



North Tyneside Outline Water Cycle Study

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Rev	Date	Details	Prepared by	Reviewed by	Approved by
1	October 2011	Draft	Gemma Costin Assistant Consultant	Andrew Woodliffe Principal Consultant	Michael Timmins Associate
			Victoria Raiment Graduate Consultant	Clare Postlethwaite Senior Consultant	
				James Riley Principal Ecologist	
2	December 2012	Final Draft	Victoria Raiment Assistant Consultant	Andrew Woodliffe Principal Consultant	Andrew Woodliffe Principal Consultant
3	April 2013	Final		Andrew Woodliffe Principal Consultant	Andrew Woodliffe Principal Consultant

URS Infrastructure and Environment UK Limited
 Royal Court
 Basil Close
 Chesterfield
 Derbyshire
 S41 7SL
 Tel: +44 (0)1246 244744
 Fax: +44 (0)1246 209229
 www.urs.com

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TABLE OF CONTENTS	1	INTRODUCTION	1
	1.1	Background	1
	1.2	WCS Steering Group	2
	1.3	Aims and Objectives	3
	2	NORTH TYNESIDE COUNCIL WATER CYCLE STUDY..	4
	2.1	Stages of the Water Cycle Study	4
	2.2	Integration with the Planning System	5
	2.3	Approach to Water Cycle Study	5
	2.4	Identification of Constraints	6
	2.5	Data Availability	9
	3	POLICY AND SUPPORTING INFORMATION.....	10
	3.1	Legislation and Policy	10
	3.2	Guidance.....	15
	3.3	Supporting Documents	15
	3.4	Status of Key Data and Reports	16
	4	DEVELOPMENT IN NORTH TYNESIDE	17
	4.1	Planned Growth within North Tyneside	17
	4.2	Housing and Employment Development Areas.....	17
	5	WATER RESOURCES AND SUPPLY	21
	5.1	Introduction	21
	5.2	Water Resources	21
	5.3	Water Supply	26
	5.4	Water Resources and Water Supply Summary	27
	6	FLOOD RISK AND SURFACE WATER MANAGEMENT	29
	6.1	Introduction	29
	6.2	North Tyneside Strategic Flood Risk Assessment	29
	6.3	Catchment Description	30
	6.4	Flood Risk Overview	31
	6.5	Summary of Flood Risk Constraints	36
	6.6	Surface Water Management.....	37
	6.7	Flood Risk Summary	41
	7	WASTEWATER ASSESSMENT.....	42
	7.1	Introduction	42
	7.2	Howdon Wastewater Treatment Works Capacity	43
	7.3	Wastewater Network Summary	44
	7.4	Assessment of Residential Development Areas	52

7.5	Assessment of Employment Development Areas.....	57
7.6	Risk Summary	58
8	WATER ENVIRONMENT	60
8.1	Introduction	60
8.2	Water Framework Directive (WFD).....	60
8.3	Northumbria River Basin District.....	60
8.4	Tyne Catchment.....	61
8.5	Water Quality Baseline Summary	66
8.6	Green Infrastructure	67
9	ECOLOGY AND BIODIVERSITY.....	69
9.1	Introduction	69
9.2	Background.....	69
9.3	Objectives and Approach	72
9.4	Proximity to Sensitive Designated/Protected Sites ...	74
9.5	Screening Assessment – International/National Sites	76
9.6	Screening Assessment – Local Sites	78
9.7	Screening Assessment - Marine Conservation Zones	78
9.8	Coastal Waters and Eutrophication.....	81
9.9	Summary.....	81
10	KEY DEVELOPMENT AREA ASSESSMENTS	83
10.1	Station Road East	84
10.2	Station Road West	85
10.3	East Benton Farm	86
10.4	West Chirton South	87
10.5	Whitehouse Farm.....	88
10.6	Scaffold Hill	89
10.7	Annitsford Farm.....	91
10.8	Shiremoor West (South).....	93
10.9	Shiremoor West (North)	95
10.10	Wellfield	97
10.11	Wallsend AAP	99
10.12	North Shields AAP.....	101
10.13	Coastal AAP	103
10.14	Employment Land.....	105
10.15	Summary.....	110
11	INFRASTRUCTURE FUNDING OPTIONS.....	111

11.1	Suggested Developer Contribution Options.....	112
11.2	Proposed Funding Process	114
11.3	Further Cost Considerations	114
12	PROGRESSION OF THE WCS	116
13	CONCLUSIONS	117
13.1	Howdon WwTW and Local Sewer Network Capacity.....	117
13.2	Water Environment, Ecology and Biodiversity.....	117
13.3	Flood Risk and Surface Water Management.....	117
13.4	Water Supply and Resources	118
14	DEVELOPER CHECKLIST	119
	APPENDICES	123
	Appendix A – Howdon WwTW Position Statement	124
	Appendix B – EA Flood Zones Map.....	128
	Appendix C – Flooding Hotspots and Associated CDA.....	129
	Appendix D – Groundwater Flooding Data.....	130

ACRONYMS AND ABBREVIATIONS	
Abbreviation	Description
AA	Appropriate Assessment
AAP	Area Action Plan
AMP	Asset Management Plan
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BOD	Biochemical Oxygen Demand
CAMS	Catchment Abstraction Management Strategy
CDA	Critical Drainage Area
CS	Core Strategy
CSO	Combined Sewer Overflow
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
GI	Green Infrastructure
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
IPC	Integrated Pollution Control
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
LWS	Local Wildlife Site
MI	Mega Litre (a million litres)
NE	Natural England
NEP	National Environment Programme
NFCDD	National Flood and Coastal Defence Database
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
PPC	Pollution Prevention and Control
PPG	Pollution Prevention Guidance
PPS	Planning Policy Statement
PR	Periodic Review
RBD	River Basin District
RBMP	River Basin Management Plan
RoC	Review of Consents
RSS	Regional Spatial Strategy
SAC	Special Area for Conservation
SEPA	Scottish Environmental Protection Agency
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Area
SPD	Supplementary Planning Document

SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SW	Surface Water
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

URS Infrastructure & Environment UK Limited (URS) was appointed by North Tyneside Council (NTC) to undertake a Scoping and Outline Water Cycle Study (WCS) to inform the evidence base of its emerging Local Development Framework (LDF). As a condition of the growth point status of North Tyneside and as required by the Planning and Compulsory Purchase Act 2004, NTC is reviewing its adopted Local Plan (LP) and currently preparing a LDF containing a suite of Development Plan Documents (DPDs) and Supplementary Planning Documents (SPDs), which will outline the development strategy for future growth across North Tyneside.

The North Tyneside Core Strategy (CS) is the key document of the LDF and sets out the vision and spatial strategy for future development to 2028. In preparing a CS, NTC must ensure that the document is:

- Founded on a robust and credible evidence base;
- The most appropriate strategy in all the circumstances, having considered reasonable alternatives;
- Deliverable;
- Flexible;
- Able to be monitored.

A WCS provides a Local Planning Authority (LPA) with a robust evidence base to assess development impacts and to set out appropriate allocations, phasing of development and developer contributions. A WCS is a vital component of the development of the evidence base for LPAs and therefore timely completion of the project is of utmost importance.

The North Tyneside WCS will also inform a number of forthcoming Area Action Plans (AAPs) and will link into Green Infrastructure (GI) strategy work.

1.1.1 *Core Strategy Status*

Following consideration of responses to the CS Preferred Options and consultation on Growth Options, a submission Draft of the CS will be presented to a meeting of the North Tyneside Cabinet to commence the process of consideration. At present, NTC are reviewing the content of the CS and its timetable in light of the changes to Government policy as indicated in the National Planning Policy Framework (NPPF)¹, and of updated evidence on the many issues that it will cover. Following consideration, the CS it will be subject to a further period of statutory consultation and then submitted to the Government after which a public enquiry will be held concerning both the content of the Plan and process followed. Adoption is unlikely to happen until late 2013 /early 2014.

Ten key housing sites have been identified, which are located broadly along the metro line from Longbenton to Shiremoor, with additional sites in Killingworth and potential AAP development sites in Wallsend, North Shields and along the coast.

The focus for new jobs will be at eight key employment sites in the broad areas of Wideopen, Longbenton, The North Bank and West Chirton.

¹ Communities and Local Government, (2012); National Planning Policy Framework. Available at: <http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950>.

1.1.2 *North Tyneside Growth Point*

North Tyneside was previously awarded Growth Point status. Designation of an area as a Growth Point represented the previous Government's response to the 2004 Barker Review on housing supply in the UK², as discussed in the Minister of State for Housing and Planning's Statement issued on the 29th June 2006³:

"The Government's response to the Barker review published last December indicated that we would need to go significantly beyond the communities plan and existing growth areas if we were to increase house-building to the levels necessary to meet household projections and improve affordability. To help do that we launched the new growth points scheme inviting local partners to come forward with proposals for housing growth, linked into their wider strategies for economic growth, for town centre renewal, for regeneration as well as for meeting local need for homes".

The Growth Point was designated with the aim to deliver 5,300 new homes over the Growth Point period of 2008/09 to 2016/17 – providing more affordable and family housing. NTC was awarded £2.5M to help deliver these ambitious targets.

The purpose of the WCS is to ensure that the proposed growth targets for North Tyneside can be met without adversely impacting on the water environment and that required infrastructure can be planned for and brought online alongside new development, in a timely and phased manner. The study will also help identify areas of uncertainty that may require further detailed studies.

The current government have withdrawn Growth Points, however this Outline WCS will support the Growth Point status of North Tyneside and will be used to provide an evidence base that can be used by NTC to inform the development of strategic site options with regard to the location and intensity of potential development. It is also anticipated that the WCS will be used by Northumbrian Water Ltd (NWL) to further support business plans to provide future investment to infrastructure required to support new development.

1.2 **WCS Steering Group**

A Steering Group was formed with the aim of reviewing and guiding the Outline WCS. The main Steering Group members are:

- North Tyneside Council, as the Local Planning Authority and delivery vehicle for growth;
- The Environment Agency (EA), as the statutory planning and flood risk consultee as well as regulator for water quality;
- Northumbrian Water (NWL), as the provider of water supply and wastewater infrastructure.

By involving key stakeholders at an early stage of the WCS, any recommendations with regards to planning timeframes and infrastructure requirements such as funding, can be discussed and identified early in the planning process.

The Steering Group should advise and agree on the findings of the Outline WCS and also agree the requirements for any potential more detailed assessment.

² HM Treasury, (17th March 2004); Delivering stability: securing our future housing needs, Barker Review of Housing Supply - Final Report – Recommendations

³ <http://www.theyworkforyou.com/wms/?id=2006-06-20b.87WS.3>

1.3 Aims and Objectives

The objective of the Outline WCS is to identify any constraints to housing and employment growth planned for North Tyneside (up to 2028), that may be imposed by the water cycle and how these can be resolved i.e. by ensuring that appropriate water infrastructure is planned for to support proposed development. Furthermore, the WCS will provide a strategic approach to the management and use of water which ensures that the sustainability of the water environment in the region is not compromised.

The impacts of flood risk within the district have been assessed by a Strategic Flood Risk Assessment (SFRA) and a Surface Water Management Plan (SWMP) and the findings of these studies are summarised in the WCS.

The study has been undertaken following initial discussions with, and using data provided by, the following key stakeholders:

- North Tyneside Council;
- The Environment Agency;
- Northumbrian Water.

However, it is concluded that it is important that other stakeholders are involved in future discussions or included in a Consultation Group. The additional stakeholders that should or have been consulted include:

- Natural England;
- Nexus;
- Network Rail;
- Neighbouring LPAs;
- Major developers and landowners.

2 NORTH TYNESIDE COUNCIL WATER CYCLE STUDY

2.1 Stages of the Water Cycle Study

Current guidance on WCS⁴ suggests that they should generally be undertaken in three stages, dependent on the status of the various LDDs, as part of the wider LDF, being prepared by LPAs for submission. To coincide with NTC's timescales for responses and submissions and in accordance with WCS guidance, the North Tyneside WCS is being undertaken in two distinct stages: Outline (including a Scoping WCS) and Detailed (if required).

2.1.1 *Outline Water Cycle Study*

The key aim of the Outline WCS is to provide the evidence base to ensure that water issues have been taken into account when determining the location and intensity of development, as part of the development of their CS. In doing this, the Outline WCS considers all of the ways in which new development will impact on the water environment or water infrastructure specific to where growth is most likely to be targeted. The Outline WCS includes:

- An assessment of the water resource availability up to 2028;
- An assessment of flood risk to the proposed development sites and mitigation options;
- A high level assessment of the locations where strategic infrastructure upgrades may be required to identify the key constraints and required phasing of development to ensure that development does not outstrip capacity;
- An assessment of the likely surface water storage requirements and potential Sustainable Drainage Systems (SuDS) for proposed development;
- An environmental assessment of the impact of proposed development upon watercourses and ecologically important sites;
- Phasing of proposed development sites and key constraints for each of the major sites, with reference to the above assessments;
- The setting up of a Project Steering Group at the early stages of the Outline WCS to guide, advise and agree on the findings of the Outline Study, and the requirements for the Detailed WCS.

2.1.2 *Detailed Water Cycle Study*

A Detailed WCS can vary significantly in scope and remit; however, if new infrastructure is required, or an impact on the water environment cannot be ruled out as being insignificant (at the Outline WCS stage), a Detailed WCS will need to be undertaken for site specific allocations, or for the LPA area as a whole.

A further key purpose of a Detailed WCS 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.

⁴ Environment Agency. Available online at: <http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf>

2.2 Integration with the Planning System

The role of the WCS as an evidence based study which specifically addresses the impact of proposed growth on the ‘water cycle’, and its interactions with the LDF has been discussed in Section 2.1.

NWL published its Business Plan in 2009, to set out the required asset investment over the next 5-year Asset Management Plan (AMP) period, (AMP5, which runs from 2010 to 2015), the justification for it and the price increases required to fund it. OFWAT determined the final price limits from this process in November 2009.

Water companies are able to seek interim determination within the 5 year AMP cycles to fund unforeseen investment requirements. However, the process is lengthy and therefore if significant water cycle infrastructure improvements are required in addition to those included in the current price review it is unlikely that these can be funded before the AMP6 period (2015-2020) at the earliest.

In addition to the publication of the final Business Plan, the final Water Resource Management Plan (WRMP) was also published in 2010.

2.3 Approach to Water Cycle Study

The Outline WCS should consider the ways in which new development will impact on the water environment or water infrastructure specific to where growth is most likely to be targeted. In the case of North Tyneside, NTC have identified ten key development areas. These will be used to assess the water cycle baseline and potential constraints to proposed development up to 2028. The key development areas are:

- Station Road East;
- Station Road West;
- East Benton Farm;
- West Chirton South;
- Whitehouse Farm;
- Scaffold Hill;
- Annitsford Farm;
- Shiremoor West (South);
- Shiremoor West (North);
- Wellfield.

In addition to the key development areas, there is significant regeneration and development proposed for Wallsend and North Shields and these urban areas both have their own Area Action Plans (AAP). There is also a Coastal AAP, however proposed growth numbers within this area are much lower than those associated with the other AAPs. There are also three other proposed housing development sites to the south-west and south-east of Annitsford Farm and to the north-west of Shiremoor North which are referred to as the ‘Urban Fringe’ development.

The location of the development areas, including the AAPs are shown in Figure 2-1 and Figure 4-1.



Figure 2-1: Key Development in North Tyneside
 (Source: Preferred Options Document June 2010)

2.4 Identification of Constraints

The Outline WCS identifies constraints in terms of proposed growth within North Tyneside in relation to the five key ‘water cycle’ areas. A description of the aims of these assessments is provided in Table 2-1.

It is important to note that the constraints matrix (Table 2-2) is a broad brush summary, and that a detailed assessment should be used to provide further analysis during any Detailed WCS, if required.

Also, the 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.

2.4.1 Wastewater Treatment Assessment

It should be noted that the assessment of the capacity of the wastewater treatment works (WwTW) within the study area has not been carried out as would normally be expected in a WCS. All foul flows from new development within the North Tyneside area will drain to Howdon WwTW. The works are subject to a separate monitoring and assessment by NWL and the EA. A Position Statement on Howdon is available in Appendix A.

TABLE 2-1: IDENTIFICATION OF CONSTRAINTS		
Assessment	Description	Section
Water Resources and Supply	<ul style="list-style-type: none"> Determines the existing baseline with respect to available water resources and identifies where the raw water to supply the new development will be sourced. Identifies potential capacity issues in terms of raw water supply availability and/or water infrastructure. Considers the requirement for transmission infrastructure for treated water in order to service and supply the new development areas. 	5
Flood Risk and Surface Water Management	<ul style="list-style-type: none"> Reviews and summarises the findings of North Tyneside's Level 1 SFRA⁵ to identify potential sources of flood risk to and from the development in North Tyneside and where these pose a constraint to development in these areas. Considers the suitability of a range of SUDS based upon the geology, soils and/or groundwater vulnerability in North Tyneside. Considers management of surface water in North Tyneside which has the potential to increase the rate and amount of water that enters watercourses causing an increase in flood risk. Identifies strategic level flood risk constraints and mitigation measures to development in North Tyneside. 	6
Wastewater	<ul style="list-style-type: none"> Assesses existing wastewater network capacity and requirement for upgrades to serve new development. Assesses the impact of the discharge of additional treated wastewater from new development on: the water quality of receiving waters; the hydrological/hydraulic regime of receiving waters and associated habitats; and, flood risk downstream of the discharge. 	7
Water Environment	<ul style="list-style-type: none"> Assesses the current quality of the water related environment against current EA water quality requirements and future WFD standards. Assesses the capacity of the water environment to absorb further discharges (from WwTW and/or surface water). Considers the mitigation requirements to ensure that there is no unacceptable deterioration in the quality of the water related environment as a result of the proposed development. 	8
Ecology and Biodiversity	<ul style="list-style-type: none"> Identifies any water dependent designated conservation sites within and hydraulically linked to North Tyneside that could be affected by discharges of wastewater or further abstraction of raw water. 	9

⁵ JBA Consulting, 2010; NTC Level 1 Strategic Flood Risk Assessment. Available online at: http://www.northtyneside.gov.uk/pls/portal/NTC_PSCM.PSCM_Web.download?p_ID=519214

2.4.2 **Constraints Matrix**

The most relevant and important constraints have been identified for each key development and AAP area to aid in the assessment of development within North Tyneside. For the purpose of the constraints matrices these were amalgamated and placed in generic categories as outlined in Table 2-2. The resultant outcome was the formulation of a constraints matrix for each of the key development and AAP 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 and AAP, 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.

TABLE 2-2: 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/water body. 	<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/water body. 	<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/water body. 	<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.

2.5 Data Availability

Undertaking of a WCS requires a large amount of data collection, much of which is reliant on the willingness of third parties to supply in order to allow the study to be progressed. In some cases, the availability of data with respect to water cycle infrastructure and future planning is not available within the time required to undertake the assessment and various assumptions have to be used to enable the study to continue.

NWL are responsible for the wastewater network serving North Tyneside and provided a GIS layer of the sewer network however this confirms limited information. In addition, the capacity at Howdon WwTW has not been assessed within this WCS, as discussed in Section 2.4.1.

3 POLICY AND SUPPORTING INFORMATION

National, regional, sub-regional and local planning policy and guidance documents provide requirements guidance for delivering sustainable development. The following is a summary of the 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.

3.1 Legislation and Policy

3.1.1 International and National

TABLE 3-1: WATER RELATED EUROPEAN AND NATIONAL LEGISLATION, POLICY AND GUIDANCE	
Directive/Legislation /Guidance	Description
Code for Sustainable Homes	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. 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.
Environment Act 1995	Sets out the role and responsibility of the EA.
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.

<p>UK Conservation of Habitats and Species Regulations 2010</p>	<p>These regulations are the principal means by which the Habitats Directive is transposed in England and Wales.</p>
<p>Making Space for Water, 2004</p>	<p>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.</p>
<p>Planning Policy Statements and Planning Policy Guidance</p>	<p>Until 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.
<p>National Planning Policy Framework (NPPF)</p>	<p>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.</p>
<p>Pollution Prevention and Control Act (PPCA) 1999</p>	<p>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.</p>
<p>Water Act 2003</p>	<p>Implements changes to the water abstraction management system and to regulatory arrangements to make water use more sustainable.</p>

<p>Water Framework Directive (WFD) 2000/60/EC</p>	<p>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 integrated approach to the management of all freshwater bodies, groundwater, 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 EA is the body responsible for the implementation of the WFD in the UK. The EA have been supported by UKTAG⁶, 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 status⁷. These have recently been finalised and issued within the River Basin Management Plans (RBMP).</p>
<p>Bathing Waters Directive 76/160/EEC</p>	<p>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.</p>
<p>Water Resources Act 1991</p>	<p>Protection of the quantity and quality of water resources and aquatic habitats. Parts have been amended by the Water Act 2003.</p>
<p>Flood & Water Management Act 2010</p>	<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 EA 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 by the SoS following a full public consultation.

⁶ 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.

⁷ UK Environmental Standards and Conditions (Phase I) Final Report, April 2008; UK Technical Advisory Group on the Water Framework Directive

<p>Marine and Coastal Access Act 2009</p>	<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>
<p>Marine Strategy Framework Directive 2010</p>	<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; • Establishment of a programme of measures for achieving Good Environmental Status by 2016.
<p>EU Birds Directive 1979</p>	<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>

3.1.2 ***Local Development Frameworks***

NTC closed consultation on its CS Preferred Options in September 2010 and are preparing site-specific documents which will allocate sites to meet the aims of the CS. The Coastal, North Shields and Wallsend AAPs will identify sites for housing, employment, retail and other types of development.

Other studies supporting the CS, such as retail and employment land availability have been completed or are currently underway and are intended to further inform locations for growth as are currently proposed.

This Outline WCS will also inform the identification locations for growth.

3.1.3 ***Water Company Planning***

Financial and Asset Planning

Water companies currently plan for asset management and the financial procurement required for it through the AMP process, which runs in 5 year cycles. The Water Services Regulation Authority (known as The Office of Water Services or 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 (i.e. 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 - as the regulator determining investment required to improve the environment, this is a two way process between the EA and Water Company and is conducted through the National Environment Programme (NEP);
- The Drinking Water Inspectorate (DWI) - who determine through a two way process with the Water Company where investment is required to assets to improve quality of drinking water;
- OFWAT - who along with the EA require the Water Company 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 5 year period, the justification for it and the price increase required to fund it.

OFWAT determines how much a water company can charge its customers and considers views of the Water Company, regulators (EA and DWI) and consumer groups (Consumer Council for Water). This process is known as the Price Review and is undertaken on a 5 year cycle. This review allows OFWAT to determine the price limits for the proceeding 5 years that allow the Water Company to raise funds required for necessary investment into asset management (the AMP period).

At the time of undertaking the NTC WCS, the Strategic Business plans had already been submitted for the Price Review 2009 (PR09) and OFWAT had determined the price limits for the AMP5 period (2010 to 2015), which dictates the investment that NWL will be able to undertake over the next five years.

Where significant water cycle infrastructure requirements are not included within PR09, funding cannot be sought until the next Price Review towards the end of AMP5 (PR14) at the earliest. Only in exceptional circumstances will a Water Company seek to deviate from their Business Plan and submit an interim determination within the 5 year AMP cycle to provide funding for unforeseen investment requirements.

Water Resource Planning

Water companies produce Water Resource Management Plans (WRMP) 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. The statutory WRMPs will be updated in 5 yearly cycles to coincide with the PR and AMP process. NWL's current WRMP was finalised in 2010 and has been used to inform this WCS.

Water Company Planning and the Water Framework Directive

An important consideration in the Water Company planning and funding process is the timing with respect to the requirements of the Water Framework Directive (WFD); at present, there is a discrepancy between the two planning timelines. The River Basin Management Plans (RBMPs) were finalised in December 2009 and therefore the Programme of Measures (PoMs) which sets out what changes will need to be implemented in order to achieve WFD 'good status' or 'good potential' was not known until this point. However, the current PR09

and AMP 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 (i.e. 2015-2020).

Whilst it is not just Water Companies that will be affected by the PoMs, it is considered that Water Companies, NWL in this case, will have a key role to play in implementing the measures and helping to achieve 'good status' in time for the 2015 deadline as required by the WFD, or by 2027 as identified by the RBMP.

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 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'.

3.2 Guidance

The EA has issued a National Guidance (The WCS Manual⁸) document to ensure that all WCS are carried out in a consistent way. The approach set out in the guidance forms current best practice and the basis for the methodology followed in this WCS.

Although a SWMP has been undertaken by NTC concurrent to this study, the WCS has utilised guidance on the development of SWMP and management of surface water as issued by Defra⁹.

3.3 Supporting Documents

In addition to the legislation and guidance set out in Table 2.1 and Table 2.2 and above, the following studies and reports are relevant and, where available, have been used within the WCS:

- North Tyneside Level 1 SFRA¹⁰;
- Environment Agency Groundwater Protection Policy¹¹;
- Environment Agency Review of Consent (RoC) Process;
- North Tyneside Biodiversity Action Plan (BAP)¹²;
- Northumbria River Basin Management Plan (RBMP)¹³;
- Northumbrian Water Water Resources Management Plan (WRMP)¹⁴;

⁸EA Available online at: <http://publications.environment-agency.gov.uk/pdf/GEHO0109BPFF-e-e.pdf>

⁹ DEFRA, 2010; Surface Water Management Plan technical Guidance -

<http://www.defra.gov.uk/environment/flooding/documents/manage/surfacewater/swmp-guidance.pdf>

¹⁰ JBA Consulting, (2010); North Tyneside Council Level 1 Strategic Flood Risk Assessment. Available online at:

http://www.northtyneside.gov.uk/pls/portal/NTC_PSCM.PSCM_Web.download?p_ID=519214

¹¹ EA, (2008); Groundwater Protection: Policy and Practice. Available online at: <http://publications.environment-agency.gov.uk/PDF/GEHO1006BLMW-E-E.pdf>

¹² Northumberland Biodiversity Partnership, (2007); Northumberland Biodiversity Action Plan. Available online at: <http://www.northumberlandbiodiversity.org.uk/actionplans.asp>

¹³ EA, (2009); Northumbria River Basin District River Basin Management Plan. Available online at: <http://publications.environment-agency.gov.uk/PDF/GENE0910BSRV-E-E.pdf>

¹⁴ NWL, (2010); Final Water Resources Management Plan. Available online at: http://www.nwl.co.uk/NW_Final__WRMP_V.9.pdf

- The SuDS Manual¹⁵.

3.4 Status of Key Data and Reports

3.4.1 *Water Framework Directive*

The EA has published the Final RBMP for England and Wales as required under the WFD. The final plans were published in December 2009, following sign off from the Secretary of State for the Environment. The Northumbrian RBMP has been used within the Outline WCS to inform the water environment and wastewater assessments.

3.4.2 *Habitats Directive and the Review of Consents*

Specific mention is given in this section to the Habitats Directive as it has a significant influence on both the wastewater and waste supply strategies, owing to an on-going review process that has been undertaken by the EA and Natural England (NE) over several years.

The review process is referred to as the RoC. The process requires the EA to review all of the existing consents and licences it has issued for both discharges and abstractions to and from rivers and/or groundwater. The review is to determine whether, when used to their maximum permitted level, the current licences and consents are likely to be impacting on the integrity of ecologically designated sites which became protected under the Habitats Directive. The licences and consents being reviewed were issued prior to sites becoming designated, so the review is a retrospective process necessitated by the new legislative requirements brought in by the Habitats Directive and its transposition into UK law as the Habitats Regulations.

The potential effects of the consents and licences are considered in isolation and in combination with others. In relation to consents to discharge, the pollutant load of these discharges is considered as well as the impact of the volume of discharge on habitat integrity; whilst for abstraction licences, the direct impact of reduced water availability in a groundwater or river system is determined for impact on any protected habitat reliant on the river or groundwater.

If the conclusion is to revoke or modify any permission, the EA must work with the licence or consent holder to ensure that they are compensated by considering alternatives for replacing the lost permission.

¹⁵ Woods-Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007); The SUDS Manual, Ciria C697.

4 DEVELOPMENT IN NORTH TYNESIDE

4.1 Planned Growth within North Tyneside

The CS Preferred Options indicates that approximately 10,375 new dwellings are being delivered through the period up to 2028. In addition to this up to 180 ha of employment land is to be delivered during the same planning period.

Through supporting studies, including the Strategic Housing Land Availability Assessment (SHLAA) and employment land assessments NTC has identified numerous strategic housing and employment sites. These sites have been assessed against key criteria, and those meeting minimum criteria have been chosen as key housing sites or key employment sites. The Preferred Options document identifies ten key housing sites and eight key employment sites. In addition to this, the key areas of Wallsend and North Shields will undergo significant development and have their own AAPs to consider potential development options there in more detail. In addition there are a further three proposed housing development sites to the south-west and south-east of Annitsford Farm and to the north-west of Shiremoor North which are referred to as the 'Urban Fringe' development.

4.2 Housing and Employment Development Areas

4.2.1 *Housing Development*

NTC is currently planning development up to 2028. During this period NTC is planning to build approximately 10,375 dwellings, of which over 3,000 already have planning permission. The majority of this development is to be located in the ten key housing sites identified within the Preferred Options document, and the Coastal, North Shields and Wallsend AAPs. The rest of the development will be spread out across the remainder of North Tyneside.

The main locations for development within North Tyneside and the associated housing numbers are included in Table 4-1 and shown on Figure 4-1.

TABLE 4-1: POTENTIAL HOUSING NORTH TYNESIDE

Development Area	Dwellings
Station Road East	650
Station Road West	560
East Benton Farm	50
West Chirton South	420
Whitehouse Farm	367
Scaffold Hill	450
Annitsford Farm	400
Shiremoor West (South)	370
Shiremoor West (North)	260
Wellfield	210
Wallsend AAP	500
North Shields AAP	430
Coastal AAP	270
Urban Fringe*	121
Urban Area (remainder of North Tyneside)**	2,094
Existing Planning Permissions	3,223
Total Dwellings	10,375

* Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor.

** Development in the remainder of North Tyneside is likely to be allocated in small parcels, on a site by site basis.

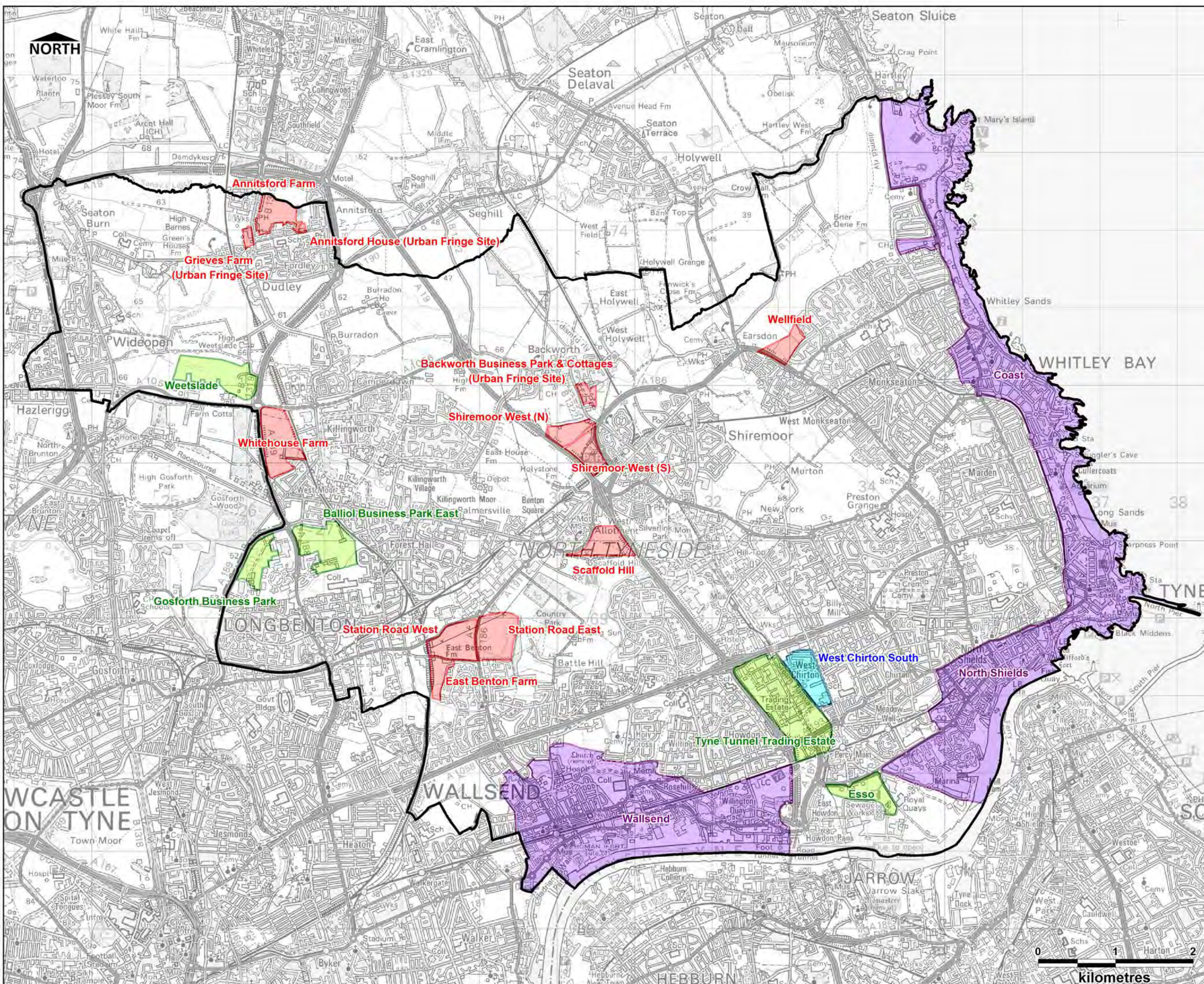
4.2.2 *Employment Development*

Employment growth within North Tyneside is focused at eight key employment sites which will act as a catalyst for the rejuvenation of North Tyneside as a whole:

- Tyne Tunnel Trading Estate;
- West Chirton (Middle) Industrial Estate;
- Balliol Business Park East;
- North Bank Area;
- Esso;
- Gosforth Business Park and Balliol West;

- Weetslade;
- Proctor and Gamble.

Whilst it is recognised that there may be other employment sites throughout North Tyneside, it is unlikely that these will have a significant impact on water cycle components and therefore for the purposes of the Outline WCS only those areas targeted for significant employment growth have been assessed at this stage. For the purposes of the Outline WCS, employment growth has been assumed to be evenly phased throughout the development period.



NORTH TYNESIDE WATER CYCLE STUDY

Figure Title: **DEVELOPMENT LOCATIONS**

Legend:

- Council Boundary
- Housing Site
- Employment Site
- Mixed Use Site
- AAP Area

Notes:

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		Chest'fid:	

Environment Agency

North Tyneside Council

URS Infrastructure & Environment UK Ltd
 Royal Court
 Basil Cross, Chedderfield
 Derbyshire, S41 7SL
 Telephone +44 (0)1246 209 221
 Fax +44 (0)1246 209 229
 www.ursglobal.com

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FIGURE 4-1

5 WATER RESOURCES AND SUPPLY

5.1 Introduction

This section identifies the water resource constraints for development up to 2028 and includes:

- A review of the EA's Catchment Abstraction Management Strategy (CAMS) and any concerns/issues the EA have with water resources and supply in the North Tyneside area;
- A review of the WRMP, which plans for growth in the region up to 2035 and available water resources to supply additional demands;
- Water demand forecasts from potential new development in North Tyneside and how these can be managed to reduce demand, where required;
- A review of strategic water supply infrastructure serving North Tyneside and growth areas, and potential upgrades required to serve the additional population.

5.2 Water Resources

5.2.1 *Catchment Abstraction Management Strategy*

The EA manages water resources at the local level through the use of CAMS. The North Tyneside area lies within two CAMS areas; the Northumberland Rivers (Central Northumberland) dated September 2003 (updated March 2008) and the River Tyne (Southern Northumberland) dated March 2005 (updated 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 5-1. 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 5-1: 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.

The EA separate catchments into smaller areas based on similarities in characteristics in order to effectively measure, manage and regulate these areas effectively. These areas are classed as Water Resources Management Units (WRMU). Although North Tyneside falls within two CAMS areas (the Northumberland Rivers CAMS and the River Tyne CAMS) the study area does not fall within a WRMU. The River Tyne at North Tyneside is tidal and therefore is not included in the EA’s CAMS assessment. Upstream of North Tyneside the ‘Lower Tyne WRMU’ is classed as having ‘water available’. This WRMU is regulated by releases from Kielder Water which prevent the Lower Tyne from experiencing extreme low flows. Subject to the normal determination criteria new abstraction licences are likely to be renewed for this WRMU whilst the renewal of time limited licences may be subjected to minor changes including the addition of water efficiency conditions.

The Water Act 2003 introduced a new statutory framework for managing water resources in England and Wales. Important aspects of this legislation which may affect the North Tyneside area, which is downstream of the Lower Tyne WRMU 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 are 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 has powers under this legislation to revoke ‘sleeper licences’ i.e. those abstraction licences which have not been used for four years (and again after 2012, no compensation would be payable);
- Under the Water Resources Act, new provision for third parties to pursue claims against abstractors and this is a significant change. Under previous Water Resources 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.

5.2.2 ***Northumbrian Water’s Water Resource Management Plan***

NWL has two Water Resource Zones (WRZs) known as Kielder WRZ and the Berwick WRZ. All of the North Tyneside area is served and supported by the Kielder WRZ. 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 contained within the WRMP, a review of current usage of licences has been undertaken. The purpose 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 North Tyneside 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;
- Surface Water/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 Output (DO)¹⁶ than could be achieved from the individual use of sources.

Table 5-2 contains the approximate amount of spare capacity (in Megalitres per day) in the Kielder supply area.

TABLE 5-2: KIELDER WATER RESOURCES – SPACE CAPACITY			
Resource Zone	Type of Source	% of Utilisation	Approximate Spare Capacity (Mld ⁻¹)
Kielder	SW/Res	76	147.2
	GW	40	5.1

The summary table (Table 5-2) above shows:

- Approximately 76% of SW licences (including reservoir licences) are utilised, whereas only 40% 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 5.1 Mld⁻¹ of spare GW licences (on average);
- 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.

5.2.3 ***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 North Tyneside, 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 to promote sustainable development. With climate change over the next 50 to 100 years, water resources within the United Kingdom are likely to become scarcer with warmer, drier summers being predicted throughout the country.

¹⁶ 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

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

- Scenario 1 - 129 lh⁻¹d⁻¹ - Water Company (NWL) current non-metered demand forecast;
- Scenario 2 - 125 lh⁻¹d⁻¹ - Buildings Regulations Part G;
- Scenario 3 - 120 lh⁻¹d⁻¹ - Code for Sustainable Homes (CSH) Levels 1 & 2;
- Scenario 4 - 105 lh⁻¹d⁻¹ - CSH Levels 3 & 4;
- Scenario 5 - 80 lh⁻¹d⁻¹ - CSH Levels 5 & 6.

NWL plan for new properties to be built to Part G of the Building Regulations and do not require greater water efficiency to be achieved.

Residential Demands

The estimates in growth from residential demand for the main development areas within North Tyneside (for Scenario 1 and Scenario 4) are shown in Table 5-3.

TABLE 5.3: ESTIMATED RESIDENTIAL WATER DEMAND FORECAST					
Development Site	Number of Dwellings	Total Supply (Maximum)	Total Supply (Minimum)	Headroom Allowance	
		Scenario 1	Scenario 4	Scenario 1	Scenario 4
		Mld ⁻¹			
Station Road East	650	0.20	0.12	0.22	0.13
Station Road West	560	0.17	0.11	0.19	0.12
East Benton Farm	50	0.02	0.01	0.02	0.01
West Chirton South	420	0.13	0.08	0.14	0.09
Whitehouse Farm	367	0.11	0.07	0.12	0.08
Scaffold Hill	450	0.14	0.08	0.15	0.09
Annitsford Farm	400	0.12	0.08	0.13	0.08
Shiremoor West (South)	370	0.11	0.07	0.12	0.08
Shiremoor West (North)	260	0.08	0.05	0.09	0.05
Wellfield	210	0.06	0.04	0.07	0.04
Wallsend	500	0.15	0.09	0.17	0.10
North Shields	430	0.13	0.08	0.14	0.09
Coast	270	0.08	0.05	0.09	0.06
Urban Fringe	121	0.04	0.02	0.04	0.03
Urban Area (remainder of North Tyneside)	2,094	0.63	0.39	0.70	0.43
Existing Planning Permission	3,223	0.98	0.61	1.07	0.67
Total	10,375	3.15	1.95	3.46	2.15

To calculate these demands, it was 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 North Tyneside area, NWL's unmeasured households, typically have an OR of between 2.26 and 2.35¹⁷ over the planning period and their average water consumption rates for its metered customers is 129 lh⁻¹d⁻¹.

Non-Residential Demands

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 North Tyneside WCS, estimates for non-residential demand are based on the relationship between non-residential and residential water demands as reported by OFWAT. In the case of NWL, 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 North Tyneside 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. Table 5-4 shows the estimated total non-residential demand across North Tyneside.

TABLE 5-4: ESTIMATED NON-RESIDENTIAL WATER DEMAND FORECAST				
Development Type	Total Supply (Maximum)	Total Supply (Minimum)	Headroom	
	Scenario 1	Scenario 4	Scenario 1	Scenario 4
	Mld ⁻¹			
Non-Residential	2.46	1.52	2.71	1.67

Total Water Demands

The combined residential and non-residential water demand (including headroom or the total amount of proposed development is predicted to be between 3.82 Mld⁻¹ and 6.17 Mld⁻¹ as shown in Table 5-5.

TABLE 5-5: ESTIMATED TOTAL WATER DEMAND FORECAST		
Development Type	Total Supply (Maximum)	Total Supply (Minimum)
	Scenario 1	Scenario 4
	Mld ⁻¹	
Residential	3.46	2.15
Non-Residential	2.71	1.67
Total	6.17	3.82

Taking the highest forecast for future demand (Scenario 1, including a headroom allowance), this equates to only 4% of NWL's current total spare capacity.

¹⁷ A value of 2.35 was used to calculate the water demand figures as shown in Table 5-3 to establish the worst case.

5.3 Water Supply

5.3.1 *Strategic Water Supply and Infrastructure*

Limited information has been provided by NWL on the water supply network within the North Tyneside area. The information presented in this section of the report comes mainly from their WRMP¹⁸, the CAMS documents for the two catchment areas and published map information e.g. Groundwater Vulnerability and Source Protection Zone Maps.

The WRMP refers to a large amount of effort which has been put into investigating the whole resilience¹⁹ of its water treatment and supply network over the preceding few years to ensure that it can treat and transfer water to match its customers' demands. The outcome of this work does not appear directly in the WRMP, which considers mainly to the supply/demand balance, but which has been used to better define the DO and outage²⁰ of each of the water treatment works and will better focus NWL's capital maintenance spending in the future.

In general, the NWL's water supply system is well connected, 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 North Tyneside area.

5.3.2 *Potential Risks to Water Supplies*

In the preparation of its WRMP, NWL will have assessed the potential risks to water supplies in the North Tyneside 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 defined 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 impact of climate change on source yield;

¹⁸ Northumbrian Water, (January 2010); Final Water Resources Management Plan 2010-2035. Available online at http://www.nwl.co.uk/assets/documents/NW_Final_WRMP_V.9.pdf

¹⁹ 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.

²⁰ Outage - A temporary loss of output from a water treatment works, which may either be planned or unplanned.

- Uncertain output from new resource developments.

Demand Related

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

In the case of the Kielder WRZ, the resultant calculated target headroom is 16.57 Mld⁻¹ from the present day, rising at a rate of approximately 1.0 Mld⁻¹ per annum into the future. Given that the current available headroom is just under 200 Mld⁻¹ (an exceptionally large amount) reducing to around 160 Mld⁻¹ by 2035, then it is the case that target headroom should be comfortably met and no new resource schemes will be required as a result.

5.4 Water Resources and Water Supply Summary

Table 5-6 provides a summary of the risk for water resources and water supply in each area given the proposed developments in North Tyneside.

TABLE 5-6: WATER RESOURCES AND WATER SUPPLY RISK SUMMARY	
Development Area	Risk
Coast	Green
North Shields	Green
Wellfield	Green
West Chirton South	Green
Annitsford Farm* (including Urban Fringe development)	Green
Whitehouse Farm	Green
Shiremoor* (including Urban Fringe development)	Green
Scaffold Hill	Green
Station Road	Green
East Benton Farm	Green
Wallsend	Green
All Employment	Green

** Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor.*

The overall picture indicates:

- North Tyneside area does not lie within an area of water stress;
- River catchments in North Tyneside do not form part of an EA CAMS. However the 'Lower Tyne WRMU' located upstream of North Tyneside is classified as having 'Water Available';
- In terms of NWL existing abstraction licences within the North Tyneside study area, 76% of the SW licences (including reservoir licences) are utilised, whereas only 40% of GW licences are utilised;

- A large volume of spare licence quantity is held by NWL 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 NTC (for both employment and residential) and based on NWL consumption figures, the maximum total additional water demand for the North Tyneside area up to 2028 would be between 3.82 Mld⁻¹ and 6.17 Mld⁻¹. This equates to only approximately 4% of NWL's total water surplus;
- In addition, 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.

6 FLOOD RISK AND SURFACE WATER MANAGEMENT

6.1 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. Section 10 of the NPPF²¹) emphasises 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 North Tyneside, 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.

6.2 North Tyneside Strategic Flood Risk Assessment

The North Tyneside Level 1 SFRA²² is a strategic level assessment of the sources of flood risk and considers the implications of flood risk arising from new development. This allows NTC to undertake the Sequential Test on potential development areas, as required in the NPPF. The Sequential Test is a method by which development areas are considered and selected on the basis of taking forward the areas with lowest flood risk. Where it is has been proven that there are no reasonably available development sites within lesser areas of flood risk, and there are overriding sustainability reasons for considering higher risk options, then the Exception Test²³ (Part A) is undertaken dependent on the development type.

²¹ The NPPF replaces PPS25. However the PPS25 Practice Guidance is still relevant.

²² JBA Consulting, (2010); North Tyneside Council Level 1 Strategic Flood Risk Assessment. http://www.northtyneside.gov.uk/pls/portal/NTC_PSCM.PSCM_Web.download?p_ID=519214

²³ The Exception Test is a method of managing flood risk while still allowing necessary development to occur. Development is only permissible in areas at risk of flooding where it can be demonstrated that there are no reasonably available sites in areas of lower risk and that the benefits outweigh the risks from flooding.

6.3 Catchment Description

6.3.1 *Watercourses*

The key watercourses in North Tyneside include:

- Brierdene Burn;
- Forest Hall Letch;
- Longbenton Letch;
- Redburn Dene;
- Sandy's Letch;
- Seaton Burn;
- Wallsend Burn;
- Willington Gut;
- River Tyne.

6.3.2 *Geology*

The Solid and Drift deposit geologies of the area have been established from British Geological Survey (BGS) mapping.

The bedrock geology in the administrative study area is underlain by mudstones, sandstones and siltstones, with pockets of middle and upper and lower Pennine coal measures. The Pennine Lower Coal Measures Formation can be found in the north east of the study area, and the Pennine Upper Coal Measures Formation in the south west. The Pennine Middle Coal Measures Formation dominates the rest of the surface bedrock, covering over three quarters of the administrative area. These formations are all classified as secondary aquifers (A)²⁴ by the EA. In the south west of the study area, the Coal Measures are overlain by the Yellow Sands Formation (fine, medium grained sandstone), and in other areas there are also pockets of Rockey and Raisby Dolomite rock Formations. The Rockey and Raisby Dolomite Formations and the Yellow Sands Formation have all been classified as principal aquifers²⁵ by the EA.

The majority of the study area is overlain by superficial deposits of till, diamicton and beach deposits along the coastal strip. There is also alluvium along the banks of the Tyne Estuary. Beach deposits have a very high to high permeability, the till deposits are generally expected to behave as aquitards²⁶ and permeabilities and can range from high to low to localised variations in sand and gravel horizons. Alluvium is classified as a secondary (A) aquifer of which varies for high to very low permeability.

6.3.3 *Flood Defences*

Flood defences are typically engineered structures designed to limit the impact of flooding. The Level 1 SFRA details the coastal defences within North Tyneside as provided by the National Flood and Coastal Defence Database (NFCDD), compiled by the EA.

²⁴ 'Secondary aquifer (A)' - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

²⁵ 'Principal aquifer' - Layers that have high permeability. They may support water supply and/or river base flow on a strategic scale.

²⁶ Aquitard - A bed of low permeability adjacent to an aquifer.

There are a range of tidal and fluvial flood defences within the North Tyneside study area and these include:

- A variety of sea wall designs along the coastline from St Mary’s Island to Tynemouth, a mixture of block masonry walls, concrete revetments, and curved sea walls are recorded;
- Engineered and maintained channels are found along Sandy’s Letch, Longbenton Letch, Wallsend Burn and Seaton Burn; and
- The Tyne Estuary is shown as being defended, though NFCDD lists defence type as natural channel.

The EA is responsible for maintaining almost all of the fluvial defences for NTC whilst coastal defences are maintained by NTC. The standard of defence according to NFCDD is between 25 and 100 years.

6.4 Flood Risk Overview

This assessment covers the risk of flooding and hence flood risk constraints posed to the key development areas and AAP sites. In line with Section 10 of the NPPF, 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.

The Level 1 SFRA has considered the main flood risks to the area from fluvial sources, tidal sources, groundwater and surface water, sewer flooding and flooding from artificial sources.

6.4.1 Tidal Flood Sources

Tidal flood sources are the North Sea and Tyne Estuary. The Tyne Estuary is the only tidal flood source in the North Tyneside area. The NPPF requires definition of the following tidal Flood Zones as provided in Table 6-1.

TABLE 6-1: TIDAL FLOOD ZONE DEFINITIONS		
Flood Zone	Definition	Probability of Flooding
1	Land at risk from flood event less than the 1 in 1000 year event (less than 0.1% annual probability of flooding each year)	Low Probability
2	Land at risk from flood event between the 1 in 200 and 1 in 1000 year event (between 0.5% and 0.1% annual probability of flooding each year)	Medium Probability
3a	Land at risk from flood event equal to, or greater than, the 1 in 200 year event (greater than 0.5% annual probability of flooding each year)	High Probability
3b	Land where water has to flow or be stored in times of flood, or land purposely designed to be flooded in an extreme flood event (0.1% annual probability). The 1 in 20 year annual probability floodplain is the starting point for consideration but local circumstances should be considered and an alternative probability can be agreed between the LPA and the EA	Functional Floodplain

Climate Change

The NPPF requires developments in floodplains to consider the potential impacts on flood risk for the lifetime of the proposed development. It is generally assumed that commercial developments should be considered to have a 75 year design life, and residential developments should be considered to have a design life of 100 years (as stated in the PPS25 Practice Guide, which has not been revoked and still applicable). In accordance with the

NPPF Technical Guidance, allowances for climate change, based on the UKCIP02 scenarios, should be made on tidal flood sources for a 75 and 100 year design horizon. This requires an assessment of the impact of 10% sensitivity allowance on offshore wind speeds and extreme wave heights for the period 2055-2115 when modelling flood events.

Historical Flood Events

There are no recorded flood events in recent years of flooding from the Tyne Estuary or the North Sea. There are recorded events of tidal flooding affecting homes and commercial properties in October 1824, February 1827, February 1868, and January 1834.

Tidal Flooding in North Tyneside

Tidal flood risk areas defined by the EA Flood Zones are shown in Appendix B. Tidal flood risk threatens a narrow area immediately adjacent to the estuary and coast.

A summary tidal flood risk for each of the proposed development and employment areas in North Tyneside are shown in Table 6-4 and Table 6-5.

6.4.2

Fluvial Flood Sources

Fluvial flood sources include sections of river that are not affected by the sea. The main sources of fluvial flooding within North Tyneside are Seaton Burn, Longbenton Letch and Forest Hall Letch. Wallsend Burn and Brierdene Burn can experience ‘tide-locking’ conditions where they are unable to discharge freely due to a high tidal level. This can make them more susceptible to flooding.

Section 10 of the NPPF defines three ‘flood risk zones’ with respect to fluvial flooding (Table 6-2). The flood zones are classified in terms of flood risk from rivers based on probability of a flood event occurring.

TABLE 6-2: FLUVIAL FLOOD ZONE DEFINITION		
Flood Zone	Definition	Probability of Flooding
1	Land at risk from flood event less than the 1 in 1000 year event (less than 0.1% annual probability of flooding each year)	Low Probability
2	Land at risk from flood event between the 1 in 100 and 1 in 1000 year event (between 1.0% and 0.1% annual probability of flooding each year)	Medium Probability
3a	Land at risk from flood event equal to, or greater than, the 1 in 100 year event (greater than 1.0% annual probability of flooding each year)	High Probability
3b	Land where water has to flow or be stored in times of flood, or land purposely designed to be flooded in an extreme flood event (0.1% annual probability). The 1 in 20 year annual probability floodplain is the starting point for consideration but local circumstances should be considered and an alternative probability can be agreed between the LPA and the EA	Functional Floodplain

Climate Change

The effects of climate change should be considered when assessing the design life of development. It is generally assumed that commercial developments should be considered to have a 75 year design life, and residential developments should be considered to have a

design life of 100 years in accordance with guidance in the PPS25 Practice Guide²⁷. For fluvial systems, Section 10 of the NPPF requires an increase of 20% in peak river flows and 30% in peak rainfall intensities to be used when modelling fluvial flood events for development up to 2115.

Historical Fluvial Flood Events

The EA and NTC provided GIS datasets of areas flooded in 2005, 2007, 2008, 2009, 2010 and 2012. Some of the same areas flooded in multiple events; however it does not show the source or severity of the flooding, simply notes that it suffered flooding. Some specific fluvial events identified include:

- Longbenton Letch in 2007 and 2008;
- Forest Hall Letch in 2007 and 2008;
- Wallsend Burn in 2007, 2008, 2009 and 2010.

Fluvial Flood Risk to North Tyneside

Fluvial flood risk areas defined by the EA’s Flood Zones are shown in Appendix B.

A summary fluvial flood risk for each of the proposed development and employment areas in North Tyneside are shown in are shown in Table 6-4 and Table 6-5.

6.4.3 **Surface Water Flooding**

Surface water flooding and overland flow typically arises from intense rainfall, that fails to infiltrate the surface or enter drainage systems and as a result travels over the ground surface and can result in flooding. Local topography and built form can have a strong influence on the direction and depth of flow.

The Level 1 SFRA provides a summary of existing and available data on surface water flooding and includes mapping of Areas Susceptible to Surface Water Flooding (ASStWF).

URS have undertaken a SWMP (Phase 1-4)²⁸ for NTC alongside this WCS, which provides additional detail on the areas at risk of surface water flooding, including greater detail on depth, location and for a wider range of return periods.

The SWMP identifies that Wallsend, Longbenton/Killingworth and North Shields are most at risk from surface water flooding within North Tyneside; a further six areas within North Tyneside are also considered to be at risk (see Table 6-1 of the SWMP).

There is considerable interaction between surface water sewers, ordinary watercourses and the wider sewer network, and the source of flooding is often a complex combination of several sources interacting. Table 6-3 shows recorded instances of surface water flooding flood events in North Tyneside. For mapping showing the location of the historical flooding please refer to Figure 6-2 of the North Tyneside SWMP.

²⁷ Department for Communities and Local Government, (2006); ‘Planning Policy Statement 25: Development and Flood Risk’, TSO: London.

²⁸ URS, (2012); North Tyneside Surface Water Management Plan (Phase I, II, III and IV)

TABLE 6-3: HISTORICAL FLOODING IN NORTH TYNESIDE

Location of Flooding	Year
Wallsend	2005, 2012
Battlehill	2005, 2012
Backworth	2005, 2012
Whitley Bay	2005, 2007, 2012
Earsden	2005, 2008, 2012
A189 roundabout	2008, 2012
West Monkseaton	2005, 2008, 2009, 2010, 2012
Dudley	2005, 2007, 2009, 2012
Wideopen	2005, 2007, 2009
Camperdown	2009
Killingworth	2005, 2007, 2008, 2009, 2012
Shiremoor	2005, 2007, 2008, 2009, 2012
Silverlink	2007, 2009
North Shields	2005, 2007, 2008, 2009, 2012
Percy Main	2005, 2009, 2012
Longbenton	2005, 2007, 2008, 2009, 2012
Willington	2005, 2012
Murton	2005, 2012
West Chirton	2005, 2012

Source: North Tyneside Council (Spreadsheet and GIS) Datasets

'Thunder Thursday'

During the undertaking of this Outline WCS, North Tyneside and wider parts of the North East suffered severe widespread flooding on 28th June 2012. Large areas were entirely inundated, cars were submerged, roofs collapsed and some homes lost power. A total in excess of 700 instances of flooding to properties were recorded by NTC and NWL.

Surface Water Management Plan and Surface Water Modelling for North Tyneside

As part of the SWMP pluvial modelling was undertaken to identify flooding hotspots, and their associated critical drainage areas (CDAs) in North Tyneside, a map of which is presented in Appendix C. From this, the SWMP has gone on to examine potential mitigation measures, where applicable, for alleviating flood risk across North Tyneside.

Results from the pluvial modelling undertaken as part of the SWMP identify that the majority of the proposed development sites are not at a significant risk of flooding from surface water sources in events up to the 1 in 200 year event.

A number of sites have apparent downstream receptors (for example, Gosforth Business Park is located on a greenfield site adjacent to an area of significant surface water flooding in Longbenton) and therefore as part of the development plans for these sites consideration should be given to attenuation of runoff as a result of these developments. Chapter 11 of the SWMP outlines the requirements for surface water management in more detail. A number of

sites are located next to watercourses and therefore have potential to impact key surface water pathways which will need consideration at each stage of any proposed development (refer to Chapter 10 of the SWMP).

A summary surface water flood risk for each of the proposed development and employment areas in North Tyneside is shown in Table 6-4 and Table 6-5. Further information is available in Chapter 10 of the SWMP.

6.4.4 ***Sewer Flooding***

Sewer flooding arises when the capacity of a sewer system is exceeded, either as a result of a rainfall event which generates more runoff than can be accommodated in the sewer, or as a result of a blockage in the sewer which prevents effluent from flowing. Both situations can result in a sewer overflowing.

Modern sewer systems are typically designed to accommodate rainfall events with a 1 in 30 year return period. Older sewer systems were often constructed without consideration of a design standard; therefore some areas may be served by sewers with an effective design standard of less than 1 in 30 years. Consequently, rainfall events with a return period greater than 1 in 30 years may result in flooding of some parts of the sewer system.

In addition, as towns and villages expand to accommodate growth, the original sewer systems may become overloaded. This problem is compounded by climate change, which is forecast to result in milder wetter winters and increased rainfall intensity in summer months. The combination of these factors would increase the pressure on existing sewer systems, effectively reducing their design standard and increasing the frequency of flooding.

As previously noted, there are known complex interactions between surface water and the sewer networks and it has been impossible in many cases to separate out the initial source of the flooding. Table 6-3 lists recorded flood events which have been attributed to surface water and sewer flooding. Figure 7-2 and Insets 1-4 show the location of sewer flooding (reported to NWL) within 100m grid squares in North Tyneside

NWL have classified the risk of sewer flooding in the drainage areas within North Tyneside as low, medium or high (refer to Figure 7-3). The following areas have been classified as having locations within them being at high risk of flooding however investment is onsite, planned or complete at most of these locations:

- Benton;
- Brierdene;
- Chirton;
- Cullercoats;
- Seaton Valley;
- Tynemouth;
- Whitley Bay.

A summary of the sewer related flood risk for the proposed development in North Tyneside is provided in Table 6-4 and Table 6-5.

6.4.5 ***Groundwater Flooding***

Groundwater flooding occurs when water levels in the ground rise above surface elevations. Groundwater flooding may take weeks or months to dissipate, as groundwater flow is much slower than surface water flow therefore water levels take much longer to recede.

Groundwater Flooding in North Tyneside

There have been no reports of groundwater flood incidents reported to the EA or NTC; however the British Geological Survey (BGS) Groundwater Flooding Susceptibility data shows that there are large areas of North Tyneside that may be at high or very high susceptibility to groundwater flooding, particularly where ground elevations are low (refer to Groundwater Assessment as Appendix C to the SWMP). BGS groundwater flooding susceptibility areas are shown in Appendix D (mapping taken from Appendix C of the SWMP).

The main areas in North Tyneside shown to potentially be at risk from groundwater flooding, which were identified within the Groundwater Assessment of the SWMP (although not entirely confined to these areas) are:

- Shiremoor;
- West Chirton;
- Backworth;
- Longbenton.

The BGS data suggests that this susceptibility is mostly associated with superficial geological layers as opposed to bedrock geology. Given the poor availability of groundwater level data made available to BGS it is possible however that the various categories may not be wholly accurate.

A summary groundwater flood risk for each of the proposed development and employment areas in North Tyneside is shown in Table 6-4 and Table 6-5.

6.4.6 ***Artificial Sources and Infrastructure Failure***

The NPPF requires that artificial water sources with a potential to cause flooding within the study area should be identified as part of a SFRA. Artificial sources include canals, reservoirs, ponds, and any feature where water is held above natural ground level.

The most well-known lakes in North Tyneside are Killingworth Lake, Rising Sun Country Park Lake and Tynemouth Boating Lake. All of these lakes provide which provides facilities for wildlife and recreation. However a review of the outputs of the national Reservoir Inundation Modelling and Mapping undertaken by the EA has shown that other than along the fringe of the River Tyne, no parts of North Tyneside are at risk of reservoir breach.

Also there are no known records of flooding from artificial sources within North Tyneside.

6.5 **Summary of Flood Risk Constraints**

Based on the data presented in Section 6.1 to Section 6.4 a summary of available flood risk information for each residential development site and the major employment sites is presented in Table 6-4 and Table 6-5 below.

TABLE 6-4: OVERVIEW OF FLOOD RISK FOR RESIDENTIAL SITES

Settlement	Flood Risk				
	Fluvial	Coastal	Surface Water	Sewer	Groundwater
Station Road East	Green	Green	Amber	Green	Green
Station Road West	Green	Green	Amber	Green	Green
East Benton Farm	Green	Green	Amber	Green	Green
West Chirton South	Green	Green	Amber	Green	Red
Whitehouse Farm	Green	Green	Amber	Amber	Red
Scaffold Hill	Green	Green	Green	Amber	Amber
Annitsford Farm* (including Urban Fringe)	Amber	Green	Green	Green	Red
Shiremoor West (South)	Green	Green	Amber	Amber	Red
Shiremoor West (North)* (including Urban Fringe)	Green	Green	Amber	Amber	Red
Wellfield	Green	Green	Amber	Amber/	Red
Wallsend AAP	Green	Green	Green	Green	Green
North Shields AAP	Green/ Amber	Green	Green	Amber	Green/ Amber
Coastal AAP	Green/ Amber	Amber	Green	Amber	Amber

** Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor.*

TABLE 6-5: OVERVIEW OF FLOOD RISK FOR EMPLOYMENT SITES

Settlement	Flood Risk				
	Fluvial	Coastal	Surface Water	Sewer	Groundwater
Gosforth Business Park	Green	Green	Green	Amber	Red
Weetslade	Green	Green	Amber	Green	Green
Balliol Business Park East	Amber	Green	Amber	Amber	Red
Esso	Amber	Green	Green	Green/ Amber	Green
Tyne Tunnel Trading Estate	Green	Green	Amber	Amber	Red

6.6 Surface Water Management

Flood risk generated as a result of any development is an important consideration with respect to the assessment of development area potential, to ensure compliance with the NPPF. In areas where surface water run-off from new development is likely to be discharged to a river system, it is important that new development does not increase runoff rates to greater than the existing rate, as this would increase the risk of flooding downstream.

In addition, the NPPF requires that all new development should ensure that runoff rates and runoff volumes from new development are not increased above that of the existing land use. Much of the development in North Tyneside will be on previously undeveloped greenfield land where there will be a requirement to ensure that runoff rates and volumes are no greater than

the greenfield run off rates for the design event with return period of 1 in 100 years (with an 30% allowance for climate change) and smaller rainfall events up to this level.

The Flood and Water Management Act (FWMA)²⁹ gained royal assent on 8th April 2010. Schedule 3 (Sustainable Drainage) of the FWMA contains new regulations which have implications on the design, approval and adoption of sustainable drainage systems (SuDS).

As part of any SuDS scheme, consideration should be given to the long-term maintenance of SuDS to ensure that it remains functional for the lifetime of the development. New obligations for Lead Local Flood Authorities (LLFA) under the FWMA mean that NTC will become a SuDS Approving Body (SAB). This is currently due to take effect in late 2013. Therefore all SuDS proposals should consider the requirements of the Draft SuDS National Standards³⁰. These set out the requirements for the design, construction and operation of SuDS for residential, commercial and industrial developments and redevelopments. They encourage developers to consider drainage at the earliest stage of planning and take into account local flood risk, planning policies and climate change. As part of the Council's SAB responsibilities North Tyneside specific guidance on the local standards for SuDS will be developed.

It is the intention that where SuDS systems serve more than 1 property and are designed to new national standards, the LLFA will adopt and maintain the approved drainage system provided that three conditions are met, these are:

- The drainage system is constructed in pursuance of approval;
- The drainage system is constructed and functions in accordance with approval;
- The drainage system is a sustainable drainage system.

6.6.1 *Flood Risk from Development*

Chapter 10 of the SWMP has highlighted that a number of sites have apparent downstream receptors and therefore as part of the development plan for these areas consideration should be given to the potential to attenuate runoff above current levels. Longbenton Letch, Forest Hall Letch, Sandys Letch and Wallsend Burn have been identified in the SFRA as having limited capacity to receive more flow. Any future development within the locality of these watercourses will therefore require attenuation (or storage) prior to discharging to greenfield runoff rates.

To ensure that potential flood risk from development within North Tyneside is minimised, surface water runoff from the new developments will need to be managed to ensure that there is no increase in runoff rates to watercourses or surrounding areas. The Detailed WCS will assess the surface water management options and recommendations for the proposed major development areas.

In order to reduce runoff rates from developed sites to that of existing (and where possible to achieve 'betterment'), NPPF and its technical guidance recommend that SuDS be used. Construction within the new development areas will need to include for the SuDS both at a site specific level but also a strategic scale level. In general, there are advantages to be gained to developing drainage strategies for site wide developments such that strategic scale options such as balancing ponds can be developed at lower overall cost, but also to;

- Strategically manage flood risk and surface water;
- Maximise GI linkage;

²⁹ Communities and Local Government, (2010); 'The Flood & Water Management Act'.

³⁰ DEFRA, (December, 2011); National Standards for Sustainable Drainage Systems. Available online at <http://www.defra.gov.uk/consult/files/suds-consult-annexa-national-standards-111221.pdf>

- Maximise ecological enhancement;
- Maximise water quality benefits from retention and filter type SuDS;
- Contribute towards the point system for Code for Sustainable Homes grading.

An increase in the quantity of water to aquifers through SuDS or groundwater rebound may however lead to future groundwater issues and infiltration SuDS should be carefully managed.

The SWMP, which was produced alongside this WCS further investigated detailed SuDS requirements for the development areas in North Tyneside. Further site-specific SuDS requirements should also be investigated as part of the Detailed WCS.

Tables 10-2 and 10-3 in Chapter 10 of the SWMP summarise the flood risk to and from the proposed residential development in North Tyneside identifying if any of the sites are likely to impact downstream receptors. Table 6-7 identifies areas with North Tyneside (downstream receptors) that may be at risk as a result of the proposed development. Attenuation measures and stringent surface water runoff rates should be implemented to prevent the worsening on flood risk from proposed development and this is further discussed in the SWMP.

TABLE 6-7: SUMMARY TABLE OF DOWNSTREAM RECEPTORS POTENTIALLY TO BE IMPACTED BY PROPOSED DEVELOPMENT

Development Area	Development Type	Area potentially at risk from flooding (Downstream Receptor)
Station Road East	Residential	Wallsend
Station Road West	Residential	Wallsend
East Benton Farm	Residential	Wallsend
West Chirton South	Residential	Percy Main
Whitehouse Farm	Residential	Killingworth
Annitsford Farm	Residential	Unlikely to significantly increase downstream flood risk, however attenuation of runoff would be prudent as discharge to Sandy's Letch is likely.
Shiremoor West (South)	Residential	Runoff likely to drain to Brierdene Burn which may increase flood risk at Backworth
Shiremoor West (North)	Residential	Runoff likely to drain to Brierdene Burn which may increase flood risk at Backworth
Wallsend AAP	Residential	Areas of notable flooding across AAP and potential to provide betterment though attenuation of runoff. Careful consideration should be given to both as development plans for the AAP emerge.
West Chirton Industrial Estate	Employment	Percy Main
Balliol Business Park East	Employment	Potential for increased runoff post-development.
Gosforth Business Park	Employment	Potential for increased runoff post-development.
Weetslade	Employment	Runoff likely to drain towards Seaton Burn which may increase flood risk at Dudley.

6.6.2

Appropriate SuDS Utilisation within North Tyneside

Various SuDS techniques are available and operate on two main principles; attenuation and infiltration. All systems generally fall into one of these two categories, or a combination of the two.

The SuDS suitability assessment undertaken as part of Phase III of the SWMP has shown that broadly the majority of North Tyneside is not suitable for infiltration based SuDS. However it is emphasised that this is a high level assessment and only forms an approximate guide to infiltration based SuDS suitability; a site investigation is required to confirm local conditions and should be considered on a site by site basis at the detailed development stage.

Given that the prevailing ground conditions have indicated that North Tyneside is generally unsuitable for the use of infiltration techniques it is suggested within the SWMP that the management of surface water prior to discharge should be undertaken using attenuation techniques.

Surface Water Runoff Attenuation

The Level 1 SFRA for North Tyneside states that surface water runoff should be controlled as near to the source as possible which should include the application of SuDS. As part of the SWMP (Phase III) development areas where stringent surface water management measures are required have been identified. In addition, measures that have the potential to alleviate flooding in these areas have been determined. The available options and policies that have been identified generally fall within the following categories:

- Raising community awareness;
- Improving resilience to flooding;
- Improvement to maintenance of drainage network;
- Planning and development policies;
- Water conservation.

Storage volumes that will need to be provided on a site-by-site basis will be dependent on the level of infiltration that can be provided, either via green areas or specific infiltration SuDS. This volume can be provided strategically, in large scale storage features such as retention lakes or in combination with site specific features such as rainwater harvesting or smaller scale balancing ponds. The strategic SuDS options should be assessed as part of future detailed assessment (i.e. in a Detailed WCS or at the masterplanning stage), in terms of the volume of attenuation required and the scale of mitigation that would be required to mitigate flood risk from the development. In addition the linkage of these schemes to existing green infrastructure should be considered. In the majority of cases, site specific SuDS and site specific infiltration testing will be required and these will be decided by the individual site developers.

Information regarding the specific measures proposed for North Tyneside is discussed in more detail in Chapter 11 of the SWMP. Once more is known about the exact numbers of housing and likely layouts of the sites, it is recommended that an assessment of the detailed requirements for different types of SuDS is undertaken.

SuDS Adoption and Maintenance

The adoption and maintenance of SuDS features can be a task that is often overlooked in the early stages of the planning process. Section 2.2.5 of the National SuDS Working Group's 'Interim Code of Practice for Sustainable Drainage Systems'³¹ states the "maintenance of SuDS differs from that for conventional systems, so it is important to allocate responsibility for the maintenance of SuDS early in discussion before planning approval for the development is given".

³¹ National SUDS Working Group. (2004); Interim Code of Practice for Sustainable Drainage Systems. http://www.ciria.org.uk/suds/pdf/nswg_icop_for_suds_0704.pdf

The SWMP which was produced in parallel with this WCS investigated SuDS adoption and maintenance to ensure that developers and planners sign-up at an early stage to the proposed flood mitigation measures and drainage systems.

6.7 Flood Risk Summary

The overall picture indicates that:

- There is a risk of tidal flooding to a narrow area immediately adjacent to the Tyne estuary and coast;
- The main sources of fluvial flooding in North Tyneside are from Seaton Burn and the Longbenton and Forest Hall Letches; Wallsend Burn and Brierdene Burn can experience 'tide-locking' and historically Longbenton Letch, Forest Hall Letch and Wallsend Burn have suffered from multiple flood events. Therefore areas within the vicinity of these watercourses are most likely to be at risk from fluvial flooding in North Tyneside;
- There have been no reports of groundwater flood incidents reported to the EA or NTC; however the BGS Groundwater Flooding Susceptibility data shows that there are large areas of North Tyneside that may be highly or very highly susceptible to groundwater flooding;
- Historically there have been no known reports of flooding from artificial sources and outputs from EA reservoir breach modelling confirm there is little risk in North Tyneside;
- Shiremoor West (South), Shiremoor West (North), North Shields AAP, Coastal AAP, Whitehouse Farm, Scaffold Hill, Wellfield, Tyne Tunnel Trading Estate, Gosforth Business Park and Balliol Business Park are areas which are considered to be at a medium risk of flooding from the local sewer network after a review of NWL sewer catchment risk data;
- Wallsend, Longbenton/Killingworth and North Shields have been identified in the SWMP as being most at risk from surface water flooding in North Tyneside. A number of proposed development areas have been identified to be at medium risk of surface water flooding including Station Road (East and West), East Benton Farm, West Chirton South, Whitehouse Farm, Shiremoor, Weetslade, Balliol Business Park and the Tyne Tunnel Trading Estate; and
- A number of the proposed residential and employment sites (Table 6-7) are identified to pose a risk to areas within North Tyneside (downstream receptors) and therefore attenuation measures and stringent surface water runoff rates would need to be implemented in these areas to help reduce the impact of surface water flood risk as a result of the proposed development. Gosforth Business Park is located on a greenfield site adjacent to an area of significant surface water flooding in Longbenton and therefore development in this area has potential to exacerbate problems if not managed. Further information is available in the SWMP.

7 WASTEWATER ASSESSMENT

POSITION STATEMENT (April 2013)

At this stage, due to the scale of proposed growth across North Tyneside and the availability of limited data a number of assumptions have been made for the purpose of the draft report.

Moving forward it is essential that the wastewater assessment is reviewed in detail by NTC and NWL to ensure that any constraints to growth are fully identified at an early stage.

Consultation between NTC, NWL and URS will also allow the screening out of areas (networks and/or WwTWs) 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:

North Tyneside Council

- Broad locations for development areas across the region;
- Growth figures (residential and employment) for each development area.

Northumbrian Water

- Limited sewer network data (no detail of pipe inverts and/or gradients and approximately 20% of pipe diameters missing);
- Sewer flooding risk GIS layer highlighting, low, medium and high risk areas based on DG5 records;
- Comment on the headroom at Howdon WwTW.

7.1 Introduction

This section will identify the wastewater collection, treatment and disposal for those settlements identified for growth and any constraints associated with these. This will include:

- At a strategic 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;
- Identifying any known or expected hydraulic, process and treatment constraints on Howdon WwTW;
- 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 the potential new developments and timescales for delivery of this.

Proposed residential development in North Tyneside is widespread, and covers eleven development areas (Table 7-1):

TABLE 7-1: PROPOSED RESIDENTIAL DEVELOPMENT AREAS		
Development Area	NTC Ward	New Homes
Coastal AAP	St. Mary's, Whitley Bay and Tynemouth	141
North Shields AAP	Riverside	656
Wellfield	St. Mary's	210
West Chirton South	Chirton	420
Annitsford Farm (including Urban Fringe)	Weetslade	400 (+61)
Whitehouse Farm	Longbenton	268
Shiremoor (including Urban Fringe)	Valley	630 (+60)
Scaffold Hill	Killingworth	450
Station Road	Northumberland	1210
East Benton Farm	Northumberland	50
Wallsend AAP	Wallsend	424

Within each of the above areas, development figures for the (revoked) RSS targets for residential growth have been tested.

7.2 Howdon Wastewater Treatment Works Capacity

POSITION STATEMENT (April 2013)

The following information regarding Howdon WwTW is correct as of November 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. The Howdon WwTW supports all current developments in North Tyneside and NWL have confirmed that all foul flows from proposed development within North Tyneside will drain to 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 A.

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 measures 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.

7.3 Wastewater Network Summary

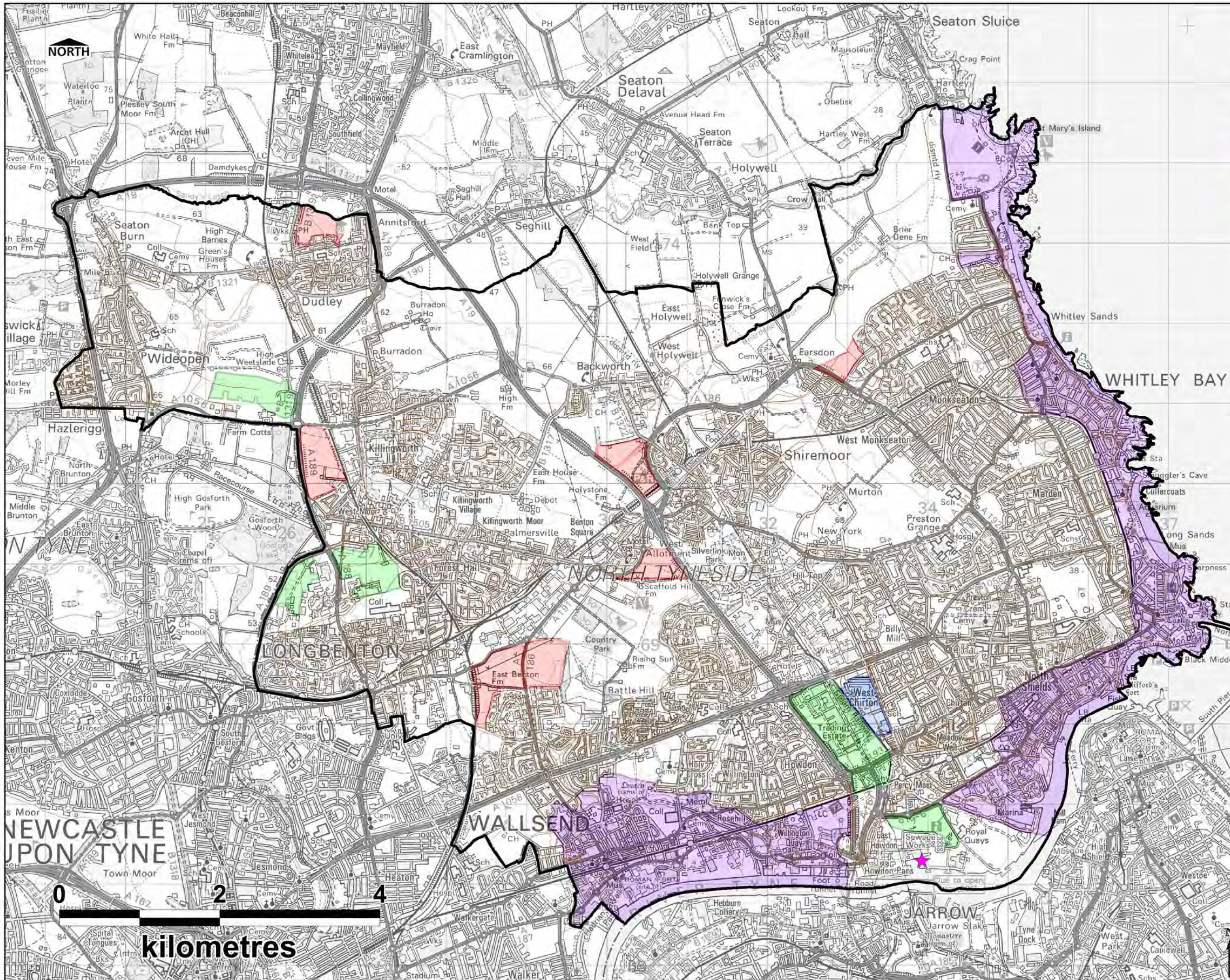
NWL are responsible for the wastewater network serving North Tyneside. For the purpose of this Outline WCS, NWL have provided a GIS layer of the sewer network, though this reveals limited information and contains no invert/gradient information.

Figure 7-1 shows the location of the Howdon WwTW and sewer network across North Tyneside. Figure 7-2 is an overview map of North Tyneside showing the location of areas at risk of sewer flooding and the location of NWL schemes currently planned to reduce the risk of flooding in North Tyneside. The four figures that follow Figure 7-2 are 'zoomed in' Insets of Figure 7-2.

NWL have also provided broad sewer risk catchment data indicating the current risk to capacity of the sewer network in North Tyneside. Figure 7-3 presents this data indicating which risk category each proposed development area is to be located within.

The 'high level' assessments set out the foul flows constraints for new development in North Tyneside. The FWMA has removed the automatic right of connection for surface water and therefore surface water flows should be managed by using the hierarchy of preference in Part H of the Building Regulations³² (see Table 2-2 for an explanation of the Constraint Traffic Lights).

³² 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



KEY:

- ★ Howdon WwTW
- ▭ Council Boundary
- NWL Sewer Records

Development Locations

- ▭ Housing Site
- ▭ Employment Site
- ▭ Mixed Use Site
- ▭ AAP Area

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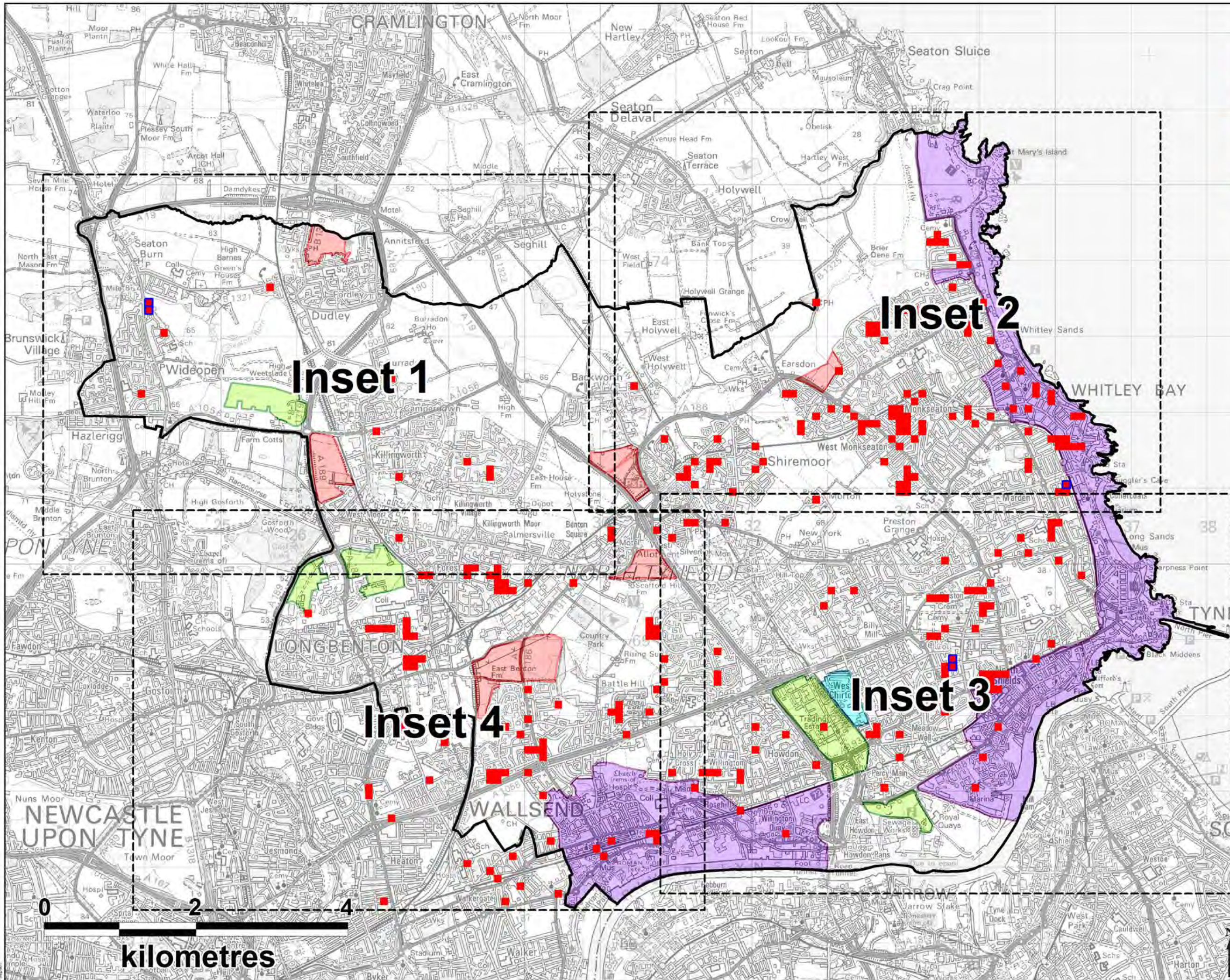
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NOTES

- Council Boundary
- Housing Site
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- AAP Area
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- NWL AMP5 Scheme

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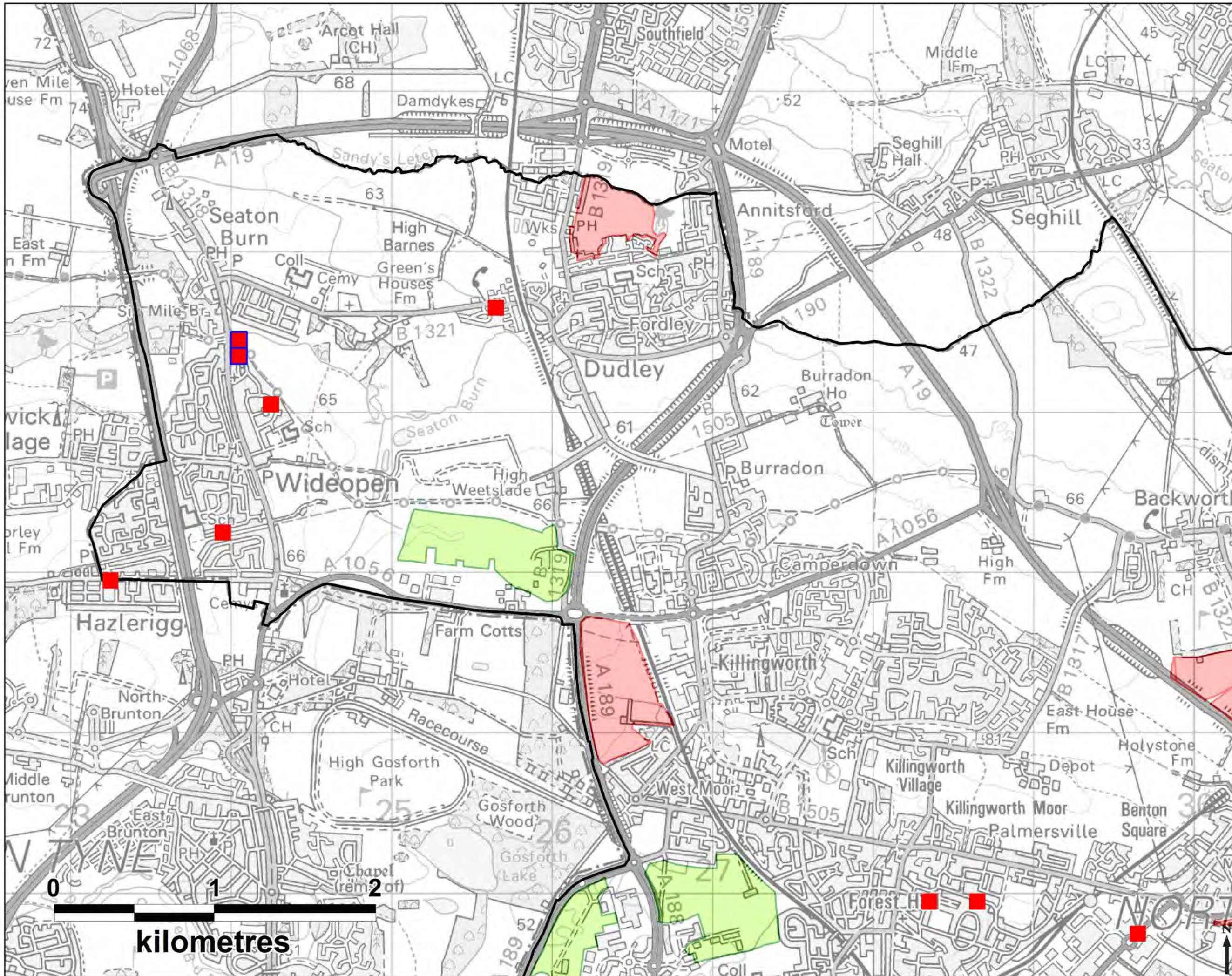
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Drawing Number: **FIGURE 7-2**



NOTES

- Council Boundary
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Job Title: **NORTH TYNESIDE WATER CYCLE STUDY**

Drawing Title: **SEWER FLOODING AND AMP5 SCHEMES**

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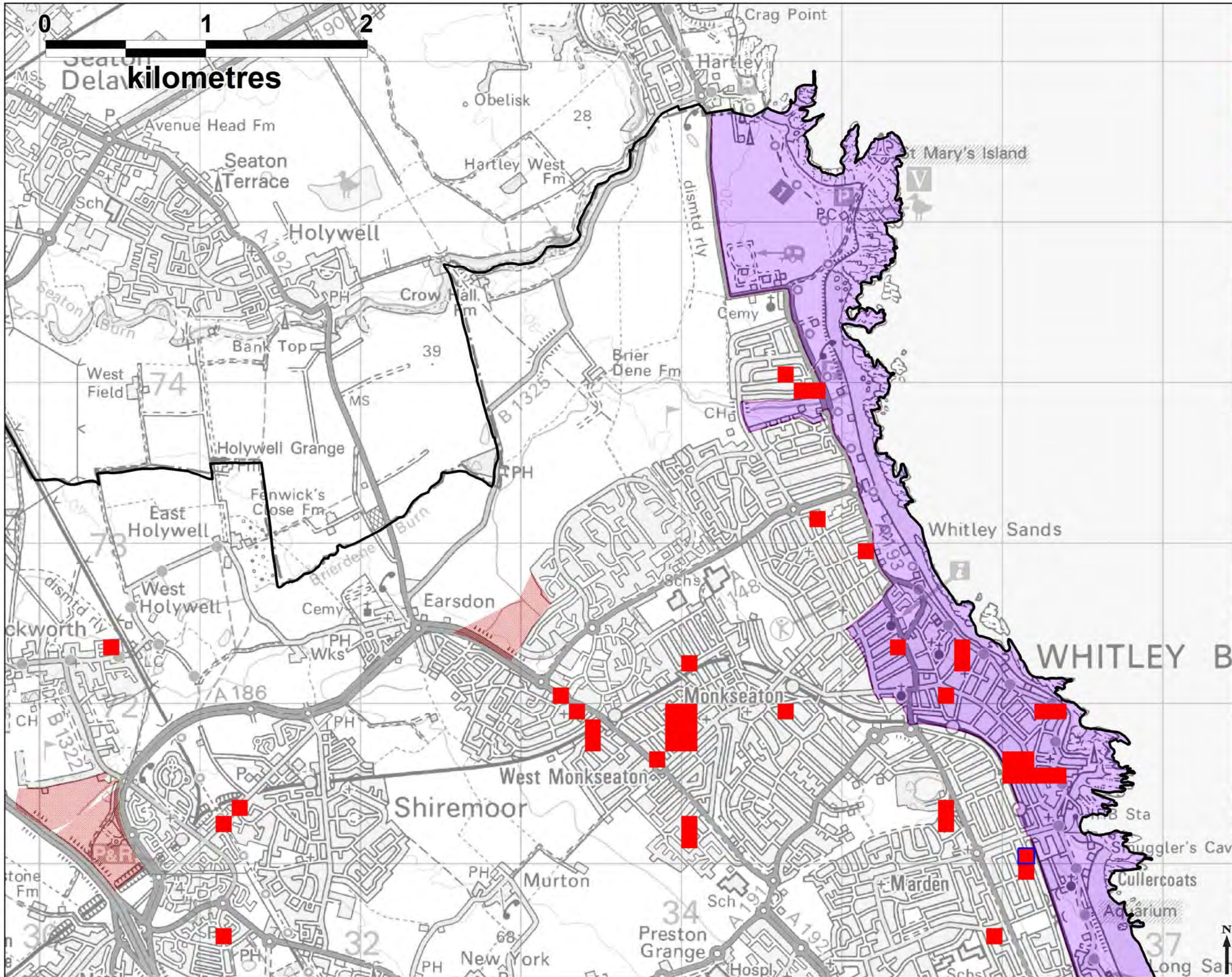
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Drawing Number: **FIGURE 7-2: INSET 1**





NOTES

- Council Boundary
- Housing Site
- Employment Site
- Mixed Use Site
- AAP Area
- Sewer Flooding Incidents reported to NWL (100m square)
- NWL AMP5 Scheme

INSET OVERVIEW

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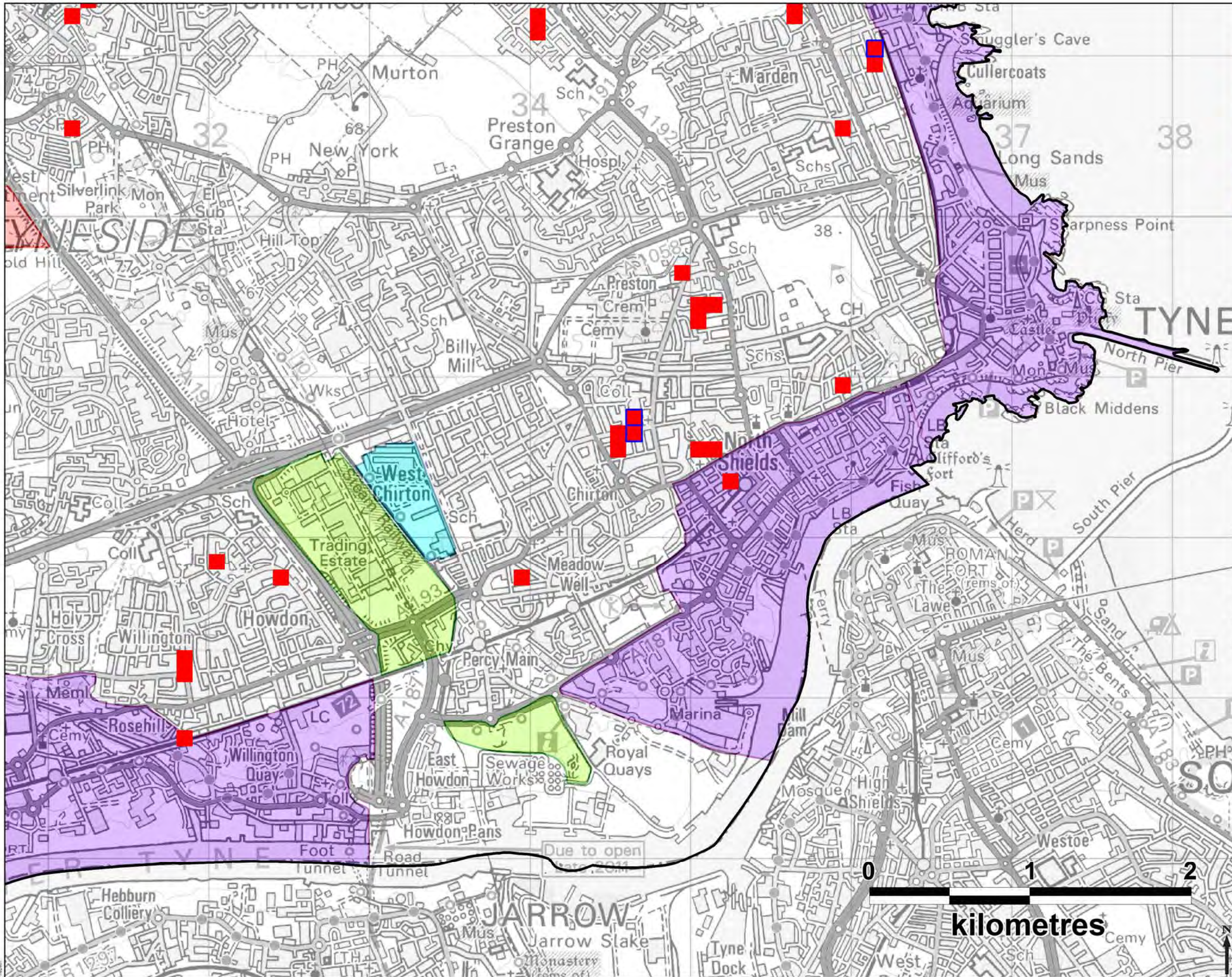
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Drawing Number

FIGURE 7-2: INSET 2



NOTES

- Council Boundary
- Housing Site
- Employment Site
- Mixed Use Site
- AAP Area
- Sewer Flooding Incidents reported to NWL (100m square)
- NWL AMP5 Scheme

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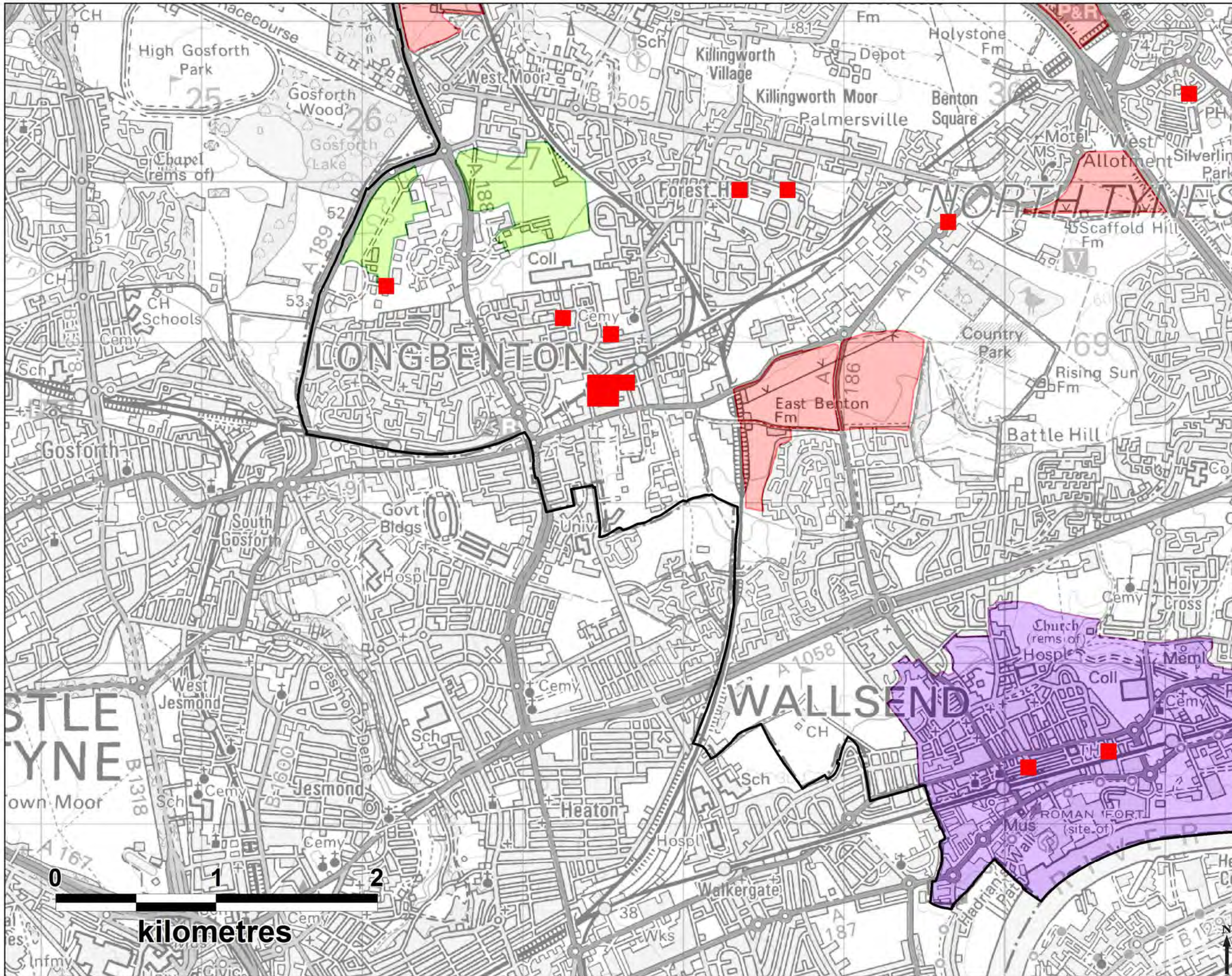
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Job Title				
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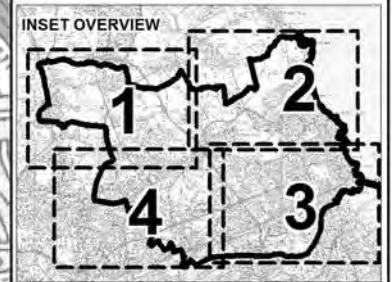
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FIGURE 7-2: INSET 3



- NOTES
- Council Boundary
 - Housing Site
 - Employment Site
 - Mixed Use Site
 - AAP Area
 - Sewer Flooding Incidents reported to NWL (100m square)
 - NWL AMP5 Scheme

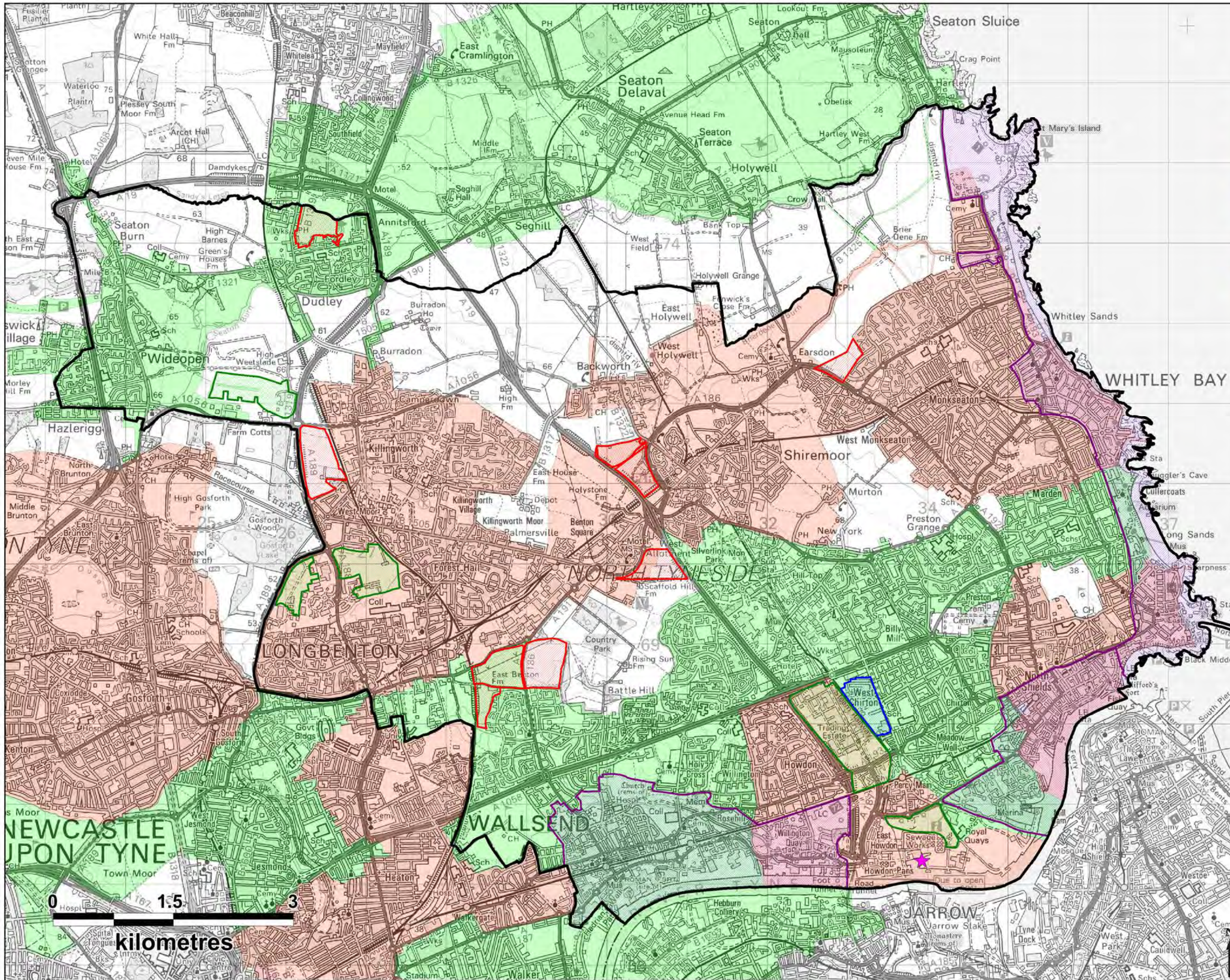


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KEY:

- ★ Howdon WwTW
- ▭ Council Boundary
- NWL Sewer Records

Development Locations

- ▭ Housing Site
- ▭ Employment Site
- ▭ Mixed Use Site
- ▭ AAP Area

NWL Sewer Risk Classification

- ▭ Low Risk
- ▭ Medium Risk

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SEWER NETWORK CAPACITY RISK

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FIGURE 7-3

7.4 Assessment of Residential Development Areas

7.4.1 *Coastal AAP*

- 270 new dwellings are proposed within the coastal area, which covers three NTC wards. These wards are St. Mary's, Whitley Bay and Tynemouth; however at this stage it has not been determined within which ward the development would take place.
- Development within St. Mary's would drain through Whitley Bay and on through Tynemouth and Riverside to Howdon WwTW.
- The main sewer running through the Tynemouth area is 1,500 mm diameter, which is a combined sewer serving South Cramlington, Seghill, Seaton Delaval, Seaton Sluice, Whitley Bay and Tynemouth. A number of sewer pipes in this area, however are 225 mm diameter. Depending on the location of new development these pipes may not have capacity. However without data on the current number of homes feeding these smaller sewer pipes it is not possible to accurately calculate the spare capacity.
- Towards the north end of the Tynemouth area and for much of the Whitley Bay area the diameter of sewer pipes is not known. This increases the risk involved in predicting potential sewer capacity in these areas.

Summary

At this stage, as the location of proposed development is unknown and 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 any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving the broad coast area, except for the northern end of the Tynemouth area, indicating that there may be limited capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

Coastal AAP Sewer Network Risk - AMBER

7.4.2 *North Shields AAP*

- 430 new dwellings are proposed within the North Shields area (Riverside ward). This ward receives all flows from the St. Mary's, Whitley Bay and Tynemouth wards.
- Much of the sewer network in this area is of 300 mm diameter, with the main interceptor sewer being 1,500 mm diameter.
- There may be scope to construct new developments towards the west of the Riverside ward, where there is easier access to the 1,500 mm diameter interceptor sewer and is closer to Howdon WwTW.

Summary

Whilst most sewer pipe diameters are known, a complete record of pipe inverts and gradients is not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving coastline, except for the northern end of the Tynemouth area, indicating that there may be limited capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

North Shields AAP Sewer Network Risk - AMBER

7.4.3 *Wellfield*

- 210 new dwellings are proposed within the Wellfield area (St. Mary's ward).
- The existing sewer connects to the proposed development area as a 300 mm diameter pipe. This increases gradually until it reaches the 1,200 mm diameter trunk sewer which runs into the next ward.

Summary

Whilst most sewer pipe diameters are known, a complete record of pipe inverts and gradients is not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding in the drainage unit serving the proposed development land, indicating that there is likely to be insufficient capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

Wellfield Sewer Network Risk – AMBER

7.4.4 *West Chirton South*

- 420 new dwellings are proposed within the West Chirton South area (Chirton ward). All houses will drain directly to Howdon WwTW, with minimal interaction with sewage flows from other wards.
- An existing sewer runs through the middle of the proposed development area.

Summary

Whilst all sewer pipe diameters are known, a complete record of pipe inverts and gradients is not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a low risk of sewer flooding to the drainage unit serving the proposed development land, indicating that there may be capacity.

West Chirton South Sewer Network Risk - GREEN

7.4.5 *Annitsford Farm*

- 400 new dwellings are proposed within the Annitsford Farm development area, situated in the Weetstone ward. All houses will drain to Howdon WwTW.

- In addition there are 61 new dwellings proposed from the Urban Fringe development area, situated in two areas to the south-east and south-west of Annitsford Farm. (The proposed new dwellings for the Urban Fringe development area have been split equally between Shiremoor and Annitsford Farm. Please refer to Figure 4-1).
- It appears that the drainage route for sewage from Annitsford Farm passes outside the boundary of data provided, thus it is not possible to assess these missing pipe runs.
- Within the vicinity of Annitsford Farm the main sewer pipe is 375 mm diameter, reducing to 225 mm diameter before joining an 825 mm diameter trunk sewer. The 225 mm diameter pipe is a continuation pipe downstream of a consented CSO.
- It is worth noting that a large number of sewer diameters are unknown as these were not provided in the assessed data package. There therefore may be alternative drainage routes available.

Summary

A complete record of pipe diameters, inverts and gradients is not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a low risk of sewer flooding across the full area in and around the proposed development land, indicating that there may be sufficient capacity in the existing network.

Annitsford Farm Sewer Network Risk - GREEN

7.4.6

Whitehouse Farm area

- 367 new dwellings are proposed within the Whitehouse Farm development area (Longbenton ward).
- Given the available sewer data it is not clear the precise drainage route for sewage leaving the Longbenton area. The route appears to pass outside the boundary of data provided, thus it is not possible to assess these missing pipe runs.
- The main sewer pipe leaving the Whitehouse Farm area is 225 mm diameter, rising to 300 mm diameter before joining a 1,050 mm diameter trunk sewer.

Summary

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding in areas of the drainage unit serving the proposed development land, indicating that there may be insufficient capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

Whitehouse Farm Sewer Network Risk - AMBER

7.4.7 *Shiremoor*

- 630 new dwellings are proposed within the Shiremoor development area (Valley ward). All houses will drain to Howdon WwTW via St. Mary's, Whitley Bay, Tynemouth and Riverside.
- In addition there are 60 new dwellings proposed from the Urban Fringe development area, situated just to the north-east of Shiremoor (the proposed new dwellings for the Urban Fringe development area have been split equally between Shiremoor and Annitsford Farm - see Figure 4-1).
- Much of the sewer connecting Shiremoor to the 1,200 mm diameter trunk main in St. Mary's is 600 mm diameter.
- The first section of sewer pipe leaving the Shiremoor development area is 300 mm diameter.

Summary

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding to the drainage unit serving the proposed development land, indicating that there may be limited capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

Shiremoor Sewer Network Risk - AMBER

7.4.8 *Scaffold Hill*

- 450 new dwellings are proposed within the Scaffold Hill development area (Killingworth ward).
- Due to a lack of available sewer network data, it is not clear how flows will drain to Howdon WwTW. Drainage may potentially occur via Longbenton and Wallsend, which runs outside the extent of the data provided.

Summary

The main issue in this area is the lack of a drainage route to Howdon WwTW visible in the provided data. It is important that more complete data is provided to better understand any potential capacity issues in this area.

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be insufficient capacity in the existing network. It is therefore prudent to be conservative at this stage when considering the potential constraints to new development.

Scaffold Hill Sewer Network Risk - AMBER

7.4.9 *Station Road*

- 1,210 new dwellings are proposed within the Station Road development areas (Northumberland ward), adjacent to the East Benton Farm development area. These new properties will drain to Howdon WwTW via Wallsend.
- The development at Station Road is split into two; Station Road West (560 properties) and Station Road East (650 properties), either side of an existing 225 mm diameter sewer.

Summary

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is generally a low risk of sewer flooding across the proposed development land, indicating that there may be sufficient capacity in the existing network.

Station Road Sewer Network Risk – GREEN

7.4.10 *East Benton Farm*

- 50 new dwellings are proposed within the East Benton Farm development area (Northumberland ward), adjacent to the Station Road development area. These new properties will drain to Howdon WwTW via Wallsend.
- The new properties at East Benton Farm are able to drain either via the Station Road development, or via a separate 375 mm diameter sewer pipe, joining flows from Station Road in a 450 mm sewer pipe.
- Given the minimal growth numbers it is unlikely that there will be a significant issue with sewer capacity.

Summary

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

However, information provided by NWL (refer to Figure 7-3) has confirmed that there is a low risk of sewer flooding across the proposed development land, indicating that there may be sufficient capacity in the existing network.

East Benton Farm Sewer Network Risk – GREEN

7.4.11 *Wallsend AAP*

- 500 new dwellings are proposed within the Wallsend development area (Wallsend ward), to the west of Howdon WwTW into which they drain.
- Wallsend covers a large area and it is unclear where precisely new properties will be constructed, however the area has a large interceptor sewer running west to east which is

in excess of 2,000 mm diameter. It is believed that will be able to cope with the additional flow.

- Where feasible development within Wallsend should be steered towards areas where there are no capacity issues within the network.

Summary

Whilst pipe diameters are known a complete record of pipe inverts and gradients are not available. It is therefore recommended that the capacity of the network in this location to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

Information provided by NWL has confirmed that there is a low risk of sewer flooding across the western part of the wider AAP area, indicating that there may be limited capacity in the existing network. However, the information also indicates that there is a low risk of sewer flooding across the eastern part of the wider AAP area (east of Willington and Rosehill), indicating that there may be sufficient capacity of the network in this location. Therefore where practicable, development should be steered towards the areas with known capacity.

Wallsend AAP Sewer Network Risk – GREEN

7.5 Assessment of Employment Development Areas

A complete record of pipe data is not available. It is therefore recommended that the capacity of the network in each of the proposed employment locations to serve the proposed development is assessed as part of any Detailed WCS or development specific study.

7.5.1 Gosforth Business Park

Information provided by NWL (refer to Figure 7-3) indicates that there is a medium risk of sewer flooding to the Gosforth Business Park employment area, indicating that there may be limited capacity in the existing network. The Gosforth Business Park area is located in close proximity to the Balliol Business Park and the Whitehouse Farm proposed residential area which also lies in an area with a medium risk of sewer flooding. There is therefore also estimated to be a cumulative impact on the sewer network risk in this area of North Tyneside.

Gosforth Business Park Sewer Network Risk - AMBER

7.5.2 Weetslade

Information provided by NWL (refer to Figure 7-3) indicates that there is a low risk of sewer flooding to the Weetslade employment area, indicating that there may be sufficient capacity in the existing network.

Weetslade Sewer Network Risk – GREEN

7.5.3 Balliol Business Park East

Information provided by NWL indicates that there is a medium risk of sewer flooding to the Balliol Business Park employment area, indicating that there may be limited capacity in the existing network. The Gosforth Business Park area is located in close proximity to the Balliol Business Park and the Whitehouse Farm proposed residential area which also lies in an area with a medium risk of sewer flooding. There is therefore estimated to be a cumulative impact on the sewer network risk in this area of North Tyneside.

Balliol Business Park East Sewer Network Risk - AMBER

7.5.4 *Esso*

Information provided by NWL (refer to Figure 7-3) indicates that there is a low risk of sewer flooding to the Esso employment area, indicating that there may be sufficient capacity in the existing network.

Esso Sewer Network Risk – GREEN/AMBER

7.5.5 *Tyne Tunnel Trading Estate*

Information provided by NWL indicates that there is a medium risk of sewer flooding to the Tyne Tunnel Trading Estate employment area, indicating that there may be limited capacity in the existing network.

Tyne Tunnel Trading Estate Sewer Network Risk - AMBER

7.6 **Risk Summary**

Table 7-2 and Table 7-3 summarise of the risk of sewer networks exceeding their capacity in each area given the proposed nearby developments in North Tyneside. The sites were looked at individually on a high level basis based on available qualitative data. As more details come forward regarding the proposed development then detailed modelling of the sewer network will be required to assess the impact on the sewer network on a site-by-site basis.

TABLE 7.2: SUMMARY OF SEWER RISK RATINGS - RESIDENTIAL	
Development Area	Risk due to Development
Coastal AAP	Amber
North Shields AAP	Amber
Wellfield	Amber/Red
West Chirton South	Green
Annitsford Farm (including Urban Fringe development)	Green
Whitehouse Farm	Amber
Shiremoor (including Urban Fringe development)	Amber
Scaffold Hill	Amber
Station Road	Green
East Benton Farm	Green
Wallsend AAP	Green

** Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor.*

TABLE 7.3: SUMMARY OF SEWER RISK RATINGS - EMPLOYMENT	
Development Area	Risk
Gosforth Business Park	Amber
Weetslade	Green
Balliol Business Park East	Amber
Esso	Green/Amber
Tyne Tunnel Trading Estate	Amber

8 WATER ENVIRONMENT

8.1 Introduction

This section provides the baseline for the current water environment within North Tyneside, and in particular around the potential new development areas, through undertaking 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 the WWTW identified to be discharging additional waste as a result of growth).

Any proposed developments will need to ensure that they demonstrate no deterioration of existing surface and groundwaters, through effective design of wastewater and surface drainage infrastructure and will, in combination with other measures, assist in the achievement of 'good status' or 'good potential' as required by the WFD by 2015.

8.2 Water Framework Directive (WFD)

The 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 or potential' may be delayed until 2021 or 2027. The Environment Agency is the body responsible for the implementation of the WFD in England and Wales and surveys all main waterbodies on a regular basis, in order to analyse, monitor and review the status of the waterbodies against the WFD objectives.

For surface waters, 'good status' is a statement of overall status, consisting of chemical and ecological components. 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.

Some waterbodies are designated as 'artificial' or 'heavily modified' as they are not able to achieve near natural conditions due to physical modifications e.g. for navigation or flood defence purposes. The classification of these waterbodies and the biology they support are therefore 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.

8.3 Northumbria River Basin District

The Northumbria River Basin Management Plan (RBMP) reports the classification of the waterbodies within the Northumberland Rivers and Tyne Catchments. North Tyneside's river, estuarine and coastal waterbodies are included in the Northumbria River Basin District (RBD) which covers an area of 9,029 km² and has been divided into a number of catchments. The North Tyneside study area lies within the Northumberland Rivers and Tyne catchments within the Northumbria RBD.

There are six main waterbodies in the study area (WFD status and location shown in Figure 8-1):

- Seaton Burn – assessed in the Northumberland Rivers Catchment;
- Brierdene Burn – assessed in the Northumberland Rivers Catchment;

- Wallsend Burn – assessed in the Northumberland Rivers Catchment;
- New York to North Shields Catchment – assessed in the Northumberland Rivers Catchment;
- Tyne Estuary- assessed separately; and
- Tyne and Wear – assessed separately.

All development (including all proposed development) in North Tyneside drains to the Howdon WwTW which currently discharges to the Tyne Estuary which flows out into the North Sea at North Shields.

8.4 Tyne Catchment

The River North Tyne rises in the Cheviot Hills and flows in a south and easterly direction to its confluence with the South Tyne (which rises in the north Pennines), at Warden where the rivers become the River Tyne. The River Tyne flows from Northumberland through Hexham and Corbridge then onto Prudhoe and Wylam before entering the Newcastle/Gateshead conurbation.

Several of the rivers in the Tyne catchment are recognised as having very good water quality, which supports a variety of flora and fauna including otters. The River Tyne is also considered to be one of the best salmon rivers in England.

The two groundwater bodies in the Tyne catchment both have been assessed as having poor chemical status, largely due to the history of heavy industry and mining in the area.

There are 116 river water bodies and 19 lakes in the catchment, of which 49 are artificial or heavily modified, including Kielder Water (in Northumberland) and large sections of the River Tyne. The percentages of waterbodies achieving good ecological, chemical and biological status are shown in Table 8-4.

TABLE 8-1: WFD STATUS IN TYNE CATCHMENT (SOURCE: EA NORTHUMBRIAN RBMP DECEMBER 2009)		
River and Lake Waterbodies	Current Number	Number by 2015
% At good ecological status or potential	50	57
% At good or high biological status	52	55
% At good chemical status (5 assessed)	40	40
% At good overall status (ecological and chemical)	50	56

8.4.1 Estuarine Waterbodies – Tyne Estuary

The River Tyne borders the southern boundary of the North Tyneside study area. In this location the Tyne is tidal and has therefore been classified as an estuarine waterbody within the Northumbria RBMP. Further information on the WFD classification for the Tyne Estuarine waterbody is provided in Table 8-2.

The water quality standards for transitional or tidal/estuarial waters are less well defined, 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. The WFD only sets standards for DO (Dissolved Oxygen) and N (Dissolved Inorganic Nitrogen) for transitional waterbodies.

The Tyne transitional waterbody (GB510302310200) (i.e. the Tyne Estuary) has been classified as being of ‘*moderate ecological potential*’ within the Northumbria RBMP, with biological quality being classified as ‘moderate’ and DO as ‘high’. However, the waterbody is currently failing to achieve the required chemical status.

Hydromorphological elements limit the Tyne Estuary from achieving ‘*good ecological potential*’. It is expected that by 2015 the Tyne Estuary will still be of ‘*moderate potential*’ with the aim that it will achieve ‘*good ecological potential*’ by 2027. It would be technically infeasible or disproportionately expensive for the Tyne Estuary to reach ‘*good ecological potential*’ by 2015. The Tyne Estuary is protected by the Freshwater Fish Directive, as it is a designated salmonid fishery from the North Tyne to the tidal limit. There are surface water Nitrate Vulnerable Zones (NVZ) designated under the Nitrates Directive to the north west and south west of the study area.

The requirements of the Bathing Water Directive (BWD) must also be considered, as there are designated bathing beaches present at Whitley Bay, Tynemouth Cullercoats, Tynemouth Long Sands North, Tynemouth Long Sands South, Tynemouth King Edwards Bay, South Shields and Marsden.

Any increase in wastewater discharge from Howdon WwTW as a result of proposed development within the WwTW catchment area (including North Tyneside, south Northumberland and Newcastle and Gateshead), will need to ensure that the DO status does not deteriorate from its current classification of ‘high status’.

TABLE 8-2: WFD DATA FOR TYNE ESTUARY

Water Body ID	GB510302310200
Water Body Name	Tyne
Current Ecological Potential /Status	Moderate
Current Chemical Status	Fail
Biological	Moderate
Ammonia	N/A*
Dissolved Oxygen	High
Phosphate (P)	N/A*
Applicable Directives	Bathing Water Directive. Freshwater Fish Directive. Nitrates Directive.
* N/A – does not require assessment	

8.4.2

Groundwater bodies - Tyne Carboniferous Limestone and Coal Measures

The RBMP designated one groundwater body within the study area, the Tyne Carboniferous Limestone and Coal Measures. This is currently at poor chemical quality and good quantitative quality, giving an overall status of poor. The predicted status in 2015 is poor chemical quality and good quantitative quality, giving an overall status in 2015 of poor. The waterbody is classed as being ‘at risk’, due to hazardous substances and other pollutants, thought to originate from mines.

This groundwater body is classed as a Secondary A bedrock aquifer, which are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

8.4.3 ***Coastal Waterbodies – Tyne and Wear Coastal Waterbody***

The WFD also sets targets and standards for coastal waterbodies. There is one coastal waterbody which is assessed by the WFD and falls within the Northumbria RBMP: Tyne and Wear. This waterbody has been classified as being of ‘good status’; further information on the WFD classification for the Tyne and Wear coastal waterbody is provided in Table 8-3. This waterbody is potentially at risk of being impacted by proposed development within the North Tyneside study area. It is expected that the Tyne and Wear coastal waterbody will remain as ‘good status’ for 2015.

As with the Tyne Estuary, any increase in wastewater discharge from Howdon WwTW as a result of proposed development within the WwTW catchment area (including North Tyneside, south Northumberland and Newcastle and Gateshead), will need to ensure that the status does not deteriorate from its current classification of ‘high status’.

TABLE 8-3: WFD DATA FOR TYNE AND WEAR (NORTH SEA)	
Water Body ID	GB650301500002
Water Body Name	Tyne and Wear
Current Ecological Potential /Status	Good
Current Chemical Status	Good
Biological	Good
Ammonia	Not stated
Dissolved Oxygen	High
Phosphate (P)	Not Stated
Applicable Directives	Bathing Water Directive.

8.4.4 ***Bathing Waters***

The coastline around the mouth of the Tyne has several designated Bathing Waters with the potential to be impacted by effluent discharges directly, or through the cumulative effect of several upstream discharges. It is essential that any growth does not impact on compliance with the Bathing Water Directive (BWD)³³. The key requirement of the BWD is that all bathing waters achieve ‘sufficient’ classification by 2015.

The coastline at North Tyneside has five designated bathing waters:

- Whitley Bay;
- Tynemouth Cullercoats;
- Tynemouth King Edwards Bay.

33 Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC

- Tynemouth Long Sands North; and
- Tynemouth Long Sands South.

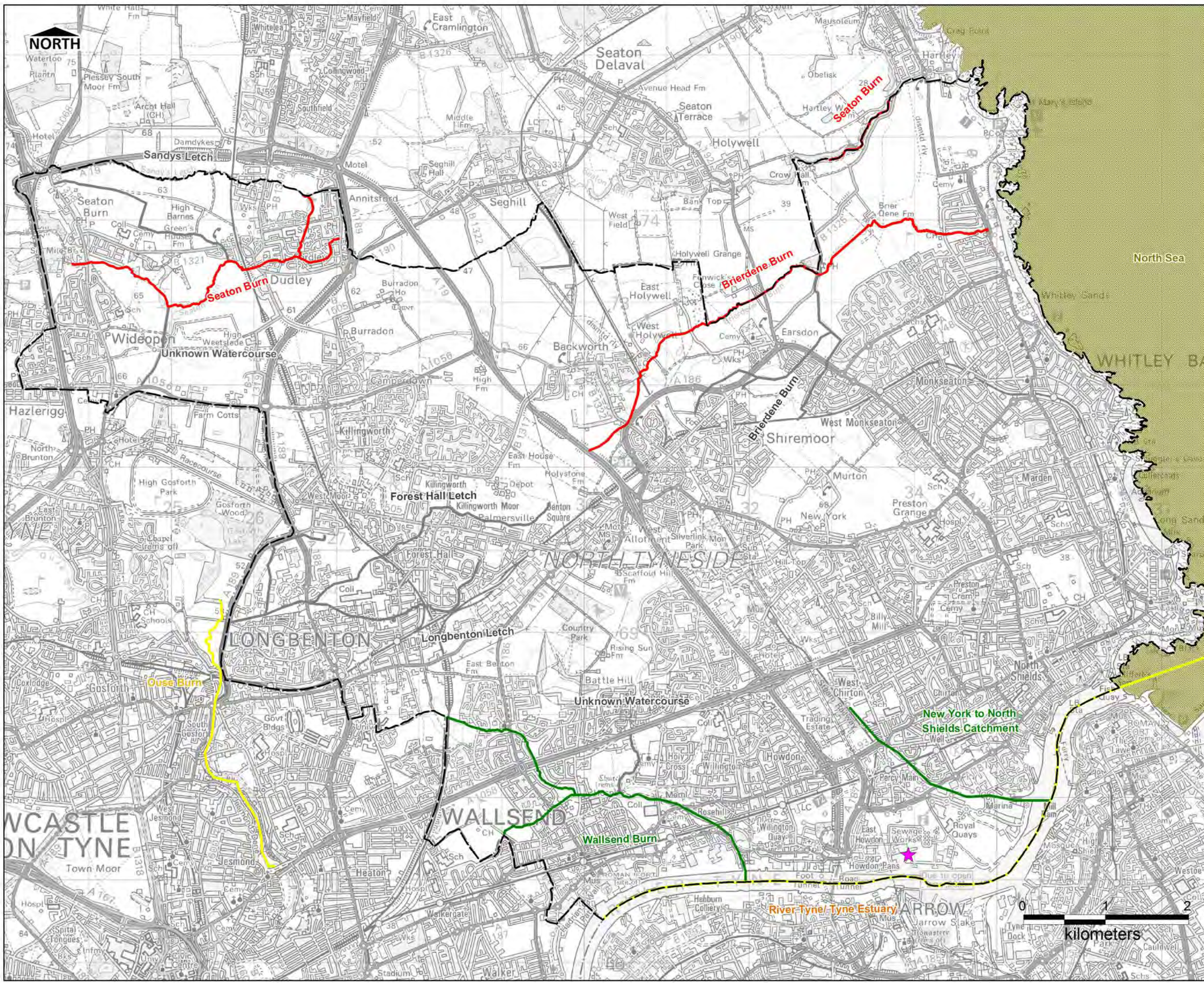
All five bathing waters complied in 2011 with the higher "Guideline" standards of 76/160/EEC and are predicted to meet at least the 'Sufficient' standards of 2006/7/EC³⁴.

The BWD measures bacterial levels within designated Bathing Waters, bacteria which may originate from discharges of treated (i.e. from STW) or untreated (i.e. storm overflows) sewage. Discharge consents do not normally have limits on the same bacteriological parameters in effluents as are measured at designated EU bathing waters and used for assessing compliance in the environment. However, WwTW and their catchments are designed to ensure that bathing waters are unaffected by both continuous and intermittent treated sewage discharges i.e. to avoid storm spills in a location or at a frequency that could cause BWD standards to be failed.

The BWD is a key directive influencing quality conditions of WwTW discharge consents (and other discharges) to the sea. In close proximity to Bathing Waters the BWD may often require high levels of treatment from WwTW and stricter controls on the permitted frequency of intermittent storm (untreated) discharges as well as the continuous quality of the discharge.

Development within a WwTW catchment area could potentially overload a combined sewer system resulting in more frequent Combined Sewer Overflow (CSO) spillages during rainfall, as there would be less capacity available. This is taken into consideration by NWL when new development proposals are considered in WwTW catchments adjacent to designated bathing waters. NWL requests that new development is served by separate foul and surface water sewers, which would limit the increases in storm spills to a certain degree, although some of the proposed development lies within or adjacent to areas of combined sewers and separation of foul and surface water may therefore not be possible.

³⁴ 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



Job Title
NORTH TYNESIDE
WATER CYCLE STUDY

Figure Title
WFD Waterbody
Classification

Legend

- Council Boundary
- Watercourse Status**
- (WFD) Poor Status
- (WFD) Moderate Potential
- (WFD) Good Status
- (WFD) Unclassified
- Coastal Waterbody**
- (WFD) Good Status
- Howdon WwTW

Notes

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Environment Agency

North Tyneside Council

URS Infrastructure & Environment UK Ltd
Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Telephone +44 (0)1246 209 221
Fax +44 (0)1246 209 229
www.ursglobal.com

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Drawing Number
Figure 8 - 1

8.5 Water Quality Baseline Summary

The Tyne transitional waterbody is currently classified as being at '*moderate ecological potential*', due to its moderate biological quality (a sub-component of the overall classification). However, the general physico chemical quality (another sub-component of the overall classification) shows the DO levels within the Tyne Estuary to be at 'high potential'. This therefore places more stringent constraints on increased discharge from the Howdon WwTW, as no reduction in DO classification, such as could result from an increased discharge of BOD, would be permitted under the WFD. The Tyne and Wear coastal waterbody is currently of '*good ecological status*' with a 'high status' for DO

Where any future increase in the discharge volume from Howden WwTW is likely, as a result of the proposed development, measures will need to be taken to ensure that there is no deterioration in DO levels within the Tyne transitional waterbody.

Future water quality within the North Tyneside study area 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 future development:

- There is no deterioration in the current water quality status; and
- There is no prevention to the future achievement of 'good status or potential' within the waterbodies.

The Northumbria RBMP identifies the following proposed actions for addressing failing waterbodies in the river catchments in North Tyneside:

- Address land management issues;
- Identify diffuse pollution from urban, agricultural, coal and metal mining sources;
- Target pollution prevention campaigns;
- Tackle barriers to fish migration e.g. by removing artificial obstructions of the River Tyne; and
- Encourage the use of SuDS.

Any proposed development in the study area should consider these objectives and, where possible, work towards improving the existing water environment through, for example, the use of SuDS within all developments.

Howdon WwTW has been assessed by NWL to have sufficient volumetric capacity within its current discharge consent limits to treat the additional flow from the proposed growth without requiring a variation to the consent (see Section 7). However, issues have been identified by NWL relating to the proportion of the flow treated at Howdon WwTW which is made up of surface water. Assuming the planned investigations into this issue are carried out, including flow monitoring and SuDS feasibility studies, it may be that additional capacity at the works could be freed up. However, as a precautionary approach pending the outcomes of these investigations, the potential impacts on the waterbodies hydrologically linked to the proposed development sites (Tyne Estuary and Tyne and Wear coastal waterbody) are considered to be at medium risk (Table 8-4).

TABLE 8-4: SUMMARY TABLE OF RISK RATINGS TO THE WATER ENVIRONMENT FROM PROPOSED DEVELOPMENT

Development Area	Risk
Coastal AAP	Amber
North Shields AAP	Amber
Wellfield	Amber
West Chirton South	Amber
Annitsford Farm* (including Urban Fringe)	Amber
Whitehouse Farm	Amber
Shiremoor West (North)* (including Urban Fringe)	Amber
Shiremoor West (South)	Amber
Scaffold Hill	Amber
Station Road East	Amber
Station Road West	Amber
East Benton Farm	Amber
Wallsend AAP	Amber
All Employment	Amber

* Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor and it is therefore assumed that these developments drain to the either Sandy's Letch or Brierdene Burn.

8.6 Green Infrastructure

Green Infrastructure (GI) 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 GI at all stages of a WCS, as it plays a key role in the sustainable management of water.

The GI strategy for North Tyneside sets out the vision for GI development and enhancement in North Tyneside over the next 15 years. The strategy includes the following key planning principles that should be applied to all new development:

- All new development and redevelopment schemes should make a significant contribution to the county's GI network and should fully integrate into the surrounding landscape whilst providing links to existing communities and contributing to predicted climate change.;
- Development and regeneration proposals should 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 should 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 North Tyneside such as by the usage of green roofs and other innovative solutions, upon new and existing buildings, particularly sites within wildlife corridors;
- Use should 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 GI;

- 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 strategy by identifying any new or upgraded infrastructure requirements and flood / surface water management requirements.

9 ECOLOGY AND BIODIVERSITY

9.1 Introduction

The Ecology and Biodiversity assessment includes a review of the designated conservation sites that could be impacted by potential new development in the identified growth areas of North Tyneside.

This chapter identifies and reviews any water dependent sites within and linked to North Tyneside and assesses whether abstraction for the public water supply or increased discharge from WwTWs associated with the proposed development within North Tyneside 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 2007³⁵. 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 RSS³⁶ (either alone or in combination with other plans or projects) might influence key ecological processes and functions³⁷ or exacerbate any existing adverse trends.

9.2 Background

North Tyneside and the surrounding area has a number of European designated conservation sites which are designated in order to protect Europe's rare and endangered habitats and species. These have the potential to be affected by development within North Tyneside; in particular those sites located along the coastline could be affected.

There are also a number of nationally and locally designated conservation sites located in North Tyneside which could potentially be impacted by development. A number of these are designated for habitats or species that are water dependent and therefore could be impacted by changes in discharges or abstractions. The main potential sources of effects relating to water as identified in the AA of the RSS are as follows:

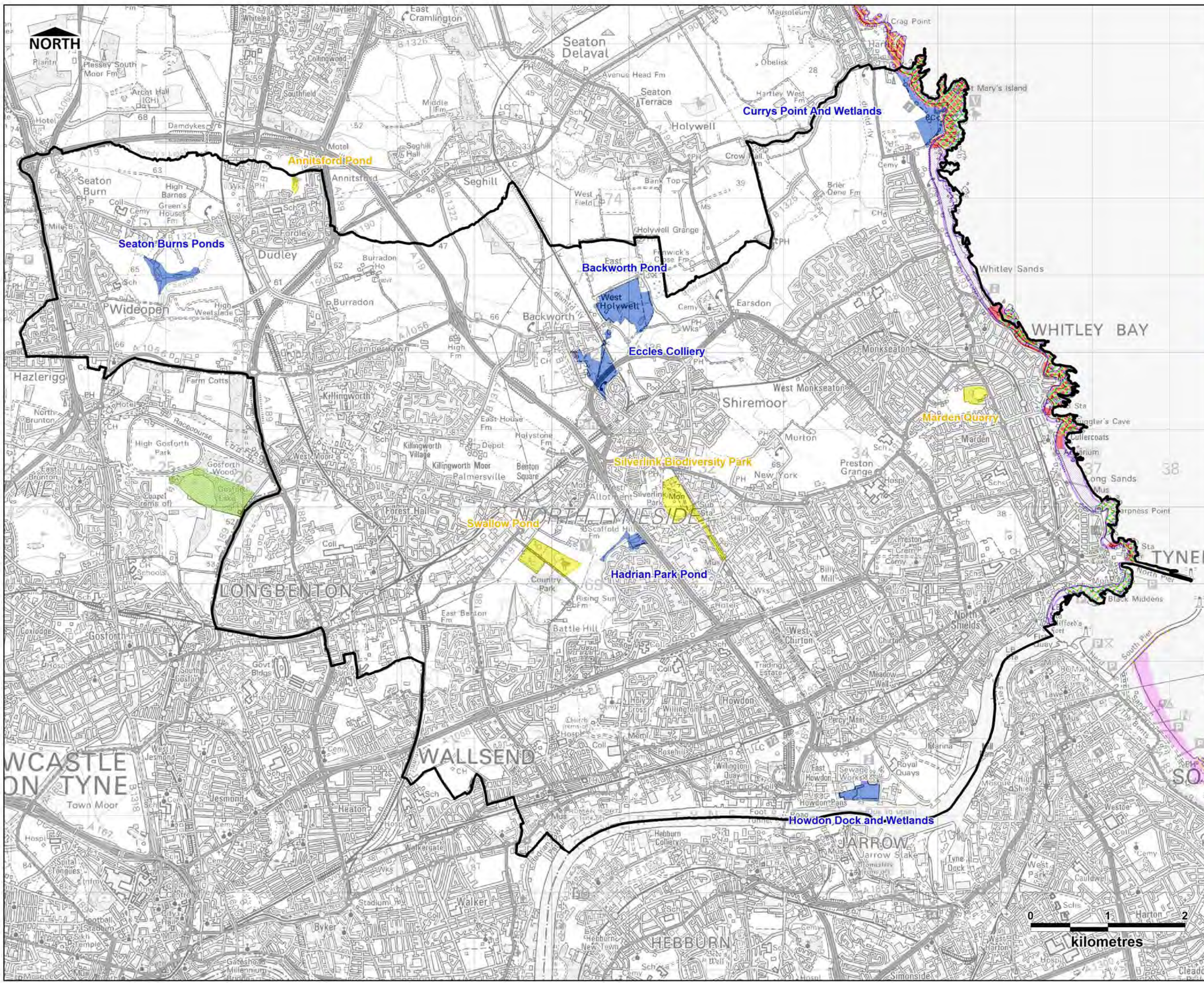
- The promotion of development in coastal districts and the growth of ports which may affect the ability of certain intertidal habitats to migrate naturally landward as sea level rises;
- The drawdown of water levels as a result of excessive abstraction;
- Hyper-nutrication resulting from increased phosphorus (in freshwater systems) and nitrogen (in marine systems) due to the increase in WwTW discharges (as a result of the increase in housing) which can lead to eutrophication and localised changes in scour patterns if WwTW discharge volumes increase significantly; and

³⁵ 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

³⁶ 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.

³⁷ 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.)".

- Development of housing and an increase in hard standing areas which may affect water quality at European sites through contamination by toxic substances.



Job Title
NORTH TYNESIDE
WATER CYCLE STUDY

Figure Title
Ecological Sites with
Aquatic Ecology Component

Legend

- Council Boundary
- International Site (Northumbria Coast)
 - Ramsar
 - SPA
- National Site (SSSI)
 - Northumberland Shore
 - Tynemouth to Seaton Sluice
 - Durham Coast
 - Gosforth Park
- Local Designated Site
 - LWS
 - LNR

Notes

LWSs illustrated include only those with an aquatic ecology component relative to this study.

SLCIs are not included on this map. No detailed information regarding the SLCIs was made available for this study.

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Drawing Status
FINAL

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By	Date	Suffix	
Job Number	Scale @ A3	As shown	
Drawn	Approved	AW	
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		CHESTFLD	APR 2013

URS Infrastructure & Environment UK Ltd
 Royal Court
 Basal Close, Chesterfield
 Derbyshire, S41 7SL
 Telephone +44 (0)1246 209 221
 Fax +44 (0)1246 209 229
 www.ursglobal.com

URS

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Drawing Number
Revision

Figure 9-1

Figure 9-1 shows the distribution of designated conservation sites across North Tyneside.

9.3 Objectives and Approach

There is no statutory requirement for a WCS to be subject to Habitat Regulations Assessment (HRA)/AA 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 conservation sites that are located within the WCS study area. Additionally, sites outside the study area that may be affected by the planned growth (e.g. by increases in abstraction or discharge through identified pathways³⁸) 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 AA 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 (see below). The ultimate aim of AA 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.

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, HRA is used to refer to the overall procedure required by the Conservation of Habitats and Species Regulations 2010.

Habitats Directive 1992

Article 6 (3) states that:

“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.”

Conservation of Habitats and Species Regulations 2010

The regulations state that:

“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”.

“... 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”.

³⁸ 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:

9.3.2 ***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’ AA 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.

9.3.3 ***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 Environmental 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 Environmental Impact Assessment, compensation for significant adverse effects (i.e. creation of alternative habitat) is not permitted at the AA stage.

9.3.4 ***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.

9.3.5 ***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 designated site. While the AA of the North Tyneside LDF CS is the place to consider wider issues such as recreational pressure and coastal squeeze where relevant, 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.

9.3.6 ***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 North Tyneside including Sites of Special Scientific Interest (SSSIs) and locally designated sites. 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 EA's RoC assessments and potential for future impact based upon any need for relevant WwTWs to increase their consented discharge volumes. Since the EA's RoC work will have already analysed the impact of consented abstraction/discharge volumes, it is assumed in this analysis that WwTWs that do not need to exceed their consented volumes will have already been fully considered in the RoC process.

9.3.7 ***Other Projects and Plans***

The other projects and plans that will need consideration in combination with the impacts of development within North Tyneside 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 North Tyneside 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 North Tyneside. Therefore the WCS only identifies other potential sources of impact, which are not discussed in this analysis further.

9.4 **Proximity to Sensitive Designated/Protected Sites**

9.4.1 ***Internationally Designated Sites***

Considering the pathways above, it is determined that the Northumbria Coast Special Protection Area (SPA) and Ramsar site, which is linked via the Tyne downstream of the Howdon WwTW, may be linked to impacts associated with abstraction or wastewater discharge as a result of the development of housing in North Tyneside. Further information regarding the Northumbria Coast is shown in Table 9-2.

TABLE 9-2: NORTHUMBRIA COAST SPA RAMSAR

Features/Reason for Designation	Key Factors to Maintain Integrity
<ul style="list-style-type: none"> • 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"> • Maintenance and appropriate management of the protected habitats and a good environmental quality to support the internationally important bird species. • Control of disturbance to nesting/resting habitat for bird species.

9.4.2 ***Nationally Designated Sites***

Considering the pathways above, it is determined that the Durham Coast SSSI, the Northumberland Shore SSSI and the Tynemouth to Seaton Sluice SSSI, which are also linked via the Tyne downstream of the Howdon WwTW, may be subject to impacts associated with

abstraction or wastewater discharge as a result of the development of housing in North Tyneside. Gosforth Park SSSI is located on the western border of North Tyneside and is designated for its important aquatic ecology component and thus has the potential to be impacted by the proposed development in North Tyneside. Further information regarding the SSSIs is shown in Table 9-3.

TABLE 9-3: SITES OF SPECIAL SCIENTIFIC INTEREST IN NORTH TYNESIDE		
Name of SSSI	Features/Reason for Designation	Key Factors to Maintain Integrity
Durham Coast	<ul style="list-style-type: none"> • Unique flora and fauna including paramaritime magnesium limestone vegetation to the British Isles. • Supports a variety of nationally important wintering shore birds. 	<ul style="list-style-type: none"> • Maintenance and appropriate management of the protected habitats. • Control of disturbance to nesting/resting habitat for nationally important wintering bird species. • Protection of natural flushing and other natural processes which produce the unique internationally important landscape.
Northumberland Shore	<ul style="list-style-type: none"> • Supports international and nationally important bird species (purple sandpiper, turnstone, sanderling, golden plover, ringed plover and redshank). 	<ul style="list-style-type: none"> • Maintenance and appropriate management of the protected habitats. • Control of disturbance to nesting/resting habitat for nationally important wintering bird species.
Tynemouth to Seaton Sluice	<ul style="list-style-type: none"> • Nationally important geology. • Supports nationally important knot, ringed plover and golden plover bird species. 	<ul style="list-style-type: none"> • Maintenance and appropriate management of the protected habitats. • Control of disturbance to nesting/resting habitat for nationally important wintering bird species.
Gosforth Park	<ul style="list-style-type: none"> • Important for aquatic, grassland and woodland invertebrate fauna. • Supports nationally rare <i>Triplax scutellaris</i> (beetle) and <i>Adrena alfkenella</i> (bee). 	<ul style="list-style-type: none"> • Maintain fen marsh and swamp area in favourable condition. • Maintenance of habitat for rare species

9.4.3 ***Locally Designated Sites***

Not including those that overlap with the International or National sites discussed in this report there are four local nature reserves (LNR) located within North Tyneside which have an aquatic ecology component. There are also 28 non-statutory local wildlife sites (LWS) within the North Tyneside Study Area of which 6 have an aquatic ecology component and thus have the potential to be impacted by development within North Tyneside. Further information regarding the local sites is shown in Table 9-4.

TABLE 9-4: LOCALLY (AQUATIC ECOLOGY) DESIGNATED SITES

Site	Type of Local Designation	Approximate Distance from Development	Aquatic Ecology Features
Annitsford Pond	LNR	Directly East of Annitsford Farm	A large subsidence pond which is important locally for breeding pochard.
Marden Quarry	LNR	0.5 km West of Coastal AAP	A range of habitats including a large wildfowl lake.
Silverlink Biodiversity Wildlife Park	LNR	0.3 km East of Scaffold Hill	A series of ponds, which support protected great crested newts. The site also incorporates a wetland.
Swallow Pond	LNR	0.5 km West of Scaffold Hill	A large subsidence pond which is locally important for wildfowl and wading birds
Howden Dock & Wetlands	LWS	1.0 km West of Wallsend AAP Adjacent to Howdon WwTW Adjacent to Esso	Wetland nature reserve, which supports an assemblage of wildfowl.
Currys Point and Wetlands	LWS	Directly West of Coastal AAP	Wetland nature reserve, which supports an assemblage of wildfowl.
Backworth Pond	LWS	1.3 km North of Shiremoor West (North and South)	Mosaic of habitats that support a variety of rare and scare wildfowl.
Eccles Colliery	LWS	0.2 km East of Shiremoor West (North and South)	Mosaic of habitats that support a variety of rare and scare wildfowl.
Seaton Burns Ponds	LWS	1.8 km West of Annitsford Farm	Various ponds of various sizes.
Hadrian Park Pond	LWS	0.3 km South of Scaffold Hill	A medium sized pond.

There are a number of Sites of Local Conservation Interest (SLCI) in North Tyneside of which some may have aquatic ecology features. Due to the lack of information these sites have not been considered further at the outline stage. Should further information be made available about these sites then they should be considered further at the Detailed stage of the WCS or as part of planning applications for the proposed developments.

9.5 Screening Assessment – International/National Sites

9.5.1 *Water Quality*

Any new development in North Tyneside is most likely to discharge treated effluent to the River Tyne via the Howdon WwTW which ultimately drains into the Northumbria Coast and Durham Coast, which are located approximately 3 km downstream of the WwTW.

The most likely possible effects that require consideration are therefore:

- Increased phosphorus load (and potentially concentration), coupled with an increase in total oxidized nitrogen, potential lowering of dissolved oxygen for a stretch and an increase in biological oxygen demand and nitrogen for a given distance;
- Potential increase in velocity and levels, notable at lower to normal flows for a distance downstream as a result of the additional wastewater volumes entering the river.

According to the EA's Northumbria Coast RoC, Little Tern, Purple Sandpiper and Turnstone are all identified as being at risk from nutrient enrichment; the main mechanism for this adverse effect was thought to be the cumulative contribution of nitrogen from sewage discharges and other sources. Elevated nutrient concentrations can affect the habitats used by

the birds and their food across wide areas. The modelled nitrogen areas are already higher than the threshold concentration in many areas with some regulated discharges in coastal areas, near to the SPA contributing more than 10% of the nitrogen threshold. There was however no evidence of an adverse ecological effect on the SPA due to elevated nitrogen levels and thus at present the water quality discharges do not have an adverse effect on the integrity of the SPA alone.

It is considered that the Northumbria Coast, Northumberland Shore, Tynemouth to Seaton Sluice and Durham Coast are not vulnerable to adverse effects as a result of an increase in nutrients in the Tyne Estuary (due to an increased volume of effluent being discharged into the Estuary from the Howdon WwTW as a result of the increased number of dwellings) that will result from proposed development in North Tyneside. The dilution capacity of the Tyne is likely to prevent any impact on the integrity and the statutory designation requirements of the three international/national important sites and therefore do not require further investigation as part of this WCS. Finally, it has been established that while the discharge from Howdon WwTW may increase beyond current levels it is likely to remain within the limits of the current consent and as such, impacts on international/national sites and any necessary remedial measures will have been covered through the EA's RoC process.

It is proposed that development will take place along the Northumbria Coast adjacent to the protected site. This development could potentially impact the site during construction via fuel/oil spillages, sediment runoff etc. or during operation via cross connections.

Construction in the vicinity of Gosforth Park could pose a number of potential risks to the aquatic ecology components of the site. Such threats include fuel leakages, soil erosion, contaminated water spillages and accidental pollution spillages. However, this should be fully assessed during the detailed design and planning application process for the individual developments.

9.5.2 ***Sediment Regimes***

Increased volumes of effluent being discharged to the River Tyne 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 Howdon WwTW outfall and will have already been covered through the EA RoC process as necessary since the increased volume will still be within the consented volume limits. This issue does not therefore require further investigation as part of this WCS unless proposals to increase the consented discharge volumes are developed.

9.5.3 ***Water Resources***

The potable water for North Tyneside is currently supplied from Kielder Reservoir. At present there is a large space capacity due to the historically high concentration of industries that required high water demand and it is believed that the increased demand due to proposed new development in North Tyneside will only account for approximately 3.07% of the NWL water surplus.

The existing spare capacity in these consents, which may be required to serve the new development proposed in North Tyneside, has already been evaluated for its potential to result in adverse effects on European sites through the EA's RoC process (which always assesses the full licensed volume irrespective of whether the current actual volume is lower). Since there is such a large surplus there are no abstraction requirements planned in North Tyneside and there will be no adverse effects on the international/national sites and therefore do not need further consideration as part of this WCS.

9.5.4 *Conclusion*

While North Tyneside 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 EA's RoC process. It has therefore been possible to conclude that there is no requirement to consider impacts the impacts of water resources on international/national sites any further in this WCS.

However, there may be a requirement for further investigation to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

9.6 **Screening Assessment – Local Sites**

9.6.1 *Water Quality*

There are four statutory and six non-statutory hydrologically sensitive LWSs located within North Tyneside.

Of the four statutory and the six non-statutory LWSs in North Tyneside, which are hydrologically sensitive, only one (Howdon Dock and Wetlands LWS) is connected to the Tyne Estuary into which effluent will be discharged. Although the site is located upstream of the WwTW outfall, the Tyne Estuary is tidally influenced and thus the effects of the extra discharge could carry upstream on a flood tide to the Howden Dock and Wetlands LWS.

Construction at sites within North Tyneside could to pose a number of potential risks to waterbodies in the vicinity of the proposed housing developments. Such threats include fuel leakages, soil erosion, contaminated water spillages and accidental pollution spillages. However, this should be fully assessed during the detailed design and planning application process for the individual developments.

The local sites which are considered to be potentially at risk from construction are Annitsford Pond, Curry's Point and Wetlands, Marden Quarry, Silverlink Biodiversity Wildlife Park, Swallow Pond, Eccles Colliery and Hadrian Park Pond as all these sites lie approximately within 500m of a development site Therefore the risk to these sites should be discussed further at the site specific planning stage for the individual developments.

9.6.2 *Water Resources*

The main risk to the LWSs within North Tyneside that have an aquatic ecology component is drawdown from abstraction. There is only one licensed groundwater abstraction and the current groundwater spare capacity for North Tyneside is 5.1 mld⁻¹ (Table 5-2).

There will be no additional groundwater abstraction for public water supply for the proposed new development in North Tyneside and therefore as the current spare capacity for groundwater availability is so high the LWSs are not considered to be at risk from drawdown.

9.6.3 *Conclusion*

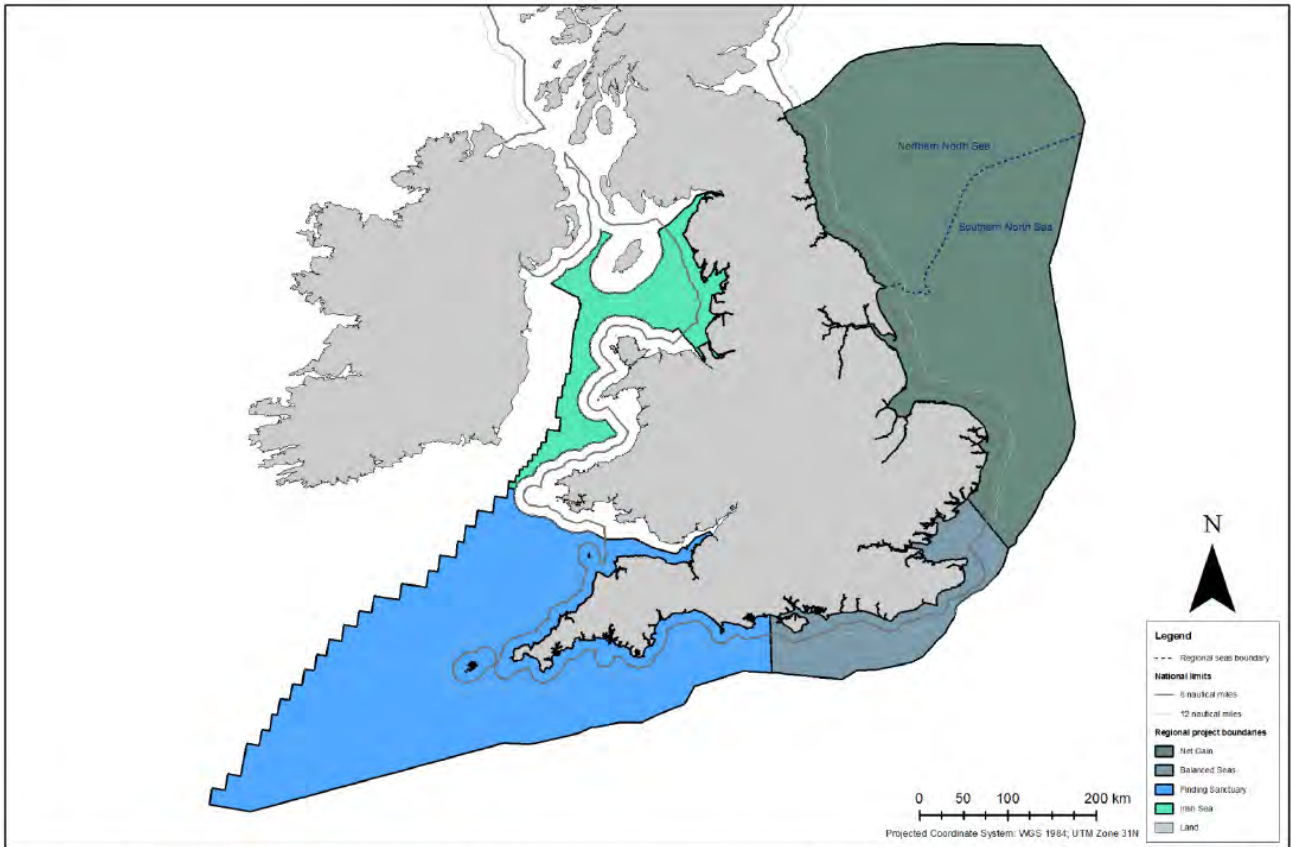
It is therefore considered that impacts on the LWSs mentioned above (including those associated with the construction of the development sites) do not require further investigation in the WCS and should be further investigated at the site specific planning stage for the individual developments.

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. Full designation of the MCZs is not expected to be until 2013. The Net Gain Regional MCZ Project area encompasses the part of the North Sea which is located next to North Tyneside (Figure 9-2). At present there is one proposed MCZ which could potentially be impacted by proposed development in North Tyneside (Figure 9-3 and Table 9-5). There are a number of other MCZs located in proximity to North Tyneside 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.

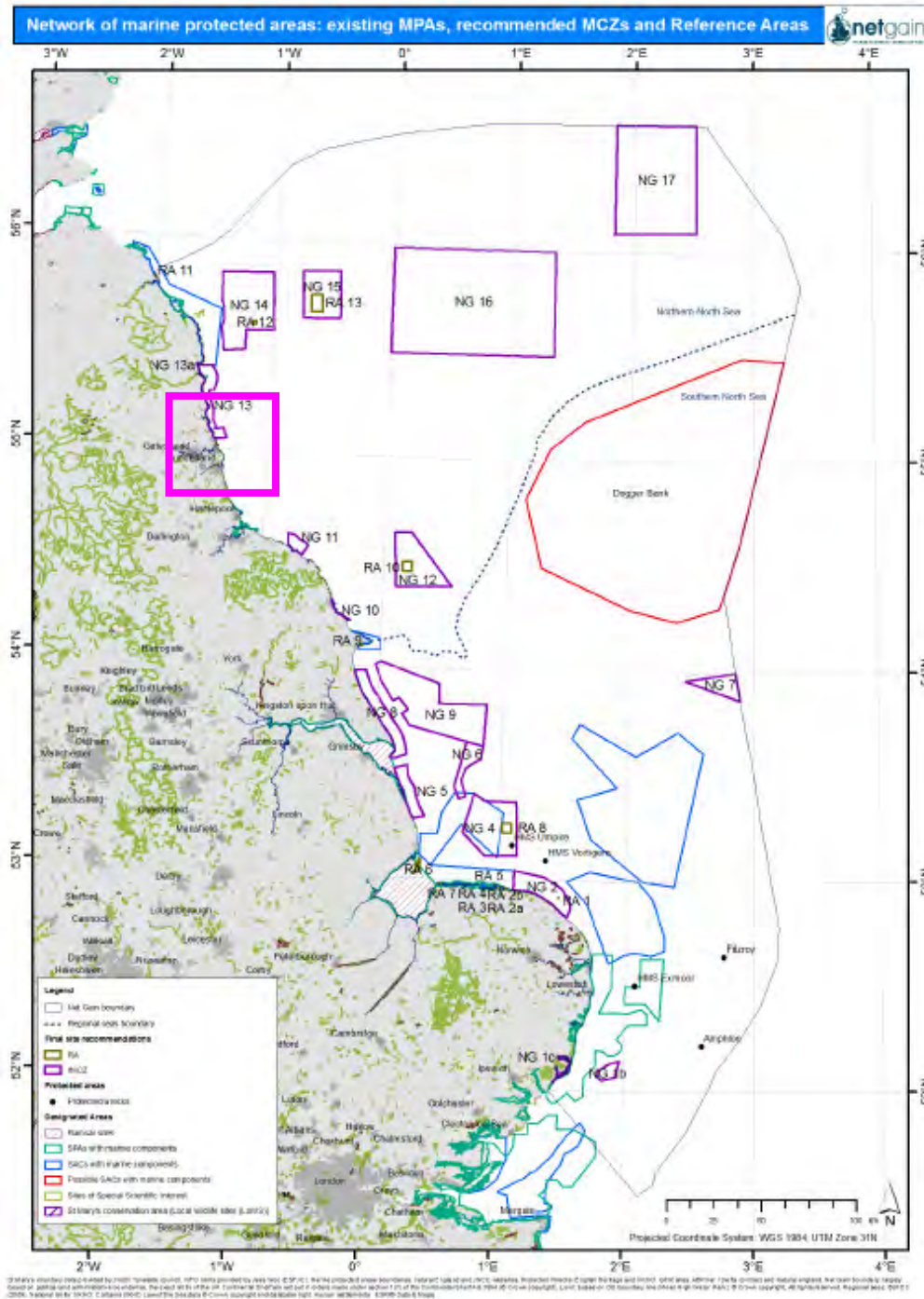
Source: Net Gain Final Recommendations – Submission to NE and JNCC Document³⁹

TABLE 9-5: SUMMARY OF MCZ WHICH COULD POTENTIALLY BE IMPACTED BY PROPOSED DEVELOPMENT IN NORTH TYNESIDE

Site ID	Site Name	Important Features
NG13	Coquet to St Mary's	<ul style="list-style-type: none"> 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.

³⁹ <http://www.netgainmcz.org>, (August 2011); Net Gain Final Recommendations – Submission to NE and JNCC

Figure 9-3: Location of MCZs which could potentially be impacted by Development (refer to thick pink box)



Source: Net Gain Final Recommendations – Submission to NE and JNCC Document⁴⁰

Table 9-5 shows the important features of the Coquet to St Marys MCZ located downstream of the Howdon WwTW that may potentially need to exceed consented discharge volume in the

⁴⁰ <http://www.netgainmcz.org>, (August 2011); Net Gain Final Recommendations – Submission to NE and JNCC

future to accommodate the planned levels of housing in North Tyneside. Further investigation will be required during any Detailed WCS, but provided that the Howdon WwTW complies with the policy of ‘no deterioration downstream’ there should be no likely significant effect from delivery of the proposed development in North Tyneside on the Coquet to St Marys MCZ.

9.8 Coastal Waters and Eutrophication

As the RoC process for the Northumbria Coast SPA has identified, hyper-nutrication 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 the Howdon WwTW should prevent an adverse effect as a result of the proposed development in North Tyneside. Further investigations should be undertaken at the Detailed stage of the WCS once more accurate information regarding potential development is available.

9.9 Summary

Tables 9-6 and 9-7 provide a summary of the risk ratings to the International, National and Local Ecological sites presented by the proposed development and employment areas in North Tyneside. The risks associated with the LWSs relate to impacts from construction and this should be explored further as part of planning applications for the associated developments.

TABLE 9-6: SUMMARY OF RISK RATINGS TO INTERNATIONAL, NATIONAL AND LOCAL ECOLOGICAL SITES FROM POTENTIAL DEVELOPMENT AREAS

Development Area	Risk to International/ National/Local Sites
Coastal	Green
North Shields	Green
Wellfield	Green
West Chirton South	Green
Annitsford Farm (including Urban Fringe development)	Green
Whitehouse Farm	Green
Shiremoor West (North) (including Urban Fringe development)	Green
Shiremoor West (South)	Green
Scaffold Hill	Green
Station Road East	Green
Station Road West	Green
East Benton Farm	Green
Wallsend	Green

* Due to the location of development in the Urban Fringe area the proposed residential figures have been split equally between Annitsford Farm and Shiremoor and it is therefore assumed that these developments drain to the either Sandy’s Letch or Brierdene Burn.

TABLE 9-7: SUMMARY OF RISK RATINGS TO INTERNATIONAL, NATIONAL AND LOCAL ECOLOGICAL SITES FROM POTENTIAL EMPLOYMENT AREAS

Development Area	Risk to International/National/Local Sites
Gosforth Business Park	Green
Weetslade	Green
Balliol Business Park East	Green
Esso	Green
Tyne Tunnel Trading Estate	Green

KEY DEVELOPMENT AREA ASSESSMENTS

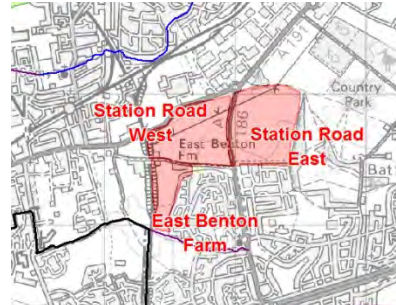
An assessment has been undertaken for each of the key development areas and AAPs based on the findings of the flood risk, water environment, water resources and wastewater assessments undertaken in Section 5 to Section 9. It is important to note that a colour coding of red does not mean that the proposed development cannot take place within the key development area, 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.

Table 2-2 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.

The key development area assessments are provided in Section 10.1 to Section 10.13 and the key employment assessments are provided in Section 10.14. A summary of the findings of these assessments is presented in Table 10-1.

10.1 Station Road East

650 new dwellings are proposed within the Station Road East area during the LDF period.



10.1.1 Flood Risk

Flood risk is not considered to be a constraint to development across Station Road East, but careful management of surface water runoff in particular, and the use of SuDS will be necessary to prevent flood risk becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

10.1.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourses (Longbenton Letch or Wallsend Burn), which are outside of the boundary of the site. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.1.3 Ecology and Biodiversity

The development proposed at Station Road East presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.1.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

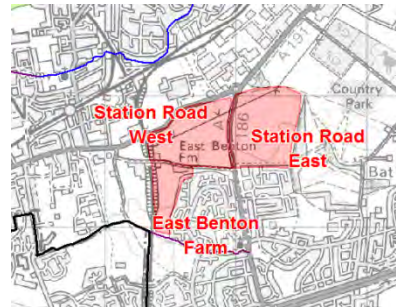
10.1.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes within the Station Road East area for future capacity. However, information provided by NWL has confirmed that there is a low risk of sewer flooding across the proposed development site, indicating that there may be sufficient capacity in the existing network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within Station Road East will drain to Howdon WwTW, flowing south through Wallsend and then east to Howdon. Refer to Howdon WwTW Position Statement in Appendix A.

10.2 Station Road West

560 new dwellings are proposed within the Station Road West area during the LDF period.



10.2.1 Flood Risk

Flood risk is not considered to be a constraint to development across Station Road West, but careful management of surface water runoff in particular, and the use of SuDS will be necessary to prevent flood risk becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

10.2.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourses (Longbenton Letch or Wallsend Burn), which are outside of the boundary of the site. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.2.3 Ecology and Biodiversity

The development proposed at Station Road West presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.2.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

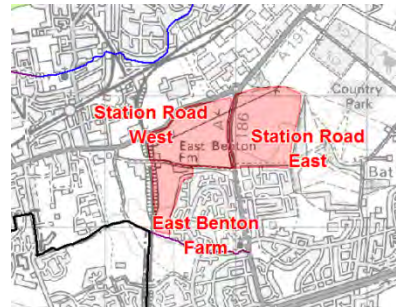
10.2.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Station Road West area for future capacity. However, information provided by NWL has confirmed that there is a low risk of sewer flooding across the proposed development land, indicating that there may be sufficient capacity in the existing network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within Station Road West will drain to Howdon WwTW, flowing south through Wallsend and then east to Howdon.

10.3 East Benton Farm

50 new dwellings are proposed within the East Benton Farm area during the LDF period.



10.3.1 Flood Risk

Flood risk is not considered to be a constraint to development across East Benton Farm, but careful management of surface water runoff from the proposed new development, and the appropriate use of SuDS will be necessary to prevent flood risk becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, with the upper reaches of Wallsend Burn running along the southern boundary of the site.

10.3.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the upper reaches of Wallsend Burn, which runs along the southern boundary of the site. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.3.3 Ecology and Biodiversity

The development proposed at East Benton Farm presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.3.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

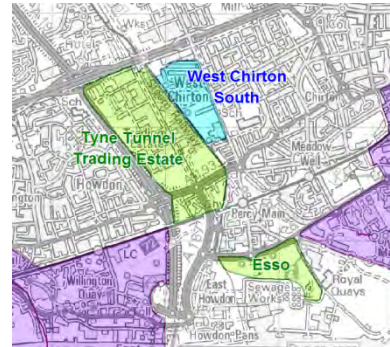
10.3.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the East Benton Farm area for future capacity. However, information provided by NWL has confirmed that there is a low risk of sewer flooding across the proposed development land, indicating that there may be sufficient capacity in the existing network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within East Benton Farm will drain to Howdon WwTW, flowing south through Wallsend and then east to Howdon.

10.4 West Chirton South

420 new dwellings are proposed within the West Chirton South area during the LDF period. It is also proposed that an employment site will be developed in the same area.



10.4.1 Flood Risk

The West Chirton development area lies in an area at Very High groundwater flooding susceptibility and should be considered further. With careful planning, flood risk from groundwater may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

10.4.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourse, where practicable. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.4.3 Ecology and Biodiversity

The development proposed at West Chirton presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.4.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.4.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the West Chirton area for future capacity. However, information provided by NWL has confirmed that there is a low risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be sufficient capacity in the existing network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within West Chirton will drain south directly to Howdon WwTW.

10.5 Whitehouse Farm

268 new dwellings are proposed within the Whitehouse Farm area during the LDF period.



10.5.1 Flood Risk

The Whitehouse Farm development area lies in an area at High to Very High groundwater flooding susceptibility and should be considered further. With careful planning, flood risk from groundwater may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

10.5.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

10.5.3 Ecology and Biodiversity

The development proposed at Whitehouse Farm presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.5.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

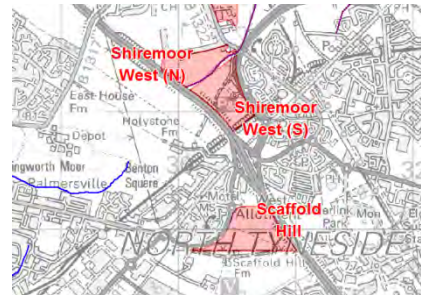
10.5.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Whitehouse Farm area for future capacity. However, information provided by NWL has confirmed that there is a medium risk of sewer flooding across the full area in and around the proposed development land, indicating that there may be insufficient capacity in the existing network.

WwTW - all proposed development within Whitehouse Farm will drain to Howdon WwTW, flowing south through Longbenton and then eastern fringes of Newcastle, before flowing east through Wallsend to Howdon.

10.6 Scaffold Hill

450 new dwellings are proposed within the Scaffold Hill area during the LDF period.



10.6.1 Flood Risk

There is a Moderate to High risk of groundwater flooding susceptibility to the Scaffold Hill development area and this should be considered in more detail. With careful planning, flood risk from groundwater may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the use of SuDS will be necessary to prevent surface water flood risk potentially becoming an issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

10.6.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourse, where practicable. The proposed use of

attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.6.3 Ecology and Biodiversity

The development proposed within Scaffold Hill presents no risk to international, or nationally designated ecological sites. LWSs within the periphery of the site could potentially be at risk if development were to be located in close proximity to them.

Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.6.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

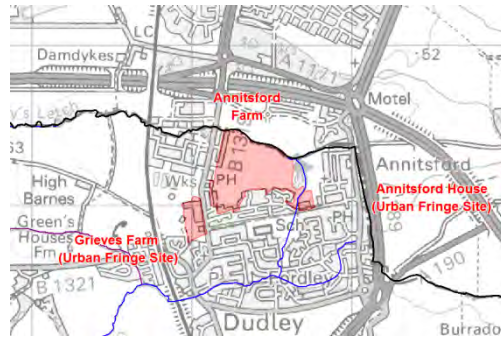
10.6.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Scaffold Hill area for future capacity. However, information provided by NWL has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be insufficient capacity in the existing network.

WwTW - all proposed development within Scaffold Hill will drain to Howdon WwTW, flowing west to Longbenton and then south into Wallsend and east towards Howdon.

10.7 Annitsford Farm

400 new dwellings are proposed within the Annitsford Farm area during the LDF period. In addition there are 61 new dwellings proposed from the Urban Fringe development area, situated in two areas to the south-east and south-west of Annitsford Farm. (The proposed new dwellings for the Urban Fringe development area have been split equally between Shiremoor and Annitsford Farm).



10.7.1 Flood Risk

The south-east section of Annitsford Farm lies in Flood Zone 2 and 3. The site lies in an area at High/Very High groundwater flooding susceptibility and this should be considered further. Careful planning design encouraging development to areas of the site at a low risk of flooding and the management of surface water runoff from the proposed new development with the appropriate use of SuDS will be necessary to prevent flood risk becoming an issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, with Seaton Burn flowing along the eastern boundary of the site.

10.7.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD

'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to Seaton Burn, which flows to the east of the site. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.7.3 Ecology and Biodiversity

The development proposed within Annitsford Farm presents no risk to international, or nationally designated ecological sites. LWSs within the periphery of the site could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.7.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.7.5 Wastewater

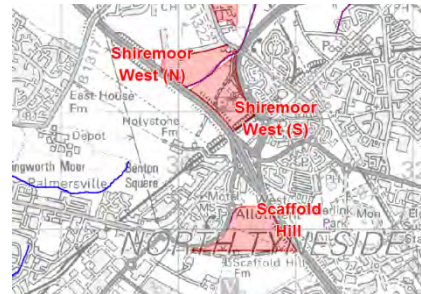
Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Annitsford Farm area for future capacity. However,

information provided by NWL has confirmed that there is a low risk of sewer flooding across the proposed development land, indicating that there may be sufficient capacity in the network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within the Annitsford Farm development area will drain to Howdon WwTW, flowing south through Dudley and Killingworth and Forest Hall towards Wallsend and then east to Howdon.

10.8 Shiremoor West (South)

370 new dwellings are proposed within the Shiremoor West (South) area during the LDF period.



10.8.1 Flood Risk

Shiremoor West (South) lies in an area at High to Very High groundwater flooding susceptibility and this should be considered in more detail. With careful planning, flood risk from groundwater may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, which in this instance is the upper reaches Brierdene Burn.

10.8.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

10.8.3 Ecology and Biodiversity

The development proposed within Shiremoor West (South) presents no risk to international, or nationally designated ecological sites. LWSs within the periphery of the site could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.8.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

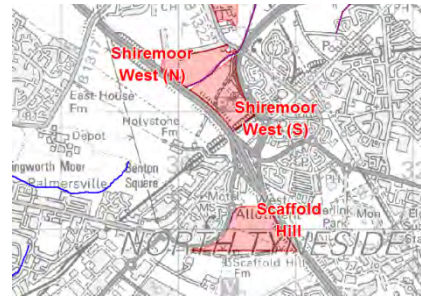
10.8.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Shiremoor area for future capacity. However, information provided by NWL has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be limited capacity in the existing network.

WwTW - all proposed development within the Shiremoor West (South) development area will drain to Howdon WwTW, flowing north east through Shiremoor and Monkseaton, then south to North Shields and south west to Howdon.

10.9 Shiremoor West (North)

260 new dwellings are proposed within the Shiremoor West (North) area during the LDF period. In addition there are 60 new dwellings proposed from the Urban Fringe development area, situated just to the north-east of Shiremoor. The proposed new dwellings for the Urban Fringe development area have been split equally between Shiremoor and Annitsford Farm.



10.9.1 Flood Risk

Shiremoor West (North) lies in an area at High to Very High groundwater flooding susceptibility. With careful planning, flood risk from groundwater may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, which in this instance is the upper reaches of Brierdene Burn.

10.9.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically

linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to Brierdene Burn, the upper reaches of which flow between the Shiremoor West South and North sites. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.9.3 Ecology and Biodiversity

The development proposed within Shiremoor West (North) presents no risk to international, or nationally designated ecological sites. LWSs could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.9.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.9.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Shiremoor area for future capacity. However, information provided by NWL has confirmed that there is a medium risk of sewer flooding in some areas of the drainage

unit serving the proposed development land, indicating that there may be limited capacity in the network.

WwTW - all proposed development within the Shiremoor West (North) development area will drain to Howdon WwTW, flowing north east through Shiremoor and Monkseaton, then south to North Shields and south west to Howdon.

10.10 Wellfield

210 new dwellings are proposed within the Wellfield AAP during the LDF period.



10.10.1 Flood Risk

The Wellfield development area lies in an area at Very High groundwater flooding susceptibility and this should be considered further. With careful planning, flood risk from groundwater is not considered a constraint to development and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming an issue in the future.

Although the site does not lie within the EA designated flood zones the site is surrounded by small ordinary watercourses. It is therefore recommended that development does not encroach within a minimum of 5m of Brierdene Burn, which runs through the site and along the south eastern edge of the site.

10.10.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically

linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to Brierdene Burn. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.10.3 Ecology and Biodiversity

The development proposed within Wellfield presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.10.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

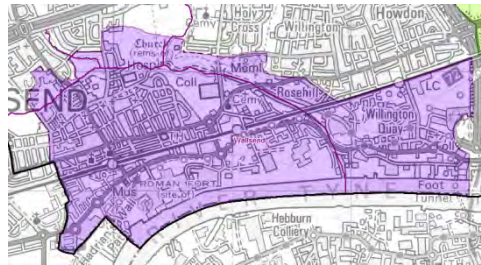
10.10.5 Wastewater

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Wellfield area for future capacity. However, information provided by NWL has confirmed that there is a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be limited capacity in the network.

WwTW - all proposed development within Wellfield will drain to Howdon WwTW, flowing south east to Monkseaton and then south east towards North Shields and south west to Howdon.

10.11 Wallsend AAP

424 new dwellings are proposed within the Wallsend AAP during the LDF period.



10.11.1 Flood Risk

Until further details of the spatial distribution of development within the Wallsend AAP are determined, it is not possible to determine flood risk in great detail. However with careful planning, flood risk is not considered a major constraint to development, although the AAP area borders the River Tyne to the south. Careful management of surface water runoff in particular, and the appropriate use of SuDS will be necessary to prevent flood risk becoming an issue in the future. Also, any new development in the Wallsend AAP should be steered towards areas of low flood risk, as advocated in the NPPF. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, including Wallsend Burn and the River Tyne.

The SWMP highlighted there may be surface water issues in the north western parts of the Wallsend AAP identifying a CDA. Any new development within the Wallsend AAP should be steered away from these areas and located in areas where the risk of surface water flooding is lower.

10.11.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a

precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to Wallsend Burn or the River Tyne. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.11.3 Ecology and Biodiversity

The development proposed within Wallsend presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.11.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.11.5 Wastewater

Sewer Network - across the Wallsend AAP, there is scope to:

- Steer growth to areas within the AAP with greater capacity;
- Determine scale of any upgrades required to facilitate new development in areas with network capacity issues.

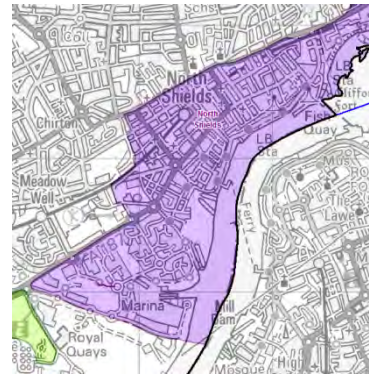
As such the risk of sewer flooding in the network as a consequence of development should be mitigated through

avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

WwTW - all proposed development within the Wallsend AAP will drain to Howdon WwTW, flowing east from the developed parts of the AAP area to Howdon.

10.12 North Shields AAP

656 new dwellings are proposed within the North Shields AAP during the LDF period.



10.12.1 Flood Risk

Until further details of the spatial distribution of development within the North Shields AAP are determined, it is not possible to determine flood risk in great detail. However with careful planning, flood risk is not considered a major constraint to development, although the AAP area borders the River Tyne to the south east.

The SWMP highlighted that the North Shields AAP is at risk of surface water flooding. Careful management of surface water runoff in particular, and the appropriate use of SuDS will be necessary to prevent flood risk becoming an issue in the future in this area. Parts of the North Shields AAP fall within Flood Zones 2 and 3. Any new development in the North Shields AAP should be steered towards areas of low flood risk, as advocated in the NPPF. It is also recommended that development does not encroach within a minimum of 5m of the banks of the River Tyne or any other local watercourse.

10.12.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the

investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged directly to the River Tyne, or via the nearest local watercourse prior to entering the River Tyne. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.12.3 Ecology and Biodiversity

The development proposed within the North Shields area presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.12.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.12.5 Wastewater

Sewer Network - across the AAP area there is scope to:

- Steer growth to areas within the AAP with greater capacity;
- Determine scale of any 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.

WwTW - all proposed development within the North Shields AAP will drain to Howdon WwTW, flowing south west from the developed parts of the AAP area to Howdon.

10.13 Coastal AAP

141 new dwellings are proposed within the Coast AAP during the LDF period.

10.13.1 Flood Risk

Until further details of the spatial distribution of development within the AAP area are determined, it is not possible to determine flood risk in detail. However with careful planning, flood risk is not considered a major constraint to development. Careful management of surface water runoff in particular, and the appropriate use of SuDS will be necessary to prevent flood risk becoming an issue in the future. Parts of the Coast AAP area lies in areas at Very High to Medium groundwater flooding susceptibility and this should be considered further. Parts of the Coast AAP fall within areas at risk of tidal/fluvial flooding. Any new development in the Coast AAP should be steered towards areas of low flood risk, as advocated in the NPPF. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, which are Brierdene Burn and Seaton Burn in the northern part of the AAP area. An appropriate distance should also be considered, to set development back from the coast and this should be discussed and agreed with the Environment Agency.



10.13.2 Water Environment

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development. Site surface water is likely to be discharged to the nearest local watercourses, which are Brierdene Burn and Seaton Burn in the northern part of the AAP area, or potentially directly into the North Sea. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

10.13.3 Ecology and Biodiversity

The development proposed within the Coast development site presents no risk to international, or nationally designated ecological sites. LWSs could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

10.13.4 Water Resources

Water resources/supply are not a constraint to development as there is sufficient available water in Kielder WRZ.

10.13.5 *Wastewater*

Sewer Network - across the Coast AAP, there is scope to:

- Steer growth to areas within the AAP with greater capacity;
- Determine scale of any upgrades required to facilitate new development in areas with network capacity issues.

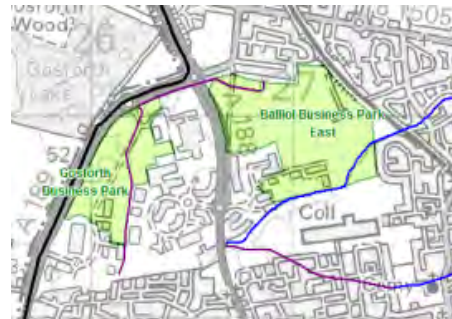
As such the risk of sewer flooding in the network as a consequence of development should be mitigated through avoiding areas with known capacity issues. Where this is not feasible, local upgrades may be required.

WwTW - all proposed development within the Coast AAP will drain to Howdon WwTW, flowing south from the developed parts of the AAP area, then through North Shields and south west to Howdon.

10.14 Employment Land

10.14.1 Balliol Business Park

As shown in Appendix B the south-east section of the Balliol Business Park employment lies in Flood Zone 2 and 3 and lies in an area of Very High to High BGS groundwater flooding susceptibility (Appendix D). Flood risk is



however not considered to be a significant constraint to development. Careful planning design encouraging development to areas of the site at a low risk of flooding and the management of surface water runoff from the proposed new development with the appropriate use of SuDS will be necessary to prevent flood risk becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, which include Forest Hall Letch (along the northern boundary of the site) and Longbenton Letch (along the southern boundary of the site).

The development proposed within the Balliol area presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to Forest Hall Letch or Longbenton Letch. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

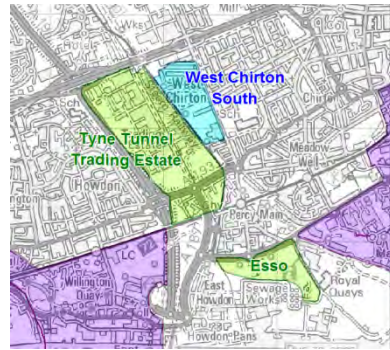
Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes in the Balliol Business Park area for future capacity. However, information provided by NWL has confirmed that there is potentially a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be limited capacity in the network.

It is proposed that Balliol Business Park and Gosforth Business Park are developed in close proximity to one another, also in close proximity to the Weetslade residential area which all lie in an area already at a medium sewer risk. There may therefore be an accumulated sewer network impact which should be considered at the Detailed stage of the WCS.

WwTW - all proposed development within the Balliol Business Park employment area will drain to Howdon WwTW, flowing south through Longbenton to Wallsend and then east to Howdon.

10.14.2 **Esso**

The south-eastern section of the Esso employment site lies in Flood Zone 2 and 3 (Appendix B). Flood risk is however not considered to be a constraint to development. Careful planning design encouraging development to areas of the site at a low risk of flooding and the management of surface water runoff from the proposed new development with the appropriate use of SUDS will be necessary to prevent flood risk becoming an issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, which includes the New York to North Shields catchment to the east.



The development proposed within the Esso development site presents no risk to international, or nationally designated ecological sites. LWSs could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically

linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourse (New York to North Shields catchment) or directly to the River Tyne. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

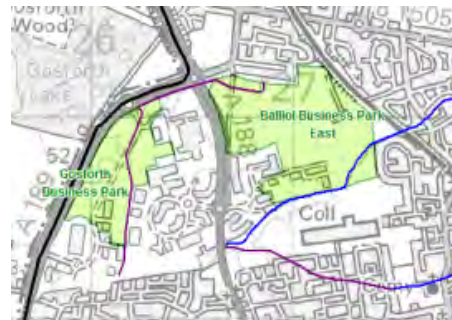
Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes for future capacity. However, information provided by NWL has confirmed that there is potentially a medium/low risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be limited capacity in the network.

WwTW - all proposed development within the Esso employment area will drain south directly to Howdon WwTW (refer to Appendix A).

10.14.3

Gosforth Business Park

Gosforth Business Park lies within an area at Very High to High groundwater flooding susceptibility (Appendix D). With careful planning, flood risk may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming an issue in the future. It is also recommended that development does not encroach within a minimum of 5m of the banks of the un-named watercourse that runs through the northern part of the site and along the eastern fringe of the southern part of the site.



The development proposed within the Gosforth Business Park development site presents no risk to international, or nationally designated ecological sites. LWSs could potentially be at risk if development were to be located in close proximity to them. Further investigation may be required to consider the impacts on the LWSs in North Tyneside and also to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD

'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the un-named watercourse, which is a tributary of Forest Hall Letch. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

WwTW, which is currently of WFD 'moderate potential'.

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes for future capacity. However, information provided by NWL has confirmed that there is potentially a medium risk of sewer flooding in some areas of the drainage unit serving the proposed development land, indicating that there may be limited capacity in the network.

It is proposed that Balliol Business Park and Gosforth Business Park are developed in close proximity to one another, also in close proximity to the Weetslade residential area which all lie in an area already at a medium sewer risk. There may therefore be an accumulated sewer network impact which should be considered at the Detailed stage of the WCS.

WwTW - all proposed development within the Gosforth Business Park employment area will drain to Howdon WwTW, flowing south through Longbenton to Wallsend and then east to Howdon.

10.14.4 **Weetslade**

Weetslade lies in an area of Very High to High groundwater flooding susceptibility (Appendix D). With careful planning, flood risk may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk.

Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.

The development proposed within the Weetslade area presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically linked to the proposed development site are considered to be an amber constraint to development.



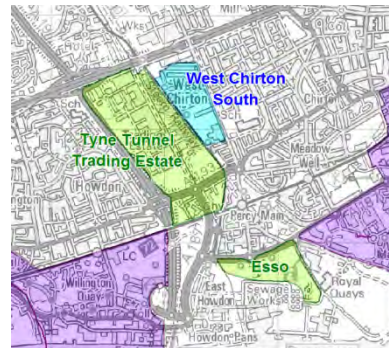
Site surface water is likely to be discharged to the nearest local watercourse, which dependent upon local topography may include the upper reaches of Seaton Burn to the west of the site. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes for future capacity. However, information provided by NWL has confirmed that there is potentially a low risk of sewer flooding in the drainage unit serving the proposed development land, indicating that there may be capacity in the network, subject to confirmation and a detailed capacity check.

WwTW - all proposed development within the Weetslade employment area will drain to Howdon WwTW, flowing south through Longbenton and then eastern fringes of Newcastle, before flowing east through Wallsend to Howdon (refer to Appendix A).

10.14.5 ***Tyne Tunnel Trading Estate***

The Tyne Tunnel Trading Estate lies in an area at Very High to High susceptibility to groundwater flooding (Appendix D). With careful planning, flood risk from may be manageable and where practicable, any development should be steered sequentially to areas of lowest flood risk. Also careful management of surface water runoff as a result of development, and the appropriate use of SuDS will be necessary to prevent surface water flood risk potentially becoming a greater issue in the future. It is also recommended that development does not encroach within a minimum of 5m of any watercourse banks, although it does not appear that there are any significant watercourses in the vicinity of the site.



The development proposed within the Tyne Tunnel Trading Estate presents no risk to international, national and local ecological sites. However further investigation may be required to consider the impacts of water quality and sediment regime on international/national sites dependent on whether the consented discharge volumes are increased due to new development in North Tyneside.

All wastewater from the proposed development will be discharged into the Tyne Estuary, which is currently of WFD 'moderate potential', via the Howdon WwTW. As a precautionary approach, pending the outcomes of the investigations at Howdon WwTW all waterbodies hydrologically

linked to the proposed development site are considered to be an amber constraint to development.

Site surface water is likely to be discharged to the nearest local watercourse, although with none being apparent on mapping, it is possible that discharges of surface water may be directly to the River Tyne. The proposed use of attenuation SuDS techniques across North Tyneside would also help to prevent an impact on the local water environment.

Sewer Network - until further details regarding the physical properties and associated metadata is provided it is not possible to determine the exact suitability of the identified sewer pipes for future capacity. However, information provided by NWL has confirmed that there is potentially a medium risk of sewer flooding in the drainage unit serving the proposed development land, indicating that there may be limited capacity in the network.

WwTW - all proposed development within the Weetslade employment area will drain south directly to Howdon WwTW (refer to Appendix A).

10.15 Summary

TABLE 10-1: SUMMARY OF RISKS ASSOCIATED WITH THE PROPOSED DEVELOPMENT IN NORTH TYNESIDE

Type	Site	Flood Risk	Water Environment	Ecology / Biodiversity	Water Resources	Sewer Network	WwTW
Residential Development	Station Road East	Green	Amber	Green	Green	Green	Amber
	Station Road West	Green	Amber	Green	Green	Green	Amber
	East Benton Farm	Green	Amber	Green	Green	Green	Amber
	West Chirton South (Mixed Use)	Amber	Amber	Green	Green	Amber	Amber
	Whitehouse Farm	Amber	Amber	Green	Green	Amber	Amber
	Scaffold Hill	Green	Amber	Green	Green	Amber	Amber
	Annitsford Farm	Amber	Amber	Green	Green	Green	Amber
	Shiremoor West (South)	Amber	Amber	Green	Green	Amber	Amber
	Shiremoor West (North)	Amber	Amber	Green	Green	Amber	Amber
	Wellfield	Amber	Amber	Green	Green	Amber	Amber
	Wallsend AAP	Green	Amber	Green	Green	Amber	Amber
	North Shields AAP	Amber	Amber	Green	Green	Amber	Amber
	Coastal AAP	Amber	Amber	Green	Green	Amber	Amber
Employment	Esso	Green	Amber	Green	Green	Green	Amber
	Weetslade	Green	Amber	Green	Green	Green	Amber
	Gosforth Business Park	Amber	Amber	Green	Green	Amber	Amber
	Balliol Business Park	Amber/Red	Amber	Green	Green	Amber	Amber
	Tyne Tunnel Trading Estate	Amber	Amber	Green	Green	Amber	Amber

11 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 NTC 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 North Tyneside 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.

Water supply and wastewater services across North Tyneside 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 Periodic Review process. As part of the Periodic Review process, NWL determine schemes to be undertaken in the next AMP cycle, which are funded by customer payments.

Figure 11-1: Water Company Timeline

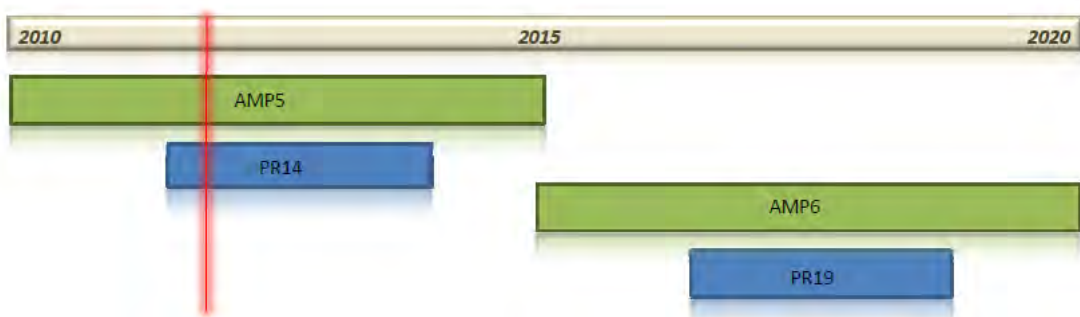


Figure 11-1 shows that NWL are currently in the early stages of AMP5 and about to commence PR14 which will determine the schemes to be planned for AMP6 and beyond.

Despite this, there are mechanisms that would allow developer contributions 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.

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 the NPPF. 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 already identified in PR14 it is likely that other funding mechanisms will be used to provide the required infrastructure in the short term.

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. Developer

contributions cannot be sought where an Section 106 sewer connection application is associated with a Section 104 adoption 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 authority⁴¹. 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.

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.

11.1.3 *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.

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.

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 s106 when:

- There is a straightforward contribution required;
- There is no requirement for the Council to covenant to do something;

⁴¹ Planning Advisory Service, Community Infrastructure Levy, <http://www.pas.gov.uk/pas/core/page.do?pagelid=122677>

- No payback requirement is necessary; or
- 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 (Section 41 and Section 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 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.

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:

- By 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; or

- By 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 PROGRESSION OF THE WCS

The Outline WCS has identified the need for a more detailed assessment once further information regarding the layout and location of the proposed development is finalised including, as stated in Section 2.1.2:

- A more detailed assessment of the surface water management options and recommendations for the proposed major development areas, including an assessment of the detailed requirements for different types of SuDS in terms of the volume of storage, infiltration or attenuation required to mitigate surface water flood risk from the proposed development (this has been undertaken at a high level as part of the SWMP);
- Further investigations into the impact of the proposed development on the locally designated sites;
- Further detail on the available capacity at Howdon WwTW and any constraints that this could place on the proposed development (Appendix A);
- Further detailed investigatory work to fully assess local constraints within the mains water supply network. To do this full access to NWL's potable water supply network models of the North Tyneside area would be required; and
- As more details come forward regarding the proposed development then detailed modelling of the sewer network will be required to assess the impact on the sewer network on a site-by-site basis.

13 CONCLUSIONS

The key purpose of the Outline WCS is to provide NTC with the evidence base which ensures that water issues have been taken into account when determining the location and intensity of development, as part of the development of their CS. The key conclusions of each Chapter of this Outline WCS are presented below.

13.1 Howdon WwTW and Local Sewer Network Capacity

A high level analysis of the sewer network has been carried out for this WCS, which has identified where there could be sewer network capacity issues from the proposed growth. A more detailed analysis was not possible for this assessment. In order to assess the full effects of the proposed growth across North Tyneside on the sewer network, modelling of the sewers should be carried out. It is not considered that this would be a requirement of a Detailed WCS, it is suggested that this be carried out by NWL as and when a development comes forward.

NWL have confirmed that all foul flows from proposed development in North Tyneside will drain to Howdon WwTW. As stated in Appendix A analysis of the annual average dry weather flows (DWF) into Howdon WwTW 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 North Tyneside and that of other council areas which drain to Howdon.

13.2 Water Environment, Ecology and Biodiversity

As stated in Appendix A, the Howdon WwTW has ample biological treatment capacity for the wastewaters from North Tyneside, as well as other councils, for the period of housing development covered by the WCS. The Tyne Estuary is currently of *moderate ecological potential* and failing to reach the requirements of the WFD. Due to the current WFD status of the Howdon WwTW and the constraints of the WFD which requires that the current status of a river must not deteriorate and should achieve 'good status' by 2015, the waterbodies hydrologically linked to the proposed development sites (Tyne Estuary and Tyne and Wear coastal waterbody) are considered to be at medium risk.

It has been established that while the discharge from Howdon WwTW may increase beyond current levels it is likely to remain within the limits of the current consent and as such, impacts on international/nationally designated sites and any necessary remedial measures will have been covered through the EA's RoC process.

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 EA's RoC process. It has therefore been possible to conclude that there is no requirement to consider impacts the impacts of water resources on international/national sites any further in this WCS.

13.3 Flood Risk and Surface Water Management

North Tyneside is at risk of flooding from a number of sources.

Although no groundwater flood incidents have been reported BGS Groundwater Flooding Susceptibility mapping shows large parts of North Tyneside to be highly or very highly susceptible to groundwater flooding.

Areas within the vicinity of the Seaton Burn, Longbenton and Forest Hall Letches, Wallsend Burn and Brierdene Burn are most at risk of fluvial flooding which includes the proposed development in Annitsford Farm, North Shields, Balliol Business Park and the Esso employment area. The Coastal area AAP is at a medium risk of flooding from tidal and fluvial sources.

A review of NWL sewer catchment risk data has shown that Shiremoor, North Shields AAP, Coastal AAP, Whitehouse Farm, Scaffold Hill, Wellfield, Tyne Tunnel Trading Estate, Gosforth Business Park and Balliol Business Park are areas which are considered to be at a medium risk of flooding from the local sewer network.

A number of proposed development areas have been identified to be at medium risk of surface water flooding including Station Road (East and West), East Benton Farm, West Chirton South, Whitehouse Farm, Shiremoor, Weetslade, Balliol Business Park and the Tyne Tunnel Trading Estate.

Attenuation measures and stringent surface water runoff rates would need to be implemented in areas that have the potential to exacerbate flooding in downstream areas to help reduce the impact of surface water flood risk as a result of the proposed development. Gosforth Business Park is located on a greenfield site adjacent to an area of significant surface water flooding in Longbenton and therefore development in this area has potential to exacerbate problems if not managed.

13.4 Water Supply and Resources

The North Tyneside area does not lie within an area of water stress. A large volume of spare licence quantity is held by NWL within the Kielder WRZ. In addition, 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.

14 DEVELOPER CHECKLIST

The overall intention is that all developers would be asked to use the water cycle Developer Checklist as part of the planning application process and to 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 EA’s 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
	EA and Natural England policy and recommendations
	National Policy or Legislation

TABLE 13-1: DEVELOPER CHECKLIST			
Number	Question	Answer	Policy or Legislation
Flood Risk			
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? 	go to 5 go to 3	
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 (FRA) in accordance with the NPPF and the relevant SFRA and the EA are required to be consulted.	Go to 8	
6	The development constitutes major development and is likely to require a FRA in accordance with the NPPF and the relevant SFRA but the EA 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 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? B) What was the extent of impermeable areas both before and after development?	% before % after	EA requirement for FRA.
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
	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 (see NPPF Technical Guidance, Table 5)?	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 EA?	Y/N or N/A	Water Resources Act Land Drainage Act
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 EA office. Has the guidance been followed?	Y/N	Guidance Driven by the Water Resources Act

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
22	A) Is the development site above an inner zone (SPZ1)?	Y/N		Groundwater Regulations
	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 EA 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	PPS23	
	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 (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? PPG23: http://publications.environment-agency.gov.uk/pdf/PMHO0406BIYL-e-e.pdf	Y/N	PPG23	

Water Consumption			
25	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 EA target of 95l/h/d as required for Levels 5 & 6)	Y/N	Outline WCS
26	Have you Provided details of water efficiency methods to be installed in houses?	Y/N	
Pollution Prevention			
27	Have you provided details of construction phase works method statement, outlining pollution control and waste management measures?	Y/N	PPG1, PPG2, PPG3, PPS5, PPG6, PPG21
Water Supply and Wastewater Treatment			
28	Have you provided evidence to confirm that water supply capacity is available, and that demand can be met in accordance with the WCS?	Y/N	Outline WCS
29	Have you provided evidence to confirm that sewerage and wastewater treatment capacity is available, and that demand can be met in accordance with the WCS?	Y/N	
Conservation / Enhancement of Ecological Interest			
30	A) Have you shown the impacts your development may have on the water environment?	Y/N	Town and Country Planning Regulations
	B) Is there the potential for beneficial impacts?	Y/N	