	EA
Information regarding details of abstractions (groundwater and surface) in the study area	EA
Information pertaining to the water supply network in Northumberland	NWL
WASTEWATER	
Location of WwTWs, their consent details, treatment type and spare capacity details	NWL
Sewerage network layout GIS layer	NWL
Discharge locations	NWL
Consent details for consented discharges	EA
Location of AMP5 schemes	NWL
Any known problem locations for the existing sewer network	NWL
FLOOD RISK	
Identification of Main Rivers and Ordinary Watercourses	EA
Areas benefitting from flood warning procedures and management strategies	EA
Flood Zone outlines 2, 3a and 3b and flood levels	EA
DG5 Records 100m grid squares	NWL
Drainage problem areas	Council
Records of surface water flooding	Council
Location of flood defences or alleviation schemes	EA
Design standards of flood defences	EA
Condition of existing defences	EA
Historic flood records (rivers and groundwater)	EA
ECOLOGY & BIODIVERSITY	
Protected areas	EA, Nature on the Map website
MCZ information	Council and MCZ website

APPENDIX B – HOWDON WWTW POSITION STATEMENT

This position statement is based upon the AECOM work currently being undertaken on behalf of Newcastle City Council and Gateshead Metropolitan Borough Council.

Northumberland County Council (NCC) has aspirations for potential growth across the authority area; however the NCC Outline Water Cycle Study (WCS) has identified that the Howdon Sewage Treatment Works (STW).presents a potential constraint to development in those parts of Northumberland which drain to Howdon. Analysis of the annual average dry weather flows (DWF) into the STW indicate that an action plan is required to ensure that the contribution from surface water sources is managed to reduce the DWF and free up hydraulic capacity to accommodate all of the planned development across Northumberland and that of other council areas which drain to Howdon.

The volume of surface water arriving at Howdon STW is recognised by the key partners working on the WCS (NCC, Northumbrian Water (NWL) and the Environment Agency) to be an issue and managing it is seen as almost certainly the most sustainable solution.

These measures will help to ensure that the levels of potential development can be accommodated and that the growth is sustainable.

Howdon STW treats wastewater and surface water from the Local Authority areas of Newcastle, Gateshead, North Tyneside, South Tyneside and parts of south Northumberland (see Figure 1 below). Across these five Local Authority areas Howdon STW serves a domestic population of around 830,000 people and trade effluent flows increase the population equivalent to around 960,000.



Howdon STW was commissioned in the 1980s with the intention that it would predominantly deal with foul sewage flows. However the bulk of Howdon's catchment area is served by combined sewers which transport both foul flows and surface water to the STW.

The area within Northumberland which drains to Howdon STW falls within NWL's Wastewater System 5 – Tyneside. The bounds of System 5 broadly align with the Tyne river basin catchment. It consists of 58 drainage areas which have 4,661km of public sewer:

- 2,538 km Combined network,
- 915 km Foul network,
- 1,208 km Surface water network,
- 264 Combined Sewer Overflows (CSO), and
- 175 Sewage Pumping stations.

The majority of separate foul and surface water sewers have been constructed to serve new development since the late 1960's but often, in the absence of a local watercourse, the surface water ultimately connects into the combined sewerage system.

The fact that the housing estates themselves are served by separate systems does however offer an opportunity to create strategic schemes to disconnect these surface water flows from several housing development sites and direct them to watercourses, the river or the sea.

Howdon STW is consented by the Environment Agency both in terms of treatment performance standards (i.e. the quality of effluent that is discharged into the River Tyne), which it complies extremely well with, and volumetric flows received at the works. Since the installation of MCerts flow monitoring devices at Howdon in 2005, NWL have been able to develop a better understanding of the daily flow into the STW and the annual DWF.

Using flow data from 2006 to 2010, the average volumetric headroom figure (spare capacity) for Howdon STW is equivalent to an additional 27,000 houses. However, if data for 2008 were to be used on its own, the headroom is reduced to 13,000 houses. The Environment Agency currently accepts that 2008 was a particularly wet summer and can be discounted; however further wet years could lead to a review of their position and a tightening of the available headroom figures.

Assuming the current Environment Agency position does not change, and no action is taken to remove surface water, this would indicate that there is sufficient volumetric headroom at Howdon STW for around seven to twelve years housing supply. This is dependent on the rate of house building across the five Local Authority areas but is also influenced by the weather as the volume of rain falling over the catchment area influences how much surface water gets into the sewers and arrives at the STW.

Given the relatively small data set of flow measurement upon which to predict long term trends and the unpredictability of housing delivery both temporally and spatially there is a significant degree of uncertainty associated with the number of additional houses that Howdon STW can accommodate.

Based upon the housing projections within the North East Regional Spatial Strategy and Core Strategies there would currently be in the order of seven to twelve years headroom unless surface water is removed from the network. Based on current housing figures and without addressing the surface water issue Howdon STW could be approaching its volumetric compliance consent between 2018 and 2023. The planning horizon for Northumberland and that of neighbouring local planning authorities is up to 2031.

NWL is working with the five affected councils and the Environment Agency to develop a consistent joint approach to creating volumetric headroom at Howdon.

The Councils' WCS and Surface Water Management Plans (SWMPs) present an excellent opportunity to demonstrate this joint working strategy to ensure that the development aspirations of the five Local

Authorities served by Howdon STW can be delivered in a manner which is both timely and sustainable for all parties.

Resolving the surface water issue within System 5

As demonstrated above, there is a potential risk to the overall housing delivery of the five councils due to the presence of surface water within the sewerage system which drains to Howdon STW.

NWL recognised the need to better understand the full scale of the issue as the first years of MCerts flow data became available and sought funding from Ofwat to carry out a study (*The Tyneside Sustainable Sewerage Study*) during the current Asset Management Plan (AMP5 from 2010 – 2015)

This study which has prioritised some pilot drainage areas across each of the councils' areas will seek to identify the tools and techniques which can be applied to reduce the surface water impact on the Tyneside System and Howdon STW. The study will also be used to promote schemes for future AMPs.

NWL currently has no plans to invest in hydraulic capacity at Howdon STW in AMP5 as there is still capacity available to facilitate growth. It will review this position as part of its future business planning and any identified needs will be investigated, justified and proposed accordingly. In parallel with this, NWL has stated that they intend to free up capacity within the system by removing or reducing the volume of surface water that is entering the combined sewer systems and consequently arriving at the STW. By removing surface water the foul water flows from new developments can be accommodated at the works (The volume of surface water greatly exceeds the volume of foul flows during wet weather). In order for this to be successful a co-ordinated approach is required between Northumbrian Water, the Environment Agency and the five Local Authorities. The rest of this document sets out the co-ordinated approach that is to be adopted to deliver a pro-active policy of surface water management.

Northumbrian Water

During AMP5 NWL intend to complete a major piece of work which relates to Howdon STW and the wider sewerage system. This is the Tyneside Sustainable Sewerage Study.

The purpose of the study is to gather the evidence base concerning the surface water issue, which will help to support the business case to obtain funding to do something about it. The project will also develop a series of tools and techniques that the water company can implement to actively remove, or reduce, surface water from combined sewer systems.

Excess surface water within the Tyneside sewerage system can generally be from four sources:

Inflow – Point flow connection to the network that is designed and meant to be there.

Ingress – Point flow connection to the network that is not designed or meant to be there.

Infiltration – Flows entering the system through the fabric of the assets.

Inundation - Flood waters coming in to the system.

Whilst the removal of some of the surface water may require investment by NWL, it is possible that the redevelopment of brownfield sites may offer significant opportunities to separate surface water flows from the combined sewerage system.

As well as this study, NWL have launched the Howdon STW AMP - The long-term (25 year) plan for the management of the network and treatment capacity in the Tyneside catchment designed to facilitate a number of needs including

- Identifying and prioritising the removal of excess surface water from the system,
- Accommodating future growth for the Howdon catchment,
- Managing long-term compliance for Howdon and the network assets,

-
- Addressing environmental protection,
 - Identifying and managing future flood risk,
 - Ensuring operational efficiency,
 - Identifying long-term investment needs, and
 - Enabling future planning.

Environment Agency

As regulator, the Environment Agency will review and ensure that Howdon STW continues to comply with its consent standards.

Northumberland County Council (Gateshead Council, Newcastle City Council, North Tyneside Council, South Tyneside Council)

All five Local Authorities affected by the issue at Howdon STW need to take unilateral action to ensure that the issue at Howdon STW is holistically addressed through policies of surface water reduction and separation.

The Local Authorities will adopt policies of surface water reduction and separation for new developments. All brownfield development sites occurring in areas served by combined sewer systems present the opportunity to separate the combined flows so that only foul flows enter the combined sewers and surface water is removed from the system. At the very least the Local Authorities will be expecting developers to reduce the volume of surface water entering the combined sewer system. The policies, to be incorporated into development plans, will encourage the developer to remove as much surface water from the combined sewer systems as possible, managing the water on site, disposing of it to a watercourse or only as a last resort utilising public surface water sewers or the combined system. In addition NCC intends to work with the other Local Authorities, as well as NWL and the EA, on monitoring the level of development within the Howdon catchment area, to enable all parties to regularly review the available headroom capacity at the STW.