

Greater Nottingham Strategic Plan



Water Cycle Study April 2024

Greater Nottingham
Planning Partnership



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1. Introduction

What is a Water Cycle Study?

- 1.1. A Water Cycle Study is a voluntary undertaking, usually carried out by a Local Planning Authority (LPA) during the formulation of a new Local Plan. The Study takes into account the levels of development required during the plan period and encourages the LPAs, water authorities and the Environment Agency to work collaboratively in order to achieve growth that is well-integrated, appropriately located and sustainable in the context of clean and safe water provision.
- 1.2. A properly functioning water cycle is vital to both the natural environment and human health and well-being. Water is a finite resource, and it is essential that it is managed appropriately. There is increasing recognition that the ways in which we use water contribute to extreme water situations, and that the planning system, through Local Plans, should ensure sufficient management and mitigation is in place so that any proposed development does not result in adverse impacts on the water cycle.
- 1.3. Such management includes:
 - ensuring that adequate supplies of clean water are available to meet the area's domestic, industrial, recreational and agricultural needs;
 - ensuring there is enough wastewater capacity to meet the needs, including transportation and treatment;
 - limiting flooding, especially from surface water; and
 - maintaining and enhancing water quality, biodiversity and natural capital.
- 1.4. This Water Cycle Study uses data provided by the Greater Nottingham Area's water provider and wastewater treatment company, Severn Trent Water, to understand the current position, drawing upon information from Severn Trent Water's Water Resource Management Plan and Drainage and Wastewater Management Plan, which sets out the future strategies for water and wastewater infrastructure in the area. Additionally, the Study is based on data within the Strategic Flood Risk Assessment (SFRA) and from the Environment Agency due to their role in abstraction licensing, and for the provision of data collected by them relating to water quality and flood risk management.

Why is a Water Cycle Study needed?

- 1.5. The Councils of Broxtowe, Gedling, Nottingham City and Rushcliffe are currently working on a joint Strategic Plan for Greater Nottingham. The Strategic Plan will set out the quantum and distribution of housing and economic growth within the Greater Nottingham Area for the years 2023-2041.

- 1.6. This Water Cycle Study forms part of the Councils' evidence base to support the Strategic Plan, replacing the previous Water Cycle Study which was published in 2010. This Study addresses the key water-centric considerations for Greater Nottingham's Strategic Plan, namely water supply, groundwater, water abstraction, water quality, wastewater and flooding. Such considerations are not readily confined to the Greater Nottingham Area as in practice water providers usually operate across several LPA areas.
- 1.7. The Study will be used to identify current issues and constraints within the area's water cycle and will provide evidence to support the policies of the Strategic Plan through comparing the forecasted development growth for the area with the management plans of Severn Trent Water. The Study will also be used to ensure that the Strategic Plan and its policies are well-evidenced and justifiable and align with advice given by Severn Trent Water and the Environment Agency.

2. Policy Context

National Policy and Guidance

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017¹

- 2.1. The Water Framework Directive applies to surface water and groundwater, focusing on ensuring good qualitative and quantitative health through the reduction and removal of pollution and on ensuring there is enough water to support wildlife at the same time as human needs.
- 2.2. It is based on a river basin district approach to ensure that neighbouring counties cooperate to manage the rivers and other bodies of water they share. The Greater Nottingham Area falls within the Humber River Basin District, which last updated its river basin management plan in 2022.
- 2.3. The key objective of the Water Framework Directive is to protect, and where necessary, restore water bodies in order to reach 'good' status, and to prevent deterioration. Good status means both good chemical and ecological status.

National Planning Policy Framework (2023)²

- 2.4. The National Planning Policy Framework (NPPF) was first published in 2012, together with accompanying technical guidance. The NPPF provides a framework which informs the development of locally prepared plans, and is a material consideration when making planning decisions.
- 2.5. Paragraph 20 of the NPPF requires strategic policies to set out an overall strategy and make sufficient provision for water supply, wastewater and flood risk infrastructure. This is reinforced at paragraph 158. When discussing planning for climate change, the NPPF requires strategic plans to take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change and water supply.
- 2.6. Chapter 15 of the NPPF discusses conserving and enhancing the natural environment, with part e of paragraph 180 stating that new and existing development should be prevented from contributing to or being adversely affected by unacceptable levels of water pollution. The NPPF states that development should help to improve the local environmental conditions such as water quality, by taking into account relevant information such as river basin management plans.

¹ [The Water Environment \(Water Framework Directive\) \(England and Wales\) Regulations](#)

² [National Planning Policy Framework](#)

National Planning Practice Guidance – Water supply, wastewater and water quality (2019)

- 2.7. The technical guidance accompanying the NPPF was replaced by the Planning Practice Guidance in 2014. The Flood Risk and Coastal Change Guidance was first produced in 2015 and most recently updated in 2019.
- 2.8. The guidance advises how to consider water supply, wastewater and water quality during the plan making process, including ensuring the suitable provision of infrastructure and addressing cross boundary concerns. The guidance encourages early discussion between LPAs and water and sewerage companies to ensure that proposed growth and environmental objectives set out in Local Plans are reflected in the water providers' infrastructure plans.

Water Cycle Studies Guidance (2021)³

- 2.9. Published by the Environment Agency, the guidance sets out what the Environment Agency expects to see in a water cycle study, and highlights the benefits of producing a water cycle study:
 - identify environmental issues and potential solutions
 - gather evidence for development plan documents and strategic development sites
 - inform wider policy planning requirements.
- 2.10. The guidance reviews the two stages of preparing a water cycle study: scoping and preparing a detailed study. A water cycle study should be scoped during the early stages of the preparation or update of development plan documents or supporting evidence or a planning application for a strategic development site. The scoping study should identify gaps in the evidence and address the environmental and infrastructure capacity issues. If the scoping study does not identify any likely constraints or evidence gaps for the growth areas, then no more work needs to be undertaken.
- 2.11. Where the water cycle scoping study does identify any likely constraints or evidence gaps, a detailed water cycle study to identify specific risks and address evidence gaps will need to be undertaken.

The Building Regulations (2010) (as amended)⁴

- 2.12. The Building Regulations cover the construction and extension of buildings, helping to ensure that they are going to be safe, healthy and high performing. Regulation 36 and Part G of Schedule 1, which is supported by Approved Document G⁵ (2016),

³ [Water cycle studies guidance](#)

⁴ [The Building Regulations](#)

⁵ [Approved Document G](#)

covers Water Efficiency. The regulations require water consumption within new dwellings to be no greater than 125 litres per person per day, or where specified, the optional requirement of 110 litres per person per day.

National Policy Statement for Wastewater (2012)⁶

- 2.13. The Statement for Wastewater forms part of the overall framework of national planning policy and sets out Government policy for the provision of major wastewater infrastructure. It is used by decision makers as the primary basis for deciding development control applications for wastewater developments that fall within the definition of Nationally Significant Infrastructure Projects (NSIP) as defined in the Planning Act 2008.

Meeting our Future Water Needs: a National Framework for Water Resources (2020)⁷

- 2.14. The National Framework looks at England's long-term water needs and sets out the scale of action needed to ensure resilient water supplies are available to meet the needs of all users in the future, and sets a greater level of ambition for restoring, protecting and improving the environment that is the source of all water supplies.
- 2.15. The Framework encourages a shift towards strategic regional planning, and sets out principles, expectations and challenges for five regional groups, which are made up of the 17 English water companies and other water users. The Greater Nottingham Area falls within the regional group 'Water Resources West'. Each regional group is required to develop a single plan which will provide a detailed picture of the future water resource needs of each region.
- 2.16. The Framework identifies water resource pressures facing the five regions. For Water Resources West, it is noted that there is a surplus, but the area will face pressures in the future. It is suggested that there is potential to make savings by reducing demand and options to supply more water to other regions.

Water Resources West Draft Regional Plan (2022)⁸

- 2.17. The Draft Regional Plan covers a 60 year period with the aim to secure sustainable water supplies for the future. The proposed strategy for securing sustainable water supplies includes:
- Ensuring the sustainability of current and future supplies: reduce abstractions (where required), protect catchments and enhance the water environment;

⁶ [National policy statement for waste water](#)

⁷ [Meeting our future water needs: a national framework for water resources](#)

⁸ [Water Resources West Draft Regional Plan](#)

- Leakage reduction: water companies will aim to halve leakage from the drinking water network by 2050;
- Support customers to reduce demand: implementing smart metering and water efficiency campaigns. Supporting LPAs in implementing tighter water consumption standards per capita for new builds;
- New sources and transfers: making the most of existing assets, natural waterways and canals, meeting the region's needs and enabling transfers within the region and beyond.

2.18. The Draft Regional Plan covers an area of 43,000km² with varied hydrological and geological characteristics. Because of this, the region experiences different types of drought and supply pressures. Figure 1 of the Plan indicates the different drought zones within Water Resources West's Plan area. The Greater Nottingham Area lies within drought region 'zone 3' which is impacted by more extensive and severe droughts.

2.19. The Draft Regional Plan recognises that Severn Trent Water (the water company that covers the Greater Nottingham Area) faces a significant loss of abstraction licence volume from groundwater sources in the Nottinghamshire area, initially in the 2030s but also in the longer term. The Draft Regional Plan recognises that there are limited options in the area to provide alternative sources, so is looking upstream to the Derwent Valley to understand if reservoir storage could be increased.

25 Year Environment Plan (2018)⁹

2.20. The environment plan sets out the Government's actions to help the natural world regain and retain good health. It aims to deliver cleaner air and water in cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first.

2.21. With regards to water, the environment plan seeks to achieve clean and plentiful water by improving at least three quarters of the UK's waters to be close to their natural state as soon as is practicable by:

- reducing the abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies;
- reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per the River Basin Management Plans;

⁹ [25 Year Environment Plan](#)

- supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025; and
- minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters.

Water Industry National Environment Programme (WINEP)¹⁰

- 2.22. The WINEP establishes the work that water companies in England are required to do in order to meet their obligations from environmental legislation and UK government policy. The WINEP is the most important and substantial programme of environmental investment in England, setting out how the water industry will contribute to improving the natural environment. For 2020 to 2025 it consists of £5.2 billion of asset improvements, investigations, monitoring and catchment interventions.

Relevant Studies

Local Flood Risk Management Strategies (2021)

- 2.23. As Lead Local Flood Authorities, Nottingham City Council and Nottinghamshire County Council are required by the Flood and Water Management Act (2010) to produce a Local Flood Risk Management Strategy. The Strategy should be consistent with the National Flood and Coastal Erosion Risk Management Strategy for England, taking account of current policy and reflecting the aspirations and priorities of other partners with responsibilities for Flood and Coastal Erosion Risk Management along with wider local interests in linked environmental or social outcomes.
- 2.24. In 2021, Nottinghamshire County Council published an updated Local Flood Risk Management Strategy¹¹ to cover the period 2021-2026. The Strategy has five main objectives:
1. To pursue new solutions, partnerships and alleviation schemes to manage future flood risks and adapt to climate change in Nottinghamshire.
 2. To increase levels of awareness within local organisations and communities by enabling and supporting them so they can become more resilient to flooding and understand their land drainage responsibilities.
 3. To improve delivery of flood risk management by working in partnership across functions and organisations, taking a catchment-based approach.
 4. To integrate local flood risk management into the planning process and support sustainable growth.

¹⁰ [Water industry national environment programme \(WINEP\)](#)

¹¹ [Nottinghamshire County Local Flood Risk Management Strategy](#)

5. To consider the environmental impact of proposed flood risk management measures, maximise opportunities to contribute to the sustainable management of the environment and deliver wider benefits.

2.25. In 2015, Nottingham City published their Local Flood Risk Management Strategy¹². The strategy has seven main objectives:

1. Work collaboratively with Risk Management Authorities and stakeholders to deliver effective maintenance, understand flood risk, jointly invest in schemes and share expertise.
2. Ensure that new development is sustainable, is not at risk of flooding and does not increase flooding elsewhere. Promote the use of sustainable drainage systems to manage water quality, water quantity and biodiversity improvements.
3. Deliver cost-effective, proportionate and risk-based flood risk management schemes and maintenance activities.
4. Engage with communities and politicians to raise awareness of flood risk, resilience measures, preparedness and riparian responsibilities.
5. Promote flood risk management activities that consider climate change, enhance the natural and historic environment, deliver blue-green infrastructure, improve water quality and provide biodiversity and amenity benefits.
6. Promote a joined-up and catchment-based approach to flood risk management whilst supporting the delivery of improvements to the water environment.
7. Further improve information on flood drainage assets and knowledge of current and future local flooding risk using a risk-based approach.

Greater Nottingham and Ashfield Outline Water Cycle Study (2010)¹³

- 2.26. The Study was produced to provide strategic level advice to the Greater Nottingham Councils and Ashfield District Council to inform their Local Plans on water infrastructure and environmental capacity. The Study recommended all new homes be built to the water consumption standards of the Code for Sustainable Homes Level 3/4 to reduce demand from new households - a minimum consumption level of 105 l/h/d. The Study suggested that Local Authorities could also include policies to support the water company's water efficient activities, an approach that was encouraged by the Environment Agency.
- 2.27. Water quality in the study area failed the Water Framework Directive Standards at many locations. However, the Study stated that this was not a constraint to

¹² [Nottingham City Local Flood Risk Management Strategy](#)

¹³ [Greater Nottingham and Ashfield Outline Water Cycle Study](#)

development, provided that 'no deterioration' in water quality will result from wastewater treatment.

Strategic Flood Risk Assessment¹⁴

2.28. Currently, the Greater Nottingham Area is covered by two SFRA's and an SFRA Addendum:

- River Leen and Day Brook SFRA (2008) – Black and Veatch
- Greater Nottingham SFRA (2010) – Black and Veatch. This document provided updates to the six technical report volumes produced for the 2008 SFRA
- Greater Nottingham SFRA Addendum (2017) – AECOM. This document refreshed the existing SFRA's.

2.29. The SFRA provides background and context to sources of flooding in the Greater Nottingham Area and historic flood events. The SFRA also provides mapping which illustrates the flood zone extents. The 2017 Addendum provided an update on climate change scenarios and undertook additional modelling which was used to update the flood mapping.

2.30. Following advice received from the Environment Agency, a new SFRA has not been commissioned to support the Strategic Plan. The Environment Agency are in the process of updating a number of hydraulic models for rivers in the Greater Nottingham Area, which are due for release during 2024. Once the model data has been officially published, a new SFRA will be commissioned in due course. In the interim, the Councils of Broxtowe, Gedling, Nottingham City and Rushcliffe have produced an SFRA review paper to form part of the evidence base of the Strategic Plan.

¹⁴ [Greater Nottingham Strategic Flood Risk Assessment](#)

3. Local Planning Policy Context

- 3.1. The members of the Greater Nottingham Planning Partnership have historically worked together on planning policy matters in the Greater Nottingham Area. The Partnership includes the Councils of Broxtowe, Erewash, Gedling, Nottingham City and Rushcliffe together with the Hucknall part of Ashfield District, and the two associated County Councils of Derbyshire and Nottinghamshire.

Adopted Local Plans

- 3.2. The Councils of Broxtowe, Erewash, Gedling, Nottingham City and Rushcliffe agreed in 2009 to work together to produce Aligned Core Strategies, with the aim to ensure that the policies of the proposed Aligned Core Strategies were consistent across Greater Nottingham.
- 3.3. During the production of the Aligned Core Strategies, Erewash and Rushcliffe departed from the joint work on the Strategies and opted to produce individual Core Strategies. However, they utilised some of the joint evidence base commissioned by the Partnership. All five Councils used the 2008 and 2010 SFRAs as part of their evidence base for their Core Strategies.
- 3.4. The following Local Plan Core Strategies have been adopted in the Greater Nottingham Area:
- Broxtowe Borough¹⁵, Gedling Borough¹⁶, Nottingham City¹⁷ Aligned Core Strategies Part 1 Local Plan (September 2014)
 - Rushcliffe Local Plan Part 1: Core Strategy (December 2014)¹⁸
 - Erewash Core Strategy (March 2014)¹⁹
- 3.5. Broxtowe, Gedling, Nottingham City and Rushcliffe opted to progress with Part 2 Local Plans. The Part 2 Local Plans were prepared individually and set out the Councils' non-strategic development allocations and detailed policies for managing new development, following on from the strategic framework set out in the Core Strategies.
- 3.6. The four Councils and Erewash commissioned an Addendum to the SFRA. The 2017 Greater Nottingham SFRA Addendum supported the Part 2 Local Plans as it refreshed the guidance provided within the 2008 and 2010 SFRAs to accord with the latest flood risk policy, guidance and data availability.

¹⁵ [Broxtowe Local Plan Part 1: Core Strategy](#)

¹⁶ [Gedling Local Plan Part 1: Core Strategy](#)

¹⁷ [Nottingham City Local Plan Part 1: Core Strategy](#)

¹⁸ [Rushcliffe Local Plan Part 1: Core Strategy](#)

¹⁹ [Erewash Core Strategy](#)

- 3.7. The following Part 2 Local Plans have been adopted by the Partnership authorities:
- Broxtowe Part 2 Local Plan 2018-2028 (October 2019)²⁰
 - Gedling Local Planning Document Part 2 Local Plan (July 2018)²¹
 - Nottingham City Land and Planning Policies Local Plan Part 2 (January 2020)²²
 - Rushcliffe Local Plan Part 2: Land and Planning Policies (October 2019)²³
- 3.8. Nottingham City and Rushcliffe included policies within their Part 2 Local Plans which required new developments to generate a water usage of no more than 110 litres per person per day.

Greater Nottingham Strategic Plan

- 3.9. The Councils of Broxtowe, Erewash, Gedling, Nottingham City and Rushcliffe agreed to work on a joint Strategic Plan. However, prior to a draft version of the Strategic Plan being consulted, Erewash departed from the joint work to undertake an individual Core Strategy Review. Broxtowe, Gedling, Nottingham City and Rushcliffe continued to work together on the Strategic Plan.
- 3.10. Broxtowe, Gedling, Nottingham City and Rushcliffe have previously consulted on the Greater Nottingham Strategic Plan Growth Options document in July 2020 and February 2021, the Greater Nottingham Strategic Plan Preferred Approach in January/February 2023, and more recently on the Greater Nottingham Strategic Plan: Distribution and Logistics Preferred Approach in September-November 2023.
- 3.11. The Councils have now prepared the Greater Nottingham Strategic Plan Publication Version. The Publication Version details the proposed policies for the area and includes strategic site allocations for the four Councils which will help meet their housing and employment needs. To meet the housing target of 54,670, all four Councils are carrying forward strategic housing allocations from their adopted Core Strategies plus the Chetwynd Barracks strategic housing allocation in Broxtowe (which is allocated in the Part 2 Local Plan for a smaller number of dwellings), with planning permission already secured on a majority of the sites. The Strategic Plan is also proposing an extension to the Top Wighay Farm site in Gedling of 710 dwellings. To fulfil the housing need, further dwellings will be delivered via allocations through future plan preparation which are to be prepared by the individual Local Authorities, or through windfall sites.

²⁰ [Broxtowe Part 2 Local Plan](#)

²¹ [Gedling Local Planning Document Part 2 Local Plan](#)

²² [Nottingham City Land and Planning Policies Local Plan Part 2](#)

²³ [Rushcliffe Local Plan Part 2: Land and Planning Policies](#)

- 3.12. To meet the employment need, two new strategic employment sites are proposed to be allocated: one on the site of the Ratcliffe on Soar Power Station and land to the south of the A453, and the other on the site of the former Bennerley Coal Disposal Area. As the power station site required significant water and wastewater treatment infrastructure onsite this can be utilised to meet the needs of this employment site, although the current abstraction licence will need to be varied to suit the new purposes, which will be subject to the Environment Agency approval. This has been examined and confirmed within the Local Development Order that has been approved for the site.
- 3.13. As discussed in Chapter 5, in order to understand the future demand for water, Severn Trent Water communicate with Local Authorities to understand the anticipated future levels of growth within their authority boundary, and also review the adopted and draft Local Plans and the supporting evidence base. The Greater Nottingham Strategic Plan Publication Draft and its evidence base are publicly available to view. It is therefore assumed that Severn Trent Water have factored in the anticipated levels of housing and employment growth in the Greater Nottingham Area into their forecasted demand for water.
- 3.14. It is anticipated that the Strategic Plan and its proposed allocations will have a limited impact upon the water resources. As the Strategic Plan is carrying forward the strategic housing allocations from the adopted Core Strategies, with the additional Chetwynd Barracks strategic allocation in Broxtowe and the extension to Top Wighay in Gedling, the Strategic Plan will not result in a significant increase in population in the Greater Nottingham Area compared to what was already anticipated from the 2014 Core Strategies and Part 2 Local Plans and hence will not significantly increase demand for water.
- 3.15. In addition, the Strategic Plan proposes two new strategic employment sites. As stated above, the Ratcliffe on Soar Power Station site has existing infrastructure on site which can be utilised to meet its needs, with necessary licence amendments made. The impact from the development of the former Bennerley Coal Disposal area is not anticipated to significantly impact water resources.
- 3.16. With regards to flood risk, the EA have advised that for Toton, which is affected by the River Erewash, the new Erewash model is due in 2025, so the flood zone extents at the site are likely to change in the short term. However, the majority of the site lies at a higher level and is outside of the flood zone extents. For Bennerley, the site is affected by the River Erewash main river and the Gilt Brook ordinary watercourse. The new Erewash model is due in 2025, however it does not include the Gilt Brook. The national project to be undertaken by the EA, which is due Summer 2024, is expected to provide a specific flood zone 3b outline for all watercourses including ordinary watercourses. Therefore, the flood zone extents at the site are likely to change in the medium term.

- 3.17. The Councils have prepared this Water Cycle Study so that it can form part of the Strategic Plan evidence base and can inform the policies to ensure that the aspirations of Severn Trent Water as water provider are met.

4. The Water Environment of Greater Nottingham

Background

- 4.1. The Greater Nottingham Area has a varied landscape, influenced by urban development comprising the city of Nottingham, large settlements and smaller villages. The settlement pattern is focused on urban concentration around the main built up area of Nottingham, and in the sub regional centre of Hucknall which abuts the plan area. Beyond this, key settlements and smaller villages are scattered across the area.
- 4.2. The area is highly accessible by rail and road. It is home to East Midlands Parkway station, which boasts direct connections to London St Pancras International. Various settlements within the Greater Nottingham Area are served by stations which provide regional connections across the Midlands Main Line.
- 4.3. The area also has excellent connections to the strategic road network, with the west of the area accessible via the M1 motorway, linking London to Leeds, and several major A roads providing good east west links to the cities of Birmingham, Derby, Leicester and Lincoln.

Landscape and Natural Environment

- 4.4. The physical landscape varies considerably and includes land which has been influenced greatly by coal mining operations in the north which are largely characterised by restored spoil mounding and smaller areas of more rural character. To the west of Nottingham, the land is often influenced by urban development comprising large settlements and smaller villages. To the east the land is a series of distinctive rolling hills and narrow incised river valleys (known as Dumbles) and larger wooded plantations which mark the start of the historic and distinctive Sherwood region. To the south the land is strongly associated with arable farmland with large areas of uniform farmland with few trees or woodlands. Hills known as 'The Wolds' are distinctive prominent features in the south that often form a backdrop to more gently undulating farmland.
- 4.5. No internationally designated environmental sites fall within the boundaries of the Greater Nottingham Area. However, the area is home to 18 nationally protected Sites of Special Scientific Interest (SSSIs). The River Trent Valley contains a number of wetland sites (former sand and gravel quarries) that are designated Local Wildlife Sites and SSSIs which are functionally linked by the River Trent.

River Catchments and watercourses

- 4.6. The Greater Nottingham Area falls within the Humber River Basin District, with a majority of Greater Nottingham located within the Lower Trent and Erewash

Management Catchment. However, Rushcliffe is also partially located within the Soar Management Catchment.

- 4.7. The area is home to several main rivers, as listed below:

River	Local Authority
River Soar	Rushcliffe
River Trent	Rushcliffe, Broxtowe, Erewash, Gedling and Nottingham City
Fairham Brook	Nottingham City and Rushcliffe
Nethergate Brook	Nottingham City
Greythorne Dyke	Rushcliffe
River Smite	Rushcliffe
River Erewash	Erewash, Ashfield and Broxtowe
Boundary Brook	Broxtowe
Tottle Brook	Nottingham City
River Leen	Nottingham City, Ashfield and Gedling
Day Brook	Nottingham City and Gedling
Ouse Dyke	Gedling
Crock Dumble	Gedling
Dover Beck	Gedling
Woodborough Brook	Gedling

Groundwater Resources

- 4.8. Within the Lower Trent and Erewash catchment, the geology is dominated by Mercia Mudstone which is classified as a secondary aquifer. However, there are significant outcrops of Sherwood Sandstone and Lower Magnesian Limestone that are classified as principal aquifers, utilised primarily for public water supply and agriculture. The Greater Nottingham Area is predominantly located on the Sherwood Sandstone, a strategically important principal aquifer. The Lower Magnesian Limestone is also a principal aquifer, but not as large as the Sherwood Sandstone.
- 4.9. As a result of historical abstraction licensing, the Sherwood Sandstone groundwater resource balance is unsustainable, and considered to be at an overall poor status. The Lower Magnesian Limestone is considered to have a good status. However, for both aquifers in the Greater Nottingham Area, the Environment Agency have ceased to license additional abstraction. Abstraction licences that have already been issued can continue to abstract, but the Environment Agency will seek opportunities to reduce the existing licences. There is an exception to this around Basford and Nottingham City Centre. This approach will minimise the risk to and prevent the deterioration of the aquifers.

- 4.10. Within the Soar catchment, there are no large areas of principal aquifer. The vast majority of bedrock outcrop relates to the Mercia Mudstone group, classed as a secondary aquifer. These are predominantly clay based and provide very inconsistent water resources. However, locally important water sources may be available subject to environmental assessment and considered on an individual case basis.

5. Water Supply

- 5.1. Pressure on water resources is increasing as a result of population growth, an increase in household demand for water and the effects of climate change and rising temperatures. To address the demand for increased water supply, water companies are required to produce Water Resource Management Plans (WRMP) under the Water Industry Act 1991. WRMPs set out how water companies intend to supply clean, reliable water to homes and businesses. They are reviewed annually and updated every 5 years. The Greater Nottingham Area is served by one water company – Severn Trent Water.

Severn Trent Water's Water Resource Management Plan 2019²⁴

- 5.2. Severn Trent Water's WRMP was adopted in August 2019 and primarily focuses on a 25-year timeframe, from 2020-2045. This is the minimum timeframe a WRMP can cover as required by the Water Industry Act 1991.
- 5.3. Severn Trent Water have divided their supply area into 15 water resource zones for the purpose of water resource planning, as can be seen in Figure 5.1 below. The zones have differing water resource concerns and require different levels of investment. The Greater Nottingham Area lies within the Nottinghamshire water resource zone.

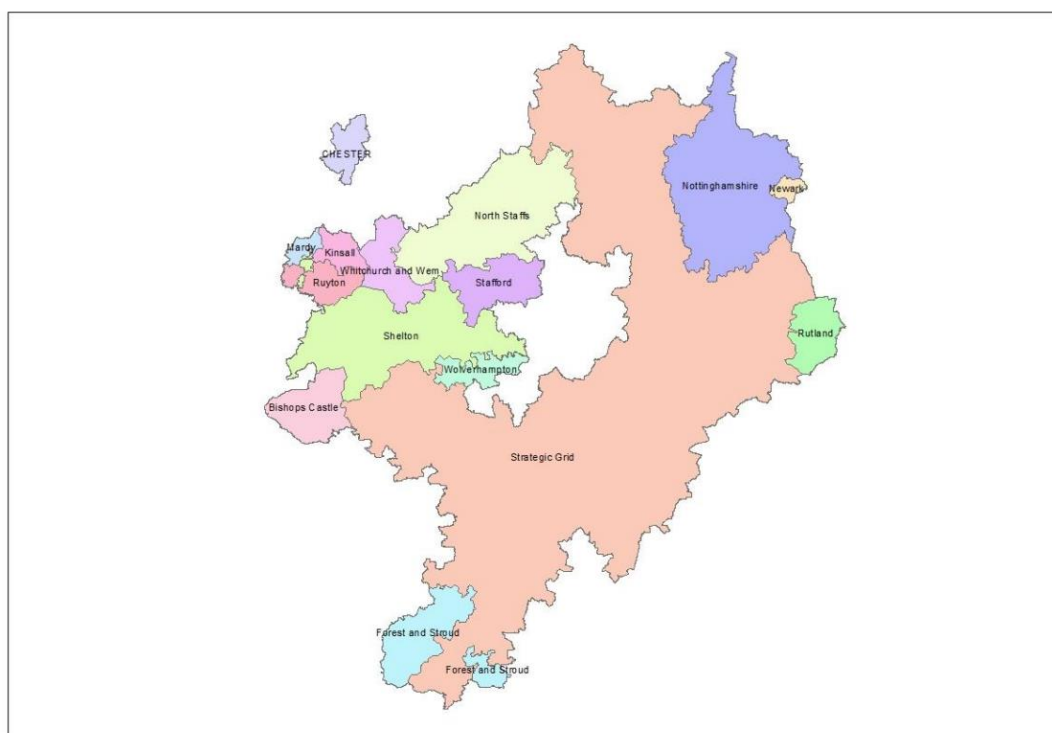


Figure 5.1 - Severn Trent Water's water resource zones (Severn Trent Water)

²⁴ [Severn Trent Water's Water Resource Management Plan](#)

- 5.4. As part of Severn Trent Water's forecasting to understand the future demand for water during the WRMP 25 year timeframe 2020-2045, Severn Trent Water stated that they consulted Local Authorities, which would include the Greater Nottingham Authorities, to understand the level of residential growth anticipated in the Local Authority areas. Severn Trent Water stated that they also reviewed annual household and population projections as well as the Local Authorities' Local Plans, the Plans' housing allocations, and any draft planning documents that indicated future growth statistics. Communication with the Local Authorities, including those within the Greater Nottingham Area, improves the accuracy of Severn Trent Water's forecasting of the future demand and ensures that water supply can meet anticipated levels of growth and the subsequent demand.
- 5.5. For the period 2020-2045 the WRMP identifies multiple challenges to water supply, such as:
- Preserving resilience against droughts;
 - Securing sustainable abstraction and preventing future environmental deterioration through a reduction in abstraction at a number of sources by up to 39Ml/d between 2020-2030 to prevent deterioration of the groundwater bodies, a fundamental objective of the Water Framework Directive;
 - Planning for climate change and the uncertainty around the long term impacts of climate change;
 - Meeting future population growth (anticipated 1.13 million people);
 - Providing resilient supplies that can cope with a loss of water resource, loss of treatment capacity or distribution issues;
 - Meeting customers' and stakeholders' expectations; and
 - Meeting wider regulatory obligations.
- 5.6. Based on the challenges listed above, Severn Trent Water assessed the likely impacts on their water supply and demand until 2045 and the longer term. They concluded that without future investment, there would be shortfalls in the Strategic Grid, Nottinghamshire and North Staffordshire water resource zones. The Nottinghamshire supply and demand balance is illustrated below in Figure 5.2.

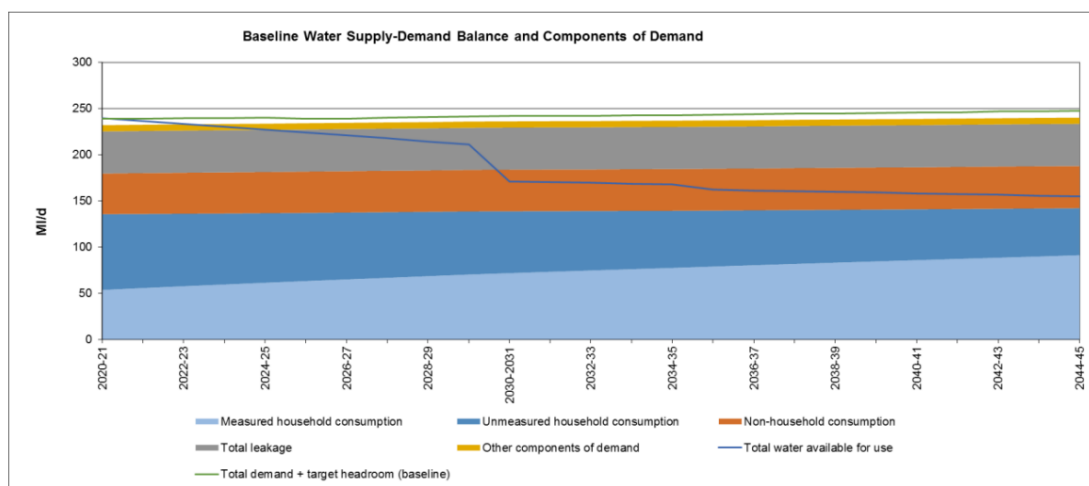


Figure 5.2 - Nottinghamshire water supply and demand balance (Severn Trent Water)

- 5.7. As raised above, the Nottinghamshire water resource zone is facing a supply/demand shortfall. Within the WRMP, Severn Trent Water confirmed there are in the Nottinghamshire water resource zone a combination of environmental pressures on groundwater bodies. This means Severn Trent Water will have to make strategic changes to the way water is supplied to Nottinghamshire, as groundwater is no longer appropriate as a long term supply option.
- 5.8. The WRMP details a number of strategies Severn Trent Water could implement to meet the challenges listed at paragraph 4.5 to ensure water supply is not put at risk, including:
- Reducing leakage in the network – aim to reduce leakage by 15% between 2020-2025, and 50% between 2020-2045;
 - Influencing customers' use of water through water efficiency activities - providing customers with water efficiency advice, free products on request and subsidised higher value products on request, plus more proactive targeted home water efficiency checks;
 - Increasing the coverage of water meters – installing meters proactively and offering customers the opportunity to switch could reduce demand by 80MI/d;
 - Reducing abstraction from water sources that may be having a detrimental impact on the environment – in the short term, localised environmental measures will allow the continuation of abstraction from some sources. However, the volume of abstraction at risk means a need for new and alternative resources to be developed to maintain long term water supply security;
 - Reducing risk of environmental degradation from future abstractions as required by the Water Framework Directive, through providing alternative ways of meeting future demand and mitigating the effects of abstraction and preventing future deterioration occurring;

- Improving long term supply capability;
- Using river restoration techniques to improve habitats and ecological resilience to low flows;
- Using the abstraction incentive mechanism to prevent future deterioration – the mechanism rewards or penalises abstractors based on the amount they take from a source over the year;
- Using catchment management measures to improve biodiversity and protect drinking water supplies – through the minimisation of future water treatment expenditure on raw water quality deterioration;
- Water trading – investigating opportunities to trade or share water resources with their parties.

Severn Trent Water's Draft Water Resources Management Plan 2024²⁵

- 5.9. Severn Trent Water have prepared a draft WRMP and have submitted it for approval to the Secretary of State. Upon approval, the 2024 WRMP will supersede the 2019 WRMP.
- 5.10. Since the production of the 2019 WRMP, a national framework for water resources has been introduced which requires stakeholders such as water companies to work in regional groups to create a strategic plan. The Greater Nottingham Area lies within the 'Water Resources West' regional group, and within the draft WRMP Severn Trent Water confirms it has worked on a regional scale with Water Resources West to ensure that planning assumptions, methods and decisions are consistent with the wider regional plan.
- 5.11. The draft WRMP confirms that 28% of Severn Trent Water's water supply is currently abstracted from groundwater sources in and around the Midlands area, 40% is sourced from reservoirs and 32% sourced from rivers. However, future pressures mean that there will likely be a supply/demand deficit of 244Ml/d by 2040/2041 growing to 540Ml/d by 2050/2051.
- 5.12. The draft WRMP identifies five key issues which are challenging Severn Trent Water's supply:
- Climate change – all climate impacted scenarios suggest hotter, drier summer periods when demand for water is critical, and wetter winters, which increases the risk of flooding, but also changes the quality of the raw water abstracted. These impacts of climate change mean a long term loss of water resources.
 - Population – the population within Severn Trent Water's region is anticipated to increase by 2.6 million people over the next 60 years.

²⁵ [Severn Trent Water Draft Water Resources Management Plan](#)

- Reducing leakage – reduce leakage by a further 16% during 2025-2030 and 50% by 2045.
- Securing sustainable abstraction and preventing future environmental deterioration – by 2030 many existing groundwater abstraction licences from the Environment Agency will be capped, and by 2050 the current Water Framework Directive ‘no deterioration’ licensing capping means groundwater abstraction needs to be reduced to help achieve the environmental destination goals described in the Environment Agency’s National Framework. This could reduce water supply by 180Ml/d by 2040 and 260Ml/d by 2050.
- Delivering best value for customers.

5.13. To estimate the population increase within the region, Severn Trent Water have used Local Authority data, including data from the Greater Nottingham Authorities, to estimate property projections. Through the use of Local Authority Local Plans, 5 year housing land supply data and housing need projections, Severn Trent Water can understand the short term picture of growth, and use the projections to estimate the housing need rate for the remaining WRMP timeframe. A further consideration for growth is Garden Communities. Whilst none are proposed in the Greater Nottingham Area, Severn Trent Water ensured their population forecasting included predicted growth from these Garden Communities. Communication with the Local Authorities, including those within the Greater Nottingham Area, improves the accuracy of Severn Trent Water’s forecasting of the future demand and ensures that the supply can meet anticipated levels of growth.

5.14. The draft WRMP has a preferred plan based on three key measures to help meet future demand:

- Tackling leaks
 - Halving water leakages by 2045
 - Finding and fixing leaks as they occur
 - Renewing mains more quickly to prevent future leaks from occurring
 - Reducing pressure in the supply system
 - Reducing trunk main leakage
 - Household metering will help identify leaks on customers supply pipes and proactively repair them
- Water metering – since 2019, Severn Trent Water has been designated a seriously water stressed area, meaning Severn Trent Water can make water metering compulsory. The draft WRMP recommends making a move towards compulsory metering, with 1.1 million new smart metres expected to be installed.
- Water efficiency – encourage water efficiency activities that will achieve the Government’s consumption target of 110 litres per head per day by 2050.

- 5.15. Within the preferred plan, the draft WRMP also sets out preferred options for increasing supply. Severn Trent Water recognises that the challenges around long term sustainability mainly affect groundwater sources, so they have planned to increase use of existing reservoirs and river water as well as environmental investigations to better understand the future risks to groundwater. New infrastructure is also being planned to help move water to areas of need.

Water Abstraction

- 5.16. The Environment Agency (EA) is responsible for managing water resources in England. The EA regulates existing water abstraction licences and grants new ones, using the Abstraction Licensing Strategy (ALS) procedure. A licence is needed where more than 20 cubic metres of water per day will be abstracted from a river or stream, reservoir, lake or pond, canal, spring or from an underground source. Whether or not a licence is granted depends on the amount of water available after the needs of the environment and existing abstractors are met and whether the justification for the abstraction is reasonable.
- 5.17. The Greater Nottingham Area is covered by two Abstraction Licensing Strategies: primarily the Lower Trent and Erewash (2020), but a small part of Rushcliffe is covered by the Soar (2020).

Lower Trent and Erewash Abstraction Licensing Strategy²⁶

- 5.18. The Lower Trent and Erewash area includes the River Trent, which is 174km long, and its main tributaries including the rivers Derwent, Soar, Erewash, Leen, Greet, Devon, Idle, Torne, Eau and the Dover Beck. As stated at paragraph 3.8, within the Lower Trent and Erewash area, the geology is dominated by Mercia Mudstone which is classed as a secondary aquifer. However, there are significant outcrops of Sherwood Sandstone and Lower Magnesian Limestone that are classed as principal aquifers, which are primarily utilised for public water supply and agriculture. The Greater Nottingham Area is predominantly located on the Sherwood Sandstone, which is a strategically important principal aquifer. The Lower Magnesian Limestone is also a principal aquifer, but not on the scale as the Sherwood Sandstone.
- 5.19. The Lower Trent and Erewash Strategy calculated water resource availability at four different flows, Q95 (low flow), Q70, Q50, and Q30 (higher flow). As can be seen below in Figure 5.3, localised areas of the Lower Trent and Erewash have no additional water available for licensing, even at the highest flow. The largest area is located in the Greater Nottingham Area. At the lowest flow the majority of the Lower Trent and Erewash area has restricted water available.

²⁶ [Lower Trent and Erewash abstraction licensing strategy](#)

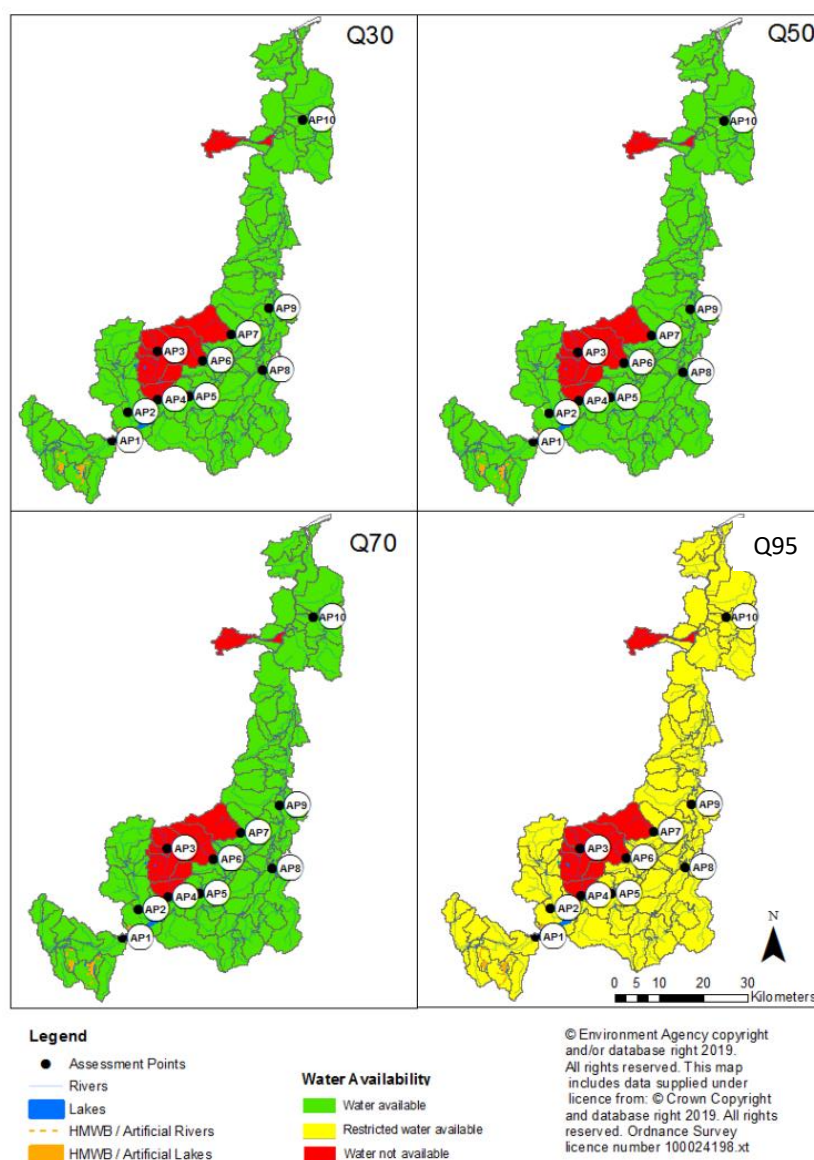


Figure 5.3 - River Trent and Erewash ALS water availability (Environment Agency)

- 5.20. The Strategy demonstrates that there is no additional water resource available for licensing over and above what is already licensed in the Greater Nottingham Area (with the exception of an area around Basford and Nottingham City Centre). There is water available for licensing at Diseworth in Leicestershire, subject to a hands off flow of 2,650 Ml/d being applied to licence applications found to be in continuity with the river.
- 5.21. Following investigation under the Water Framework Directive into the impact that groundwater abstraction for public water supply is having on numerous water bodies, the Abstraction Licensing Strategy confirms that Severn Trent Water will have to reduce abstraction at some of their boreholes abstracting from the Sherwood Sandstone primary aquifer. In total this reduction will mean that Severn Trent Water licensed abstraction from the Sherwood sandstone will reduce by

23.5 Ml/d below recent actual abstraction rates. The reductions in licences will come into effect by 2030.

Soar Abstraction Licensing Strategy²⁷

- 5.22. The Soar catchment is a significant tributary of the River Trent, and extends over an area approximately 1,380 km². The River Soar has a number of important tributaries, including the rivers Sence and Wreake and the Rothley, Black and Kingston brooks. The Charnwood Reservoir Group, located in the north west of the catchment includes Cropston, Swithland, Thornton, Blackbrook and Nanpantan reservoirs.
- 5.23. As stated at paragraph 3.10, within the Soar catchment, there are no large areas of principal aquifer. The vast majority of bedrock outcrop relates to the Mercia Mudstone group, classified as a secondary aquifer.
- 5.24. The Soar Strategy calculated resource availability at four different flows, Q95 (low flow), Q70, Q50, and Q30 (higher flow). As can be seen below in Figure 4.4, a majority of the Soar has water available until the lowest flow, where there is a change to restricted availability.

²⁷ [Soar abstraction licensing strategy](#)

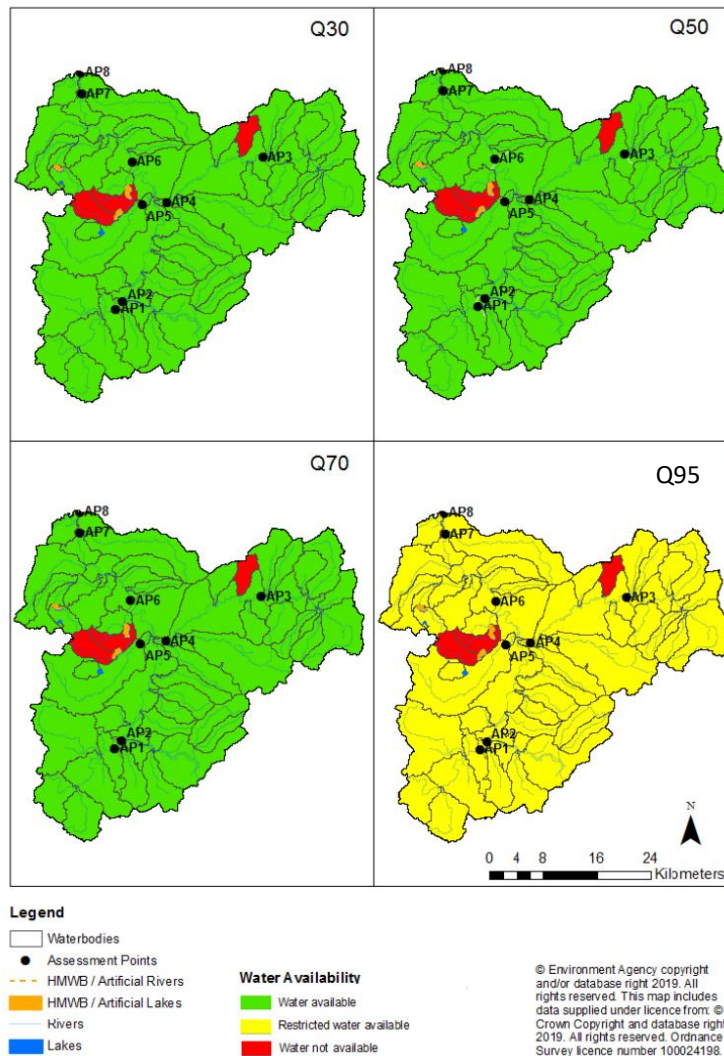


Figure 5.4 - Soar ALS water availability diagram (Environment Agency)

- 5.25. The Strategy demonstrates that there is water available for licensing from the Soar secondary aquifer, subject to a hands off flow of 340 MI/d being applied to licence applications found to be in continuity with a surface watercourse.

6. Wastewater

- 6.1. Severn Trent Water is the statutory sewerage undertaker providing wastewater services for the whole of Greater Nottingham, and many other conurbations. Water and sewerage companies have a statutory obligation to provide capacity for new development, and to comply with the environmental permits set by the Environment Agency. The location of Severn Trent Water's service areas, and its wastewater treatment work catchments are shown below in Figure 6.1.

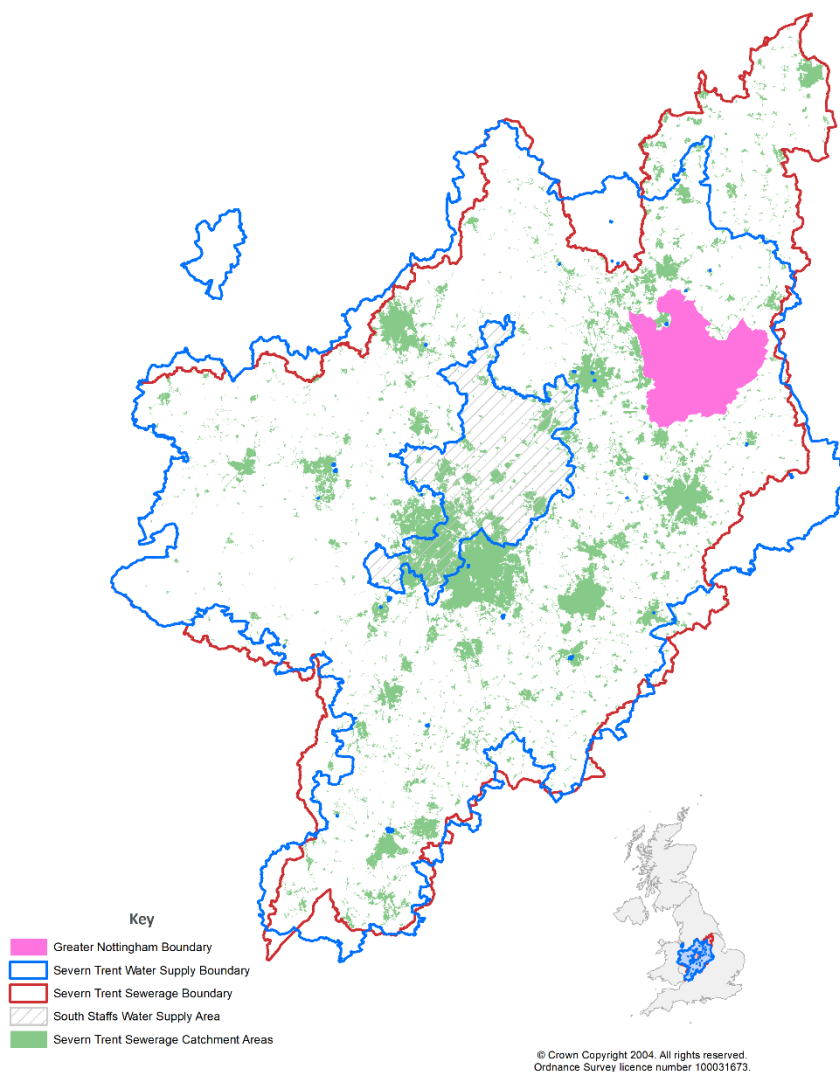


Figure 6.1- Severn Trent Water sewage catchment areas (Severn Trent Water)

- 6.2. The sewage catchment areas are determined by the coverage of the sewer network, which drains foul water from properties (and surface water where the network is combined) to a treatment facility prior to treatment and discharge. As set out in the water quality section of this Study, only 4 of the 80 water sources in the Greater Nottingham Area are achieving ecological 'good' status under the Water Framework Directive, and all water sources received a chemical status of

‘fail’, with factors relating to the provision of water supply and wastewater treatment being key contributors to these statuses.

Severn Trent Water’s Drainage and Wastewater Management Plan (2023)²⁸

- 6.3. Drainage and wastewater management plans (DWMPs) have been introduced to ensure the sustainability of drainage and wastewater management infrastructure and the services it provides to customers and the environment. These plans set out how water and sewerage companies intend to extend, improve and maintain a robust and resilient drainage and wastewater system over the long term. The first cycle of DWMPs is non-statutory. From 2024 onwards the second cycle of DWMP production will commence. The Environment Act 2021 makes DWMPs statutory for the second cycle of these plans.
- 6.4. Severn Trent Water have published their first DWMP which covers a 25 year period 2025-2050, and indicates the strategic direction Seven Trent Water will take regarding their investments in wastewater and drainage systems to ensure they are fit for the future.
- 6.5. The DWMP comprises three levels of information. Level 1 includes a non-technical report which is recommended for planners who want to understand Severn Trent Water’s approach and their findings. Level 2 includes strategic planning area assessments which detail findings across the 14 strategic catchments covered by Severn Trent Water. This includes the Lower Trent and the Soar, which is of relevance to the Greater Nottingham Area. Level 3 provides tactical planning unit summaries which give the detailed analysis behind the Level 2 findings.

Level 1 Non-Technical Report

- 6.6. As part of the DWMP, Severn Trent Water modelled the forecasted performance of its waste systems under different scenarios. The scenarios can be viewed below in Figure 6.2. To ensure accurate forecasting with regards to population growth, Severn Trent Water have, through communication with Local Planning Authorities such as those Councils in the Greater Nottingham Area, included assumptions on new development coming forward through Local Plans.

²⁸ [Severn Trent Water Drainage and wastewater management plan](#)

Driver of change	Low demand future scenario	High demand future scenario
Climate change	2°C global warming	4°C global warming
Population growth	ONS data used to inform WwTW projections, local planning data used for sewerage modelling. Water consumption rates aligned to Water consumption rates aligned to Resources Management Plan projections.	ONS data used to inform WwTW projections, local planning data used for sewerage modelling. Water consumption rates aligned to Water consumption rates aligned to Resources Management Plan projections.
Urban creep	Industry standard best practice guidance	Industry standard best practice guidance
Policy/ statutory ambition	Aligned to the Defra 'Storm Overflows Discharge Reduction Plan' consultation of 10 activations	Aligned to the Defra 'Storm Overflows Discharge Reduction Plan' consultation of 10 activations

Figure 6.2 - Variables included in the modelling of the forecasted performance of the waste systems

- 6.7. The results from the modelling indicate that under a 2°C climate change scenario the increased intensity of storms is forecast to increase the number of properties at risk of internal flooding from sewers in the Severn Trent Water area by 39% from 111,956 properties (2025) to 155,998 properties (2050). This increases to 173,199 properties, marking a 55% increase, under a 4°C scenario. The additional climate change rainfall is also expected to increase the number of properties at risk from surface water flooding.
- 6.8. The storm overflow modelling indicates that under a 2°C climate change scenario, without intervention, the total volume of activations from all overflows could increase by 43% by 2050 in an average year. This would increase the total number of activations in an average year by 14%.
- 6.9. The modelled risk to wastewater treatment works is measured by banding each catchment area depending on the level of risk in line with the DWMP Framework (Band 0/1/2), where Band 0 is the lowest risk and Band 2 the highest risk. A higher risk is an indication of limited permit headroom and limited ability to increase treatment capacity. By 2050, assuming no upgrades, Severn Trent Water's assessment indicate that 15% of its wastewater treatment works will be in the highest risk band.
- 6.10. Severn Trent Water aspire by 2050 to get to zero internal flooding, a reduction in storm overflow activations to 10 or lower in an average year and to maintain wastewater treatment works are permit compliant. The DWMP sets out a best value plan to meet these aspirations. The plan is built up of the following activities:
- Internal Sewer Flooding Incidents: Comprising of a mix of asset health deterioration modelling to reduce incident risk driven by non-rainfall causes (blockages, collapses and equipment failure) plus an element of rainfall induced incidents associated with interventions to manage the risk of flooding in a 1 in 50-year storm.

- b) Pollution Risk: Driven by asset health modelling to reduce sources of pollution, principally sewer blockages, pumping station maintenance and collapses.
- c) Sewer Collapses: Driven by asset health deterioration modelling, with the intention to maintain level serviceability.
- d) Risk of internal flooding in a 1 in 50-year storm: Derived from best value optimisation of a balanced plan considering customer willingness to pay.
- e) Storm Overflows: a statutory requirement to meet the targets specified in the Storm Overflows Discharge Reduction Plan (2022).
- f) Wastewater Treatment Works Permit Compliance: a statutory requirement to ensure continued permit compliance.

Level 2 Strategic Planning Area Overview

- 6.11. The Lower Trent Strategic Planning Area (SPA) is aligned to the Trent Lower and Erewash River Basin Management Catchment. Within the SPA there are 107 wastewater treatment work catchments serving a residential population nearing 1,317,055 people and 535,699 properties, making it the 2nd largest SPA across Severn Trent Water's region.
- 6.12. The Soar SPA is aligned to the Soar River Basin Management Catchment. Within the SPA there are 58 wastewater treatment work catchments serving a residential population nearing 1,038,809 people and 382,756 properties making it the 4th largest SPA across Severn Trent Water's region.
- 6.13. When developing the best value, long term approach to managing the future risks within each catchment, Severn Trent Water assessed each catchment against a series of interventions which fall into three themes: optimise (optimising existing assets), remove (reduce demand by removing flow) and build (increase supply by building more capacity). The findings of the assessment suggested that for the Lower Trent SPA and the Soar SPA, the main interventions worth considering were increasing the supply of capacity within the wastewater network and looking at options to reduce inflow into the sewerage system through improved surface water inflow management.
- 6.14. From the assessment, Severn Trent Water have identified the following needs for the wastewater treatment work catchments within the Lower Trent SPA and the Soar SPA:

First Five Years:

- Continuation of river pledge (as set out in Get River Positive March 2023²⁹) and ensure Severn Trent Water do not cause any Reasons for Not Achieving

²⁹ [Get River Positive](#)

Good Status at water courses in the drainage area (overflow and treatment works).

- Compliance with the new Storm Overflow Discharge Reduction Plan targets for 2030 by implementing a balance of blue/green and grey engineering solutions, focusing on the Defra priority areas (Sites of Special Scientific Interest and Special Areas of Conservation) for removal of local ecological impact from assets (overflows and treatment works).
- Ensure that all overflows invested in have appropriate screening control in place to reduce aesthetic impact on watercourses.
- Implementation of interventions with regard to flood reduction such as a balance of blue/green and grey engineering solutions.
- Investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and guidance. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

Over the next 5 to 10 years:

- Compliance with the new Storm Overflow Discharge Reduction Plan targets for 2035 by implementing a balance of blue/green and grey engineering solutions focusing on the Defra priority areas (Eutrophic sensitive areas) for removal of local ecological impact from assets (overflows and treatment works).
- Ensure that all overflows invested in have appropriate screening control in place to reduce aesthetic impact on watercourses.
- Ensure continuation of flood risk reduction measures by implementing a balance of blue/green and grey engineering solutions.
- Investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and guidance. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

Over the next 10 to 25 years:

- Compliance with the new Storm Overflow Discharge Reduction Plan targets for 2050 by ensuring no overflow spilling more than 10 times per average year by reducing spill frequency by implementing a balance of blue/green and grey engineering solutions.
- Ensure all overflows in the system have appropriate screening controls in place to reduce aesthetic impact on the watercourses.
- Ensure flood risk reductions in the catchments by focusing on the medium and long term priority catchments within the DWMP best value plan with regard to

flooding by implementing a balance of blue/green and grey engineering solutions.

- Investigations in river quality including standard ecological, aesthetic and water quality chemical monitoring following the industry standards and guidance. Where any issues are found, pragmatic operational remediation will be implemented with more complex interventions planned and actioned in the next 5 year programme period.

7. Water Quality

- 7.1. The Water Framework Directive is the main law for water quality protection in England and Wales. It ensures an integrated approach to water management, respecting the integrity of whole ecosystems, by regulating individual pollutants and setting corresponding regulatory standards. It is based on a river basin district approach, and requires all rivers, lakes and groundwater to achieve 'good' status to prevent deterioration. Good status means both good chemical and good ecological status.
- 7.2. Water quality is an important indicator of the health of the water environment. Good quality water is vital for drinking, industry uses, recreation and for supporting a wide variety of wildlife. The chemical and ecological quality of water is affected by the management of abstraction from rivers and groundwaters and how effluent returns to them, and by the design and maintenance of navigation and flood control measures.

Humber River Basin Management Plan³⁰

- 7.3. The Greater Nottingham Area lies within the Humber River Basin district. The Humber River Basin district covers an area of 26,100 km² and extends from the West Midlands in the south, northwards to North Yorkshire and from Staffordshire in the west to parts of Lincolnshire and the Humber Estuary in the east. In total more than 10.8 million people live and work within the district.
- 7.4. The River Basin Plan for the Humber is made up of a collection of documents which describe how the waters are managed, with information on the River Basin presented in tables and maps. The River Basin Plan provides an assessment of the current condition of each water body and, if it is not in good condition, the reason why.
- 7.5. The majority of water bodies in the Great Nottingham Area have an objective of achieving an ecological 'good' status by 2027 and all water bodies in the Greater Nottingham Area have an objective of achieving a chemical 'good' status by 2027, although this is an extended deadline as the required improvements could not be made by the initial deadline of 2021. In many cases, the reason for not achieving the target sooner is that the required improvements are either technically infeasible or disproportionately expensive.
- 7.6. Irrespective of the current water body status objective, the long-term ecological and chemical objective remains 'aim to achieve good status'. Therefore, even if the current target status for a water body is less than good, proposals for new

³⁰ [Humber river basin management plan](#)

developments and strategic long-term planning processes should be designed to achieve good status.

Water Framework Directive Status

- 7.7. The Humber River Basin District contains 18 management catchments. The Greater Nottingham Area lies predominantly within the Lower Trent and Erewash management catchment, but also partially within the Soar management catchment.
- 7.8. Each management catchment is split into further operational catchments which provide a local level assessment of the water bodies against the WFD ecological and chemical 'good' status. Whilst localised, the operational catchments are based on the geography of the water bodies, not local authority boundaries, so the operational catchments that cover the Greater Nottingham Councils also cover other local authority areas. A review of the chemical and ecological statuses of the relevant operational catchments which cover the Greater Nottingham Area is provided below. The data was published in 2022.
- 7.9. All catchments in England received a chemical status of 'fail' due to a number of changes to the assessment of the chemical status of surface water bodies. The changes include new substances, new standards, and improved analytical techniques and methods. Due to these changes, all water bodies in England now receive a chemical status of fail.

Nottingham Urban Operational Catchment³¹

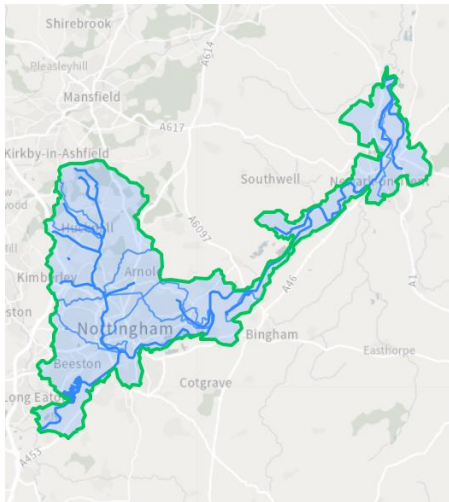


Figure 7.1- Map of the Nottingham Urban Operational Catchment (Environment Agency)

- 7.10. There is a total of 12 water bodies within the Nottingham Urban Operational Catchment.

Ecological status for surface waters				
Bad	Poor	Moderate	Good	High
1	2	7	2	0
Chemical status for surface waters				
Fail		Good		
12		0		

³¹ [Nottingham Urban Operational Catchment](#)

Nottinghamshire South A Operational Catchment³²

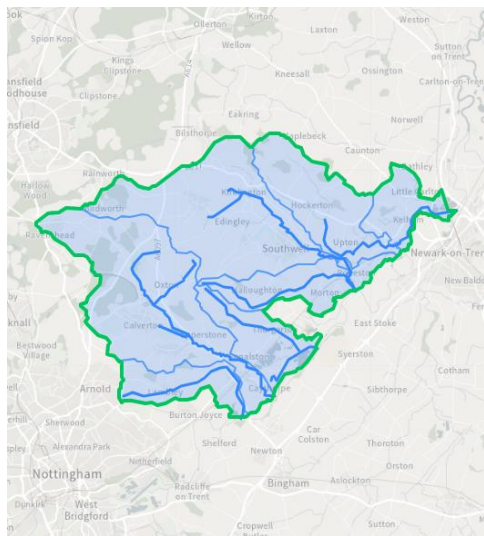


Figure 7.2- Map of Nottinghamshire South A Operational Catchment (Environment Agency)

- 7.11. There is a total of 7 water bodies in Nottinghamshire South A Operational Catchment.

Ecological status for surface waters				
Bad	Poor	Moderate	Good	High
0	2	4	1	0
Chemical status for surface waters				
Fail		Good		
7		0		

³² [Nottinghamshire South A Operational Catchment](#)

Nottinghamshire South B Operational Catchment³³

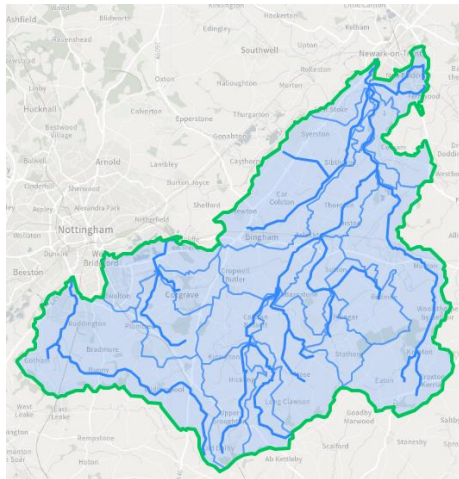


Figure 7.3- Map of Nottinghamshire South B Operational Catchment (Environment Agency)

- 7.12. There is a total of 16 water bodies in the Nottinghamshire South B Operational Catchment.

Ecological status for surface waters				
Bad	Poor	Moderate	Good	High
0	7	9	0	0
Chemical status for surface waters				
Fail		Good		
16		0		

³³ [Nottinghamshire South B Operational Catchment](#)

Erewash River Operational Catchment³⁴

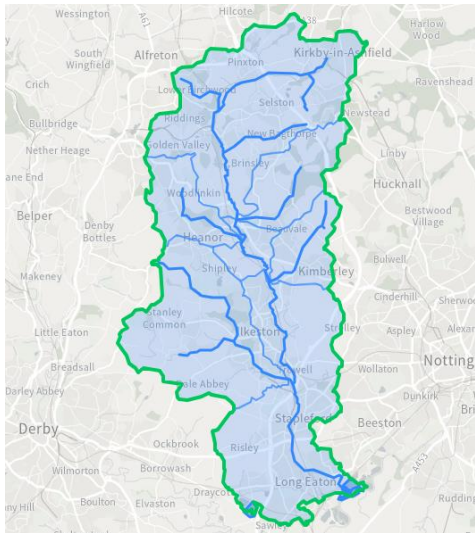


Figure 7.4- Map of Erewash River Operational Catchment (Environment Agency)

7.13. There is a total of 10 water bodies in Erewash River Operational Catchment.

Ecological status for surface waters				
Bad	Poor	Moderate	Good	High
1	5	4	0	0
Chemical status for surface waters				
Fail		Good		
10		0		

³⁴ [Erewash River Operational Catchment](#)

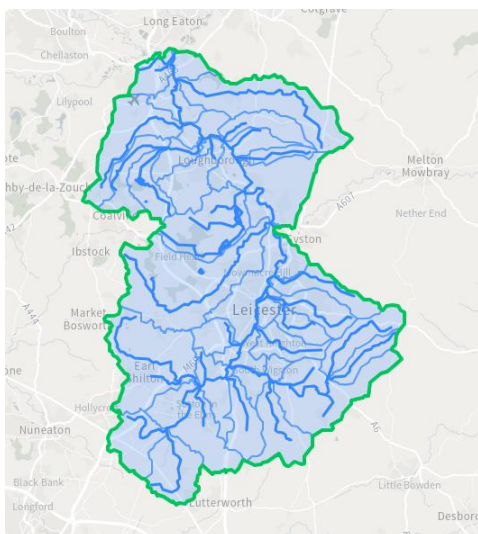
Soar River Operational Catchment³⁵

Figure 7.5- Map of Soar River Operational Catchment (Environment Agency)

There is a total of 35 water bodies in the Soar River Operational Catchment.

Ecological status for surface waters				
Bad	Poor	Moderate	Good	High
1	9	24	1	0
Chemical status for surface waters				
Fail		Good		
35		0		

- 7.14. Overall, there are 80 water bodies within the various Operational Catchments that cover the Greater Nottingham Area. As discussed above, all water bodies in England received a chemical status of 'fail'. Regarding ecological status, 3 were bad, 25 were poor, 48 were moderate and 4 were good. No water bodies received a 'high' status.
- 7.15. The data indicates that a majority of all water bodies in the Greater Nottingham Area are failing to meet the ecological and chemical 'good' status required by the WFD.
- 7.16. The River Basin Management Plan indicates a number of challenges that the Lower Trent and Erewash and the Soar management catchments face, including:
- Pollution from agriculture and rural areas – loading of nutrients, sediment and agricultural chemicals from rural areas alter aquatic ecosystem dynamics, lower resilience and reduce biodiversity;

³⁵ [Soar River Operational Catchment](#)

- Pollution from towns, cities and transport – urban areas are affected by polluted runoff from impermeable areas, roads and water treatment system discharges;
- Changes to the natural flow and water levels – changing climate, catchment practices and modification of river channels impact on flow levels and contribute to increased flood risk across the catchment;
- Physical modifications – heavily modified waterways and historical barriers alter flows, block fish passage and reduce biodiversity across the catchment;
- Pollution from wastewater – a majority of water bodies are failing due to point source pollution from wastewater.

8. Flooding

- 8.1. As discussed in Chapter 2, the Greater Nottingham Area is covered by two SFRA and an SFRA Addendum:
- River Leen and Day Brook SFRA (2008) – Black and Veach
 - Greater Nottingham SFRA (2010) – Black and Veach. This document provided updates to the six technical report volumes produced for the 2008 SFRA
 - Greater Nottingham SFRA Addendum (2017) – AECOM. This document refreshed the existing SFRA.
- 8.2. The Greater Nottingham Area has a long history of flooding. Following a flood event in 2000, the Environment Agency studied the flood risk over the entire length of the River Trent and its main tributaries. The Nottingham Trent Left Bank Flood Alleviation Scheme was designed to reduce the risk of flooding to homes and businesses along a 27km stretch of the River Trent. The scheme was completed and fully operational by 2012 and raised existing flood defences from Sawley to Colwick in order to provide a minimum 1 in 100 year Standard of Protection along the left bank of the River Trent. Works to defences near Wilford and West Bridgford on the River Trent right bank were completed as part of the West Bridgford Flood Alleviation Scheme in 2008. The areas covered by the schemes are illustrated below in Figure 8.1.

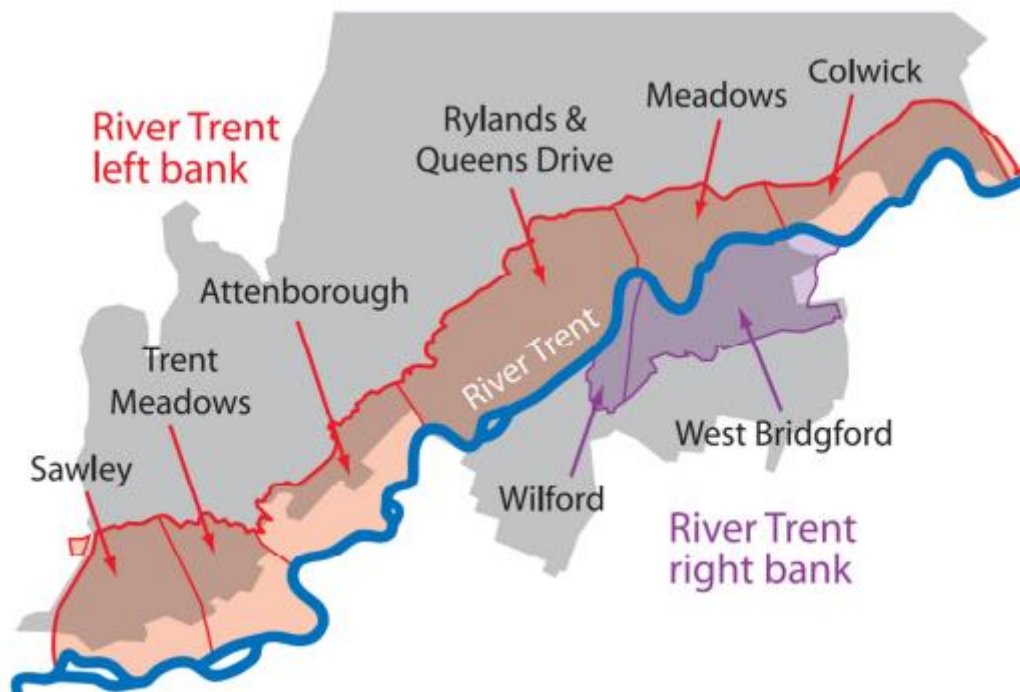


Figure 8.1- River Trent Left and Right Bank flood alleviation schemes³⁶

³⁶ [Greater Nottingham SFRA Addendum \(2017\) – AECOM](#)

- 8.3. Within Broxtowe Borough Council, there is a risk of flooding from other watercourses, predominantly the River Erewash but including others such as Boundary and Beauvale Brooks as well as the very significant risk to Attenborough, Rylands and Beeston from the River Trent.
- 8.4. Within Gedling Borough Council, there is a risk of flooding from other watercourses, predominantly from the Ouse Dyke, River Leen and the Day Brook.
- 8.5. Within Nottingham City, the floodplain of the River Trent contains thousands of properties at risk from flooding. There is also risk of flooding from other watercourses, predominantly the River Leen, but also including watercourses such as the Fairham Brook.
- 8.6. Within Rushcliffe Borough Council, there is a risk of flooding from other watercourses, predominantly the Greythorne Dyke and Fairham Brook but including others such as Adbolton and Polser Brooks as well as the very significant risk to West Bridgford and Wilford from the River Trent.
- 8.7. All four Councils within the Greater Nottingham Area also face a risk of flooding from sources other than rivers such as surface water runoff and highway drainage.
- 8.8. The Councils have provided an online mapping system which illustrates the flood extents from fluvial sources, pluvial sources and groundwater sources as well as the flood defences within the Greater Nottingham Area. These maps were provided as part of the SFRA, and updated in 2017 following the SFRA Addendum.

Sustainable Drainage Systems (SuDS)

- 8.9. The Flood and Water Management Act (2010) promoted an increased awareness of the management of surface water run-off from new development, and in March 2016 the National Technical Sustainable Drainage Systems Standards were released, which required a detailed Surface Water Management Strategy (SWMS) to be submitted to the Lead Local Flood Authority for all major development applications. The SWMS is expected to evidence how SuDS can be incorporated within the proposed development, demonstrating compliance with the Technical Standards.
- 8.10. SuDS are drainage solutions that provide an alternative to the direct channelling of surface water through networks of pipes and sewers to nearby watercourses. By mimicking natural drainage regimes, SuDS aim to reduce surface water flooding, improve water quality and enhance the amenity and biodiversity value of the environment. SuDS achieve this by lowering flow rates, increasing water storage capacity and reducing the transportation of pollution to the water environment.

- 8.11. The 2017 SFRA Addendum included recommendations to the Greater Nottingham Councils to promote the use of strategic, integrated and maintainable SuDS in all flood zones for both brownfield and greenfield sites, with space set-aside for SuDS in masterplans.

9. Identifying the Issues

- 9.1. The table below sets out a range of options available to the Councils of the Greater Nottingham Area to address the issues in the water cycle, as set out in the preceding sections of this Study. The information provided within these options have been used to inform the drafting of the Strategic Plan policies, while the Water Cycle Study itself will form part of the evidence base which supports the Strategic Plan.

Area of Focus	Method of Improvement via Local Planning Policy
Environmental	<p>Planning policies should, where it is feasible, require the provision of SuDS within all new developments as part of multifunctional Blue and Green Infrastructure. As discussed in Chapter 8, SuDS manage surface water by mimicking natural drainage systems, which can improve water quality by reducing pollutants from surface water runoff and enhancing the biodiversity of blue infrastructure. Planning policy and conditions imposed upon planning permissions would need to secure the management and maintenance of SuDS. Proposals for SuDS that involve infiltration will need to be discussed with the Environment Agency to understand potential impacts to the groundwater.</p> <p>More broadly, in addition to their recreational and biodiversity benefits, a policy requirement to provide multi-functional Blue and Green Infrastructure (green and open spaces) will offer opportunities to deliver natural infiltration of water into the ground, reducing surface water run-off and flooding and maintaining the natural water cycle.</p>
Social	<p>Planning policies should seek to protect and enhance multi-functional blue and green infrastructure, which maintain the water cycle, which should subsequently improve connectivity across the infrastructure network and improve accessibility for the public to enjoy and use for amenity purposes. These have benefits to both people's mental and physical health.</p>
Water Supply	<p>Communication between the Local Planning Authorities and Severn Trent Water as part of the</p>

Area of Focus	Method of Improvement via Local Planning Policy
	<p>Local Plan making process, and critically the Infrastructure Delivery Plan (which identifies the required infrastructure that will deliver development identified in the plan), can ensure that the proposed levels of growth align with the water supply, and can vice versa help inform and develop Severn Trent Water's infrastructure plans to match the future demand. Section 106 of the Water Industry Act (1991) can secure contributions which can also help facilitate connections to the water supply on individual developments.</p>
Water Demand	<p>Given the planned reductions in water abstraction from the Sherwood Sandstone aquifer and impacts of climate change, planning policies should encourage a reduction in water usage which should ease the pressure on demand. Policies to tackle this should include a requirement for higher water efficiency, water harvesting and smart metering to be included within all new dwellings. Non-domestic consumption should also be reduced through a requirement for higher water efficiency or through a requirement for all new developments to be designed to a high BREEAM standard.</p>
Water Quality	<p>As the 80 water bodies within the Greater Nottingham Area received a chemical status of 'fail', and only 4 received an ecological status of 'good' (the rest being either moderate, poor or bad), planning policies should look to help improve water quality to reach the 'good' status as required by the Water Framework Directive. As discussed in Chapter 8, SuDS manage surface water by mimicking natural drainage systems, which can improve water quality by reducing pollutants from surface water runoff and enhancing the biodiversity of blue infrastructure. Planning policies and planning conditions imposed upon planning permissions can require new developments that include water bodies within their boundary to include measures to protect and improve the water body, such as implementing a buffer zone around the water body which would</p>

Area of Focus	Method of Improvement via Local Planning Policy
	prevent development encroaching on it. This would reduce pollutants being discharged directly into the water body improving the water quality and the biodiversity of a water course.
Wastewater	Planning policies and conditions imposed upon planning permissions should require adequate wastewater treatment facilities to be delivered prior to the occupation of new development, or should limit the phasing of development to ensure that sufficient wastewater drainage is provided in conjunction with new development. Planning policy should also require the provision of SuDS within all new developments, which should increase the blue and green infrastructure network, contributing to meeting Severn Trent Water's Storm Overflow Discharge Reduction Plan.
Flood Risk and Drainage	The SFRA illustrates the areas most at risk of flooding, this should be used to inform planning policy allocations, to ensure proposed growth is located in areas least at risk of flooding. Planning policy should require the delivery of SuDS within all new developments, which reduce flood risk by increasing, where possible, water retention capacity during rainfall through attenuation ponds and swales.
Climate Change	Planning policies should help meet the challenges of climate change by encouraging new developments to accord with sustainable design principles such as improved water efficiency measures. The SFRA should help aid policy makers to locate proposed allocations in areas that are at the lowest risk of flooding. The SFRA also includes recommendations which should be conditioned to ensure new developments are adapted against the impacts of climate change, such as raising finished floor levels above flood levels including an allowance for climate change.

10. Conclusions

- 10.1. The National Planning Policy Framework requires strategic policies to set out an overall strategy for growth, whilst also making 'sufficient provision' for water supply, wastewater and flood risk infrastructure. To aid the delivery of sufficient provision, the Planning Practice Guidance states that a water cycle study can help Local Planning Authorities plan for sustainable growth, as it can provide evidence regarding environmental and infrastructure capacity within the area's water cycle.
- 10.2. This Water Cycle Study supports the development of the Greater Nottingham Strategic Plan and forms part of its evidence base. The four Councils that are involved with the Strategic Plan are: Broxtowe, Gedling, Nottingham City and Rushcliffe. The Greater Nottingham Strategic Plan sets out the vision for the area for the period 2023-2041, and will dictate the locations of growth for the area.
- 10.3. This Water Cycle Study seeks to ensure that the levels of growth forecast in the Strategic Plan are aligned with the strategies of the relevant water and sewerage provider (Severn Trent Water) so that sufficient resources are available to serve new residential and employment development. As part of the current Water Resource Management Plan (WRMP) 2019 and the draft WRMP 2024, Severn Trent Water state that they will communicate with the Local Authorities in their area to understand the level of growth anticipated, as well as reviewing relevant publications by the Local Authorities such as the adopted and draft Local Plan, the Plan's allocations, and any draft planning documents that indicate levels of future growth. The Strategic Plan and its evidence base have been publicly available for Severn Trent Water to review and include within their forecasting for water demand.
- 10.4. Currently, all four Councils are carrying forward strategic housing allocations from their adopted Core Strategies plus the Chetwynd Baracks strategic allocation in Broxtowe (which is allocated in the Part 2 Local Plan for a smaller number of dwellings) and the extension to Top Wighay in Gedling, with planning permission already secured on a majority of the sites. The Strategic Plan is also proposing two new strategic employment sites.
- 10.5. It is therefore anticipated that the Strategic Plan and its proposed allocations will have a limited impact upon the resources of Severn Trent, as the allocations of the Strategic Plan will not significantly increase the population in the Greater Nottingham Area compared to what was already anticipated from the 2014 Core Strategies and Part 2 Local Plans and hence will not significantly increase demand for water.
- 10.6. Whilst it is not anticipated that the Strategic Plan will impact the water resources, this Water Cycle Study has been developed to guarantee that all appropriate

measures are being secured within the Strategic Plan policies to meet the aspirations of Severn Trent Water as water and sewerage provider.

- 10.7. In respect of water supply, the Environment Agency's Abstraction Licensing Strategy for the Lower Trent and Erewash (which the Greater Nottingham Area largely falls within) confirms there is no additional water resource available for licensing over and above what is already licensed in the Greater Nottingham Area. Whilst there are opportunities for abstraction elsewhere in the Lower Trent and Erewash area, the Environment Agency, following investigation into the impact of abstraction on numerous water bodies, confirmed that Severn Trent Water will have to reduce abstraction at some of their boreholes abstracting from the primary aquifer in Nottinghamshire. This totals a reduction of 23.5 Ml/d below recent abstraction rates. The reductions in licences will come into effect by 2030.
- 10.8. Severn Trent Water, within their current Water Resource Management Plan (WRMP) 2019 acknowledges that groundwater is no longer appropriate as a long term supply option. The WRMP sets out a number of strategies that Severn Trent Water could utilise to increase supply, including halving leakages in their network by 2045, educating customers on water efficiency measures and increasing water meters in properties. Severn Trent Water are currently working on a draft WRMP. The draft WRMP sets out a preferred plan for meeting water demand, which similar to the existing WRMP, focuses on leakages, water efficiency measures and water meters.
- 10.9. In respect of wastewater, Severn Trent Water have developed a drainage and wastewater management plan (DWMP). The DWMP provided Strategic Planning Area overviews, with the Greater Nottingham Area predominantly lying within the Lower Trent area, and also the Soar area. When developing the best approach to managing future risks, Severn Trent Water assessed each area against a series of interventions. The findings of the assessment suggested that the main interventions worth considering were increasing the supply of capacity within the wastewater network and looking at options to reduce inflow into the sewerage system through improved surface water inflow management. This could include implementing a balance of blue/green and grey engineering solutions.
- 10.10. In respect of water quality, there are five operational catchments which cover the Greater Nottingham Area. The Environment Agency monitor the water quality within each catchment, with the long-term objective being "aim to achieve good status". Out of the 80 water bodies within the five catchments, only four achieve ecological 'good' status, and none achieve 'high'. All water bodies received a 'fail' for its chemical status.
- 10.11. The Environment Agency identified a number of challenges to the catchments, particularly pollution from multiple sources including agriculture, cities, transport

and wastewater. Changes to the natural flow and physical modifications also present challenges to improving the status of the water bodies.

- 10.12. The Water Cycle Study has ensured all relevant data from the necessary stakeholders has been gathered and considered. By incorporating the suggestions set out in Chapter 9, it is considered that the policies in the Strategic Plan aid the main stakeholders, Severn Trent Water and the Environment Agency, in the delivery of their Plans and contributes towards their targets.