Telford & Wrekin Council Stage 1 Scoping Water Cycle Study

Final Report

July 2021

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Revision History

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S3-P01 – July 2021	Draft Report	Hannah Post (TWC)
A1-C02 – July 2023	Final Report	Hannah Post (TWC)
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Contract

This report describes work commissioned by the Telford & Wrekin Council, on 13th April 2021. Hannah Booth and Richard Pardoe of JBA Consulting carried out this work.

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Purpose

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Acknowledgements

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Executive summary

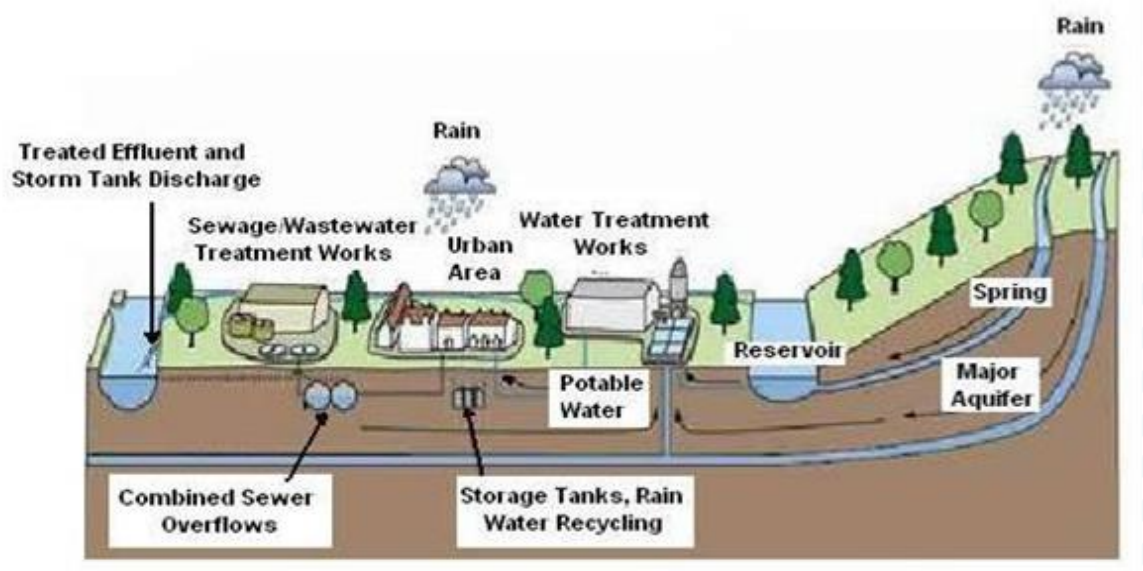
In April 2021, JBA Consulting was commissioned by Telford & Wrekin Council to undertake a Water Cycle Study (WCS) to inform the Telford & Wrekin Local Plan Review. This study assesses the potential issues relating to future development within Telford & Wrekin and the impacts on water supply, wastewater collection and treatment and water quality. The Water Cycle Study is required to assess the constraints and requirements that will arise from potential growth on the water infrastructure.

The majority of the work in this study was undertaken in 2021 based on the information available at the time. Stage 2 will build on the evidence presented in the Stage 1 report and update it where necessary.

New homes require the provision of clean water, safe disposal of wastewater and protection from flooding. The allocation of large numbers of new homes requires careful planning to ensure there are sufficient water resources, and available capacity in the water supply and wastewater network, protecting existing customers and the environment.

In addition to increased housing demand, future climate change presents further challenges to the existing water infrastructure network, including increased intensive rainfall events and a higher frequency of drought events. Sustainable planning for water must now take this into account. The water cycle can be seen in the figure below and shows how the natural and man-made processes and systems interact to collect, store or transport water in the environment.

The Water Cycle



Source: Environment Agency – Water Cycle Study Guidance

This study will assist Telford & Wrekin Council to select and develop sustainable development allocations where there is minimal impact on the environment, water quality, water resources, infrastructure and flood risk. This has been achieved by identifying areas where there may be conflict between any proposed development, the requirements of the environment and by recommending potential solutions to these conflicts.

Telford & Wrekin provided the sites submitted to the Council as part of their Call for Sites. These sites will be subject to a thorough assessment process, culminating in a shortlist of possible allocations. Allocations have not been decided at the time of writing. Available information was collated on water policy and legislation, water resources, water quality, and environmental designations within the study area. Growth already planned in the study area, and data provided

by Severn Trent Water was used to indicate the current capacity in wastewater treatment infrastructure.

The objective of the study is to provide evidence to guide development towards the most sustainable locations.

Water Resources

Severn Trent Water (STW) is responsible for supplying Telford & Wrekin with water. Telford & Wrekin is covered by the Shelton, Whitchurch and Wem, North Staffs, and Stafford Water Resource Zones (WRZ).

Severn Trent have stated that whilst growth during the Telford & Wrekin Local Plan review is likely to exceed what has been accommodated in their Water Resource Management Plan (WRMP), they have additional headroom to account for uncertainty in the plan, and the STW demand team will incorporate the latest growth forecast into the draft 2024 WRMP.

The strategic direction in the UK set out in the new National Water Resources Framework is to attain an average household water efficiency of 110 l/p/d by 2050. This also aligns with the recommendation in the River Basin Management Plan aimed at reducing the impact of abstraction. There would also be a positive economic impact for residents in terms of reduced energy and water bills.

It is therefore recommended that the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010 is adopted for Telford & Wrekin. Policies to reduce water demand from new developments, or to go further and achieve water neutrality in certain areas, could be defined to reduce the potential environmental impact of additional water abstractions in Telford & Wrekin, and also help to achieve reductions in carbon emissions. Severn Trent Water confirmed that they support this approach.

Water supply infrastructure

STW stated that having reviewed the potential development sites, they have no immediate concerns regarding impact on the water supply network.

Early developer engagement is required to ensure that, as development occurs within the study area, detailed modelling of water supply infrastructure will allow any upgrades to be completed without restricting the timing, location or scale of the planned development.

Wastewater collection infrastructure

STW provide wastewater services to Telford & Wrekin. Sewerage Undertakers have a duty under Section 94 of the Water Industry Act 1991 to provide sewerage and treat wastewater arising from new domestic development. Except where strategic upgrades are required to serve very large or multiple developments, infrastructure upgrades are usually only implemented following an application for a connection, adoption, or requisition from a developer. Early developer engagement with STW is therefore essential to ensure that sewerage capacity can be provided without delaying development.

Early engagement with STW is required, and further modelling of the network may be required at the planning application stage.

Wastewater treatment capacity

STW provided assessments of the Wastewater Treatment Works (WwTW) serving growth in each scenario based on hydraulic capacity and headroom in the environmental permit. JBA performed a flow permit assessment in parallel to this.

While the proposed growth in Telford & Wrekin can be accommodated at a number of WwTW, some treatment works could require upgrades to ensure growth can occur without causing the flow permits being exceeded.

Early engagement with STW would be required at the planning application stage to ensure that growth is aligned with provision of capacity at WwTW.

Odour

Any sites that are close enough to a WwTW should carry out an odour assessment as part of the planning application process. The cost of this should be met by the developer.

Water quality

An increase in the discharge of effluent from WwTW as a result of development and growth in the area which they serve can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD), a watercourse is not allowed to deteriorate from its current WFD classification (either the overall watercourse classification or for individual elements assessed).

This Stage 1 Scoping Study presents the current status of waterbodies within the study area and gathers the data required to model the impact of growth during the plan period on water quality. It is recommended that the modelling of water quality is carried out in a Stage 2 Outline Study.

Flood risk from additional foul flow

In catchments where a large growth in population is expected, and where the WwTW will discharge effluent to a small watercourse, the increase in discharged effluent might have a negative effect on the risk of flooding. An assessment will be carried out to quantify such an effect in the Stage 2 WCS, and where necessary mitigation options identified.

Environmental constraints

Development has the potential to cause an adverse impact on the environment through a number of routes, such as worsening of air quality, pollution to the aquatic environment, or disturbance to wildlife. In the context of a Water Cycle Study, the impact of development on the aquatic environment is under assessment.

A source-pathway-receptor approach can be taken to investigate the risk of an adverse impact on protected sites and identify where further assessment or action is required. The potential impacts of development on a number of protected sites such as Special Area of Conservation (SAC), Special Protection Areas (SPAs) SPAs, Sites of Special Scientific Interest (SSSIs) and Ramsar sites within, or downstream of the study area should be carefully considered in future plan making, as well as the large number of Priority Habitats and Priority Rivers. This Scoping Study identifies the protected sites that are downstream of a WwTW and may experience a deterioration in water quality during the plan period. It is recommended that modelling of this impact is carried out within a Stage 2 WCS.

Runoff from development sites is a potential source of diffuse pollution and could be managed through implementation of SuDS with a focus on treating the water quality of surface runoff from roads and development sites. Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity. In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk management, water quality improvement and habitat creation.

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Abbreviations / Glossary

ALS	Abstraction Licensing Strategy
AMP	Asset Management Plan
AMR	Automatic Meter Reading
AONB	Area of Outstanding Natural Beauty
AP	Assessment Point
ASNW	Ancient Semi-Natural Woodland
BIDS	Business, Industrial, distribution and Storage
BOD	Biochemical Oxygen Demand
BREEAM	Building Research Establishment Environmental Assessment Methodology
CAMS	Catchment Abstraction Management Strategies
CAPEX	Capital Expenditure
CED	Common End Date
CFMP	Catchment Flood Management Plan
CfSH	Code for Sustainable Homes
CSO	Combined Sewer Overflow
DCLG	Department of Communities and Local Government (Replaced by MHCLG)
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
EC	European Community
ECA	European Communities Act
EFI	Ecological Flow Indicator
EP	Environmental Permit
EU	European Union
FEH	Flood Estimation Handbook
FFT	Flow to Full Treatment
FWMA	Flood and Water Management Act
FZ	Flood Zone
GIS	Geographic Information Systems
HOF	Hands-Off Flow
HOL	Hands-off Level
HRA	Habitats Regulations Assessment
JBA	Jeremy Benn Associates
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
l/p/d	Litres per person per day
Ml/d	Mega (Million) litres per day
MHCLG	Ministry of Housing Communities and Local Government
NH4	Ammonia
NMP	Nutrient Management Plan
NPPF	National Planning Policy Framework
OAN	Objectively Assessed Need
OfWAT	Water Service Regulation Authority

OPEX	Operational Expenditure
OS	Ordnance Survey
P	Phosphorous
RAG	Red / Amber / Green assessment
RBD	River Basin District
RBMP	River Basin Management Plan
ReFH	Revitalised Flood Hydrograph
RoFSW	Risk of Flooding from Surface Water (replaced uFMfSW)
RQP	River Quality Planning tool
RZ	Resource Zone
SA	Sustainability Appraisals
SAC	Special Area of Conservation
SBP	Strategic Business Plan
SEA	Strategic Environmental Assessment
SfA	Sewers for Adoption
SFRA	Strategic Flood Risk Assessment
SHELAA	Strategic Housing and Economic Land Availability Assessment
SHMA	Strategic Housing Market Assessment
SPA	Special Protection Area
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SS	Suspended Solids
SSSI	Site of Special Scientific Interest
STW	Severn Trent Water
SU	Sewerage Undertaker
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TWC	Telford & Wrekin Council
TWLP	Telford & Wrekin Local Plan
UWWTD	Urban Waste Water Treatment Directive
WaSC	Water and Sewerage Company
WCS	Water Cycle Study
WFD	Water Framework Directive
WINEP	Water Industry National Environment Programme
WRMP	Water Resource Management Plan
WRZ	Water Resource Zone
WTW	Water Treatment Works
WwTW	Wastewater Treatment Works

1 Introduction

1.1 Terms of reference

JBA Consulting was commissioned by Telford & Wrekin Council to undertake a Scoping Water Cycle Study (WCS). The purpose of the WCS is to form part of a comprehensive and robust evidence base to inform the update of the Local Plan, which will set out a vision and framework for development in the area up to 2040 and will be used to inform decisions on the location of future development.

Unmitigated future development and climate change can adversely affect the environment and water infrastructure capability. A WCS will provide the required evidence, together with an agreed strategy to ensure that planned growth occurs within environmental constraints, with the appropriate infrastructure in place in a timely manner so that planned allocations are deliverable.

The majority of the work in this study was undertaken in 2021 based on the information available at the time. Stage 2 will build on the evidence presented in the Stage 1 report and update it where necessary.

1.2 The Water Cycle

Planning Practice Guidance on Water Supply, Wastewater and Water Quality[1] describes a water cycle study as:

"a voluntary study that helps organisations work together to plan for sustainable growth. It uses water and planning evidence and the expertise of partners to understand environmental and infrastructure capacity. It can identify joined up and cost-effective solutions, that are resilient to climate change for the lifetime of the development.

The study provides evidence for Local Plans and sustainability appraisals and is ideally done at an early stage of plan-making. Local authorities (or groups of local authorities) usually lead water cycle studies, as a chief aim is to provide evidence for sound Local Plans, but other partners often include the Environment Agency and water companies."

The Environment Agency's guidance on WCS[2] recommends a phased approach:

- Stage 1: Scoping study, identifies if the water infrastructure capacity could constrain growth and if there are any gaps in the evidence you need to make this assessment. The scoping study will identify:
    - The area and amount of proposed development
    - the existing evidence
    - main partners to work with
    - evidence gaps and constraints on growth
- Stage 2: Detailed study, to provide the evidence to inform an integrated water management strategy. It will identify the water and flood management infrastructure that will mitigate the risks from too little or too much water. It will also identify what you need to do to protect and enhance the water environment.

Figure 1.1 below shows the main elements that compromise the Water Cycle and shows how the natural and man-made processes and systems interact to collect, store or transport water in the environment.

1 Planning Practice Guidance: Water supply, wastewater and water quality, Department for Communities and Local Government (2014). Accessed online at: http://planningguidance.planningportal.gov.uk/blog/guidance/ on: 05/07/2021

2 Water Cycle Study Guidance, Environment Agency (2021). Accessed online at: https://www.gov.uk/guidance/water-cycle-studies on: 10/06/2021

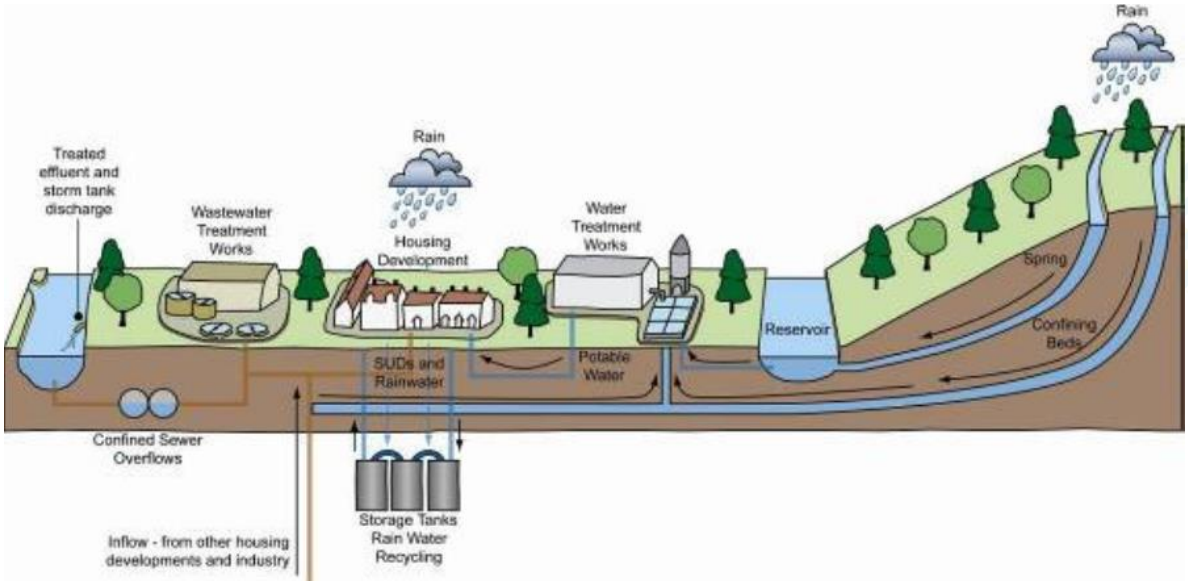


Figure 1.1 The Water Cycle

1.3 Impacts of Development on the Water Cycle

New homes require the provision of clean water, safe disposal of wastewater and protection from flooding. Allocating large numbers of new homes requires careful planning to ensure there are sufficient water resources, and available capacity in the water supply and wastewater network, protecting existing customers and the environment. Climate change presents further challenges such as increased intensity and frequency of rainfall and a higher frequency of drought events that can be expected to put greater pressure on the existing infrastructure.

1.4 Objectives

As a WCS is not a mandatory document, Local Planning Authorities are advised to prioritise the different stages of the WCS to integrate with their Local Plan programme. This scoping report is written to support the Telford & Wrekin Local Plan Review.

The WCS brief from Telford & Wrekin Council stated that the overall objective of the WCS is to understand the environmental and physical constraints of development and identify opportunities for more sustainable planning and improvements that may be required to achieve the required level of development. This should be assessed by considering the following issues:

- Water demand and supply;
- Wastewater infrastructure and treatment;
- Water quality and the environment;
- Flood risk and drainage.

1.5 Study Area

Telford & Wrekin Council covers an area of approximately 290km^2 of which 72km^2 is made up of the Telford urban area. The borough has a population of 175,800 (based on 2017 data). Over 80% of residents live in the Telford urban area, a collection of several centres which were brought together as a New Town making a single urban area. The town has a rich industrial past and continues to provide the largest and most extensive employment areas in the borough. Over 60% of the borough is rural and this area includes several named settlements which range from a small cluster of buildings to larger villages with a range of facilities.

Several Environment Agency designated main rivers flow through Telford & Wrekin. The borough contains the River Severn, Meese, Rode, Strine, Strine Brooks, Tern, Commission Drain, Hurley Brook, and Coalbrook.

Water supply and wastewater services are provided by Severn Trent Water (STW).

1.6 Record of Engagement

1.6.1 Introduction

Preparation of a WCS requires significant engagement with stakeholders, within the Local Planning Authority area, with water and wastewater utilities, with the Environment Agency, and where there may be cross-boundary issues, with neighbouring local authorities. This section forms a record of engagement for the WCS.

1.6.2 Engagement

The preparation of this WCS was supported by the following engagement:

Inception meeting

Engaged Parties	Telford & Wrekin Council Environment Agency
Details	Scope of works and data collection requirements.

Neighbouring authorities

Engaged Parties	Shropshire County Council South Staffordshire Council Stafford Borough Council
Details	Request for water cycle studies conducted in their area, and housing growth that would be served by WwTW within or shared with Telford & Wrekin Council.

Collaboration with Water Companies

Engaged Parties	Severn Trent Water
Details	Water company assessments of water and wastewater infrastructure and capacity constraints.

2 Future Growth in Telford & Wrekin

2.1 Growth in Telford & Wrekin

The Telford & Wrekin Local Plan (TWLP) was adopted in January 2018 and allocates 148 ha of employment land alongside the housing requirement of 17,280 dwellings (864 dwellings per year) for the Plan period 2011-2031. A significant proportion of this employment and housing growth has already been delivered through allocations and commitments.

In order to meet future housing and employment land requirements as well as recent revisions to national planning policy and guidance, and the obligation to review Local Plans within a five-year period from adoption, the Council is proposing to review the current Local Plan. The Council formally commenced the Review in January 2020. Telford & Wrekin Council are proposing to extend the local plan period to 2040.

Analysis for this study is based on the figures below, the housing numbers are the middle population led scenario consulted on at the Issues & Options stage of the plan process. It must be noted that at this point the Council has not yet determined a final housing requirement and regular monitoring carried out by the Council means that the figures (as well as the windfall allowances) may change after this report is published.

Table 2.1 Calculation of TWC's Housing Requirement (as at 21st March 2021)

Housing Need	Annual housing need figure 2020 to 2040	Total housing supply = Housing need + contingency of 300 homes over plan period	Annual supply of new homes to be found through housing land allocations = 9,679 + 300
19,540	977 per annum	19,840	499 per annum

Table 2.2 TWC's Employment Requirement (from Issues and Options consultation)

	Economic growth (ha)	Past trends (ha)
Employment land requirement	167	189
Current employment land supply	90	90
Net employment land requirement	77	99

Source: Issues and Options consultation[3]

The TWLP proposes an urban-focused distribution of development as part of their preferred options consultation with the majority being in Telford Centre and Newport.

2.2 Distribution of future development in Telford & Wrekin

TWC are considering the spatial growth options and provided a long list of potential development sites from the Call for Sites which indicate the locations in the study area where growth is likely to be focused. These sites will be subject to a thorough assessment process, culminating in a shortlist of possible allocations. Allocations have not been decided at the time of writing. An urban-focused distribution, with growth focused around Telford and Newport is the most likely scenario.

3 Issues and Options Consultation, TWC 2020. Accessed online at: https://www.telford.gov.uk/downloads/file/15577/local_plan_review_-_issues_and_option_consultation_document on: 10/07/2023

Development sites already in the planning system, or allocated in the adopted local plan, have been provided by TWC and used to form a baseline growth scenario to assess current capacity in water infrastructure.

2.3 Windfall

Windfall sites are sites that have not been specifically allocated in the Local Plan. Local Plans usually provide an allowance to cover this circumstance, consistent with the National Planning Policy Framework (NPPF).

The windfall allowance of 850 homes was advised by Telford & Wrekin Council. This may change as a result of subsequent monitoring.

2.4 Growth outside Telford & Wrekin

Where growth within a neighbouring Local Planning Authority (LPA) area may be served by infrastructure within or shared with Telford & Wrekin, the LPA were contacted as part of a duty to cooperate request to provide information on:

- The latest growth forecast (housing and employment) for the district
- Details of future growth within the catchments of WwTW which serve part of their council area and Telford & Wrekin.

Where specific trajectory was not given by the neighbouring councils, committed development was assumed to be spread evenly over the next five years (2020/21 to 2024/25) and Local Plan development was spread evenly from 2020/21 to the end of the Local Plan period.

2.4.1 Shropshire County Council

JBA has completed the WCS for the Shropshire County Council. Two WwTWs serve both Shropshire and TWC – Coalport and Monkmoor.

Table 2.3 Summary of growth in the Shropshire County served by infrastructure shared with Telford & Wrekin

WwTW	Proposed number of dwellings	Period
Coalport	7,782	2016-2038
Monkmoor	8,145	2016-2038

2.4.2 Stafford and South Staffordshire Districts

The Stafford and South Staffordshire Districts do not share any significant water or wastewater infrastructure with Telford & Wrekin and therefore growth in these authorities has not been considered as part of this study.

3 Legislative and Policy Framework

3.1 Introduction

The following sections introduce several national, regional and local policies that must be considered by the LPA, water companies and developers during the planning stage. Key extracts from these policies relating to water consumption targets and mitigating the impacts on the water from the new development are summarised below.

3.2 National Policy

3.2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[4] was published on 27th March 2012, as part of reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. A comprehensive revision was issued in July 2018. This was further revised in February 2019[5], but the changes were not significant from the July 2018 version for policy areas relevant to the WCS. The NPPF provides guidance to planning authorities to take account of flood risk and water and wastewater infrastructure delivery in their Local Plans. Key paragraphs include:

Paragraph 34:

> *"Plans should set out the contributions expected from development. This should include setting out the levels and types of affordable housing provision required, along with other infrastructure (such as that needed for education, health, transport, flood and water management, green and digital infrastructure). Such policies should not undermine the deliverability of the plan."*

Paragraph 149:

> *"Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply..."*

Paragraph 170 (e):

> *"…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".*

4 National Planning Policy Framework, Department for Communities and Local Government (2012)
5 National Planning Policy Framework, Ministry of Housing, Communities and Local Government (2019). Accessed online at: https://www.gov.uk/government/publications/national-planning-policy-framework--2 on: 12/06/2021

In March 2014, the Planning Practice Guidance was issued by the Department for Communities and Local Government, with the intention of providing guidance on the application of the National Planning Policy Framework (NPPF) in England. The MHCLG is in the process of updating the Guidance to consider the necessary 2018 and 2019 updates of the NPPF. Of the sections relevant to this study, only the Water Supply, Wastewater and Water Quality section has been updated.

- Flood Risk and Coastal Change[6]
- Water Supply, Wastewater and Water Quality[7].
- Housing - Optional Technical Standards[8].

3.2.2 Planning Practice Guidance: Flood Risk and Coastal Change

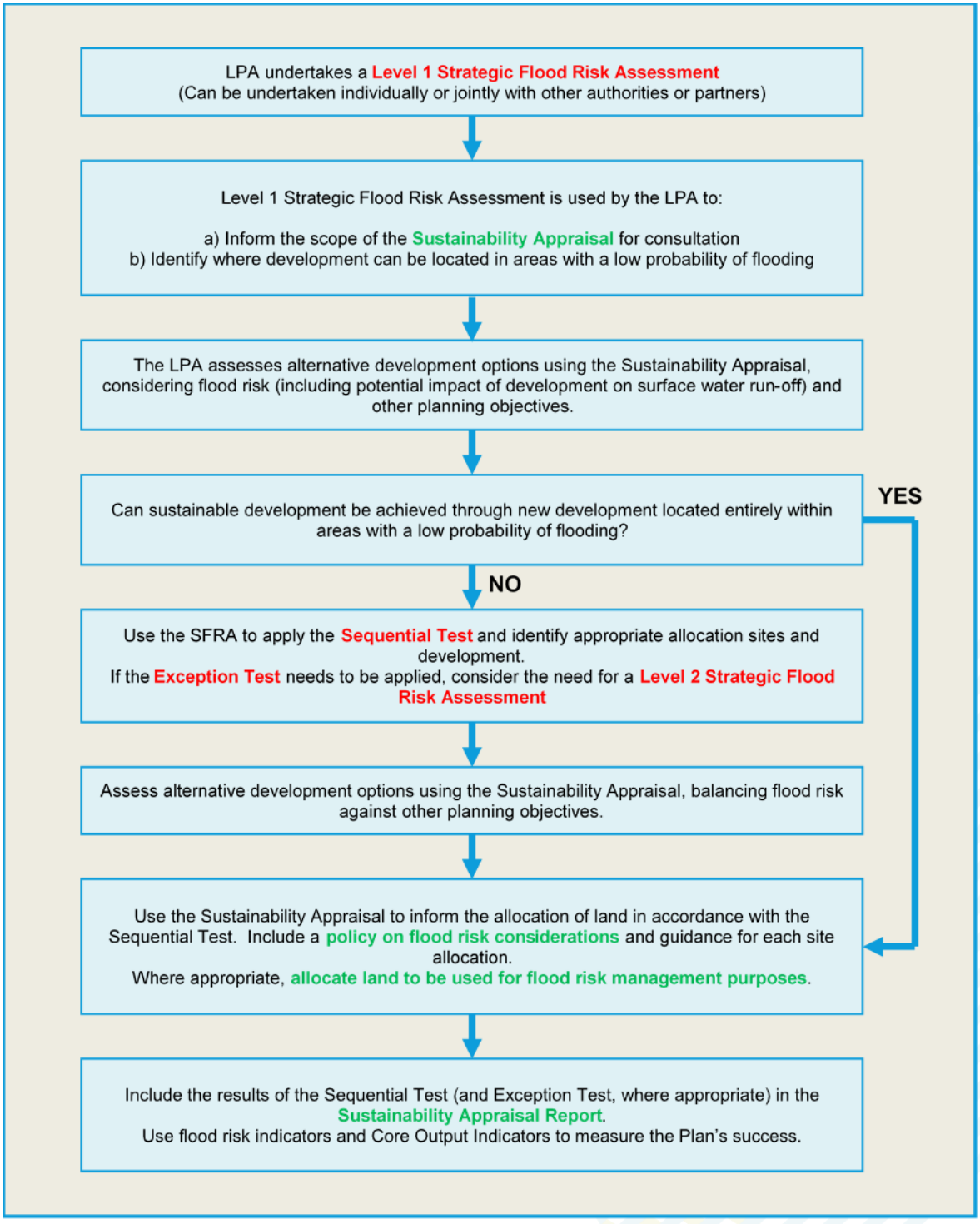
Diagram 1 in the Planning Practice Guidance sets out how flood risk should be considered in the preparation of Local Plans (Figure 3.1). These requirements are addressed principally in the Council's Strategic Flood Risk Assessment.

3.2.3 Planning Practice Guidance: Water Supply, Wastewater and Water Quality

A summary of the specific guidance on how infrastructure, water supply, wastewater and water quality considerations should be accounted for in both plan-making and planning applications is summarised below in Figure 3.2.

6 Planning Practice Guidance: Flood Risk and Coastal Change, Department for Communities and Local Government (2014). Accessed online at: http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/ on: 12/06/2021.
7 Planning Practice Guidance: Water supply, wastewater and water quality, Department for Communities and Local Government (2014). Accessed online at: https://www.gov.uk/guidance/water-supply-wastewater-and-water-quality on: 12/06/2021
8 Planning Practice Guidance: Housing - Optional Technical Standards, Department for Communities and Local Government (2014). Accessed online at: https://www.gov.uk/guidance/housing-optional-technical-standards on: 12/06/2021

Figure 3.1 Flood Risk and the Preparation of Local Plans[9]



9 Based on Diagram 1 of NPPF Planning Practice Guidance: Flood Risk and Coastal Change (paragraph 004, Reference ID: 7-021-20140306

Figure 3.2 PPG: Water supply, wastewater and water quality considerations for plan-making and planning applications

	Plan-making		Planning applications
Infrastructure	Identification of suitable sites for new or enhanced infrastructure. Consider whether new development is appropriate near to water and wastewater infrastructure. Phasing new development so that water and wastewater infrastructure will be in place when needed.	→	Wastewater considerations include: First presumption is to provide a system of foul drainage discharging into a public sewer. Phasing of development and infrastructure. Circumstances where package sewage treatment plants or septic tanks are applicable.
Water supply	Not Specified	→	Planning for the necessary water supply would normally be addressed through the Local Plan, exceptions might include: Large developments not identified in Local Plans; Where a Local Plan requires enhanced water efficiency in new developments.
Water quality	How to help protect and enhance local surface water and groundwater in ways that allow new development to proceed and avoids costly assessment at the planning application stage. The type or location of new development where an assessment of the potential impacts on water bodies may be required. Expectations relating to sustainable drainage systems.	→	Water quality is only likely to be a significant planning concern when a proposal would: Involve physical modifications to a water body; Indirectly affect water bodies, for example as a result of new development such as the redevelopment of land that may be affected by contamination etc. or through a lack of adequate infrastructure to deal with wastewater.
Wastewater	The sufficiency and capacity of wastewater infrastructure. The circumstances where wastewater from new development would not be expected to drain to a public sewer.	→	If there are concerns arising from a planning application about the capacity of wastewater infrastructure, applicants will be asked to provide information about how the proposed development will be drained and wastewater dealt with.
Cross-boundary concerns	Water supply and water quality concerns often cross local authority boundaries and can be best considered on a catchment basis. Recommends liaison from the outset.	→	No specific guidance (relevant to some developments).
SEA and Sustainability	Water supply and quality are considerations in strategic environmental assessment and sustainability appraisal ... sustainability appraisal objectives could include preventing deterioration of current water body status, taking climate change into account and seeking opportunities to improve water bodies.	→	No specific guidance (should be considered in applications).

3.2.4 Planning Practice Guidance: Housing – Optional Technical Standards

This guidance, advises planning authorities on how to gather evidence to set optional requirements, including for water efficiency. It states that "all new homes already have to meet the mandatory national standard set out in the Building Regulations (of 125 litres/person/day). Where there is a clear local need, local planning authorities can set out Local Plan policies requiring new dwellings to meet the tighter Building Regulations optional requirement of 110 litres/person/day. Planning authorities are advised to consult with the EA and water companies to determine where there is a clear local need, and also to consider the impact of setting this optional standard on housing viability. A 2014 study[10] into the cost of implementing sustainability measures in housing found that meeting a standard of 110 litres per person per day would cost only £9 for a four-bedroom house. The evidence for adopting the optional requirements is outlined in section 4.4.

3.2.5 Building Regulations

The Building Regulations (2010) Part G[11] was amended in early 2015 to require that all new dwellings must ensure that the potential water consumption must not exceed 125 litres/person/day, or 110 litres/person/day where required under planning conditions.

3.2.6 BREEAM

The Building Research Establishment (BRE) publish an internationally recognised environmental assessment methodology for assessing, rating and certifying the sustainability of a range of buildings.

New homes are most appropriately covered by the Home Quality Mark[12], and commercial, leisure, educational facilities and mixed-use buildings by the Building Research Establishment Environmental Assessment Methodology (BREEAM) UK New Construction Standard[13].

Using independent, licensed assessors, BREEAM/HQM assesses criteria covering a range of issues in categories that evaluate energy and water use, health and wellbeing, pollution, transport, materials, waste, ecology and management processes.

In the Homes Quality Mark, 400 credits are available across 11 categories and lead to a star rating. 18 credits are available for water efficiency and water recycling. A greater number of credits are awarded for homes using water efficient fittings (with the highest score achieving 100l/p/d or less), and further credits are awarded for the percentage of water used in toilet flushing that is either sourced from rainwater or from grey water.

The BREEAM New Construction Standard awards credits across nine categories, four of which are related to water: water consumption, water monitoring, leak detection and water efficient equipment. This leads to a percentage score and a rating from "Pass" to "Outstanding".

The Councils have the opportunity to seek BREEAM or HQM status for all new, residential and non-residential buildings.

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10 Housing Standards Review: Cost Impacts, Department for Communities and Local Government (2014). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/353387/021c_Cost_Report_11th_Sept_2014_FINAL.pdf on: 05/07/2021

11 The Building Regulations (2010) Part G - Sanitation, hot water safety and water efficiency, 2015 edition with 2016 amendments. HM Government (2016). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/504207/BR_PDF_AD_G_2015_with_2016_amendments.pdf on: 05/07/2021

12 Home Quality Mark, BRE, (2018). Accessed online at: https://www.homequalitymark.com/professionals/standard/ on: 05/07/2021

13 2 BREEAM UK New Construction, BRE, (2018). Accessed online at: https://www.breeam.com/NC2018/ on: 05/07/2021

3.2.7 Sustainable Drainage Systems (SuDS)

From April 2015, Local Planning Authorities (LPA) have been given the responsibility for ensuring that sustainable drainage is implemented on developments of 10 or more homes or other forms of major development through the planning system. Under the new arrangements, the key policy and standards relating to the application of SuDS to new developments are:

- The National Planning Policy Framework, which requires that development in areas already at risk of flooding should give priority to sustainable drainage systems.
- The House of Commons written statement[14] setting out governments intentions that LPAs should "ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate" and "clear arrangements in place for ongoing maintenance over the lifetime of the development." This requirement is also now incorporated in the 2019 update of the NPPF (paragraph 165). In practice, this has been implemented by making Lead Local Flood Authorities (LLFAs) statutory consultees on the drainage arrangements of major developments.
- The Defra non-statutory technical standards for sustainable drainage systems[15]. These set out the government's high-level requirements for managing peak flows and runoff volumes, flood risk from drainage systems and the structural integrity and construction of SuDS. This very short document is not a design manual and makes no reference to the other benefits of SuDS, for example water quality, habitat and amenity.
- Telford & Wrekin Council is the LLFA in the area and play a key role in ensuring that the proposed drainage schemes for all new developments comply with technical standards and policies in relation to SuDS. Telford & Wrekin Council's "Sustainable Drainage Systems (SuDS) Handbook"[16] and contains guidance for the design and application of SuDS in Telford & Wrekin.
- An updated version of the CIRIA SuDS Manual[17] was published in 2015. The guidance covers the planning, design, construction and maintenance of SuDS for effective implementation within both new and existing developments. The guidance is relevant for a range of roles with the level of technical detail increasing throughout the manual. The guidance does not include detailed information on planning requirements, SuDS approval and adoption processes and standards, as these vary by region and should be checked early in the planning process.
- CIRIA also publish "Guidance on the Construction of SuDS" (C768)[18], which contains detailed guidance on all aspects of SuDS construction, with specific information on each SuDS component available as a downloadable chapter.
- As of April 2020, the new Design and Construction Guidance (DCG)[19] came into force in England. This contains details of the water sector's approach to the adoption of SuDS, which meet the legal definition of a sewer. The guidance

14 Sustainable drainage systems: Written statement - HCWS161, UK Government (2014). Accessed online at: http://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2014-12-18/HCWS161/ on: 05/07/2021

15 Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems, Defra (2015). Accessed online at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards on: 05/07/2021

16 Sustainable Drainage Systems (SuDS) Handbook, Telford & Wrekin Council (2019). Accessed online at: https://www.telford.gov.uk/downloads/file/10412/sustainable_drainage_systems_suds_handbook on: 23/06/2021

17 The SuDS Manual (C753), CIRIA (2015).

18 Guidance on the Construction of SuDS (C768), CIRIA (2017), Accessed online at: https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK on: 05/07/2021

19 Water UK (2020) Sewerage Sector Guidance: Appendix C Design and Construction Guidance version 2. Accessed online at https://www.water.org.uk/sewerage-sector-guidance-approved-documents/ on 05/07/2021.

replaces the former, voluntary Sewers for Adoption guidance, as compliance by water companies in England is now mandatory.

3.3 Regional Policy

3.3.1 Catchment Flood Management Plans

Catchment Flood Management Plans (CFMP) are high level policy documents covering large river basin catchments. They aim to set policies for sustainable flood risk management for the whole catchment covering the next 50 to 100 years. The borough sits in the River Severn CFMP[20].

3.3.2 Surface Water Management Plans (SWMPs)

SWMPs outline the preferred surface water management strategy in a given location and establish a long-term action plan to manage surface water. SWMPs are undertaken, when required, by LLFAs in consultation with key local partners who are responsible for surface water management and drainage in their area. There are currently no surface water management plans for the Telford & Wrekin Borough, with the previous Plan superseded by the LLFA FRMS.

3.3.3 Water Resource Management Plans

Water Resource Management Plans (WRMPs) are 25-year strategies that water companies are required to prepare, with updates every five years. In reality, water companies prepare internal updates more regularly. WRMPs are required to assess:

- Future demand (due to population and economic growth)
- Future water availability (including the impact of sustainability reductions)
- Demand management and supply-side measures (e.g. water efficiency and leakage reduction, water transfers and new resource development)
- How the company will address changes to abstraction licences
- How the impacts of climate change will be mitigated

Where necessary, they set out the requirements for developing additional water resources to meet growing demand and describe how the balance between water supply and demand will be balanced over the period 2015 to 2040.

- Using cost-effective demand management, transfer, trading and resource development schemes to meet growth in demand from new development and to restore abstraction to sustainable levels.
- In the medium to long term, ensuring that sufficient water continues to be available for growth and that the supply systems are flexible enough to adapt to climate change.

The Severn Trent WRMP covers Telford & Wrekin and is reviewed in section 4.

3.4 Local Policy

3.4.1 Localism Act

The Localism Act (2011) changes the powers of local government, it re-distributes the balance of decision making from central government back to councils, communities and individuals. In relation to the planning of sustainable development, provision 110 of the Act places a duty to cooperate on Local Authorities. This duty requires Local Authorities to *"engage constructively, actively and on an ongoing basis in any process by means of*

20 River Severn Catchment Flood Management Plan, Environment Agency (2009). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/289103/River_Severn_Catchment_Management_Plan.pdf on: 05/07/2021

which development plan documents are prepared so far as relating to a strategic matter"[21].

The Localism Act also provides new rights to allow local communities to come together and shape the development and growth of their area by preparing Neighbourhood Development Plans, or Neighbourhood Development Orders, where the ambition of the neighbourhood is aligned with strategic needs and priorities for the area. This means that local people can decide where new homes and businesses should go and also what they should look like. As neighbourhoods draw up their proposals, Local Planning Authorities are required to provide technical advice and support.

3.5 International Environmental Policy

3.5.1 Ramsar

The Convention on Wetlands of International Importance, more commonly known as the Ramsar convention after the city where it was signed in 1971, aims to protect important wetland sites. Under the treaty, member counties commit to:

- Wise use of all their wetlands
- Designating sites for the Ramsar list of "Wetlands of International Importance" (Ramsar Sites) and their conservation
- Cooperating on transboundary wetlands and other shared interests.

"Wise use" of wetlands is defined under the convention as "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". A handbook on the wise use of wetlands is available from the Ramsar Convention Secretariat[22].

Ramsar Sites are designated by the National Administrative Authority, responsible for the Ramsar Convention in each country. In the case of the UK this is the Joint Nature Conservation Committee (JNCC).

In general, the designation of UK Ramsar sites is underpinned through prior notification of these areas as Sites of Special Scientific Interest (SSSIs) and as such receive statutory protection under the Wildlife and Countryside Act 1981 (as amended). More recently, Paragraph 176 of the NPPF states that Ramsar sites should be given the same protection in the planning process as sites designated under the EU Habitats Directive.

3.6 European Environmental Policy

3.6.1 Urban Wastewater Treatment Directive (UWWTD)

The UWWTD[23] is an EU Directive that concerns the collection, treatment and discharge of urban wastewater and the treatment and discharge of wastewater from certain industrial sectors. The objective of the Directive is to protect the environment from the adverse effects of wastewater discharges. More specifically Annex II A(a) sets out the requirements for discharges from urban wastewater treatment plants to sensitive areas which are subject to eutrophication. The Directive has been transposed into UK legislation through enactment of the Urban Waste Water Treatment (England and Wales) Regulations 1994 and 'The Urban Waste Water Treatment (England and Wales) (Amendments) Regulations 2003'.

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21 Localism Act 2011: Section 110, UK Government (2011). Accessed online at: http://www.legislation.gov.uk/ukpga/2011/20/section/110 on: 05/07/2021

22 Wise use of wetlands, Ramsar Convention Secretariat (2010). Accessed online at: c on: 05/07/2021

23 UWWTD. Accessed online at: https://ec.europa.eu/environment/water/water-urbanwaste/index_en.html On: 05/07/2021

3.6.2 Habitats Directive

The EU Habitats Directive aims to protect the wild plants, animals and habitats that make up our diverse natural environment. The directive created a network of protected areas around the European Union of national and international importance called Natura 2000 sites. These include:

- Special Areas of Conservation (SACs) - support rare, endangered or vulnerable natural habitats, plants and animals (other than birds).
- Special Protection Areas (SPAs) - support significant numbers of wild birds and habitats.

Special Protection Areas and Special Areas of Conservation are established under the EC Birds Directive and Habitats Directive respectively. The directive also protects over 1,000 animals and plant species and over 200 so called "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

3.6.3 The Water Framework Directive

The Water Framework Directive (WFD) was first published in December 2000 and transposed into English and Welsh law in December 2003. It introduced a more rigorous concept of what "good status" should mean than the previous environmental quality measures. The WFD estimated that 95% of water bodies were at risk of failing to meet "good status".

River Basin Management Plans (RBMP) are required under the WFD and document the baseline classification of each waterbody in the plan area, the objectives, and a programme of measures to achieve those objectives. Telford & Wrekin falls mostly within the Severn River Basin District (RBD)[24]. Under the WFD the RBMPs, which were originally published in December 2009 were reviewed and updated in December 2015. A primary WFD objective is to ensure 'no deterioration' in environmental status, therefore all water bodies must meet the class limits for their status class as declared in the Severn River Basin Management Plan. Another equally important objective requires all water bodies to achieve good ecological status. Future development needs to be planned carefully so that it helps towards achieving the WFD and does not result in further pressure on the water environment and compromise WFD objectives. The WFD objectives as outlined in the updated RBMPs are summarised below:

- Prevent deterioration of the status of surface waters and groundwater
- Achieve objectives and standards for protected areas
- Achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status
- Reverse any significant and sustained upward trends in pollutant concentrations in groundwater
- Stop discharges/emissions of priority hazardous substances into surface waters
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants

Local Planning Authorities (LPAs) must have regard to the Water Framework Directive as implemented in the Environment Agency's River Basin Management Plans. It is of primary importance when assessing the impact of additional wastewater flows on local river quality.

24 Severn River Basin District River Basin Management Plan: 2015, Environment Agency (2015). Accessed at: https://www.gov.uk/government/publications/severn-river-basin-district-river-basin-management-plan on: 05/07/2021

3.6.4 Protected Area Objectives

The WFD specifies that areas requiring special protection under other EC Directives, and waters used for the abstraction of drinking water, are identified as protected areas. These areas have their own objectives and standards.

Article 4 of the WFD required Member States to achieve compliance with the standards and objectives set for each protected area by 22 December 2015, unless otherwise specified in the Community legislation under which the protected area was established. Some areas may require special protection under more than one EC Directive or may have additional (surface water and/or groundwater) objectives. In these cases, all the objectives and standards must be met.

The types of protected areas are:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas)
- Areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish)
- Bodies of water designated as recreational waters, including Bathing Waters;
- Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive (UWWTD)
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites

Many WFD protected areas coincide with water bodies; these areas will need to achieve the water body status objectives in addition to the protected area objectives. Where water body boundaries overlap with protected areas the most stringent objective applies; that is the requirements of one EC Directive should not undermine the requirements of another. The objectives for Protected Areas relevant to this study are as follows:

Drinking Water Protected Areas

- Ensure that, under the water treatment regime applied, the drinking water produced meets the requirements of the Drinking Water Directive plus any UK requirements to make sure that drinking water is safe to drink
- Ensure the necessary protection to prevent deterioration in the water quality in the protected area in order to reduce the level of purification treatment required

Economically Significant Species (Freshwater Fish Waters)

- Protect or improve the quality of running or standing freshwater to enable them to support fish belonging to indigenous species offering a natural diversity; or species, the presence of which is judged desirable for water management purposes by the competent authorities of the Member States

Nutrient Sensitive Areas (Nitrate Vulnerable Zones)

- Reduce water pollution caused or induced by nitrates from agricultural sources
- Prevent further such pollution

Nutrient Sensitive Areas (Urban Wastewater Treatment Directive)

- Protect the environment from the adverse effects of urban wastewater discharges and wastewater discharges from certain industrial sectors

Natura 2000 Protected Areas (water dependent SACs and SPAs)

The objective for Natura 2000 Protected Areas identified in relation to relevant areas designated under the Habitats Directive or Birds Directive is to:

- Protect and, where necessary, improve the status of the water environment to the extent necessary to achieve the conservation objectives that have been established for the protection or improvement of the site's natural habitat types and species of importance

3.6.5 Groundwater Source Protection Zones

The Environment Agency has a Groundwater Protection Policy to help prevent groundwater pollution. In conjunction with this the Environment Agency have defined groundwater Source Protection Zones (SPZs) to help identify high risk areas and implement pollution prevention measures. The SPZs show the risk of contamination from activities that may cause pollution in the area, the closer the activity, the greater the risk. There are three main zones (inner, outer and total catchment) and a fourth zone of special interest which is occasionally applied.

Zone 1 (Inner protection zone)

This zone is designed to protect against the transmission of toxic chemicals and water-borne disease. It indicates the area in which pollution can travel to the borehole within 50 days from any point within the zone and applies at and below the water table. There is also a minimum 50 metre protection radius around the borehole.

Zone 2 (Outer protection zone)

This zone indicates the area in which pollution takes up to 400 days to travel to the borehole, or 25% of the total catchment area, whichever area is the largest. This is the minimum length of time the Environment Agency think pollutants need to become diluted or reduce in strength by the time they reach the borehole.

Zone 3 (Total catchment)

This is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Zone of special interest

This is defined on occasions, usually where local conditions mean that industrial sites and other polluters could affect the groundwater source even though they are outside the normal catchment.

The Environment Agency's approach to Groundwater protection[25] sets out a series of position statements that detail how the Environment Agency delivers government policy on groundwater and protects the resources from contamination. The position statements that are relevant to this study with regard to discharges to groundwaters, include surface water drainage and the use of SuDS, discharges from contaminated surfaces (e.g. lorry parks) and from treated sewage effluent.

3.6.6 European Derived Legislation and Brexit

Much of the legislation behind the regulation of the water environment derives from the UK enactment of European Union (EU) directives. Following the departure of the United Kingdom from the European Union on 31st January 2020, this legislation remained in force during the transition period, until 31st December 2020. The UK government has signalled that "the UK will in future develop separate and independent policies in areas such as … the environment … maintaining high standards as we do so."[26]

As the details of future changes to environmental regulation are not yet known, this study has used existing, European Union derived environmental legislation, most significantly the Water Framework Directive, to assess the environmental impacts of

25 The Environment Agency's approach to groundwater protection, Environment Agency (2018). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/598778/LIT_7660.pdf on: 05/07/2021

26 The Future Relationship between the UK and the EU (2020) Accessed online at: https://www.gov.uk/government/speeches/the-future-relationship-between-the-uk-and-the-eu on 05/07/2021

planned development during the plan period for the Local Plan. Should this situation change, a review of this Water Cycle Study may be required considering any new emerging regulatory regime.

3.7 UK Environmental Policy

3.7.1 Conservation of Habitats and Species Regulations 2017 (as amended)

The Conservation of Habitats and Species Regulations 2010 (commonly referred to as the Habitats Regulations) consolidated the Conservation (Natural Habitats, &c.) Regulations 1994, and transposed the EU Habitats Directive in England and Wales. This was further amended in 2017.

The Habitats Regulations define the requirement for a Habitats Regulations Assessment (HRA) to be carried out. The purpose of this is to determine if a plan or project may affect the protected features of a "habitats site". These include:

- A special area of conservation (SAC)
- A site of Community Importance
- A site hosting a priority natural habitat type or priority species protected in accordance with Article 5(4) of the Habitats Directive
- A Special Protection Area (SPA)
- A potential SPA

All plans and projects (including planning applications) which are not directly connected with, or necessary for the conservation management of a habitat site require consideration of whether the plan or project is likely to have significant effects on that site.

This is referred to as the "Habitats Regulations Assessment screening" and should consider the potential effects of both the plan/project itself and in combination with other plans or projects.

Part 6 of the conservation of Habitats and Species Regulations 2017 states that where the potential for likely significant effects cannot be excluded, a competent authority must make an appropriate assessment of the implications of the plan or project for that site, in view of the site's conservation objectives.

The competent authority may agree to the plan or project only after having ruled out adverse effects on the integrity of the habitats site.

If adverse effects cannot be rules out, and where there are no alternative solutions, the plan or project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensatory measures can be secured.

The "People over Wind" ECJ ruling (C-323/17) clarifies that when making screening decisions for the purposes of deciding whether an appropriate assessment is required, competent authorities cannot consider any mitigation measures. This must be part of the appropriate assessment itself.

3.7.2 Wildlife and Countryside Act 1981

Sites of Special Scientific Interest (SSSI) are designated and legally protected under the Wildlife and Countryside Act 1981, Section 28G places a duty to take reasonable steps, consistent with the proper exercise of the authority's functions, to "further to the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest."[27]

27 Wildlife and Countryside Act 1981, HM Government (1981). Accessed online at: http://www.legislation.gov.uk/ukpga/1981/69/section/28G on: 08/07/2021

The Government's 25-year Environment Plan[28] has a target of "restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term." In line with this, and the Wildlife and Countryside Act 1981, Local Authorities should look put forward options that contribute to conservation or restoration of favourable condition, and at the very least must not introduce policies that hinder the restoration of favourable condition by increasing existing issues.

A site is said to be in "favourable condition" when the designated feature(s) within a unit are being adequately conserved and the results from monitoring demonstrate that the feature(s) in the unit are meeting all the mandatory site specific monitoring targets set out in the favourable condition targets (FCT).

3.7.3 The Natural Environment Rural Communities Act (NERC)

The Natural Environment and Rural Communities Act 2006 (commonly referred to the as the NERC Act), was intended to implement key aspects of the Government's Rural Strategy published in 2004 and established Natural England as a new independent body responsible for conserving, enhancing and managing England's natural environment.

Section 40 of the NERC Act places a duty to conserve biodiversity on public authorities, including Local Planning Authorities and water companies. "The public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity."[29]

Section 41 requires the Secretary of State to publish and maintain a list of species and types of habitat which in the Secretary of State's opinion (in consultation with Natural England) are of "principal importance for the purpose of conserving biodiversity."

3.8 Water Industry Policy

3.8.1 The Water Industry in England

Water and sewerage services in England and Wales are provided by 10 Water and Sewerage Companies (WaSCs) and 12 'water-only' companies. The central legislation relating to the industry is the Water Industry Act 1991. The companies operate as regulated monopolies within their supply regions, although very large water users and developments are able to obtain water and/or wastewater services from alternative suppliers - known as inset agreements.

The Water Act 2014 aims to reform the water industry to make it more innovative and to increase resilience to droughts and floods. Key measures could influence the future provision of water and wastewater services include:

- Non-domestic customers will be able to switch their water supplier and/or sewerage undertaker (from April 2017)
- New businesses will be able to enter the market to supply these services
- Measures to promote a national water supply network
- Enabling developers to make connections to water and sewerage systems

3.8.2 Regulations of the Water Industry

The water industry is primarily regulated by three regulatory bodies;

- The Water Services Regulation Authority (OfWAT) – economic/ customer service regulation

28 A Green Future: Our 25 Year Plan to Improve the Environment, HM Government (2018). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf on: 08/07/2020

29 Natural Environment and Rural Communities Act 2006, HM Government (2006). Accessed online at: http://www.legislation.gov.uk/ukpga/2006/16/section/40 on: 08/07/2020

- Environment Agency - environmental regulation
- Drinking Water Inspectorate (DWI) - drinking water quality

Every five years the industry submits a Business Plan to OfWAT for a Price Review (PR). These plans set out the companies' operational expenditure (OPEX) and capital expenditure (CAPEX) required to maintain service standards, enhance service (for example where sewer flooding occurs), to accommodate growth and to meet environmental objectives defined by the Environment Agency. OfWAT assesses and compares the plans with the objective of ensuring what are effectively supply monopolies and operating efficiently. The industry is currently in Asset Management Plan 7 (AMP7) which runs from 2020 to 2024.

When considering investment requirements to accommodate growing demand, water companies are required to ensure a high degree of certainty that additional assets will be required before funding them. Longer term growth is, however, considered by the companies in their internal asset planning processes and in their 25-year Strategic Direction Statements and WRMPs.

3.8.3 Drainage and Wastewater Management Plans

The UK Water Industry Research (UKWIR) "21st Century Drainage" programme has brought together water companies, governments, regulators, local authorities, academics and environmental groups to consider how planning can help to address the challenges of managing drainage in the future. These challenges include climate change, population growth, urban creep and meeting the Water Framework Directive.

The group recognised that great progress has been made by the water industry in its drainage and wastewater planning over the last few decades, but that, in the future, there needs to be greater transparency and consistency of long-term planning. The Drainage and Wastewater Management Plan (DWMP) framework[30] sets out how the industry intends to approach these goals, with the objective of the water companies publishing plans by the end of 2022, in order to inform their business plans for the 2024 Price Review.

DWMPs will be prepared for wastewater catchments or groups of catchments and will also encompass surface water sewers within those areas which do not drain to a treatment works. The framework defines drainage to include all organisations and all assets which have a role to play in drainage, although, as the plans will be water company led, it does not seek to address broader surface water management within catchments.

LPAs and LLFAs are recognised as key stakeholders and will be invited to join, alongside other stakeholders, the Strategic Planning Groups (SPGs) organised broadly along river basin district catchments.

DWMPs cannot inform this study, as the process is still underway. However, STW published some early findings[31] from their process which will be used to inform the wastewater sections of this report where possible.

In the future, however, DWMPs will provide more transparent and consistent information on sewer flooding risks and the capacity of sewerage networks and treatment works, and this should be taken into account in SFRAs, Water Cycle Studies, as well as in site-specific FRAs and Drainage Strategies.

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30 A framework for the production of Drainage and Wastewater Management Plans, UK Water Industry Research (2018). Accessed online at: http://www.water.org.uk/wp-content/uploads/2018/12/Water-UK-DWMP-Framework-Report-Main-Document.pdf on: 05/07/2021.

31 A9: Drainage and Wastewater Management Plan 2018, Severn Trent Water (2018). Accessed online at: https://www.stwater.co.uk/content/dam/stw/about_us/pr19-documents/sve_appendix_a9_drainage_and_wastewater_management_plan.pdf on: 12/06/2021

3.8.4 Developer Contributions and Utility Companies

Developments with planning permission have a right to connect to the public water and sewerage systems, however, there is no guarantee that the capacity exists to serve a development.

Developers may requisition a water supply connection or sewerage system or self-build the assets and offer these for adoption by the water company or sewerage undertaker. Self-build and adoption are usually practiced for assets within the site boundary, whereas requisitions are normally used where an extension of upgrading the infrastructure requires construction on third party land. The cost of requisitions is shared between the water company and developer as defined in the Water Industry Act 1991.

Where a water company is concerned that a new development may impact upon their service to customers or the environment (for example by causing foul sewer flooding or pollution) they may request the LPA to impose a Grampian condition, whereby the planning permission cannot be implemented until a third-party secures the necessary upgrading or contributions.

The above arrangements are third party transactions because the Town and Country Planning Act Section 106 agreements and Community Infrastructure Levy agreements may not be used to obtain funding for water or wastewater infrastructure.

3.8.5 Changes to Charging Rules for New Connections

In 2018 Ofwat, the water industry's economic regulator, published revised rules covering how water and wastewater companies may charge customers for new connections[32]. STW's charging arrangements[33] include:

- More charges will be fixed and published on water company websites. This will provide greater transparency to developers and will also allow alternative connection providers to offer competitive quotations more easily
- There will be a fixed infrastructure charge for water and one for wastewater
- The costs of network reinforcement will no longer be charged directly to the developer in their connection charges. Instead, the combined costs of all of the works required on a company's networks, over a five-year rolling period, will be covered by the infrastructure charges payed for all new connections.
- The definition of network reinforcement has changed and will now apply only to works required as a direct consequence of the increased demand due to a development. Where the water company has not been notified of a specific development, for example when developing long-term strategic growth schemes, the expenditure cannot be recovered through infrastructure charges.
- Some suppliers offer charging incentives to encourage environmentally sustainable development:
    - Severn Trent Water[34] will provide a £353 discount on the water infrastructure charge whereby builds are demonstrated to be below 110 litres per person per day. They also provide incentives for sewerage infrastructure charge: when there is no surface water connection, 100% discount is applied. Alternatively, when a surface water connection is

32 Charging rules for new connection services (English undertakers), OfWAT (2017). Accessed online at: https://www.ofwat.gov.uk/publication/charging-rules-new-connection-services-english-undertakers/ on: 05/07/2021
33 New Connections Charging, Severn Trent Water (2021). Accessed online at: https://www.stwater.co.uk/content/dam/stw/stw_buildinganddeveloping/new-connections/2021-charges/new-connections-charging-arranging-document-21-22.pdf on: 23/06/2021
34 Infrastructure Charges Discount Scheme, Severn Trent Water (2018). Accessed online at: https://www.stwater.co.uk/building-and-developing/regulations-and-forms/application-forms-and-guidance/infrastructure-charges/ 07/05/2021

available via a sustainable drainage system, the charge is reduced by 75%.

3.8.6 Design and Construction Guidance (DCG)

The Design and Construction Guidance, part of a new Codes for Adoption covering the adoption of new water and wastewater infrastructure by water companies, contains details of the water sector's approach to the adoption of SuDS, which meet the legal definition of a sewer. This replaces the formerly voluntary Sewers for Adoption The new guidance came into force in April 2020 and compliance by water companies in England is to be mandatory.

The standards, up to and including Sewers for Adoption Version 7, have included a narrow definition of sewers to mean below-ground systems comprising of gravity sewers and manholes, pumping stations and rising mains. This has essentially excluded the adoption of SuDS by water companies, with the exception of below-ground storage comprising of oversized pipes or chambers.

The new guidance provides a mechanism for water companies to secure the adoption of a wide range of SuDS components which are now compliant with the legal definition of a sewer. There are however several non- adoptable components such as green roofs, pervious pavements and filter strips. These components may still form part of a drainage design so long as they remain upstream of the adoptable components.

The Design and Construction Guidance states that the drainage layout of a new development should be considered at the earliest stages of design. It is hoped that the new guidance will lead to better managed and more integrated surface water systems which incorporate amenity, biodiversity and water quality benefits.

4 Water Resources and Water Supply

4.1 Introduction

4.1.1 Objectives

The aim of the water resources assessment is to ensure that sufficient water is available in the region to serve the proposed level of growth, and that it can be abstracted without a detrimental impact on the environment, both during the plan period and into the future. The report characterises the study area, identifying the key surface water and groundwater bodies, and local geology. It highlights the pressures on water resources in the region, identifies existing constraints on abstraction and provides evidence for adopting tighter water efficiency targets.

4.1.2 Surface Waters

Figure 4.1 shows the main watercourses within the study area, which lies within the River Severn catchment. The River Severn flows along the southern boundary of the study area in a south easterly direction. The River Tern flows in a southerly direction through the area before changing to a westerly direction near Admaston to join the River Severn outside the Telford and Wrekin boundary. The main tributaries of the River Tern in Telford & Wrekin include the River Roden, River Tern, River Strine, the Strine Brook and the Commission Drain. The River Meese flows in a westerly direction in the north of the borough, forming a tributary to the River Tern.

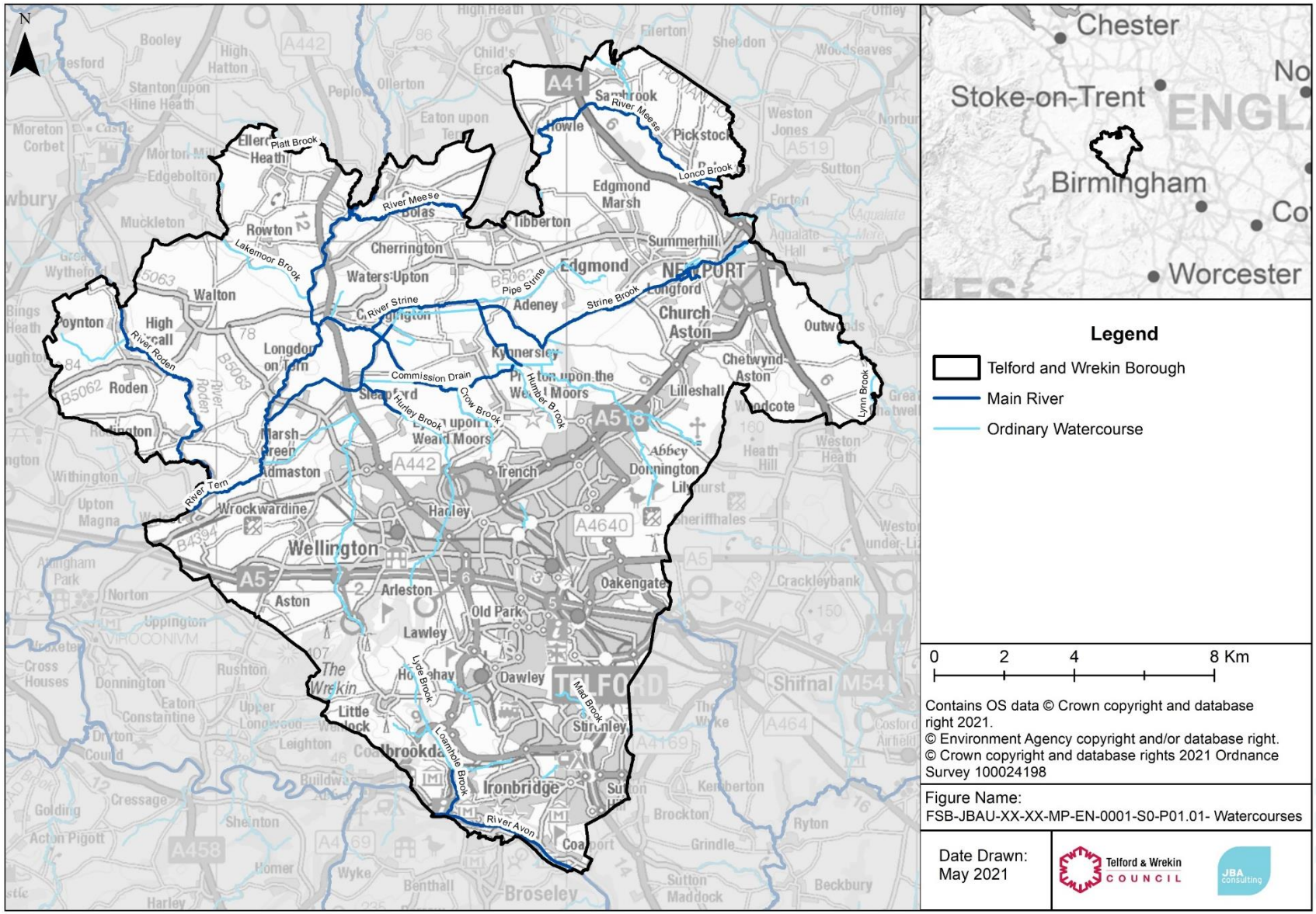

Figure 4.1 Significant watercourses within Telford & Wrekin

4.1.3 Groundwaters

There are three groundwater bodies within the study area which are shown in Figure 4.2 and their corresponding WFD classification is summarised in Table 4.1 below. The Shropshire Middle Severn groundwater body has poor quantitative status, which in stated as being due to groundwater abstraction by the water industry and for agriculture. The effect of further abstraction in these areas could be a reduction in river flow in dependent surface waterbodies, or a deterioration in dependent water sensitive ecosystems.

Table 4.1 WFD status of groundwater bodies

Groundwater Body	Quantitative Status	Chemical Status	Overall Status - WFD Cycle 2 (2019)
Severn Uplands Carboniferous Shrewsbury	Good	Poor	Poor
Shropshire Middle Severn - PT Sandstone East Shropshire	Poor	Poor	Poor
Shropshire Middle Severn - Secondary Combined	Good	Good	Good

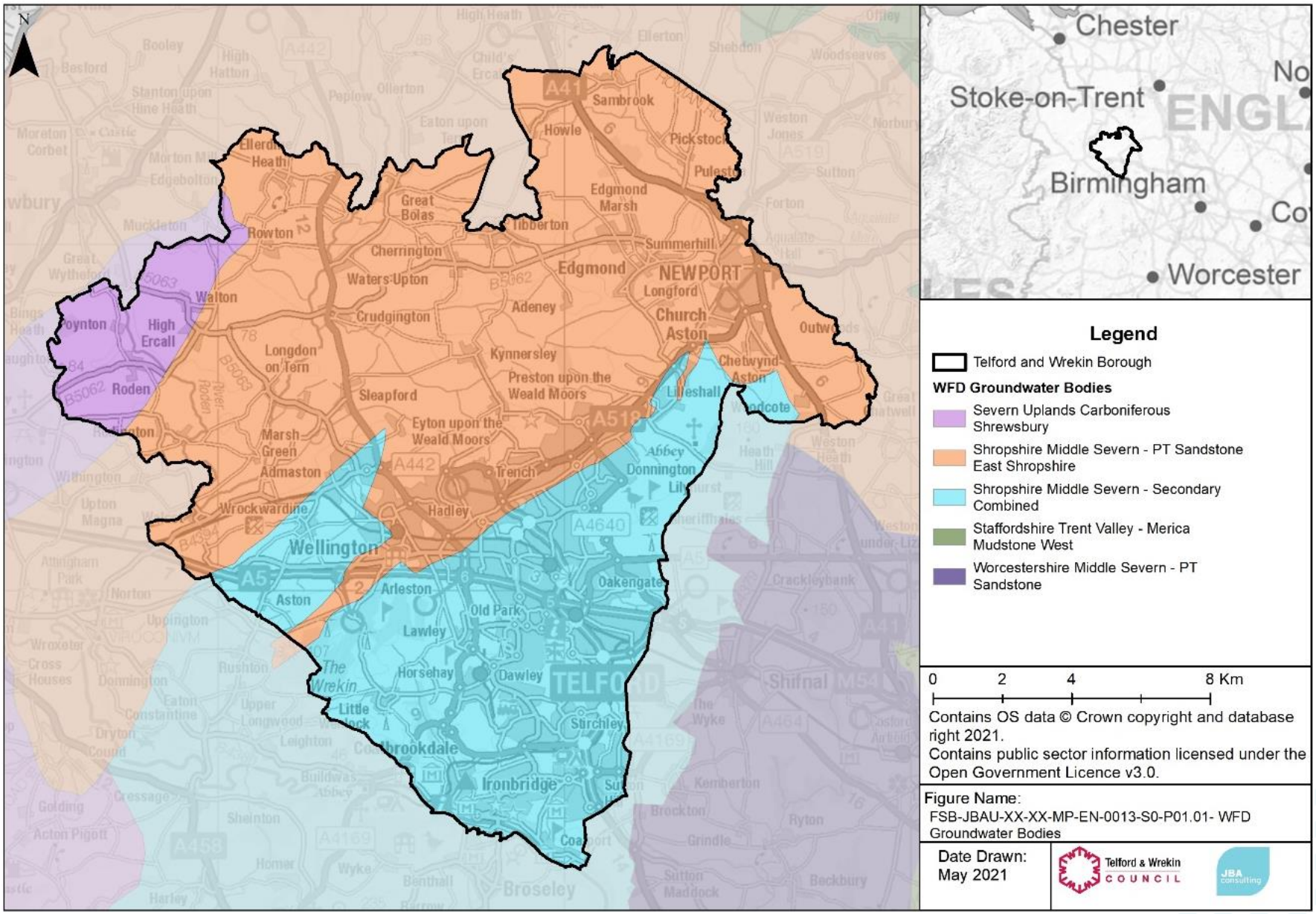

Figure 4.2 Groundwater bodies

4.1.4 Geology

The geology of the catchment can be an important influencing factor in the way that water runs off the ground surface. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.

The bedrock geology of the area is very varied. The British Geological Survey (BGS) memoir of the area lists over 35 bedrock members/units, from youngest Triassic Sandstones in the low-lying areas of the north of the Authority, through the Carboniferous coal bearing strata that underlie the high ground around Telford, to various older deposits from the Silurian, Ordovician and Cambrian and Precambrian which outcrop in the south of the area. The units generally dip from north to south allowing the older rocks to outcrop on the higher ground.

Of particular note is the Ironbridge Gorge, through which flows the River Severn. The gorge is cut from layers of coal, limestone, haematite and clay. Landslides are known to occur in the area, with over 20 recorded in the National landslide Database. The steepness of slopes, layers of clay and mining in the area are all contributing factors to the risk of landslides in the area.

The distribution of superficial deposits across the area have the following features:

- Relatively patchy till deposits on the high ground under Telford,
- Thick glacio-fluvial deposits underlying the Wellington and Newport area,
- Peat and lacustrine (lake) deposits underlying the lowest parts of the authority around Sleapford,
- Bands of alluvium and river terrace deposits along the River Tern and Roden.

It should be noted that large parts of the urban area of Telford have been modified by human processes including made ground from industrial activity, spoil mounds and infill of open cast mining to a considerable depth in some places.

Figure 4.3 shows the bedrock geology of the Telford & Wrekin study area. The geology of Telford & Wrekin is varied, but dominated by sandstone, mudstone, siltstone and conglomerates.

Figure 4.4 shows superficial (at the surface) deposits of clay, silt and sand along the course of the River Severn, River Teme, River Clun, Rea Brook and River Tern within wider areas of sand and gravel and diamicton (clay with flints). Isolated deposits of peat can be found in the north of Telford & Wrekin.

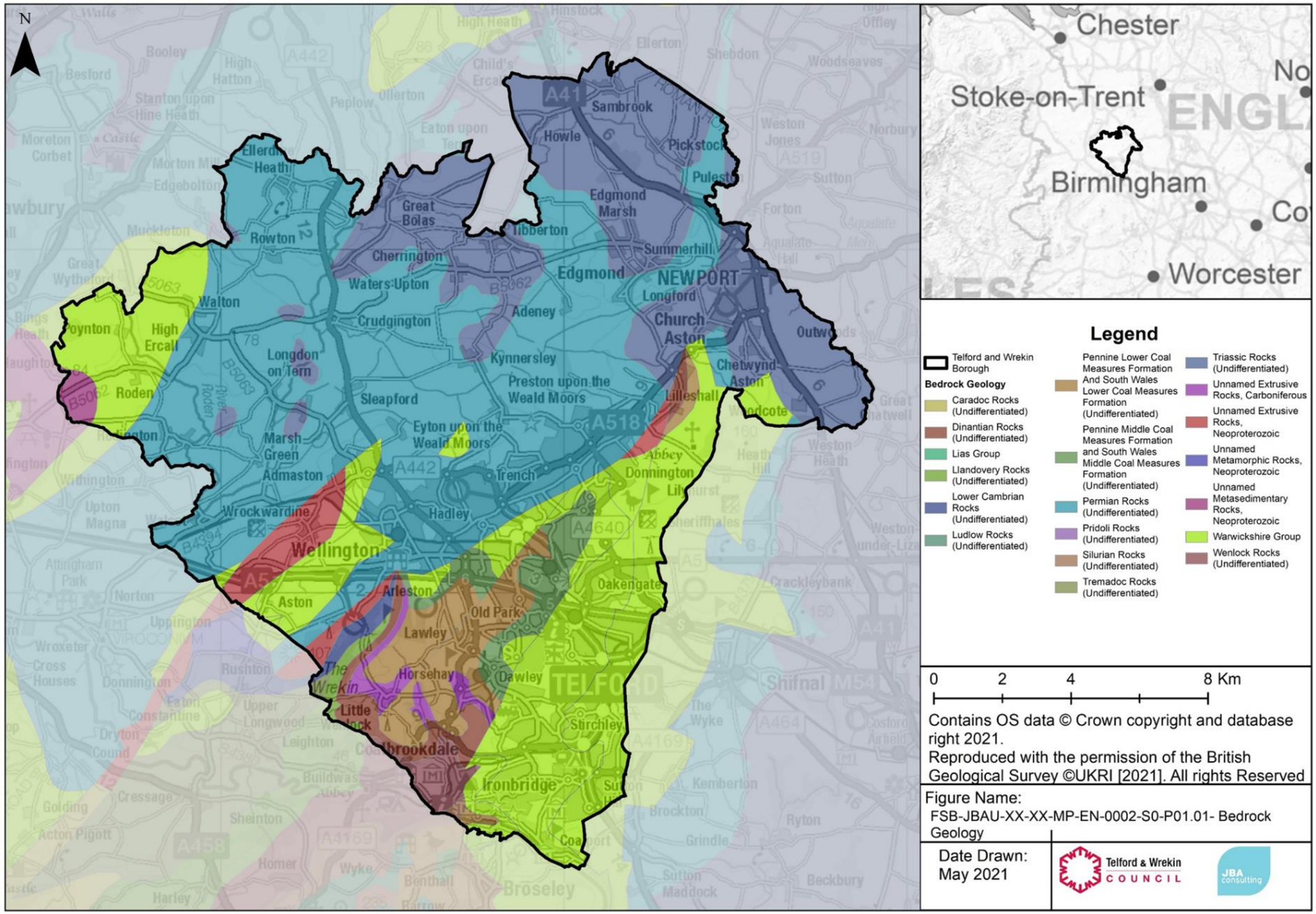

Figure 4.3 Bedrock Geology in Telford and Wrekin

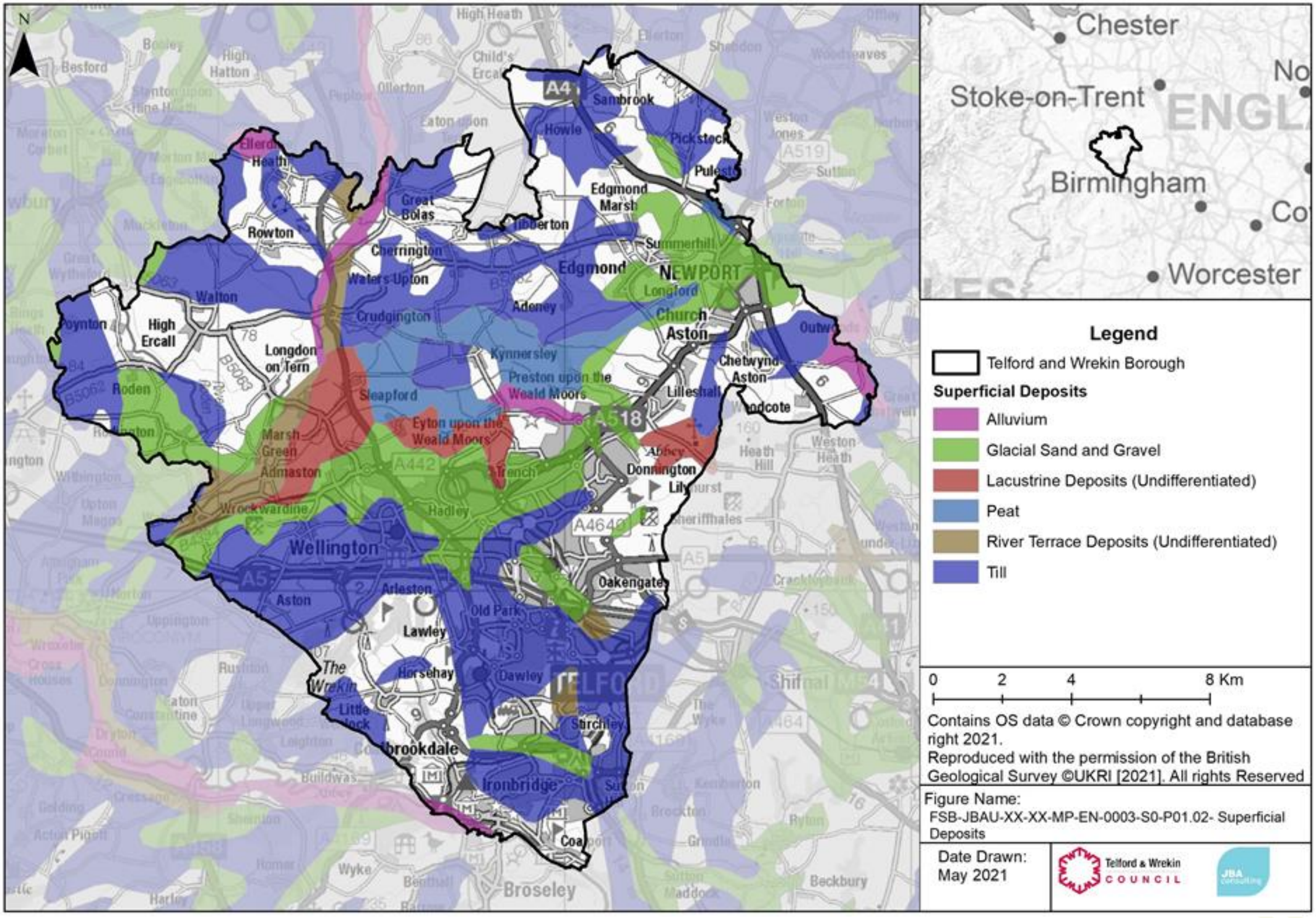

Figure 4.4 Superficial (at surface) geology of Telford & Wrekin

4.2 Availability of Water Resources

4.2.1 Abstraction Licencing Strategy

The Environment Agency (EA), working through their Catchment Abstraction Management Strategy (CAMS) process, prepare an Abstraction Licensing Strategy (ALS) for each sub-catchment within a river basin. This licensing strategy sets out how water resources are managed in different areas of England and contributes to implementing the Water Framework Directive (WFD). The ALS report provides information on the resources available and what conditions might apply to new licences. The licences require abstractions to stop or reduce when a flow or water level falls below a specific threshold, as a restriction to protect the environment and manage the balance between supply and demand for water users.

All new licences, and some existing licenses, are time-limited. This allows for a periodic review of the specific area as circumstances may have changed since the licences were initially granted. These are generally given for a twelve-year duration, but shorter license durations may also be granted, usually based on the resource assessment and environmental sustainability. In some cases, future plans or changes may mean that the EA will grant a shorter time limited licence, so it can be re-assessed following the change. If a licence is only required for a short time period, it can be granted either as a temporary licence or with a short time limit. If a licence is considered to pose a risk to the environment it may be granted with a short time limit while monitoring is carried out. The licences are then replaced with a changed licence, revoked or renewed near to the expiry date.

The ALS are important in terms of the Water Resource Management Plan (WRMP) as this helps to determine the current and future pressures on water resources and how the supply and demand will be managed by the relevant water companies[35]. Telford & Wrekin is covered by three ALS areas: Severn Corridor, Shropshire Middle Severn, and Worcestershire Middle Severn as shown in Figure 4.5 below.

35 Environment Agency (2018) Managing Water Abstraction. Accessed Online at: https://www.gov.uk/government/collections/water-abstraction-licensing-strategies-cams-process on: 05/07/2021

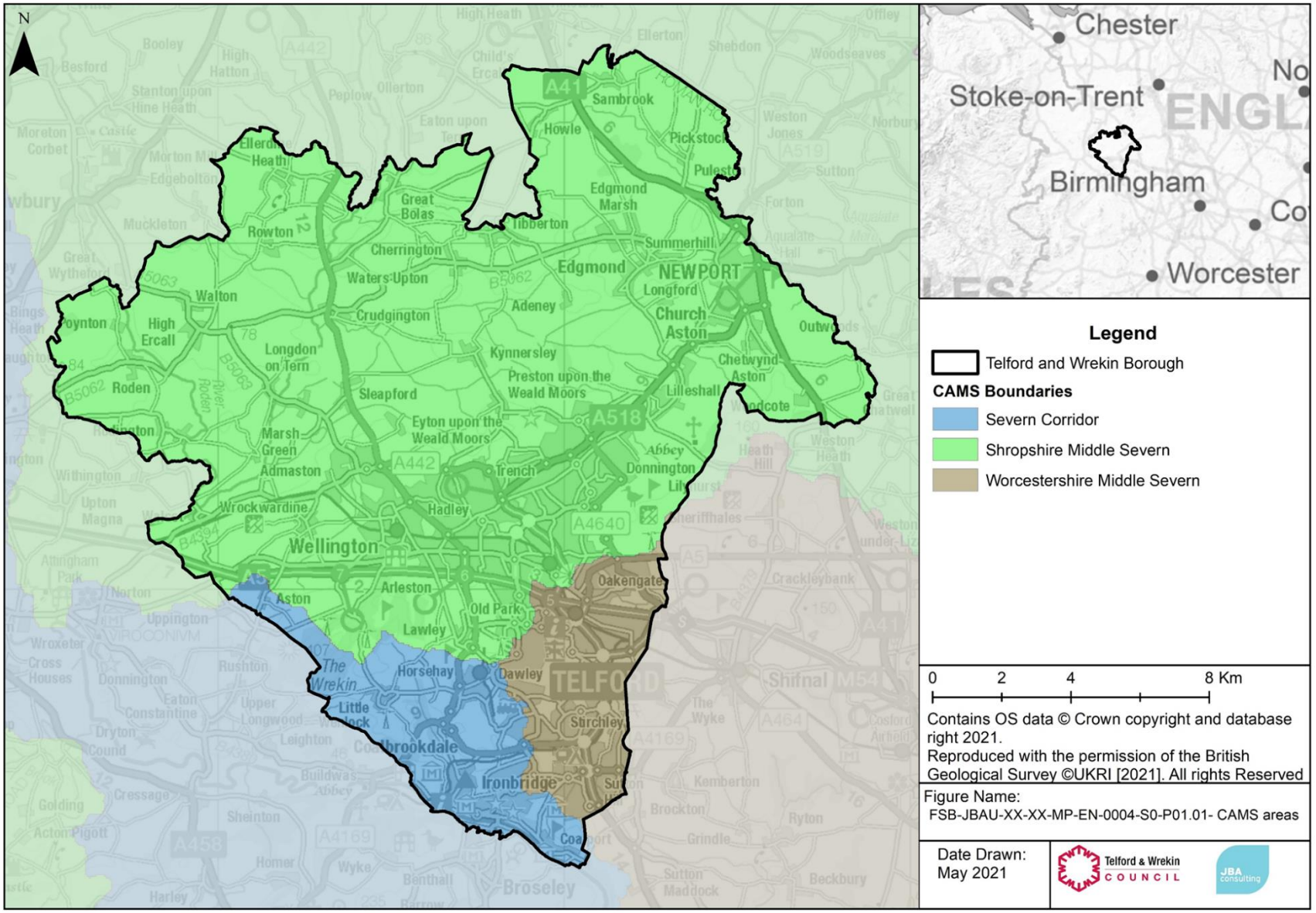

Figure 4.5 CAMS boundaries covering Telford & Wrekin

4.2.2 Resource Availability Assessment

In order to abstract surface water, it is important to understand what water resources are available within a catchment and where abstraction for consumptive purposes will not pose a risk to resources or the environment. The Environment Agency has developed a classification system which shows:

- The relative balance between the environmental requirements for water and how much has been licensed for abstraction;
- whether there is more water available for abstraction in the area;
- areas where abstraction may need to be reduced.

The availability of water for abstraction is determined by the relationship between the fully licensed (all abstraction licences being used to full capacity) and recent actual flows (amount of water abstracted in the last 6 years) in relation to the Environmental Flow Indicator (EFI). Results are displayed using different water resource availability colours, further explained in Table 4.2. In some cases, water may be scarce at low flows, but available for abstraction at higher flows. Licences can be granted that protect low flows, this usually takes the form of a "Hands-off Flow" (HOF) or Hands-off Level (HOL) condition on a licence.

Groundwater availability as a water resource is assessed similarly, unless better information on principle aquifers is available or if there are local issues that need to be considered.

Table 4.2 Implications of Surface Water Resource Availability Colours

Water Resource Availability Colour	Implications for Licensing
High hydrological regime	There is more water than required to meet the needs of the environment. Due to the need to maintain the near pristine nature of the water body, further abstraction is severely restricted.
Water available for licensing	There is more water than required to meet the needs of the environment. Licences can be considered depending on local/downstream impacts.
Restricted water available for licensing	Fully Licensed flows fall below the Environmental Flow Indicator (EFI). If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available via licence trading.
Water not available for licensing	Recent Actual flows are below the Environmental Flow Indicator (EFI). This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status. No further licences will be granted. Water may be available via licence trading.
HMWBs (and /or discharge rich water bodies)	These water bodies have a modified flow that is influenced by reservoir compensation releases or they have flows that are augmented. There may be water available for abstraction in discharge rich catchments.

Water resource availability is assessed under four different flow conditions:

- Q95 – very low flows which are exceeded 95% of the time
- Q70 – low flows which are exceeded 70% of the time
- Q50 – median flows which are exceeded 50% of the time
- Q30 – high flows which are exceeded 30% of the time

In some catchments this assessment may show that there is limited or no water available for abstraction at Q50 or Q70 but show that there is water available at lower flows. This is likely to be because most abstraction licences are limited using a 'Hands off Flow' or 'Hands off Level', therefore within the catchment less water is being abstracted at very low flows and there is water available. This may not be the case across all catchments and, particularly in heavily modified catchments, there may be other artificial influences impacting on catchment flows. For example, if there are a large number of discharges within the catchment or the flow is artificially augmented then this would artificially elevate flow particularly at lower flows. In some cases, the EA doesn't include this water in the amount available for licensing because it isn't guaranteed but flow can potentially be more available.

4.2.3 Severn Corridor ALS

The Severn Corridor ALS[36], covers the upper reaches of the River Severn catchment (including all of the upland tributaries) down to the point where it is joined by the River Perry to the northwest of Shrewsbury. From here, it focuses on the River Severn itself and a number of smaller tributaries down to the Severn Estuary. The main water demand pressure in the Severn Corridor ALS is from agriculture.

The entirety of the Severn Corridor has reliable water resources, with water being available for abstraction (by those with licenses to abstract water) at least 70% of the time.

There are 13 APs within the Severn Corridor ALS, one of which falls within Telford & Wrekin: AP9.

The groundwater availability in the Severn Corridor ALS region is guided by the surface water assessment unless specific information on principal aquifers exists or local issues that need protecting overrule it.

Consumptive groundwater licences which do not have a direct impact upon main river flows may be permitted but may be subject to restrictions such as prescribed groundwater levels. Restrictions will be determined on a case-by-case basis, dependent upon the nature and scale of any abstraction.

Resource availability for the APs within Telford & Wrekin are presented in Figure 4.6.

During Q30 flow conditions, water is available for licencing. In Q50 water availability is restricted across AP9 located at Buildwas. During the Q75 and Q95 flow conditions, water is not available.

36 Severn Corridor catchment abstraction licensing strategy, Environment Agency (2013). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291406/LIT_7848_c0b50e.pdf on: 05/07/2021

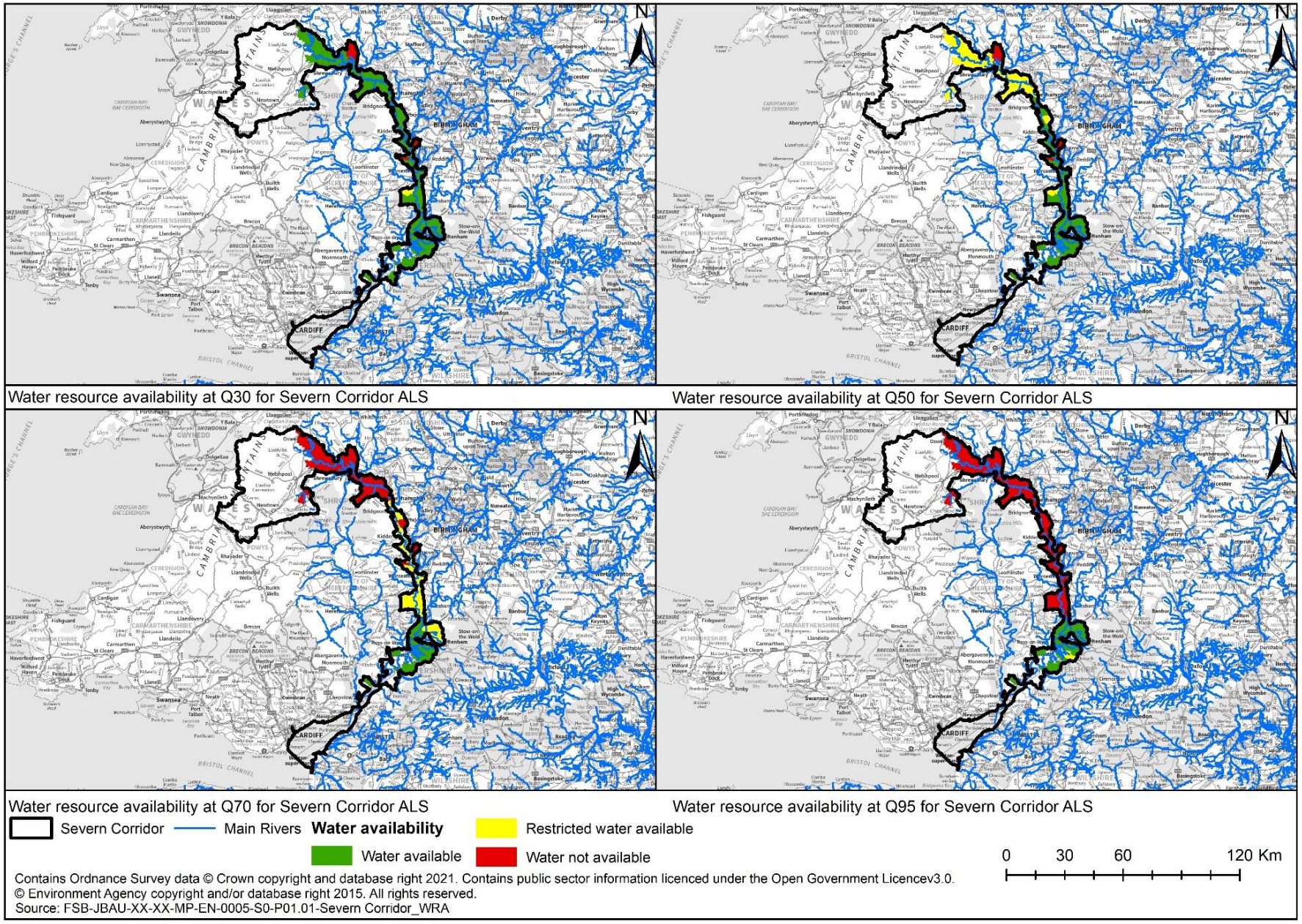

Figure 4.6 Water Resource Availability of the Severn Corridor ALS

4.2.4 Worcestershire Middle Severn ALS

The Worcestershire Middle Severn ALS[37] encompasses just over 1,000 km^2 of central England. The area lies directly west of the West Midlands conurbation and covers parts of the counties of Shropshire, Staffordshire, Worcestershire and the West Midlands. The towns of Kidderminster, Stourbridge and Telford and parts of Bridgnorth, Wolverhampton, Dudley and Bromsgrove lie within the CAMS area. The southern tip of the CAMS includes the outskirts of Worcester.

The main water resource issue in the Worcestershire Middle Severn ALS is the historic over-abstraction of groundwater for public supply and the associated environmental impact as well as the high demand for water to irrigate agricultural land.

There are 10 APs within the Worcestershire Middle Severn ALS, one of which falls within Telford & Wrekin: AP1. Currently there is restricted water available for licensing at this AP. This would limit new abstractions of water outside of public water supply.

The groundwater availability in the Worcestershire Middle Severn ALS region is guided by the surface water assessment unless specific information on principal aquifers exists or local issues that need protecting overrule it.

Consumptive groundwater licences which do not have a direct impact upon main river flows may be permitted but may be subject to restrictions such as prescribed groundwater levels. Restrictions will be determined on a case-by-case basis, dependent upon the nature and scale of any abstraction.

Resource availability for AP1 is presented in Figure 4.7 below.

During Q30 water availability is restricted across AP1 River Worfe at Burcote. During the Q50, Q75 and Q95 flow conditions, water is not available.

37 Worcestershire Middle Severn Abstraction Licencing Strategy, Environment Agency (2013). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/305450/lit_5356_35376b.pdf on: 05/07/2021

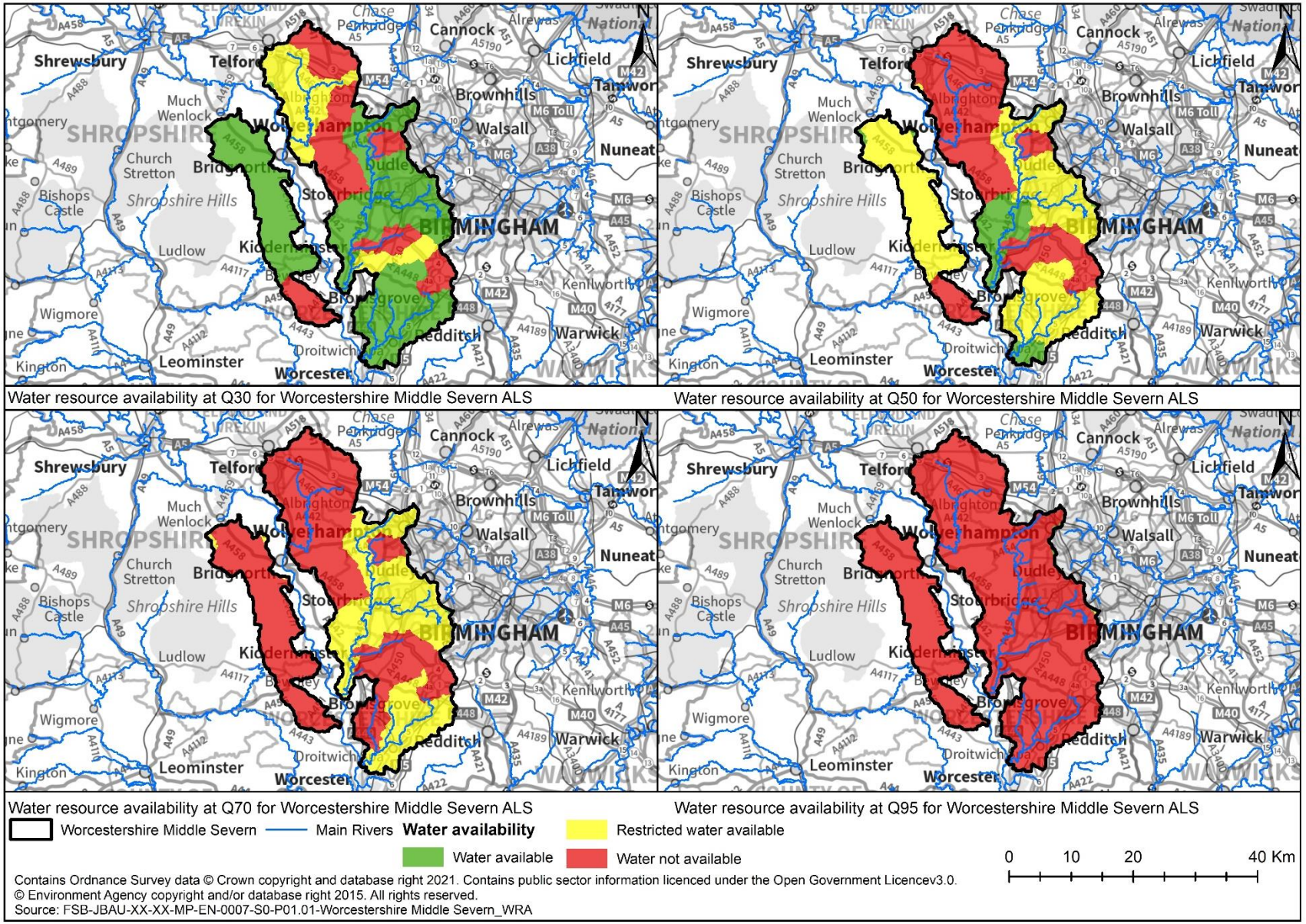

Figure 4.7 Water Resource Availability of the Worcestershire Middle Severn Corridor ALS

4.2.5 Shropshire Middle Severn ALS

The Shropshire Middle Severn ALS[38] is largely rural in nature, predominantly covering the county of Shropshire but also incorporating parts of Staffordshire, Cheshire, Wrexham, Telford and Wrekin. It covers an area of 1422 km^2. The area contains only a few urban centres, namely the market towns of Shrewsbury, Newport, Market Drayton and parts of Telford.

There are 8 APs within the Telford & Wrekin Middle Severn ALS, two of which fall within Telford & Wrekin or are located on the border with Telford & Wrekin: AP5 and AP7.

The groundwater availability is guided by the surface water assessment unless specific information on principal aquifers exists or local issues that need protecting overrule it.

Consumptive groundwater licences which do not have a direct impact upon main river flows may be permitted but may be subject to restrictions such as prescribed groundwater levels. Restrictions will be determined on a case-by-case basis, dependent upon the nature and scale of any abstraction.

Resource availability for AP4 is presented in Figure 4.8 below.

During Q30 water availability is restricted across AP5. Water is available for use in AP7 during the Q30 year flow. During the Q50, limited water is available in AP7. In AP5, water is not available. In the Q75 and Q95 flow conditions, water is not available.

38 Shropshire Middle Severn catchment abstraction licensing strategy, Environment Agency (2013). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291395/LIT_5393_7eeda4.pdf on: 05/07/2021

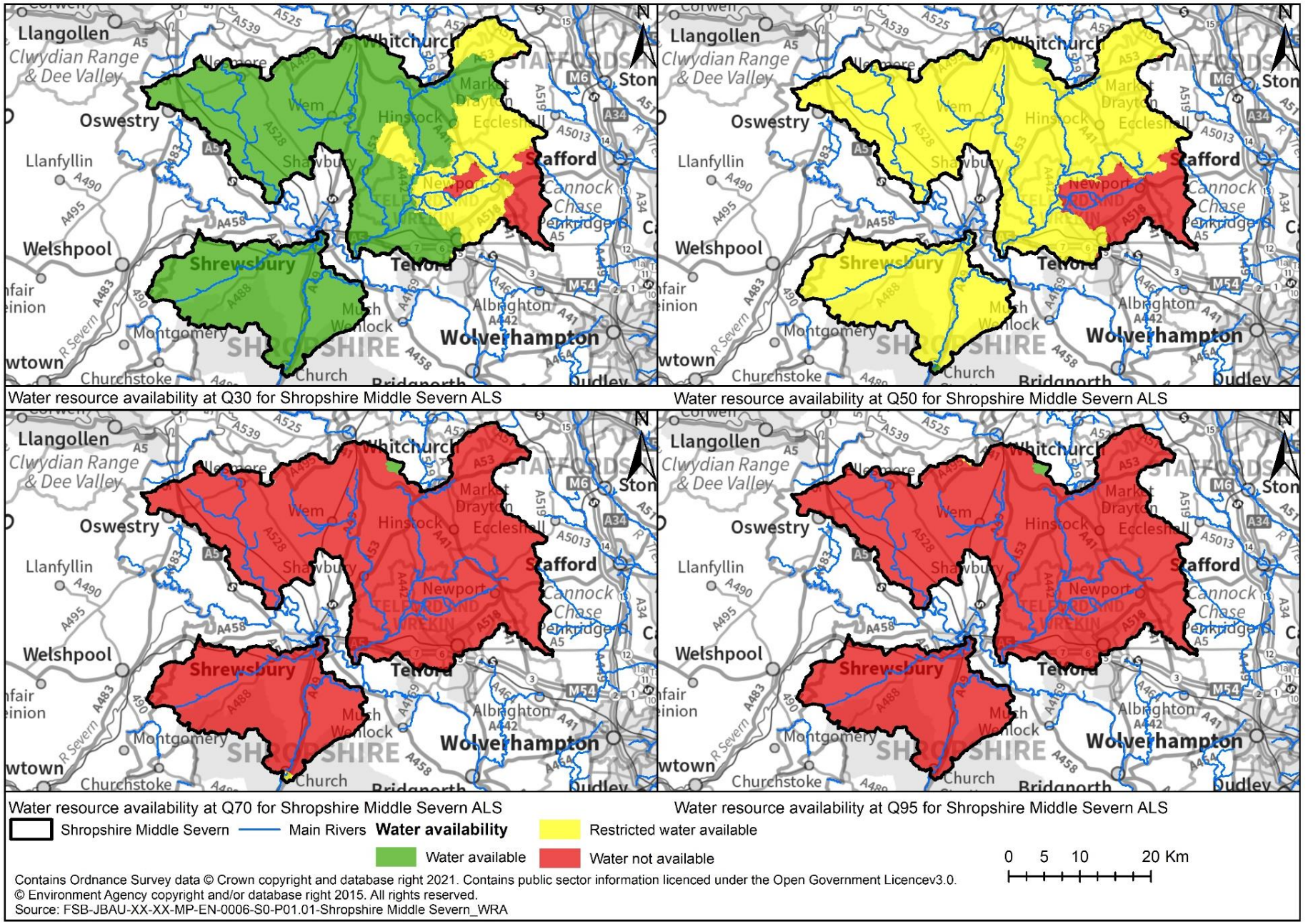

Figure 4.8 Water Resource Availability of the Shropshire Middle Severn Corridor ALS

4.3 Water Resource Assessment: Water Resource Management Plans

4.3.1 Introduction

When new development within a Local Planning Authority is being planned, it is important to ensure that there are sufficient water resources in the area to cover the increase in demand without risk of shortages in the future or during periods of high demand, and without causing a negative impact on the waterbodies from which water is abstracted.

The aim of this assessment was to compare the future additional demand as a result of development proposed within the emerging Local Plan, with the demand allowed for by Severn Trent Water in their Water Resource Management Plans.

The water resources assessment has been carried out utilising two approaches; initially by reviewing the Water Resource Management Plans (WRMPs) of Severn Trent Water and secondly by providing the water company with a growth estimate allowing them to assess the impact of planned growth on their water resource zone.

4.3.2 Severn Trent Water

Severn Trent Water is responsible for supplying Telford & Wrekin with water. For the purposes of water resources planning, the STW supply area is divided into 15 Water Resources Zones (WRZs) which vary greatly in scale and have unique water resource concerns. Telford & Wrekin is covered principally by the Shelton and the Whitchurch & Wem WRZs. Very small proportions of the Stafford and the North Staffordshire WRZs are also present in the north and northeast of the study area.

4.3.3 Methodology

The following Water Resource Management Plans were reviewed:

- Severn Trent Water – Water Resources Management Plan 2019[39]

Attention was mainly focused upon:

- The available water resources and future pressures which may impact upon the supply element of the supply/demand balance
- The allowance within those plans for housing and population growth and its impact upon the demand side of the supply/demand balance

The spatial boundaries of the WRZs have been used to overlay the Local Authority boundaries.

The Ministry for Housing, Communities and Local Government (MHCLG) 2014-based estimates of household growth up to 2041[40] were collated for the local authorities which lie within each WRZ. The percentage of the current population of each local authority within the WRZ was estimated from the OS Unique Property Reference Numbers dataset and the WRZ boundary. The assessment has used MHCLG figures, because they are available for all LPAs within the water resource zone, and over a consistent timescale and methodology. The resulting total number of households in the base year within the WRZ is comparable with the figures quoted in the WRMPs. The 2014 dataset is used as this is also used in the calculation of housing need.

39 Water Resources Management Plan 2019, Severn Trent Water (2019). Accessed online at: https://www.stwater.co.uk/about-us/our-other-plans/water-resources-management-plan/ on: 29/04/2021

40 2014-Based Household Projections for England, Office for National Statistics (2018). Accessed online at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland on: 20/05/2021

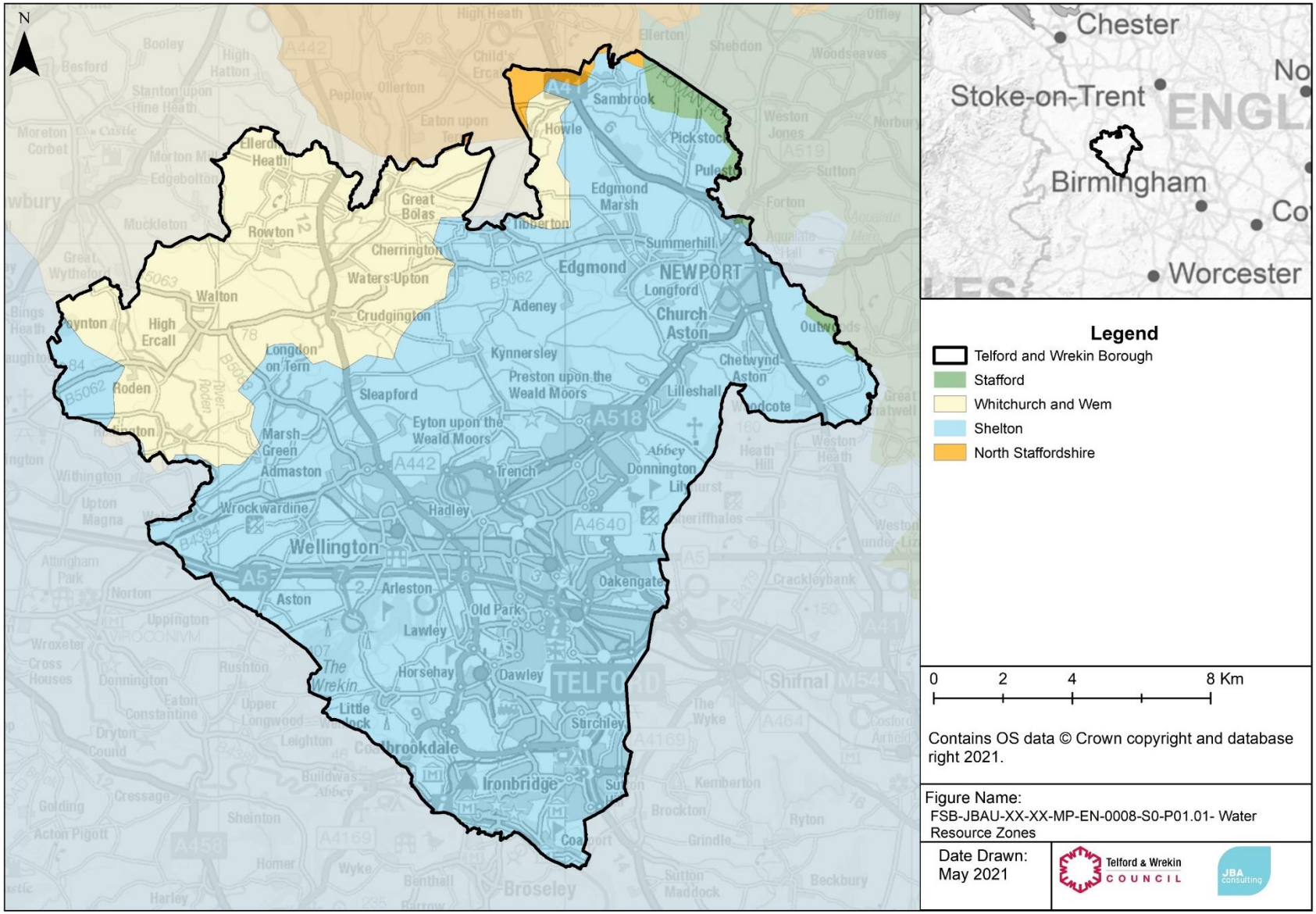

Figure 4.9 Water Resource Zones within Telford & Wrekin

Across the water supply area, 34% of supply is provided by groundwater, with the majority (approximately 88%) being derived from Sherwood Sandstone or sandstone aquifers in the Midlands region. The sandstone aquifers have substantial storage and are typically not sensitive to short term changes in precipitation.

Vulnerability assessments upon the WRZ's across the supply area identified those most sensitive to the impacts of climate change. The results showed that the largest WRZs (the Strategic Grid and Nottingham) are both vulnerable to potential changes in temperature and rainfall and all other WRZ are given a "low" vulnerability to climate change.

4.3.4 Population and household growth

Table 4.3 shows the household growth forecasts for the four WRZs serving growth in Telford & Wrekin.

If growth in Telford & Wrekin occurred according to the preferred development strategy of 19,840 dwellings from 2020-2040, including existing commitments, it would result in an increase in the number of households of approximately 27.75%, which is significantly greater than what has been accounted for in the WRMPs. Water companies base their forecasts on housing growth data that is published at the time of creation of the WRMP. In order to set a baseline for a study this can often be several years earlier than publication of the WRMP and result in a growth forecast that may be several years old. This can lead to differences between the WRMP forecast and the latest council plans which may still be in draft stage.

Table 4.3 Comparison of household growth forecasts (Severn Trent Water)

Forecast	2020	2040	% increase
MHCLG 2014-based forecast – Telford & Wrekin	**71,499**	**78,806**	**10.21%**
WRMP Forecast – Shelton	212,400	257,674	21%
WRMP Forecast – North Staffs	250,950	292,929	17%
WRMP Forecast – Whitchurch and Wem	14,210	17,831	25%
WRMP Forecast – Staffordshire	43,790	52,674	20%
Housing need – Telford & Wrekin	**71,499**	**91,339**	**27.75%**

4.3.5 Summary

The majority of settlements and sites within Telford & Wrekin are within the Shelton WRZ. Other settlements in Telford & Wrekin are located in the Whitchurch and Wem, Stafford and North Staffordshire WRZs. Severn Trent Water's WRMP highlights the significant deficit between supply and demand forecast (if no action were taken by STW) and emphasises the need to reduce this potential deficit and prevent the risk of future environmental deterioration.

The percentage growth rate in each WRMP in the study area (15 to 24%) is less than is anticipated in Telford & Wrekin if the housing need is delivered. STW commented that *"While the planned housing growth provided by TWC is above what has been accounted for in our current WRMP19, we have additional headroom to account for this. The Demand Team are also in the process of reviewing and gathering the data for our WRMP24 (currently at the draft stage) and they will be able to accommodate the new housing growth data into this."*

(The WRMP24 is the next water resources management plan due to be published in 2024.)

Although Severn Trent Water has not relied on new homes being more water-efficient than existing metered homes, the opportunity, through the planning system, to ensure that new homes do meet the higher standard of domestic water usage, at no significant

additional cost to the developer, would be in line with general principals of sustainable development, and reducing energy consumed in the treatment and supply of water.

4.4 Water efficiency and water neutrality

It is widely recognised that the climate is changing and in response Telford & Wrekin Council declared a climate emergency in July 2019[41]. Climate change is predicted to increase pressure on water resources, increasing the potential for a supply-demand deficit in the future, and making environmental damage from over abstraction of water resources more likely. Furthermore, the delivery of water and wastewater services and the heating of water in the home require high energy inputs, and therefore contribute directly to emissions of greenhouse gases. Water efficiency therefore reduces energy use and carbon emissions.

It is important that new development does not result in an unsustainable increase in water abstraction. This can be done in a number of ways from reducing the water demand from new houses through to achieving "water neutrality" in a region by offsetting a new developments water demand by improving efficiency in existing buildings.

It is for Local Authorities to establish a clear need to adopt the tighter water efficiency target through the building regulations. This should be based on:

- Existing sources of evidence such as:
    - The Environment Agency classification of water stress
    - Water resource management plans produced by water companies
    - River Basin Management Plans which describe the river basin district and the pressure that the water environment faces. These include information on where water resources are contributing to a water body being classified as 'at risk' or 'probably at risk' of failing to achieve good ecological status, due to low flows or reduced water availability.
- Consultations with the local water and sewerage company, the Environment Agency and catchment partnerships
- Consideration of the impact on viability and housing supply of such a requirement

4.4.1 Water Stress

Water stress is a measure of the level of demand for water (from domestic, business and agricultural users) compared to the available freshwater resources, whether surface or groundwater. Water stress causes deterioration of the water environment in both the quality and quantity of water, and consequently restricts the ability of a waterbody to achieve a "Good" status under the WFD.

The Environment Agency has undertaken an assessment of water stress across the UK. This defines a water stressed area as where:

- "The current household demand for water is a high proportion of the current effective rainfall which is available to meet that demand; or
- The future household demand for water is likely to be a high proportion of the effective rainfall available to meet that demand.

In the Environment Agency and Natural Resources Wales assessment[42] the Severn Trent and United Utilities supply regions are classed as areas of "moderate" water stress.

41 July 2019, Telford & Wrekin Council, 2019. Accessed online at: http://www.sustainabletelfordandwrekin.com/what-the-council-is-doing/climate-emergency on: 28/04/2021

42 Water Stressed Areas - Final Classification, Environment Agency and Natural Resources Wales (2013). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244333/water-stressed-classification-2013.pdf on: 05/07/2021

However, an updated classification of water stress has recently been consulted on[43] and is due for publication later in 2021. In this assessment, the whole of the STW supply area was classified as being an area of serious water stress. The main impact on TWC of this finding is further justification for tighter water efficiency targets.

4.4.2 River Basin Management Plans

One of the challenges identified in the River Basin Management Plan (RBMP) for the River Severn Basin is "changes to natural flow and levels of water". The management recommendations from the RBMP are listed below:

- **All sectors** take up or encourage water efficiency measures, including water industry work on metering, leakage, audits, providing water efficient products, promoting water efficiency and education.
- **Local Government** sets out local plan policies requiring new homes to meet the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010.
- **Industry manufacturing and other business** implement tighter levels of water efficiency, as proposed by changes to the Building Regulations.
- **Agriculture and rural land management** manage demand for water and use water more efficiently to have a sustainable water supply for the future.
- **Local government** commissions water cycle studies to inform spatial planning decisions around local water resources.

The RBMP goes on to state that "dealing with unsustainable abstraction and implementing water efficiency measures is essential to prepare and be able to adapt to climate change and increased water demand in the future."

4.4.3 National Water Resources Framework

The first National Framework for Water Resources was published by the Government in March 2020[44]. This outlines the water resources challenges facing England and sets out the strategic direction for the work being carried out by regional water resource groups.

A range of options were explored, and the most ambitious scenarios rely on policy change to introduce mandatory labelling of water using fittings and associated standards. The Government is currently reviewing policy on water efficiency following a recent consultation. The framework proposes that regional groups plan to help customers reduce their water use to around 110 l/p/d. This is achievable without policy interventions.

This aligns with the tighter standard of 110 l/p/d as described in building regulations. A water efficiency target higher than 110 l/p/d would make the overall target for the UK harder to achieve.

4.4.4 Impact on viability

As outlined in section 3.2.4, the cost of installing water-efficient fittings to target a per capita consumption of 110l/d has been estimated as a one-off cost of £9 for a four-bedroom house[45]. Research undertaken for the devolved Scottish and Welsh

43 Updating the determination of water stressed areas in England – consultation document, Environment Agency (2021). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/958639/Water_Stress_Consultation_V1.0_accessible.pdf on: 12/06/2021

44 National Water Resources Framework, Environment Agency (2020). Accessed online at: https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources on: 05/07/2021

45 Housing Standards Review: Cost Impacts, Department for Communities and Local Government (2014). Accessed online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/353387/021c_Cost_Report_11th_Sept_2014_FINAL.pdf on: 12/06/2021

governments[46] indicated potential annual savings on water and energy bills for householders of £24-£64 per year as a result of such water efficiency measures. There is also a significant carbon saving from water efficiency improvements. A modest reduction in household water use of 5-6% across the UK can deliver annual emissions savings of around 1.3 MtCO2e[47]. Water efficiency is therefore not only viable but of positive economic benefit to both private homeowners and tenants.

4.4.5 Summary of evidence for tighter efficiency standard

The strategic direction in the UK set out in the new National Water Resources Framework is to attain an average household water efficiency of 110 l/p/d by 2050. This also aligns with the recommendation in the River Basin Management Plan aimed at reducing the impact of abstraction. There would also be a positive economic impact for residents in terms of reduced energy and water bills.

Severn Trent Water confirmed that they support this approach.

It is therefore recommended that the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010 is adopted for Telford & Wrekin.

4.4.6 Water neutrality concept

Water neutrality is a relatively new concept for managing water resources, but one that is receiving increased interest as deficits in future water supply/demand are identified. The definition adopted by the Government and the Environment Agency[48] is:

> ***"For every development, total water use in the wider area after the development must be equal to or less than total water use in the wider area before development".***

It is useful to also refer to the refined definition developed by Ashton:

"For every new significant development, the predicted increase in total water demand in the region due to the development should be offset by reducing demand in the existing community, where practical to do so, and these water savings must be sustained over time" (V Ashton, 2014)[49]

This definition states the need to sustain water saving measures over time, and the wording "predicted increase in total water demand" reflects the need for water neutrality to be designed in at the planning stage.

Both definitions refer to water use in the region or "wider area", and the extent of this area should be appropriate to local authority boundaries, water resource zones, or water abstraction boundaries depending on what is appropriate for that particular location. For instance, if a development site is in an area of water stress relating to a particular abstraction source, offsetting water use in a neighbouring town that is served by a different water source will not help to achieve water neutrality.

In essence water neutrality is about accommodating growth in a region without increasing overall water demand.

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46 Advice on water efficient new homes for England, Waterwise. Accessed online at https://waterwise.org.uk/wp-content/uploads/2019/10/Advice-on-water-efficient-homes-for-England061118.pdf on: 13/07/2021

47 Net Zero and the role of Water Efficiency A Water & Energy T&F Group Briefing Paper. Waterwise. Accessed online at: https://www.waterwise.org.uk/wp-content/uploads/2021/02/Net-Zero-and-the-role-of-Water-Efficiency-9-2-21.pdf

48 Water Neutrality: An improved and expanded water resources management definition (SC080033/SR1), Environment Agency, 2009. Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291675/scho1009bqzr-e-e.pdf on: 05/07/2021

49 Water Resources in the Built Environment, edited by Booth and Charlesworth (2014). Published by Wiley.

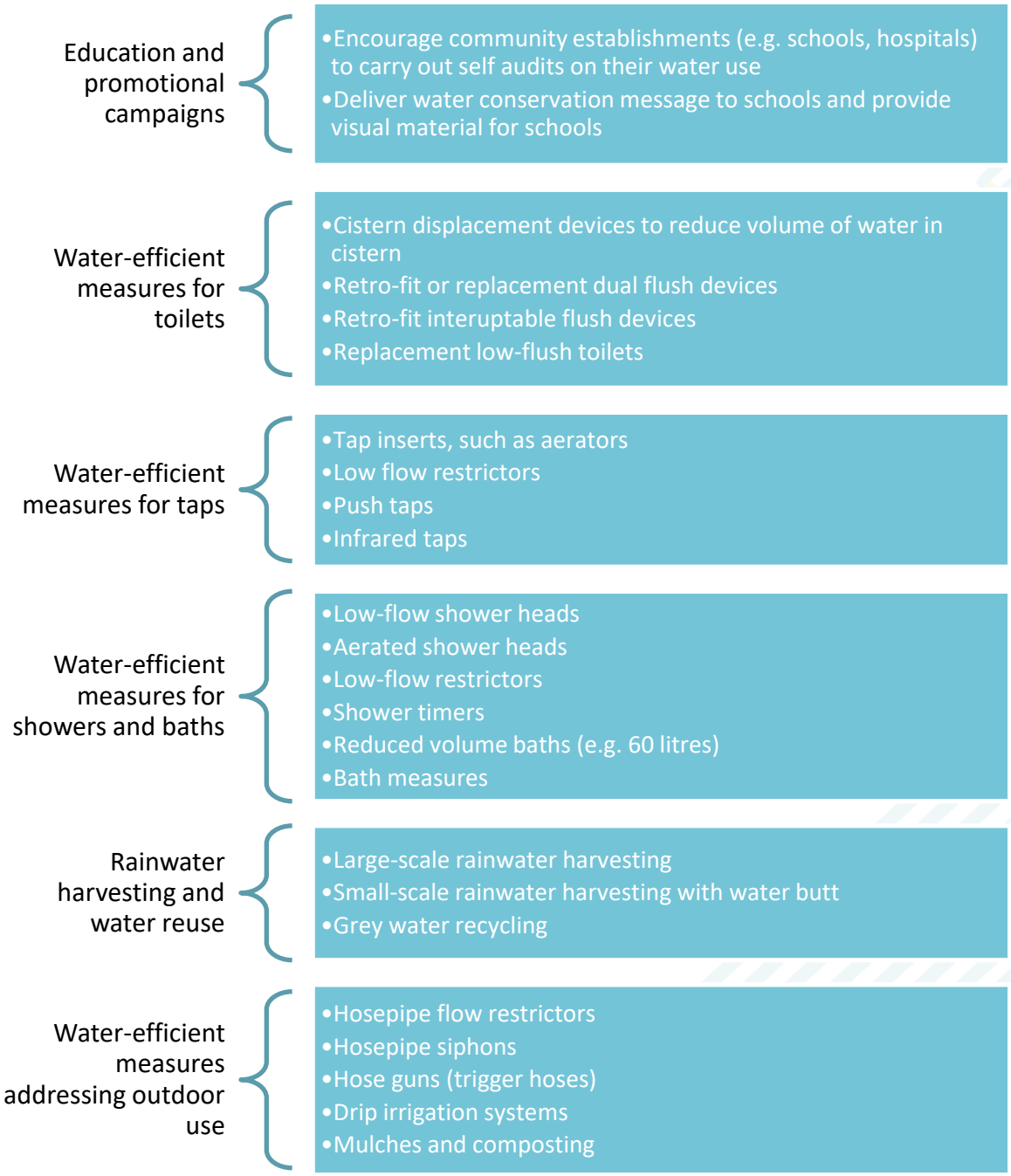
Water neutrality can be achieved in a number of ways:

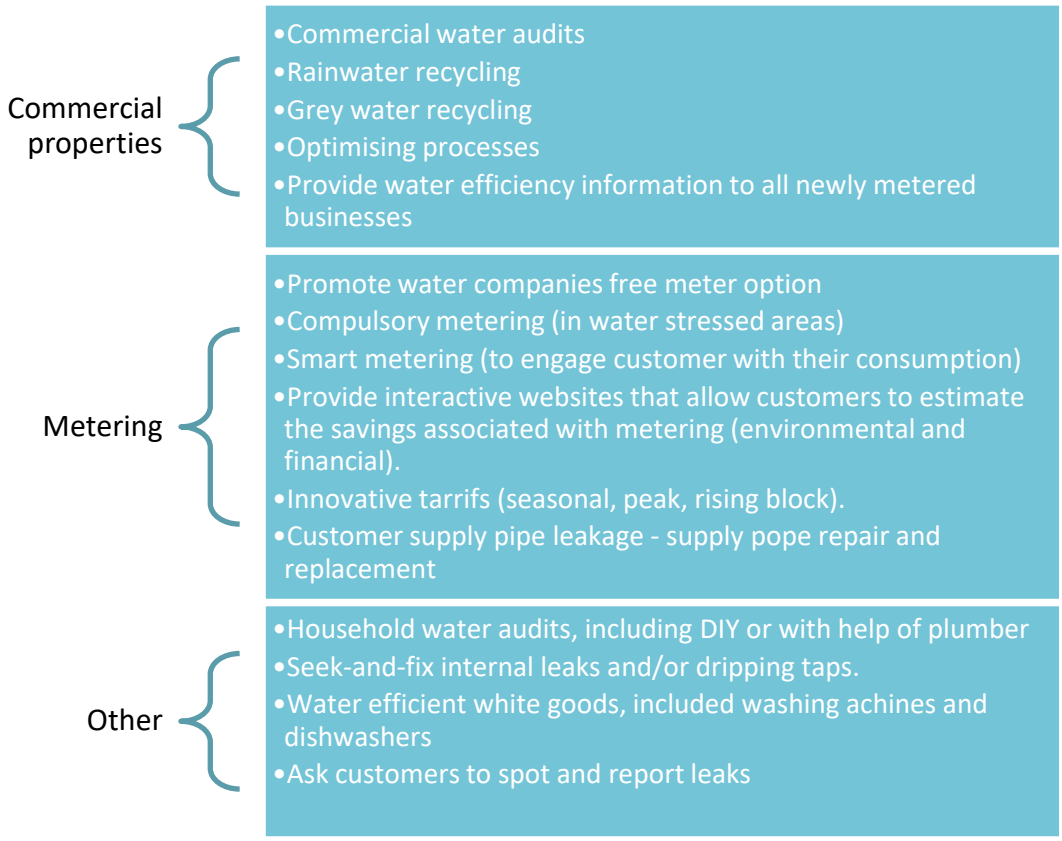
- Reducing leakage from the water supply networks
- Making new developments more water-efficient
- "Offsetting" new demand by retrofitting existing homes with water-efficient devices
- Encouraging existing commercial premises to use less water
- Implementing metering and tariffs to encourage the wise use of water
- Education and awareness-raising amongst individuals

Suggestions for water-efficiency measures are listed in Figure 4.10 below.

4.4.7 Consumer water efficiency measures

Many interventions are designed to reduce water use if operated in a particular way, and so rely on the user being aware and engaged with their water use. The educational aspect is therefore important to ensure that homeowners are aware of their role in improving water efficiency. Figure 4.10 shows water efficiency measures that can be made by consumers.


Education and promotional campaigns
•Encourage community establishments (e.g. schools, hospitals) to carry out self audits on their water use
•Deliver water conservation message to schools and provide visual material for schools
Water-efficient measures for toilets
•Cistern displacement devices to reduce volume of water in cistern
•Retro-fit or replacement dual flush devices
•Retro-fit interuptable flush devices
•Replacement low-flush toilets
Water-efficient measures for taps
•Tap inserts, such as aerators
•Low flow restrictors
•Push taps
•Infrared taps
Water-efficient measures for showers and baths
•Low-flow shower heads
•Aerated shower heads
•Low-flow restrictors
•Shower timers
•Reduced volume baths (e.g. 60 litres)
•Bath measures
Rainwater harvesting and water reuse
•Large-scale rainwater harvesting
•Small-scale rainwater harvesting with water butt
•Grey water recycling
Water-efficient measures addressing outdoor use
•Hosepipe flow restrictors
•Hosepipe siphons
•Hose guns (trigger hoses)
•Drip irrigation systems
•Mulches and composting



Source: Adapted from Booth and Charleswell 2014

Figure 4.10 Consumer water-efficiency measures

4.4.8 Rainwater and Greywater Recycling

Rainwater harvesting

Rainwater recycling or rainwater harvesting (RwH) is the capture of water falling on buildings, roads or pathways that would normally be drained via a surface water sewer, infiltrate into the ground or evaporate. In the UK this water cannot currently be used as a drinking water supply as there are strict guidelines on potable water, but it can be used in other systems within domestic or commercial premises.

Systems for collection of rainwater can be simple water butts attached to a drainpipe on a house, or it could be a complex underground storage system, with pumps to supply water for use in toilet flushing and washing machines. By utilising rainwater in this way there is a reduced dependence on mains water supply for a large proportion of the water use in a domestic property.

Benefits of RwH

- **RwH reduces the dependence on mains water supply – reducing bills for homeowners and businesses**
- **Less water needs to be abstracted from river, lakes and groundwater**
- **Stormwater is stored in a RwH system reducing the peak runoff leaving a site providing a flood risk benefit (for smaller storms)**
- **By reducing surface water flow, RwH can reduce the first flush effect whereby polluted materials adhering to pavement surfaces during dry periods are removed by the first flush of water from a storm and can cause pollution in receiving watercourses.**

Challenges of RwH

- **Dependency on rainfall can limit availability of harvested rainwater during drought and hot weather events.**
- **Increased capital (construction) costs to build rainwater harvesting infrastructure into new housing (£2,674 for a 3/4bed detached home)**
- **Payback periods are long as the cost of water is low so there is little incentive for homeowners to invest. For further information see:** https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/353387/021c_Cost_Report_11th_Sept_2014_FINAL.pdf

Greywater harvesting

Greywater refers to water that has been "used" in the home in appliances such as washing machines, showers and hand basins. Greywater recycling or greywater harvesting (GwH) is the treatment and re-use of this water in other systems such as for toilet flushing. By their nature, GwH systems require more treatment and are more complex than RwH systems, and there are limited examples of their use in the UK.

Greywater re-use refers to systems where wastewater is taken from source and used without further treatment. An example of this would be water from a bath or shower being used on plants in the garden. This sort of system is easy to install and maintain, however as mentioned above the lack of treatment to remove organic matter means the water cannot be stored for extended periods.

Greywater recycling refers to systems where wastewater undergoes some treatment before it is used again. These systems are complex and require a much higher level of maintenance than RwH or greywater re-use systems.

Domestic water demand can be significantly reduced by using GwH, and unlike with a RwH system where the availability of water is dependent on the weather, the source of water is usually constant (for instance if it is from bathing and showering). However, the payback period for a GwH system is usually long, as the initial outlay is large, and the cost of water relatively low. Viability of greywater systems for domestic retrofit applications is therefore currently limited. However, communal systems may offer more opportunities where the cost can be shared between multiple households particularly on larger new build developments.

4.4.9 Energy and Water use

According to EU statistics (Eurostat 2017), 17% of the UK's domestic energy usage is for water heating. If less water was being used within the home, for instance through more water efficient showers, less water would need to be heated, and overall domestic energy usage would be reduced.

The Government is currently consulting on a Future Homes Standard that will involve changes to Part L (conservation of fuel and power) of the Building Regulations for new dwellings. Whilst there is no direct mention of water efficiency in this consultation, there is an important link between water use and energy use, and therefore between water use and carbon footprint.

4.4.10 Funding for water neutrality

Water neutrality is unlikely to be achieved by just one type of measure, and likewise it is unlikely to be achieved by just one funding source. Funding mechanisms that may be available could be divided into the following categories:

- Infrastructure-related funding (generally from developer payments)
- Fiscal incentives at a national or local level to influence buying decisions of households and businesses
- Water company activities, either directly funded by the five-year price review or as a consequence of competition and individual company strategies
- Joint funding through energy efficiency schemes (and possibly to integrate with the heat and energy saving strategy).

Currently in the UK, the main funding resource for the delivery of water efficiency measures is the water companies, with some discretionary spending by property owners or landlords. For water neutrality to be achieved, policy shifts may be required in order to increase investment in water efficiency. Possible measures could include:

- Further incentivisation of water companies to reduce leakage and work with customers to reduce demand
- Require water efficient design in new development
- Developer funding to contribute towards encouraging water efficiency measures
- Require water efficient design in refurbishments when a planning application is made
- Tighter standards on water using fittings and appliances.

4.5 Conclusions

The strategic direction in the UK set out in the new National Water Resources Framework is to attain an average household water efficiency of 110 l/p/d by 2050. This also aligns with the recommendation in the River Basin Management Plan aimed at reducing the impact of abstraction. There would also be a positive economic impact for residents in terms of reduced energy and water bills.

It is therefore recommended that the tighter water efficiency standard of 110 litres per person per day as described in Part G of Schedule 1 to the Building Regulations 2010 is adopted for Telford & Wrekin. Policies to reduce water demand from new developments, or to go further and achieve water neutrality in certain areas, could be defined to reduce the potential environmental impact of additional water abstractions in Telford & Wrekin, and also help to achieve reductions in carbon emissions in the borough. Severn Trent Water confirmed that they support this approach.

A comparison was carried out between the level of growth anticipated in the water resource management plan, and Telford & Wrekin's housing need. The TWLP review is expected to result in growth at a higher level than anticipated in the WRMP. As stated in 4.3.5, STW commented that:

"While the planned housing growth provided by TWC is above what has been accounted for in our current WRMP19, we have additional headroom to account for this. The Demand Team are also in the process of reviewing and gathering the data for our WRMP24 (currently at the draft stage) and they will be able to accommodate the new housing growth data into this."

(The WRMP24 is the next water resources management plan due to be published in 2024.)

4.6 Recommendations

The recommendations for water resources are provided in Table 4.4 below.

Table 4.4: Recommendations for water resources

Action	Responsibility	Timescale
Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	STW	Ongoing
Provide yearly profiles of projected housing growth to water companies to inform the WRMP update.	Telford & Wrekin	Ongoing
Use planning policy to require the 100l/p/d water consumption target permitted by National Planning Policy Guidance across Telford & Wrekin	Telford & Wrekin	In TWLP review
The concept of water neutrality has the potential to provide a benefit in improving resilience to climate change and enabling all waterbodies to be brought up to Good status. Explore further with the water companies and the Environment Agency how the Council's planning and climate change policies can encourage this approach. This approach could have particular application in strategic sites	Telford & Wrekin, EA, STW	In TWLP review and Climate Change Action Plan
Strategic residential developments, and commercial developments should consider incorporating greywater recycling and/or rainwater harvesting into development at the master planning stage in order to reduce water demand.	Telford & Wrekin, STW	In TWLP review
Water companies should advise TWC of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	STW, Telford & Wrekin	Part of TWLP review process

4.7 Requirement for further study in Stage 2

No further study of water resources is recommended in a Stage 2 WCS unless the growth forecast is changed significantly from Stage 1.

5 Water Supply Infrastructure

5.1 Introduction

An increase in water demand due to growth can exceed the hydraulic capacity of the existing supply infrastructure. This is likely to manifest itself as low pressure at times of high demand. An assessment is required to identify whether the existing infrastructure is adequate or whether upgrades will be required. The time required to plan, obtain funding and construct major pipeline works can be considerable and therefore water companies and planners need to work closely together to ensure that the infrastructure is able to meet growing demand.

Water supply companies make a distinction between supply infrastructure, the major pipelines, reservoirs and pumps that transfer water around a WRZ, and distribution systems, smaller scale assets which convey water around settlements to customers. This outline study is focused on the supply infrastructure. It is expected that developers should fund water company impact assessments and modelling of the distribution systems to determine requirements for local capacity upgrades to the distribution systems.

In addition to the work undertaken by water companies, there are opportunities for the local authority and other stakeholders to relieve pressure on the existing water supply system by increasing water efficiency in existing properties. This can contribute to reducing water consumption targets and help to deliver wider aims of achieving water neutrality.

A cost-effective solution can be for local authorities to co-ordinate with water supply companies and "piggyback" on planned leakage or metering schemes, to survey and retrofit water efficient fittings into homes[50]. This is particularly feasible within property owned or managed by the local authorities, such as social housing.

5.2 Methodology

Severn Trent Water were provided with a complete list of potential development sites and the potential/equivalent housing numbers for each by TWC. Using this information, STW were asked to comment on the impact of the proposed growth on water supply infrastructure in Telford & Wrekin.

5.3 Results and conclusion

STW have stated that having reviewed the potential allocations ***"…there are no immediate concerns"*** *and* ***"In regards to additional infrastructure to reach new development specifically (e.g. pipes) this would be decided and assessed when new developments come forward for new connections. Based on our current planning and processes we don't anticipate the need for any specific land to be safeguarded"***

A site-by-site assessment of the impact on the water supply network should be undertaken in Stage 2 once a preferred option list of sites is developed. There are no water supply issues identified that would guide the location of development within Telford & Wrekin. However, TWC and developers should engage early with STW to ensure that development sites are delivered in line with the provision of any upgrades or network reinforcement that may be required.

50 Water Efficiency Retrofitting: A Best Practice Guide, Waterwise (2009). Accessed online at: http://www.waterwise.org.uk/wp-content/uploads/2018/01/Waterwise-2009_Water-efficiency-Retrofitting_Best-practice.pdf on: 05/07/2021

5.4 Recommendations

Table 5.1 Recommendations for water supply infrastructure

Action	Responsibility	Timescale
Undertake network modelling where appropriate as part of the planning application process to ensure adequate provision of water supply is feasible	STW Telford & Wrekin	As part of the planning process
Telford & Wrekin and Developers should engage early with STW to ensure infrastructure is in place prior to occupation.	Telford & Wrekin STW Developers	Ongoing

6 Wastewater Collection

6.1 Sewerage network

Severn Trent Water is the Sewerage Undertaker (SU) for the study area. The role of the sewerage undertaker includes the collection and treatment of wastewater from domestic and commercial premises, and in some areas, it also includes the drainage of surface water from building curtilages to combined or surface water sewers. It excludes, unless adopted by the SU, systems that do not connect directly to the wastewater network, e.g. Sustainable Drainage Systems (SuDS) or highway drainage.

Increased wastewater flows into collection systems due to growth in populations or per-capita consumption can lead to an overloading of the infrastructure, increasing the risk of sewer flooding and, where present, increasing the frequency of discharges from storm overflows.

As a result, headroom at Wastewater Treatment Works (WwTW) can be eroded by growth in population or per-capita consumption, requiring investment in additional treatment capacity. As the volumes of treated effluent rises, even if the effluent quality is maintained, the pollutant load discharged to the receiving watercourse will increase. In such circumstances the Environment Agency as the environmental regulator, may tighten consented effluent consents to achieve a "load standstill", i.e. ensuring that as effluent volume increases, the pollutant discharged does not increase. Again, this would require investment by the water company to improve the quality of the treated effluent.

In combined sewerage systems, or foul systems with surface water misconnections, there is potential to create headroom in the system, thus enabling additional growth, by the removal of surface water connections. This can most readily be achieved during the redevelopment of brownfield sites which have combined sewerage systems, where there is potential to discharge surface waters via sustainable drainage systems (SuDS) to groundwater, watercourses or surface water sewers. In some areas of Telford & Wrekin, including Newport and Edgmond, there are known issues of surface water causing localised flooding. Strategic schemes to provide improved local surface water drainage may be required in such areas, rather than solely relying upon on-site soakaways on brownfield or infill plots.

STW are supportive of the use of SuDS and SuDS principles to manage surface water run-off. They recommend that the Drainage Hierarchy is used to direct surface water to natural outfall routes such as infiltration to the ground or into watercourses, before utilising sewers, as supported by paragraph 80 of the NPPF. Surface water should also not be permitted to connect to a foul sewer.

Another issue when considering sewer capacity is the volume of groundwater infiltration. This is where groundwater enters the public and private sewerage systems through cracks, holes, or faulty joints. In catchments where there is significant groundwater infiltration, capacity in the sewer is used up in the same way as the presence of a surface water misconnection. Under storm conditions this increases the likelihood of sewer flooding or sewage overflows into watercourses. In some catchments prone to significant groundwater infiltration into sewers, there are 'unavoidable discharges', where water is allowed to flow from, or is pumped from foul sewers overloaded with infiltration, in order to prevent flooding. These are being managed through Infiltration Management Plans, in line with Environment Agency policy[51].

6.2 Sewerage System Capacity Assessment

New residential developments and new employment land add pressure to the existing sewerage systems. An assessment is required to identify the available capacity within the existing systems, and the potential to upgrade overloaded systems to accommodate

51 Environment Agency (2016) Regulatory Position Statement: Discharges made from Groundwater Surcharged Sewers. Version 3 Issued December 2016

future growth. The scale and cost of upgrading works may vary significantly depending upon the location of the development in relation to the network itself and the receiving WwTW.

It may be the case that an existing sewerage system is already working at its full capacity and further investigations have to be carried out to define which solution is necessary to implement an increase in its capacity. New infrastructure may be required if, for example, a site is not served by an existing system. Such new infrastructure will normally be secured through private third-party agreements between the developer and utility provider.

Sewerage Undertakers must consider the growth in demand for wastewater services when preparing their five-yearly Strategic Business Plans (SBPs) which set out investment for the next Asset Management Plan (AMP) period. Typically, investment is committed to provide new or upgraded sewerage capacity to support allocated growth with a high certainty of being delivered. Additional sewerage capacity to service windfall sites, smaller infill development or to connect a site to the sewerage network across third party land is normally funded via developer contributions, as third-party arrangements between the developer and utility provider.

6.3 Drainage and Wastewater Management Plans

Whilst publication of Drainage and Wastewater Management Plans (DWMPs) is not scheduled until 2022/23, STW have published a draft of their initial findings as they start the process[52]. This has been reviewed to report information of relevance to the sewer networks in Telford & Wrekin.

The Rushmoor WwTW catchment is the largest treatment works serving growth in the study area, serving a population equivalent of 89,719, primarily in Telford itself. Issues have been identified in the catchment relating flooding associated with "Morrison's Tank", (a storage tank on the combined sewer system) and problems with fats, oils and grease. The potential for surface water separation upstream of the storage tank is being considered as part of the ongoing plan.

Also serving Telford is Coalport WwTW. The DWMP identifies the significant number of dwellings and employment land expected to be built as part of the 2011-2031 local plan. The impact of this development has been considered to be 'low risk'. The draft DWMP notes the requirement for balancing flows between these two catchments.

Monkmoor WwTW serves growth in the west of the study area, and there are known interactions between Monkmoor WwTW and the River Severn through Shrewsbury. At times of high river levels, the River Severn can inundate assets, limiting capacity during storm conditions. The DWMP outlines strategic solutions including rationalisation of the 'Shrewsbury Loop' CSO river interactions and accommodation of the Shropshire sustainable urban extension development to the north and south of the catchment. No further details of these schemes were provided int eh Draft DWMP.

52 A9: Drainage and Wastewater Management Plan 2018, Severn Trent Water (2018). Accessed online at: https://www.stwater.co.uk/content/dam/stw/about_us/pr19-documents/sve_appendix_a9_drainage_and_wastewater_management_plan.pdf on: 29/04/2021

6.4 Storm overflows

There are several storm overflows present in Telford & Wrekin, the location of these is shown in Figure 6.1 below.

The Storm Overflow Taskforce[53] has agreed a long-term goal to end the damaging pollution caused by the operation of storm overflows. An important component of this is the monitoring of overflows, and a target has been set to monitor the frequency and duration of operation at all storm overflows by 2023[54]. This is called Event Duration Monitoring (EDM). The EDM dataset (based on the 12,000 storm overflows monitored in 2020) has been used to provide information on storm overflows in Telford & Wrekin.

The EA have set a threshold of 60 operations per year above which a storm overflow should be investigated. It can be seen that operations of overflows in Telford (within the Rushmoor WwTW catchment) are well above this threshold, as shown in Table 6.1.

Table 6.1 CSO's operations and duration

Area	Number of operations in 2020	Duration of operation in 2020 (hours)
A518 Honnington CSO	71	561
Bucks Head CSO	42	57
Clive Road Combined Sewer Overflow	39	48
Cressage Ps Combined Sewer Overflow	0	0
Field Adj To Church Street	7	11
Field No. 7078 CSO	114	209
Gas Works Storm Overflow	0	0
High Ercall Church Rd CSO	11	52
Hortonwood Trench Storm Overflow	112	2338
Ladywood CSO	26	24
Morrisons Storm Overflow	3	3
Park Avenue CSO	18	4
School Road CSO	20	11
St. Milburga's Priory Grounds CSO	45	148
The Fish House CSO	81	308
Waters Lane CSO	0	0

53 Made up of Defra, the EA, Ofwat, Consumer Council for Water, Blueprint for Water and Water UK
54 Event Duration Monitoring – lifting the lid on storm overflows, Environment Agency (2021). Accessed online at: https://environmentagency.blog.gov.uk/2021/03/31/event-duration-monitoring-lifting-the-lid-on-storm-overflows/ on: 12/06/2021

Growth in areas where there is already a high level of storm overflow operation, could exacerbate the issue by increasing flows in the sewer network – both directly from wastewater and through runoff from surface water.

STW were contacted to comment on this dataset.

"...as part of the Drainage and Wastewater Management Plan that we are in the process of producing, we are about to commence the 'Option Development & Appraisal' process of this work. Within that process we will be looking at storm overflows and what needs to be done to them to bring them up to a 'Minimum Standard' of no more than 40 spills per year (by the year 2030) and also taking into account growth development predictions. We are currently at a data gathering stage with this process, so in time, the needs and requirements will be addressed for the storm overflows for the catchment areas in the north of Telford."

Opportunities should be taken to separate foul and storm flow. This is particularly applicable to brownfield development sites.

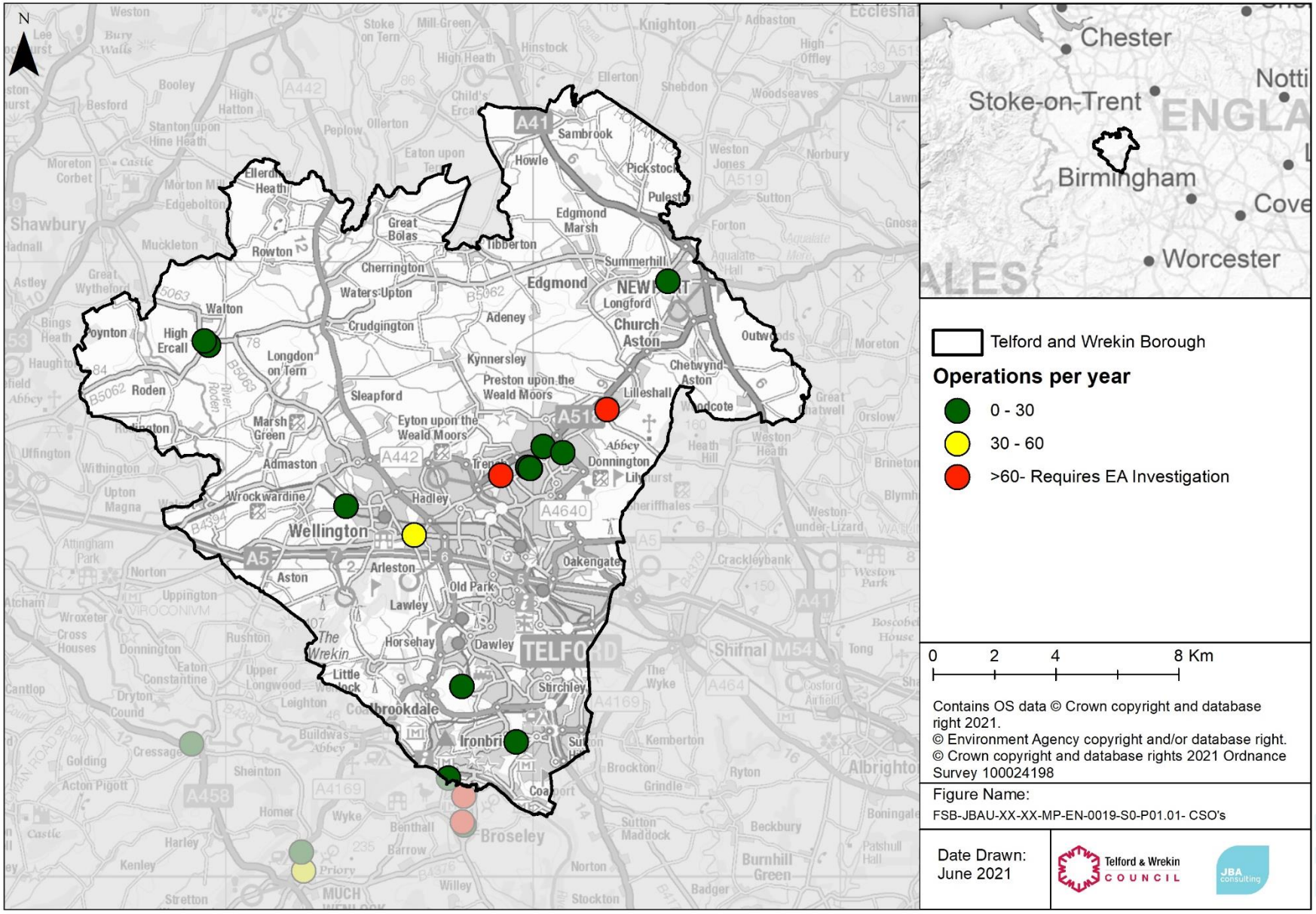


Figure 6.1 CSO's number of operations per year

6.5 Conclusions

Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a detrimental impact on existing customers, and increasing the likelihood of storm overflow operation. Early engagement with developers and Severn Trent Water is required, and further modelling of the network may be required at the planning application stage. Furthermore, in STW networks, there are areas where the current network is a combined sewer system, and further separation of foul and surface water may be required, as well as suitably design SuDS.

Early engagement between developers, Telford & Wrekin Council and STW is recommended to allow time for the strategic infrastructure required to serve these developments to be planned.

6.6 Recommendations

Table 6.2 Recommendations from wastewater network assessment

Action	Responsibility	Timescale
Early engagement between Telford & Wrekin Council and STW is required to ensure that where strategic infrastructure is required, it can be planned in by STW.	Telford & Wrekin STW	Ongoing
Take into account wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker	Telford & Wrekin STW	Ongoing
Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an outline Drainage Strategy for sites. The Outline Drainage strategy should set out the following: What – What is required to serve the site Where – Where are the assets / upgrades to be located When – When are the assets to be delivered (phasing) Which – Which delivery route is the developer going to use s104 s98 s106 etc. The Outline Drainage Strategy should be submitted as part of the planning application submission, and where required, used as a basis for a drainage planning condition to be set.	STW and Developers	Ongoing
Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA.	Developers LLFA	Ongoing

7 Wastewater Treatment

7.1 Wastewater Treatment Works in Telford & Wrekin

Severn Trent Water operates WwTWs within Telford & Wrekin. Two WwTWs are located outside of the Telford & Wrekin boundary which serve growth within the study area. These are Shrewsbury and Coalport WwTWs.

The location of the WwTWs in and around Telford & Wrekin are shown in Figure 7.1 below.

Sites already allocated in the adopted local plan, or already in the planning system (commitments) as well as an allowance for windfall, were assigned to a WwTW using the sewerage drainage area boundaries to set a baseline for WwTW capacity.

Actual connection of a development site to a particular WwTW may be different and will depend on the capacity of the receiving works, and the local sewer network.

A small number of the committed and completed sites did not fall within the catchment boundary of any WwTW. These sites were small-scale, for one or two dwellings and were widespread throughout the study area and so would be very unlikely to significantly impact any discharge flows from WwTW. Very small developments in rural areas may be suitable for on-site treatment and discharge, however the Environment Agency will not usually permit this where there is a public sewerage system within a distance calculated as 30m per dwelling.

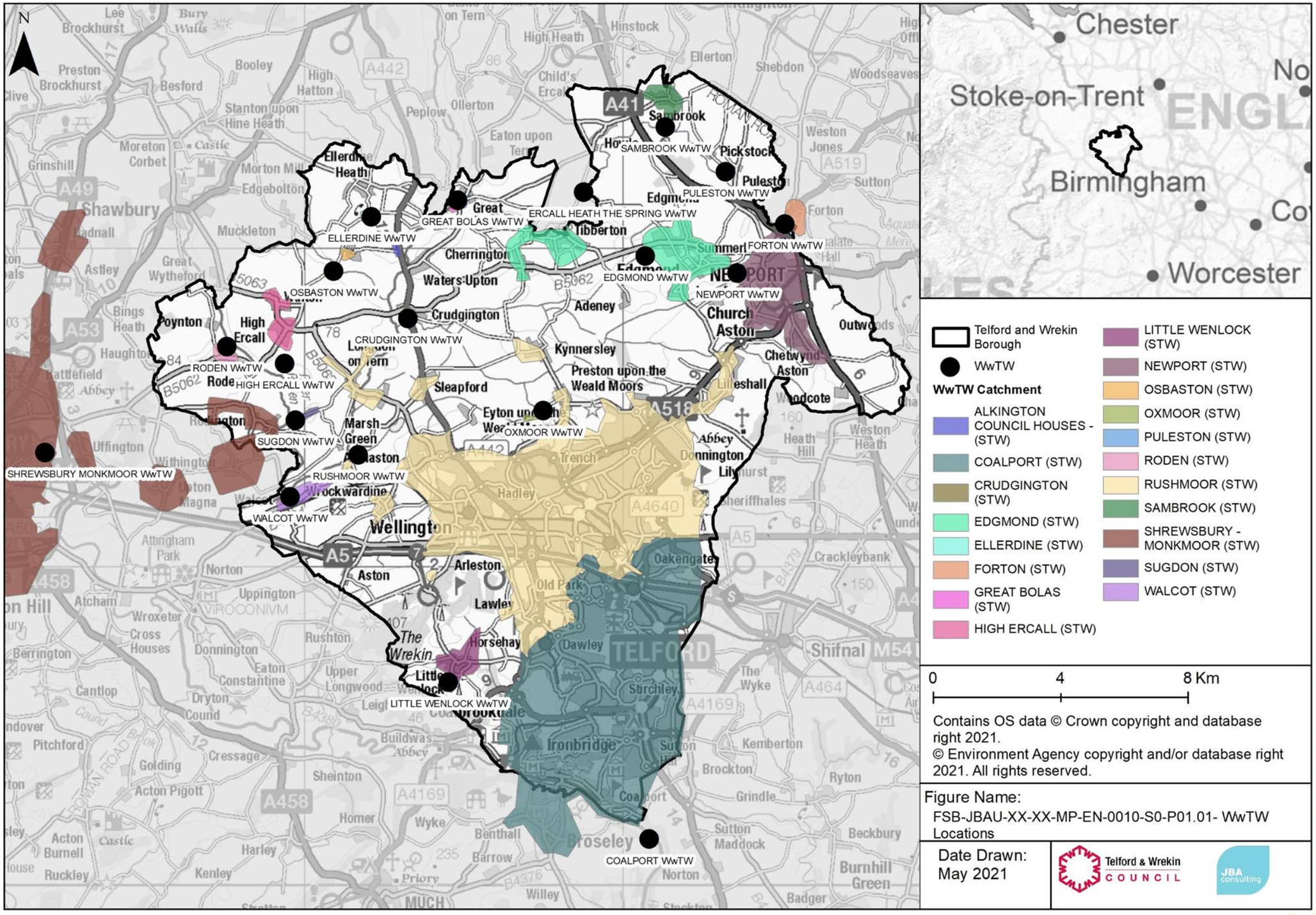


Figure 7.1 WwTW in and around Telford & Wrekin

7.2 Wastewater Treatment Works Flow Permit Assessment

7.2.1 Introduction

The Environment Agency is responsible for regulating sewage discharge releases via a system of Environmental Permits (EPs). Monitoring for compliance with these permits is the responsibility of both the EA and the plant operators. Figure 7.2 summarises the different types of wastewater releases that might take place, although precise details vary from works to works depending on the design.

During dry weather, the final effluent from the Wastewater Treatment Works (WwTW) should be the only discharge (1). With rainfall, the storm tanks fill and eventually start discharging to the watercourse (2) and Combined Sewer Overflows (CSOs) upstream of the storm tanks start to operate (3). The discharge of storm sewage from treatment works is allowed only under conditions of heavy rain or snow melt, and therefore the flow capacity of treatment systems is required to be sufficient to treat all flows arising in dry weather and the increased flow from smaller rainfall events. After rainfall, storm tanks should be emptied back to full treatment, freeing their capacity for the next rainfall event.

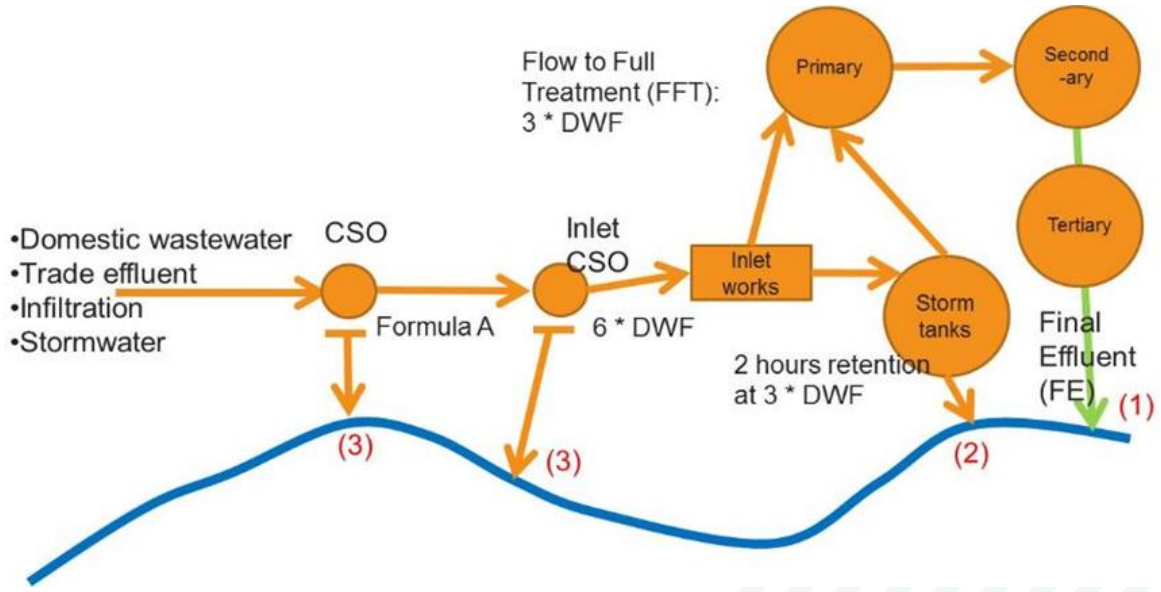


Figure 7.2 Overview of typical combined sewerage system and WwTW discharges

Environmental permits are used alongside water quality limits as a means of controlling the pollutant load discharged from a water recycling centre to a receiving watercourse. Sewage flow rates must be monitored for all WwTWs where the permitted discharge rate is greater than 50 m^3/day in dry weather.

Permitted discharges are based on a statistic known as the Dry Weather Flow (DWF). As well as being used in the setting and enforcement of effluent discharge permits, the DWF is used for WwTW design, as a means of estimating the 'base flow' in sewerage modelling and for determining the flow at which discharges to storm tanks will be permitted by the permit (Flow to Full Treatment, FFT).

WwTW Environmental Permits also consent for maximum concentrations of pollutants, in most cases Suspended Solids (SS), Biochemical Oxygen Demand (BOD) and Ammonia (NH4). Some works (usually the larger works) also have permits for Phosphorous (P). These are determined by the Environment Agency with the objective of ensuring that the receiving watercourse is not prevented from meeting its environmental objectives, with specific regard to the Chemical Status element of the Water Framework Directive (WFD) classification.

Increased domestic population and/or employment activity can lead to increased wastewater flows arriving at a WwTW. Where there is insufficient headroom at the works to treat these flows, this could lead to failures in flow consents.

7.3 Methodology

Severn Trent were provided with the potential development sites and the potential housing numbers and employment space for each site by TWC. STW were then invited to provide an assessment of the receiving WwTW and provide any additional comments about the impacts of development.

The assessment consists of two factors, the hydraulic capacity of the WwTW (consented flow vs current flow) and the capacity of the WwTW to treat a given load. The assessment may also reflect upgrades already planned at WwTW.

A parallel assessment of WwTW capacity was carried out by JBA using measured flow data supplied by the water companies. The process was as follows:

- STW provided their calculated 80th percentile exceedance flow statistic for each WwTW.
- Sites already in the planning system, windfall and neighbouring authority growth was assigned to a WwTW using the sewerage drainage area boundaries.
- For each site, the future DWF was calculated using the occupancy rates and per-capita consumption values obtained from the Water Resource Management Plans (Table 7.1), and the assumption that 95% of water used is returned to sewer. Permitted headroom was used as a substitute for actual designed hydraulic capacity for each WwTW being assessed.

Table 7.1 Per capita consumption values used in water demand calculations

Water Company	Water Resource Zone	Occupancy rate (persons per dwelling)	Per capita consumption (m^3/person/day)
Severn Trent	Stafford	2.2	0.113
	North Staffs	2.2	0.109
	Shelton	2.2	0.115
	Whitchurch and Wem	2.1	0.122

7.4 Results

Severn Trent Water provided assessments for WwTWs that may serve growth in Telford & Wrekin, and this is presented in Table 7.2. This assessment is prior to any increase in capacity that may be delivered as part of upgrade work at WwTWs. A map showing estimated capacity at each WwTW is shown in Figure 7.3. It should be noted that this map represents the remaining capacity (number of houses) once all committed sites are built, and ignores planned increased to treatment capacity.

The following definition was used by JBA to score each WwTW:

Capacity for growth during local plan period	Limited capacity during local plan period	Issues identified – WwTW capacity could be a constraint to growth

STW provided the following general comments:

"Whilst sewage treatment works may not have sufficient spare capacity to accept the levels of development being proposed in its catchment area this does not necessarily mean that development cannot take place. Under Section 94 of the Water Industry Act 1991 sewerage undertakers have an obligation to provide additional treatment capacity as and when required. Where necessary we will discuss any discharge consent implications with the Environment Agency. If there are specific issues which may prevent or delay the provision on additional capacity these have been highlighted below."

Limited capacity for growth exists at WwTWs in Telford & Wrekin. STW have upgrades planned at many WwTW already (the timing of which will be explored further in Stage 2), it is important that both the current commitments in the planning system, neighbouring authority growth, and development sites allocated in the TWLP are taking into consideration when upgrades are planned.

Table 7.2 Summary of WwTW flow assessment

WwTW	Proposed growth over Local Plan period – before TWLP allocations*	Approximate headroom (no. dwellings)	Does DWF flow exceed permitted flow over local plan period before TWLP allocations? (JBA assessment)	STW Rating	STW Comments
Coalport	11,327 houses 2,126m^2 employment space	-1108	Yes – Headroom exceeded by 13% Upgrade to treatment capacity likely to be required.	High Risk	*"WFD scheme for quality purposes. In terms of growth, we would need to invest on site to increase capacity; therefore confirmation of final growth projections and timeline are required to allow us to plan."*
Crudgington	112 houses	-5	Yes – Headroom exceeded by 70% Upgrade to treatment capacity likely to be required.	N/A	*"No* [local plan] *housing development planned for this site"*
Edgmond	110 houses 440m^2 employment space	12	No - 4% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	High	*"In terms of growth we would need to invest on site to increase capacity; therefore, confirmation of final growth projections and timeline are required to allow us to plan."*
Ellerdine	2 houses	9	No - 98% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	N/A	*"No* [local plan] *housing development planned for this site"*
High Ercall	44 houses	49	No - 49% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	N/A	*"No* [local plan] *housing development planned for this site"*
Little Wenlock	1 house 497m^2 employment space	23	No - 99% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	High Risk	*"No* [local plan] *housing development planned for this site"*
Monkmoor	8145 houses 270m^2 employment space	139	No - 1% of the permitted headroom remaining Very limited capacity in relation to the size of the WwTW.	No Risk	*"WFD scheme - lower limits on P and Iron"*

WwTW	Proposed growth over Local Plan period – before TWLP allocations*	Approximate headroom (no. dwellings)	Does DWF flow exceed permitted flow over local plan period before TWLP allocations? (JBA assessment)	STW Rating	STW Comments
			However, growth from TWC is likely to be limited in this case.		
Newport	531 houses 16,869m^2 employment space	39	No- 3% of the permitted headroom remaining An upgrade to treatment capacity is likely in order to accommodate TWLP allocations.	High Risk	*"WFD scheme for quality purposes. Increase in treatment capacity is being planned in line with current LPA plan. If the planned dwellings are in addition to the agreed growth, then we would need confirmation of final growth and timeline to allow us to plan."*
Osbaston	3 houses 130m^2 employment space	52	No - 80% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	N/A	*"No* [local plan] *housing development planned for this site"*
Roden	9 houses 10,743m^2 employment space	6	No- 19% of the permitted headroom remaining Note – this is a small WwTW with limited capacity	Low Risk	N/A
Rushmoor	4274 houses	1967	No - 17% of the permitted headroom remaining Whilst there is available headroom – this is likely to be exceeded by growth during the TWLP period. Upgrade to capacity is likely.	High Risk	*"WFD scheme for quality purposes. Increase in treatment capacity is being planned in line with current LPA plan. If the planned dwellings are in addition to the agreed growth, then we would need confirmation of final growth to allow us to plan."*
Walcot	471 houses	-46	Yes – Headroom exceeded by 566%	High Risk	*"Would it be possible to connect to Rushmoor? Walcot is unable to accommodate proposed growth"*

*includes commitments, recent completions, windfall and neighbouring authority growth

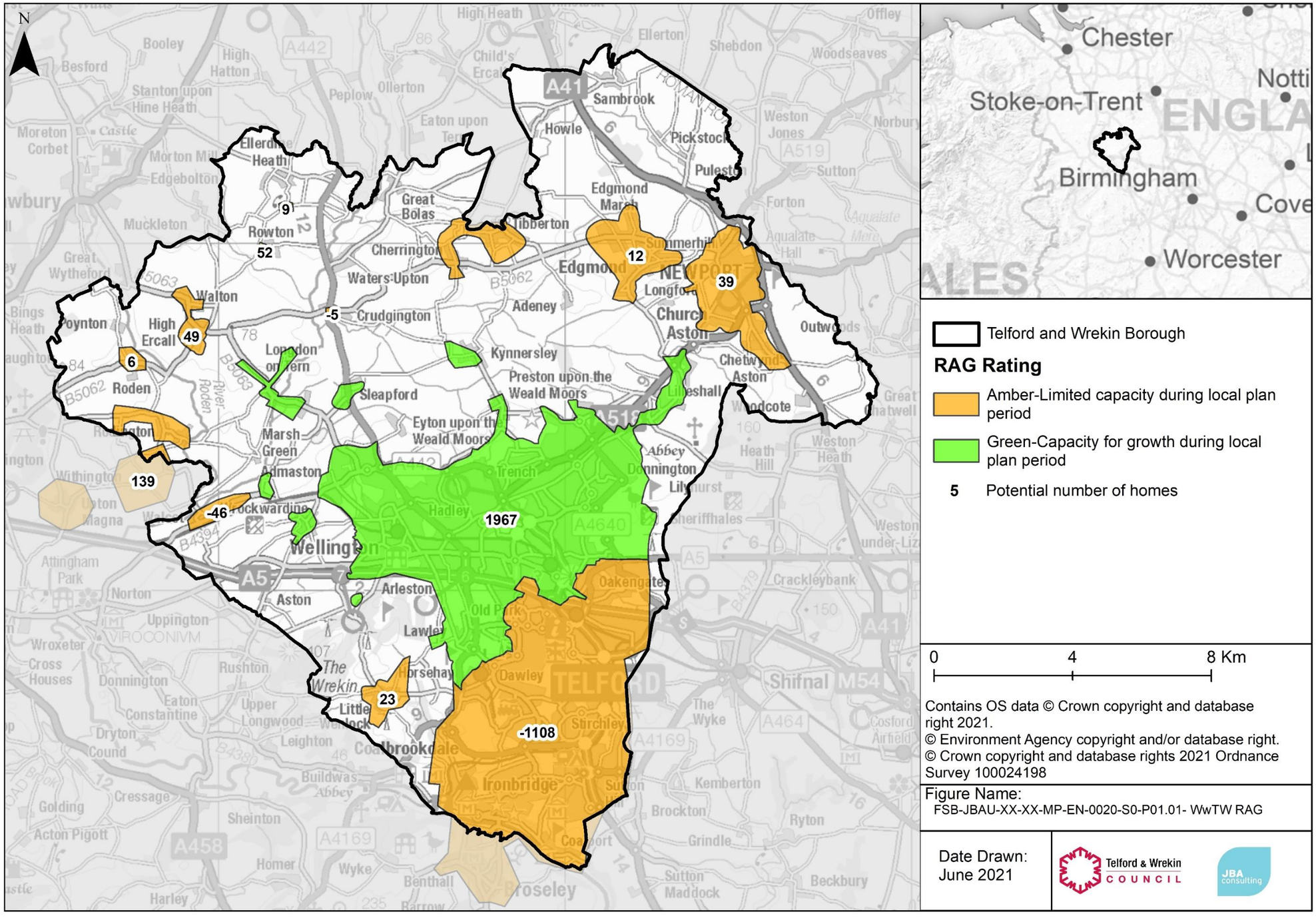


Figure 7.3 WwTW flow capacity RAG results

7.5 Conclusions

Coalport, Crudgington and Walcot WwTWs may exceed their current maximum permitted DWF over the Local Plan period as a result of potential growth in Telford & Wrekin, with Edgmond, Monkmoor and Newport WwTWs also predicted to be very close to capacity. Many of these WwTW have planned upgrades which may alleviate capacity issues. Early engagement between the Council and Severn Trent Water is required to ensure that opportunities to accommodate this growth within existing or new upgrade schemes can be realised. STW have made it clear that new capacity at WwTWs can be made available through upgrades and investment in existing infrastructure.

7.6 Recommendations

Table 7.3 Recommendations for wastewater treatment

Action	Responsibility	Timescale
Early engagement with STW is required to ensure that provision of WwTW capacity is aligned with delivery of development.	Telford & Wrekin Council	Ongoing
Provide Annual Monitoring Reports to STW detailing projected housing growth.	STW	Ongoing
STW to assess growth demands as part of their wastewater asset planning activities and feedback to the Council if concerns arise.	Telford & Wrekin Council	Ongoing

8 Odour Assessment

8.1 Introduction

Where new developments encroach upon an existing Wastewater Treatment Works (WwTW), odour from that site may become a cause for nuisance and complaints from residents. Managing odour at WwTWs can add considerable capital and operational costs, particularly when retro fitted to existing WwTWs. National Planning Policy Guidance recommends that plan-makers consider whether new development is appropriate near to sites used (or proposed) for water and wastewater infrastructure, due to the risk of odour nuisance.

8.2 Methodology

Sewerage undertakers recommend that an odour assessment may be required if the site of a proposed development is close to a WwTW and is encroaching closer to the WwTW than existing urban areas. The actual odour experienced is dependent on the size of the works, the type of treatment processes present, and the age and condition of the site. There is also significant variation due to current weather conditions.

Another important aspect is the location of the site in respect to the WwTW. Historic wind direction records for sites around Telford & Wrekin indicate that the prevailing wind is from west south-west (Shawbury) to west (Cosford Royal Air Force base) recorded at METAR weather stations[55].

8.3 Results

An odour assessment is recommended for any sites within this 800m of a WwTW. An 800m buffer is shown around the WwTW in the study area in Figure 8.1 to indicate the approximate area where nuisance odour may be a problem. Odour assessments should be undertaken and assessed as part of the planning process, and paid for by developers.

55 RenSMART website http://www.rensmart.com/Weather/WindArchive#monthlyLayer accessed on: 21/04/2021

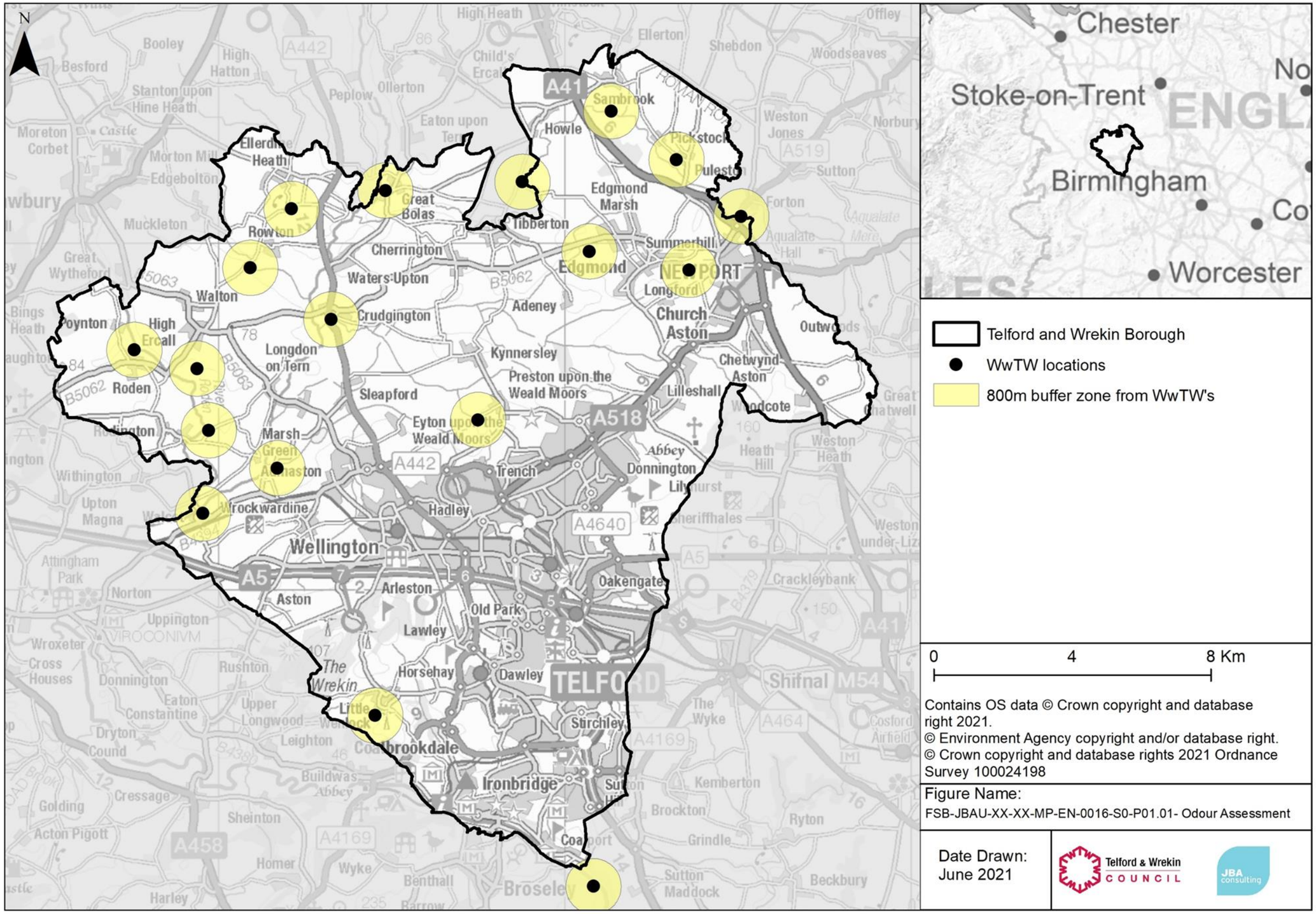


Figure 8.1 Odour assessment buffer zones

8.4 Recommendations

Table 8.1 Recommendations from the odour assessment

Action	Responsibility	Timescale
Consider odour risk when allocating sites during the TWLP process	Telford & Wrekin	Ongoing
Carry out an odour assessment for any site within the 800m potential odour zone at the planning application stage.	Site Developers	Ongoing

9 Water Quality

9.1 Introduction

An increase in the discharge of effluent from Wastewater Treatment Works (WwTW) as a result of development and growth in the area in which they serve can lead to a negative impact on the quality of the receiving watercourse. Under the Water Framework Directive (WFD), a watercourse is not allowed to deteriorate from its current WFD classification (either as an overall watercourse or for individual elements assessed).

It is Environment Agency (EA) policy to model the impact of increasing effluent volumes on the receiving watercourses. Where the scale of development is such that a deterioration is predicted, a variation to the Environmental Permit (EP) may be required for the WwTW to improve the quality of the final effluent, so that the increased pollution load will not result in a deterioration in the water quality of the watercourse. This is known as "no deterioration" or "load standstill". The need to meet river quality targets is also taken into consideration when setting or varying a permit.

The Environment Agency operational instructions on water quality planning and no-deterioration are currently being reviewed. Previous operational instructions[56] (now withdrawn) set out a hierarchy for how the no-deterioration requirements of the WFD should be implemented on inland waters. The potential impact of development should be assessed in relation to the following objectives:

- **Could the development cause a greater than 10% deterioration in water quality?** This objective is to ensure that all the environmental capacity is not taken up by one stage of development and there is sufficient capacity for future growth.
- **Could the development cause a deterioration in WFD class of any element assessed?** This is a requirement of the Water Framework Directive to prevent a deterioration in class of individual contaminants. The "Weser Ruling"[57] by the European Court of Justice in 2015 specified that individual projects should not be permitted where they may cause a deterioration of the status of a water body. If a water body is already at the lowest status ("bad"), any impairment of a quality element was considered to be a deterioration. Emerging practice is that a 3% limit of deterioration is applied.
- **Could the development alone prevent the receiving watercourse from reaching Good Ecological Status (GES) or Potential?** Is GES possible with current technology or is GES technically possible after development with any potential WwTW upgrades.

The overall WFD classification of a water body is based on a wide range of ecological and chemical classifications. This assessment focuses on three physico-chemical quality elements; Biochemical Oxygen Demand (BOD), Ammonia, and Phosphate.

9.2 Approach

It is expected that during the local plan period twelve WwTWs will see an increase in effluent as a result of growth within their catchment. If no action were taken, this has the potential to reduce water quality downstream. It is recommended at that the impact of growth during the local plan period on water quality is modelled in the Stage 2 Detailed Study. This modelling work can then be used to inform the environmental assessment outlined in Section 11.

This scoping study presents the current water quality as stated in the WFD Cycle 2.

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56 Water Quality Planning: no deterioration and the Water Framework Directive, Environment Agency (2012). Accessed online at: http://www.fwr.org/WQreg/Appendices/No_deterioration_and_the_WFD_50_12.pdf on: 05/07/2021

57 PRESS RELEASE No 74/15, European Court of Justice (2015). Accessed online at: https://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf on: 05/07/2021

9.3 Mitigation options

Should the modelling in stage 2 indicate that there is potential for a deterioration in water quality due to development, a number of mitigation options may be possible such as:

- Upgrades to treatment processes at WwTWs
- Pumping of effluent to a different WwTW catchment
- Relocation of WwTW outfalls
- Integrated Constructed Wetlands
- Catchment management actions to reduce nutrient pollution.

Where appropriate, these will be discussed further in Stage 2.

9.4 Results

9.4.1 Water Framework Directive Overview

Figure 9.1 shows the overall WFD classification for waterbodies in Telford & Wrekin. This is broken down in Table 9.1 into the determinants usually assessed in WCSs for each of the waterbodies that are predicted to receive additional effluent from growth during the plan period. Several of the WwTW discharge to small watercourses which are not within the WFD classifications. For these, the downstream watercourse status has been included. A total of 19 WwTW have been included. Of these, two waterbodies has an overall classification of "bad", six waterbodies have an overall classification of "poor", and 11 are classified as "moderate" status. The BOD, ammonia and phosphate status for each watercourse are also considered.

JBA consulting

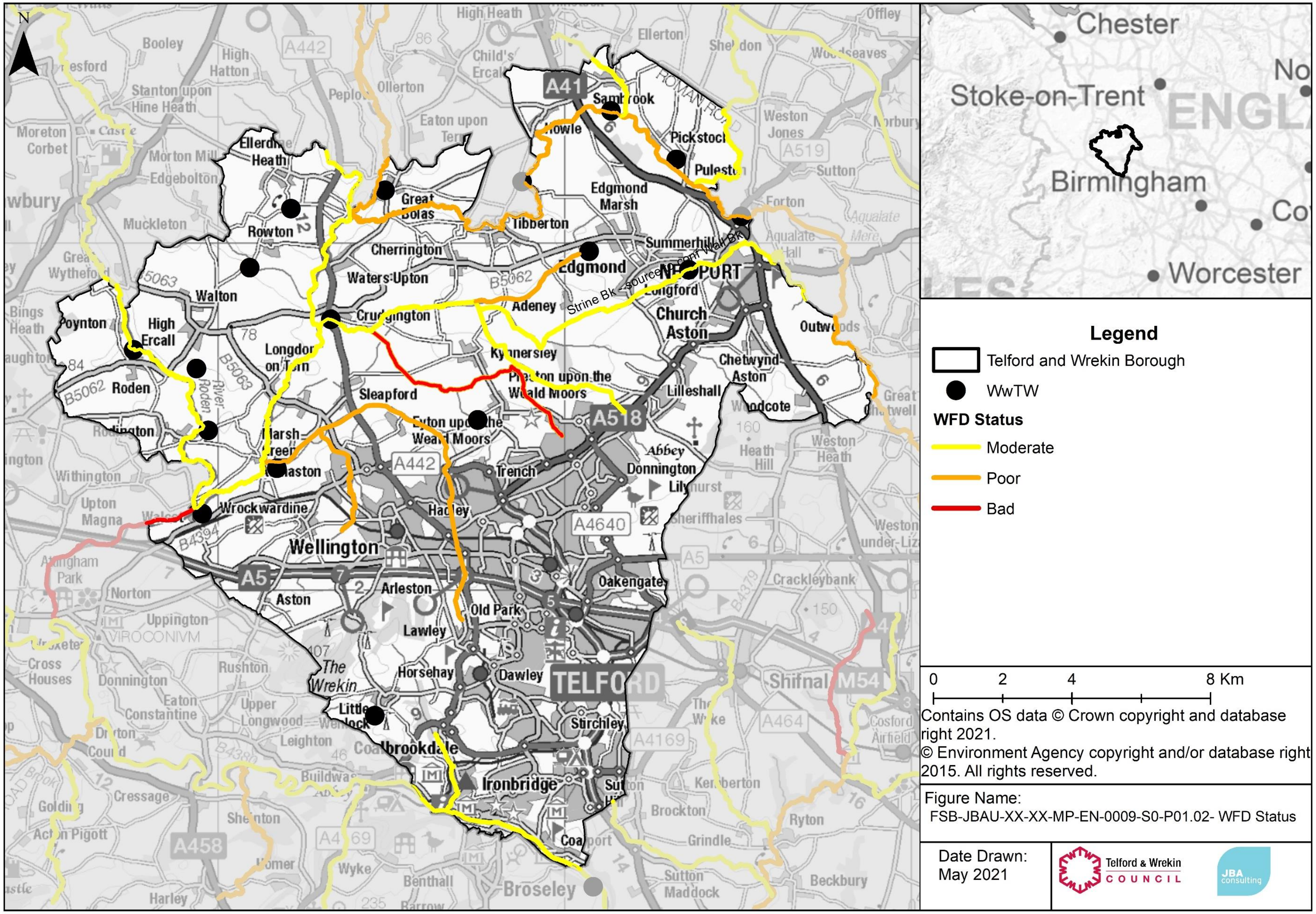

Figure 9.1 WFD status of waterbodies in Telford & Wrekin

Table 9.1: 2016 WFD classifications for waterbodies acting as discharge point for WwTW within study area

WwTW	Receiving Waterbody	Overall Status	BOD	Ammonia	Phosphate
Coalport	Severn conf M Wenlock-Farley Bk to conf R Worfe	Moderate	High	High	Moderate
Crudington	Strine – conf Pipe Strine to conf R Tern	Moderate	High	High	Poor
Edgmond	Pipe Strine – source to conf R Strine	Poor	N/A	Good	Poor
Ellerdine	Tern – conf R Meese to conf R Roden	Moderate	High	High	Poor
Ercall Heath	Meese- Outflow Aqualate Mere to conf R Ter	Poor	N/A	High	Moderate
Forton	Meese- Outflow Aqualate Mere to conf R Ter	Poor	N/A	High	Moderate
Great Bolas	Tern – conf Bailey Bk to conf R Meese	Poor	High	High	Poor
High Ercall	Roden – conf Sleap Bk to conf R Tern	Moderate	N/A	High	Poor
Little Wenlock	Severn – Sundorne Bk to conf M Wenlock-Farley Bk	Moderate	High	High	Moderate
Monkmoor	Severn – Sundorne Bk to conf M Wenlock-Farley Bk	Moderate	High	High	Moderate
Newport	Strine Bk – source to conf Wall Bk	Moderate	High	High	Moderate
Osbaston	Tern – conf R Meese to conf R Roden	Moderate	High	High	Poor
Oxmoor	Red Strine – source to conf R Strine	Bad	N/A	High	Moderate
Puleston	Meese- Outflow Aqualate Mere to conf R Ter	Poor	N/A	High	Moderate

WwTW	Receiving Waterbody	Overall Status	BOD	Ammonia	Phosphate
Roden	Roden – conf Sleap Bk to conf R Tern	Moderate	N/A	High	Poor
Rushmoor	Tern – conf R Meese to conf R Roden	Moderate	High	High	Poor
Sambrook	Meese- Outflow Aqualate Mere to conf R Ter	Poor	N/A	High	Moderate
Sugdon	Roden – conf Sleap Bk to conf R Tern	Moderate	N/A	High	Poor
Walcot	Tern – conf R Roden to conf R Severn	Bad	High	High	Poor

**N/A – these waterbodies are not included within the 2016 Cycle of WFD classification. The downstream watercourse (into which the unclassified stream flows) has been considered as alternative.*

9.4.2 Priority substances

As well as the physico-chemical water quality elements (BOD, Ammonia, Phosphate etc.) addressed above, a watercourse can fail to achieve Good Ecological Status due to exceeding permissible concentrations of hazardous substances. Currently 33 substances are defined as hazardous or priority hazardous substances, with others under review. Such substances may pose risks both to humans (when contained in drinking water) and to aquatic life and animals feeding in aquatic life. These substances are managed by a range of different approaches, including EU and international bans on manufacturing and use, targeted bans, selection of safer alternatives and end-of-pipe treatment solutions. There is considerable concern within the UK water industry that regulation of these substances by setting permit values which require their removal at wastewater treatment works will place a huge cost burden upon the industry and its customers, and that this approach would be out of keeping with the "polluter pays" principle.

Consideration should be given to how the planning system might be used to manage priority substances:

- Industrial sources – whilst this report covers potential employment sites, it doesn't consider the type of industry and therefore likely sources of priority substances are unknown. It is recommended that developers should discuss potential uses which may be sources of priority substances from planned industrial facilities at an early stage with the EA and, where they are seeking a trade effluent consent, with the sewerage undertaker.
- Agricultural sources – There is limited scope for the planning system to change or regulate agricultural practices. UK water companies are involved in a range of "Catchment-based Approach" schemes aimed at reducing diffuse sources of pollutants, including agricultural pesticides.
- Surface water runoff sources – some priority substances e.g. heavy metals, are present in urban surface water runoff. It is recommended that future developments would manage these sources by using SuDS that provide water

quality treatment, designed following the CIRIA SuDS Manual. This is covered in more detail in section 11.5.2.

- Domestic wastewater sources – some priority substances are found in domestic wastewater as a result of domestic cleaning chemicals, detergents, pharmaceuticals, pesticides or materials used within the home. Whilst an increase in the population due to housing growth could increase the total volumes of such substances being discharged to the environment, it would be more appropriate to manage these substances through regulation at source, rather than through restricting housing growth through the planning system.

No further analysis of priority substances will be undertaken as part of this study.

9.5 Conclusions

Growth during the local plan period will increase the discharge of treated wastewater from WwTWs in Telford & Wrekin. There is a potential for this to cause a deterioration in water quality in the receiving watercourses.

Water quality modelling to test potential impacts is recommended in a Stage 2 WCS as well as a discussion of possible mitigation options.

9.6 Recommendations

Table 9.2 Table of recommendations for water quality

Action	Responsibility	Timescale
Provide annual monitoring reports to STW detailing projected housing growth in the Local Authority	Telford & Wrekin	Ongoing
When preferred options for growth are identified, undertake water quality impact modelling as part of a Stage 2 WCS.	Telford & Wrekin	Ongoing
Take into account the full volume of growth (from Telford & Wrekin and neighbouring authorities) within the catchment when considering WINEP schemes or upgrades at WwTW	STW	Ongoing

9.7 Requirement for further study in Stage 2

Modelling the impact of additional discharges from WwTW on water quality is recommended in a Stage 2 WCS. It is proposed that SIMCAT an EA water quality modelling tool is used for this, and a detailed methodology will be discussed with the EA prior to Stage 2.

10 Flood Risk Management

10.1 Assessment of additional flood risk from increased WwTW discharges

In catchments with a large planned growth in population and which discharge effluent to a small watercourse, the increase in the discharged effluent might have a negative effect on the risk of flooding. This will be assessed in the Stage 2 Detailed Study.

10.2 Flood Risk in Telford & Wrekin

A detailed assessment of flood risk from all sources can be found within the Telford & Wrekin Level 1 Strategic Flood Risk Assessment[58].

The widest flood extents within Telford & Wrekin Borough are associated with the River Strine, Strine Brook, Commission drain and their tributaries, and the areas flooded are almost entirely agricultural fields and moorland. There are many smaller tributaries and brooks throughout the Borough with smaller associated flood extents, the majority of which are unnamed watercourses. The areas that these smaller watercourses affect is predominantly rural, largely covered by the Strine IDB area.

The most significant areas of flood risk are parts of Telford associated with the Humber Brook, Hurley Brook, Coalbrook/Loamhole Brook and the Mad(e) Brook, where significant numbers of properties and commercial premises are within Flood Zone 3. A significant number of properties are also within flood zones associated with the River Severn in the south of the borough, and several communities including Marsh Green and Longdon on Tern are within flood zones of the River Tern in the north of the borough.

10.3 Recommendations

Table 10.1 Recommendations from the flood risk assessment

Action	Responsibility	Timescale
Proposals to increase discharges to a watercourse may also require a flood risk activities environmental permit from the EA (in the case of discharges to Main River), or a land drainage consent from the Lead Local Flood Authority (in the case of discharges to an Ordinary Watercourse).	STW	During design of WwTW upgrades

58 Telford & Wrekin Level 1 Strategic Flood Risk Assessment (2018) Accessed online at: https://www.telford.gov.uk/info/20458/flooding/558/level_1_strategic_flood_risk_assessment on: 05/07/2021

11 Environmental Opportunities and Constraints

11.1 Introduction

Development has the potential to cause an adverse impact on the environment through a number of routes, such as worsening of air quality, pollution to the aquatic environment or disturbance to wildlife. In the context of a Water Cycle Study, the impact of development on the aquatic environment is under assessment.

A source-pathway-receptor approach can be taken to investigate the risk and identify where further assessment or action is required.

11.2 Sources of pollution

Water pollution is usually categorised as either diffuse or point source. Point source sources come from a single well-defined point, an example being the discharge from a WwTW.

Diffuse pollution is defined as "unplanned and unlicensed pollution from farming, old mine workings, homes and roads. It includes urban and rural activity and arises from industry, commerce, agriculture and civil functions and the way we live our lives."

Examples of diffuse sources of water pollution include:

- Contaminated runoff from roads – this can include metals and chemicals
- Drainage from housing estates
- Misconnected sewers (foul drains to surface water drains)
- Accidental chemical/oil spills from commercial sites
- Surplus nutrients, pesticides and eroded soils from farmland
- Septic tanks and non-mains sewer systems

The most likely sources of diffuse pollution from new developments include drainage from housing estates, runoff from roads and discharges from commercial and industrial premises. The pollution risk posed by a site will depend on the sensitivity of the receiving environment, the pathway between the source of the runoff and the receiving waters, and the level of dilution available. After or during heavy rainfall, the first flush of water carrying accumulated dust and dirt is often highly polluting.

Whilst the threat posed by an individual site may be low, a number of sites together may pose a cumulative impact within the catchment.

Runoff from development sites should be managed by a suitably designed SuDS scheme, more information on SuDS can be found in section 11.5.2. Potential impacts on receiving surface waters include the blanketing of riverbeds with sediment, a reduction in light penetration from suspended solids, and a reduction in natural oxygen levels, all of which can lead to a loss in biodiversity.

11.3 Pathways

Pollutants can take a number of different pathways from their source to a "receptor" – a habitat or species that can be impacted. This could be overland via surface water flow paths, via the river system, or via groundwater or a combination of all three.

11.4 Receptors

A receptor in this case is a habitat or species that is adversely impacted by a pollutant. Both the rivers and groundwater as well as being pathways, can also be considered to be receptors. Groundwater bodies are also given a status under the WFD which is reported in Section 4.1.3 for the groundwater bodies across Telford & Wrekin.

Within the study area and downstream are many sites with environmental designations such as:

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Sites of Special Scientific Interest (SSSI)
- Ramsar sites (Wetlands of International Importance)
- Priority Habitats and Priority Headwaters

A description of these, and the relevant legislation that defines and protects them, can be found in section 3.5 to 3.7.

In order to identify protected sites that may be at risk, Flood Zone 2 from the Risk of Flooding from Rivers and the Sea mapping was used to define an area that was either adjacent to a river or could be reasonably expected to receive surface water from a river. Where a WwTW was present in the catchment upstream of the protected site, it was considered that there was a risk of deterioration in water quality due to growth during the local plan period. Where there were no WwTWs serving growth upstream, risk of deterioration is considered to be low, and would not be shown by water quality modelling. However, in these cases the overall catchment water quality should be considered where for example they are designated for migratory fish species that may spend part of their lifecycle elsewhere in the catchment.

Priority Habitats have been mapped, but due to the large number of sites, these have not been assessed individually.

The environmental designated sites which may be impacted by change in discharge from the WwTW upstream are listed below in Table 11.1 and sites within TWC are shown in Figure 11.2. there are no SACs, SPA or Ramsar sites with in TWC, however they are present downstream and adjacent to watercourses that could be affected by an increased in effluent flow from within TWC.

Table 11.1 Protected sites which could be affected by a change in WwTW discharge

WwTW	Adjacent watercourse (pathway)	Protected site	Designation
Coalport WwTW	River Severn	Ashleworth Ham	SSSI
		Aust Cliff	
		Chaceley Meadow	
		Coombe Hill Canal	
		Frampton Pools	
		Garden Cliff	
		Grimley Brick Pits	
		Hartlebury Common and Hilldditch Coppice	
		Lydney Cliff	
		Northwick Marsh	
		Old River Severn, Upper Lode	
		Purton Passage	
		River Teme	

WwTW	Adjacent watercourse (pathway)	Protected site	Designation
		Severn Estuary	
		Severn Ham, Tewkesbury	
		Shrawley Wood	
		Upper Severn Estuary	
		Upton Ham	
		Wainlode Cliff	
		Walmore Common	
		Wyre Forest	
		Severn Estuary	SAC
		Walmore Common	SPA
		Severn Estuary	
		Walmore Common	RAMSAR
		Severn Estuary	
Little Wenlock WwTW	River Severn	Tick Wood and Benthall Edge	SSSI
Rushmoor WwTW	Commission Drain	Allscott Settling Ponds	SSSI
Shrewsbury WwTW	River Severn	Buildwas River Section	SSSI
Wallcot WwTW	River Tern	Attingham Park	SSSI

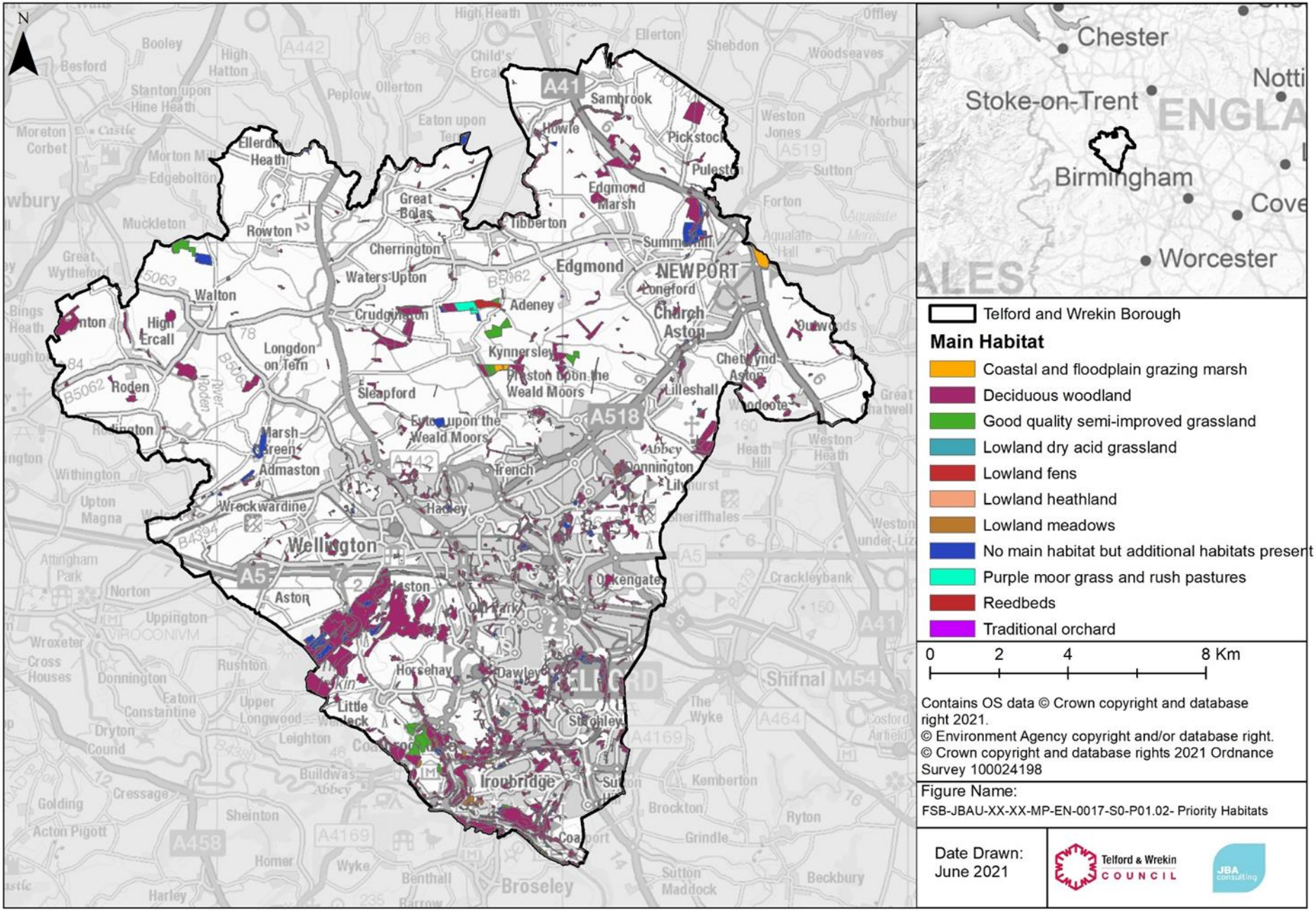

Figure 11.1 Priority habitats in TWC

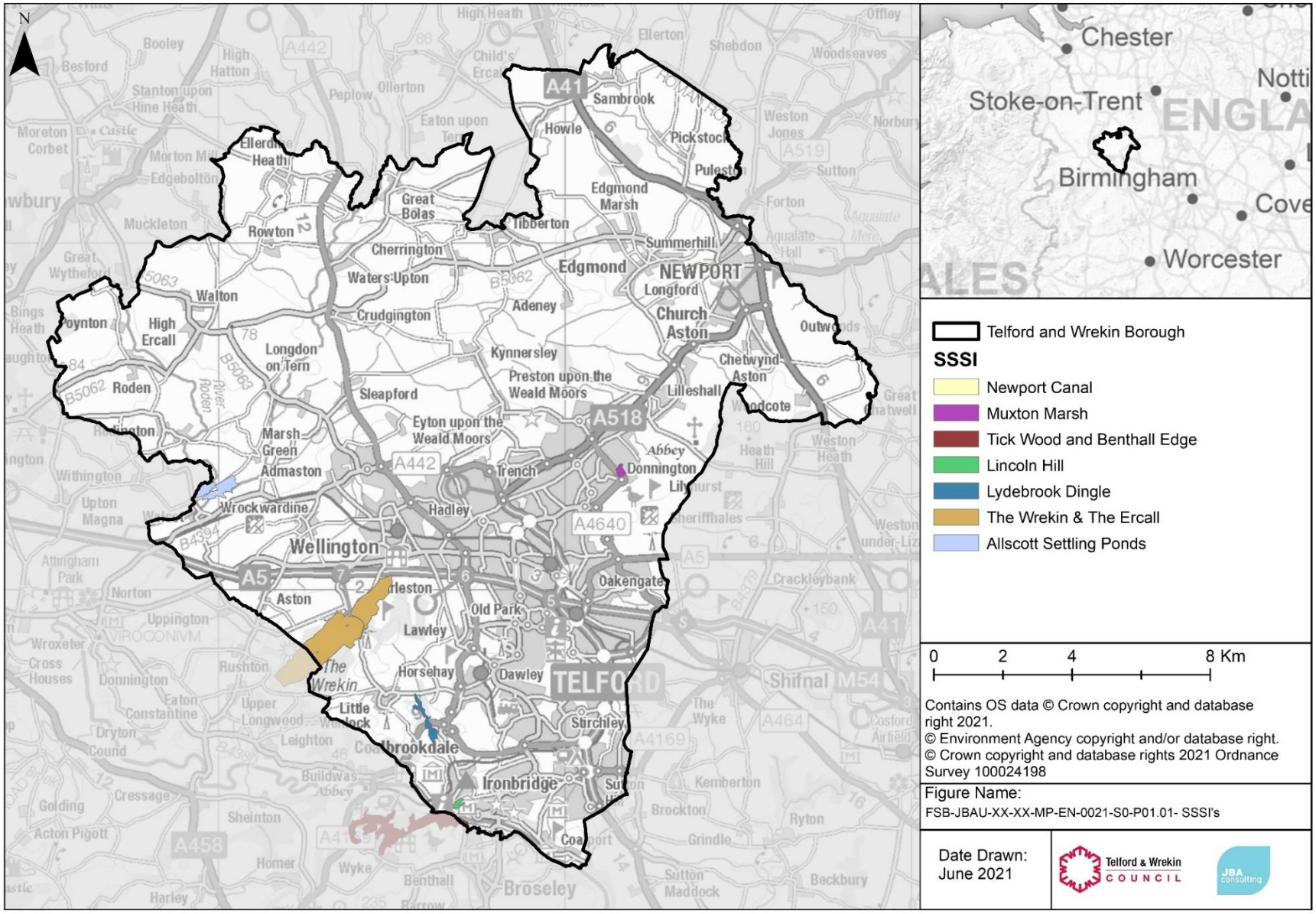

Figure 11.2 Sites of Special Scientific Interest (SSSI) in TWC

11.5 Protection and mitigation

11.5.1 Groundwater Protection

Groundwater is an important source of water in England and Wales.

The Environment Agency is responsible for the protection of "controlled waters" from pollution under the Water Resources Act 1991. These controlled waters include all watercourses and groundwater contained in underground strata.

The zones are based on an estimate of the time it would take for a pollutant which enters the saturated zone of an aquifer to reach the source of abstraction or discharge point (Zone 1 = 50 days, Zone 2 = 400 days, Zone 3 is the total catchment area). The Environment Agency will use SPZs (alongside other datasets such as the Drinking Water Protected Areas (DrWPAs) and aquifer designations as a screening tool to show:

- Areas where the EA would object in principle to certain potentially polluting activities, or other activities that could damage groundwater,
- Areas where additional controls or restrictions on activities may be needed to protect water intended for human consumption,
- How it prioritises responses to incidents.

The EA have published a position paper[59] outlining its approach to groundwater protection which includes direct discharges to groundwater, discharges of effluents to ground and surface water runoff. This is of relevance to this water cycle study where a development may manage surface water through SuDS.

Sewage and Trade Effluent

Discharge of treated sewage of $2m^3$ per day or less to ground are called small sewage discharges (SSDs). The majority of SSDs do not require an environmental permit if they comply with certain qualifying conditions. A permit will be required for all SSDs in source protection zone 1 (SPZ1).

For treated sewage effluent discharges, the EA encourages the use of shallow infiltration systems, which maximise the attenuation within the drainage blanket and the underlying unsaturated zone. Whilst some sewage effluent discharges may not pose a risk to groundwater quality individually, the cumulative risk of pollution from aggregations of discharges can be significant. Improvement or pre-operational conditions may be imposed before granting an environmental permit. The EA will only agree to developments where the addition of new sewage effluent discharges to ground in an area of existing discharges is unlikely to lead to an unacceptable cumulative impact.

Generally, the Environment Agency will only agree to developments involving release of sewage effluent, trade effluent or other contaminated discharges to ground if it is satisfied that it is not reasonable to make a connection to the public foul sewer. The EA would normally expect to only permit new private discharges where the distance to connect to the nearest public sewer exceeds the number of dwellings multiplied by 30m. So, for example, a development of 100 dwellings would need to be more than 3km from a public sewer. The developer would have to provide evidence of why the proposed development cannot connect to the foul sewer in the planning application. This position will not normally apply to surface water run-off via sustainable drainage systems and discharges from sewage treatment works operated by sewerage undertakers with appropriate treatment and discharge controls.

Deep infiltration systems (such as boreholes and shafts) are not generally accepted by the EA for discharge of sewage effluent as they bypass soil layers and reduce the opportunity for attenuation of pollutants.

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59 The Environment Agency's approach to groundwater protection, Environment Agency (2018). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Environment-Agency-approach-to-groundwater-protection.pdf on: 05/07/2021

Discharges of surface water run-off to ground at sites affected by land contamination, or from sites for the storage of potential pollutants are likely to require an environmental permit. This could include sites such as garage forecourts and coach and lorry parks. These sites would be subject to a risk assessment with acceptable effluent treatment provided.

Discharge of Clean Water

"Clean water" discharges such as runoff from roofs or from roads, may not require a permit. However, they are still a potential source of groundwater pollution if they are not appropriately designed and maintained.

Where infiltration SuDS schemes are proposed to manage surface runoff they should:

- Be suitably designed;
- Meet Government non-statutory technical standards[60] for sustainable drainage systems – these should be used in conjunction with the NPPF and PPG; and
- Use a SuDS management treatment train

A hydrogeological risk assessment is required where infiltration SuDS is proposed for anything other than clean roof drainage in a SPZ1.

Source Protection Zones in Telford & Wrekin

Source protection zones (SPZs) form a key part of the Environment Agency's approach to controlling the risk to groundwater supplies from potentially polluting activities and accidental releases of pollutants.

The Source Protection Zones (SPZs) that are present in the Telford & Wrekin area are shown in Figure 11.3.

The Environment Agency's Manual for the Production of Groundwater Source Protection Zones[61], details position statements which provide information about the Environment Agency's approach to managing and protecting groundwater.

Proposed development locations within or close to Source Protection Zones, should be assessed in relation to the relevant Environment Agency position statements.

60 Sustainable Drainage Systems: non-statutory technical standards, Department for Environment, Food & Rural Affairs (2015). Accessed online at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards on: 05/07/2021

61 Manual for the Production of Groundwater Source Protection Zones, Environment Agency (2019). Accessed online at: https://www.gov.uk/government/publications/groundwater-source-protection-zones-spz-production-manual on: 05/07/2021

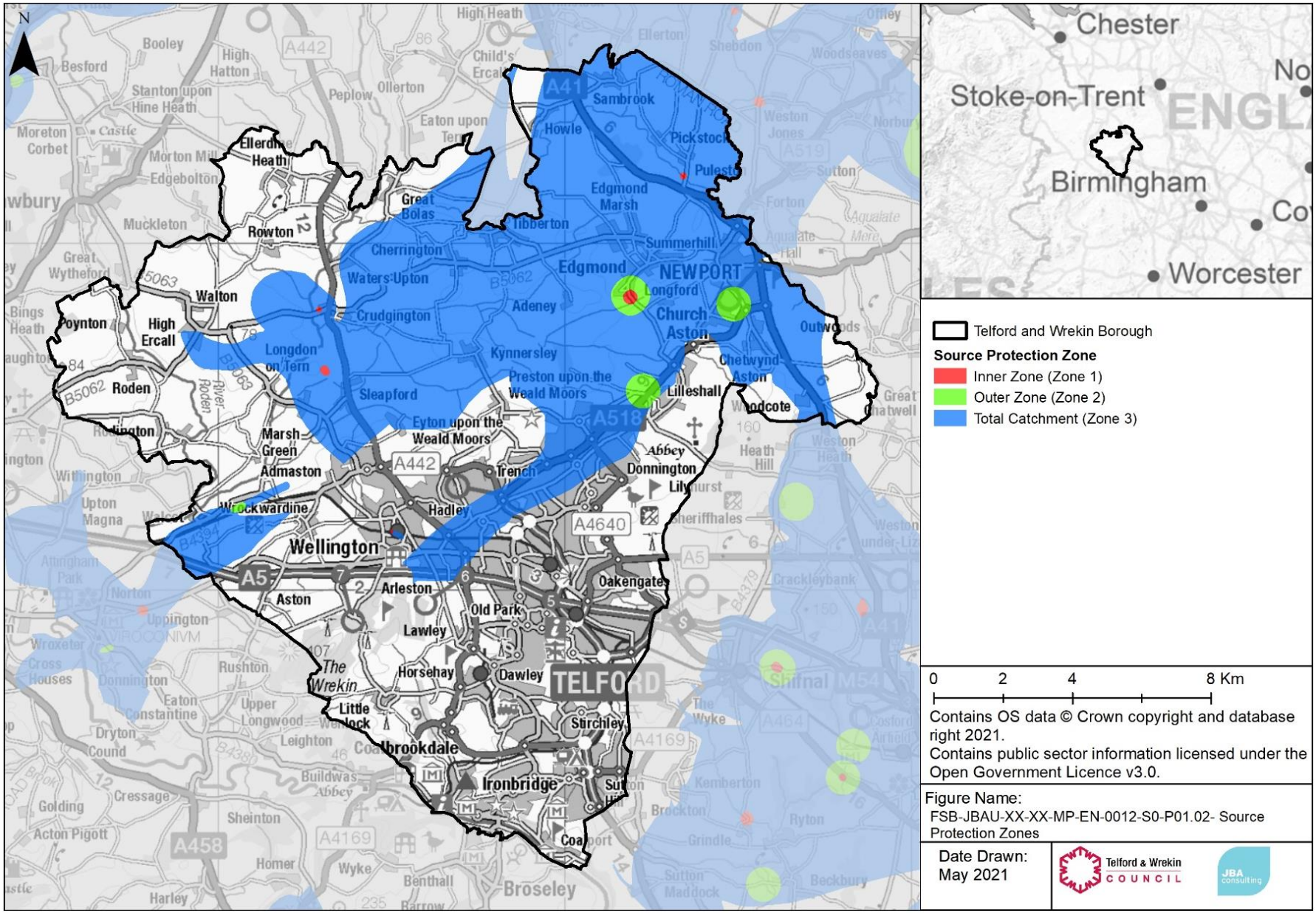

Figure 11.3 Source Protection Zones in the Study Area

11.5.2 Surface Water Drainage and SuDS

Since April 2015[62], management of the rate and volume of surface water has been a requirement for all major development sites, through the use of Sustainable Drainage Systems (SuDS).

Lead Local Flood Authorities (LLFAs) are the statutory consultees to the planning system for surface water management within major development, which covers the following development scenarios:

- 10 or more dwellings
- a site larger than 0.5 hectares, where the number of dwellings is unknown
- a building greater than 1,000 square metres
- a site larger than 1 hectare

SuDS are drainage features which attempt to replicate natural drainage patterns, through capturing rainwater at source, and releasing it slowly into the ground or a water body. They can help to manage flooding through controlling the quantity of surface water generated by a development and improve water quality by treating urban runoff. SuDS can also deliver multiple benefits, through creating habitats for wildlife and green spaces for the community. SuDS also have the advantage of providing effective Blue and Green infrastructure and ecological and public amenity benefits when designed and maintained properly.

National standards on the management of surface water are outlined within the Defra Non-statutory Standards for Sustainable Drainage Systems[63]. The CIRIA C753 SuDS Manual[64] and Guidance for the Construction of SuDS[65] provide the industry best practice guidance for design and management of SuDS

Local guidance, provided by the Lead Local Flood Authorities covering the study area, is detailed below:

- Telford & Wrekin is a Lead Local Flood Authority. The Telford & Wrekin Council sustainable drainage systems handbook[66] contains advice from the LLFA relating to surface water drainage and sets out the minimum operating requirements as required in the National Planning Policy Framework (NPPF). The SPD provides guidance on the approach that should be taken to SuDS in new developments in Telford & Wrekin so as to manage and mitigate surface water flood risk.

11.5.3 Use of SuDS in Water Quality Management

SuDS allow the management of diffuse pollution generated by urban areas through the sequential treatment of surface water reducing the pollutants entering lakes and rivers, resulting in lower levels of water supply and wastewater treatment being required. This

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62 House of Commons: Written Statement (HCWS161) Written Statement made by: The Secretary of State for Communities and Local Government (Mr Eric Pickles) on 18 Dec 2014. Accessed online at: https://www.parliament.uk/documents/commons-vote-office/December%202014/18%20December/6.%20DCLG-sustainable-drainage-systems.pdf on: 05/07/2021

63 Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems, DEFRA (2015). Accessed online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf on: 05/07/2021

64 CIRIA Report C753 The SuDS Manual, CIRIA (2015). Accessed online at: https://www.ciria.org/Memberships/The_SuDs_Manual_C753_Chapters.aspx on: 05/07/2021

65 Guidance on the Construction of SuDS (C768), CIRIA (2017), Accessed online at: https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK on: 05/07/2021

66 Telford & Wrekin Council sustainable drainage systems handbook, Highways and Engineering and Telford & Wrekin Council (2019). Accessed online at: https://www.telford.gov.uk/downloads/download/2237/sustainable_urban_drainage_systems_suds on: 06/05/2021

treatment of diffuse pollution at source can contribute to meeting WFD water quality targets, as well as national objectives for sustainable development.

This is usually facilitated via a SuDS Management Train of a number of components in series that provide a range of treatment processes delivering gradual improvement in water quality and providing an environmental buffer for accidental spills or unexpected high pollutant loadings from the site. Considerations for SuDS design for water quality are summarised in Figure 11.4 below.

The non-statutory technical standards for SuDS are currently being updated. Feedback on the draft text highlighted the need for the update to place a greater emphasis on multiple benefits with water quality being the most desired benefit not currently included[67]. A new standard has therefore been created for water quality: *"Apply a 'SuDS approach' that manages the quality of the surface water runoff to prevent pollution and protect both groundwater and surface water"*.

67 News article on draft NSTS, HR Wallingford (2020). Accessed online at: http://www.uksuds.com/news/draft-updated-standards on: 05/07/2021

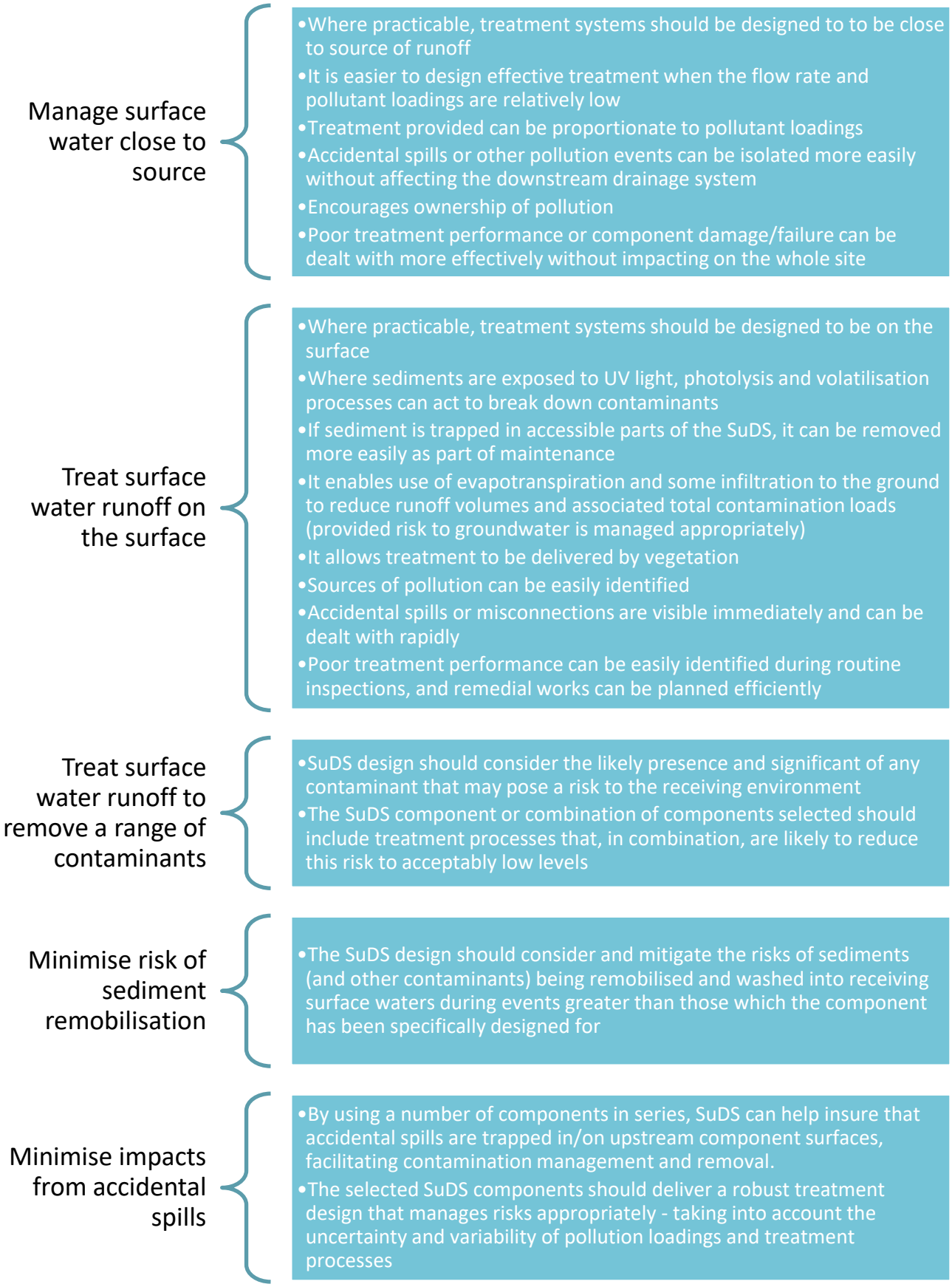


Figure 11.4 Considerations for Suds Design for Water Quality

Managing pollution close to its source can help keep pollutant levels and accumulation rates low, allowing natural processes to be more effective. Treatment can often be delivered within the same components that are delivering water quantity design criteria, requiring no additional cost or land-take.

SuDS designs should control the 'first flush' of pollutants (usually mobilised by the first 5mm of rainfall) at source, to ensure contaminants are not released from the site. Best practise is that no runoff should be discharged from the site to receiving watercourses or sewers for the majority of small (e.g. less than 5mm) rainfall events.

Infiltration techniques will need to consider Groundwater Source Protection Zones and are likely to require consultation with the Environment Agency. Early consideration of SuDS within master planning will typically allow a more effective scheme to be designed.

11.5.4 Additional Benefits

Flood Risk

The Strategic Flood Risk Assessment contains recommendations for SuDS to manage surface water on development sites, with the primary aim of reducing flood risk.

SuDS are most effective at reducing flood risk for relatively high intensity, short and medium duration events, and are particularly important in mitigating potential increases in surface water flooding, sewer flooding and flooding from small and medium sized watercourses resulting from development.

Water Resources

A central principle of SuDS is the use of surface water as a resource. Traditionally, surface water drainage involved the rapid disposal of rainwater, by conveying it directly into a sewer or wastewater treatment works.

SuDS techniques such as rainwater harvesting, allow rainwater to be collected and re-used as non-potable water supply within homes and gardens, reducing the demand on water resources and supply infrastructure.

Climate Resilience

Climate projections for the UK suggest that winters may become milder, and wetter and summers may become warmer, but with more frequent higher intensity rainfall events, particularly in the south east. This would be expected to increase the volume of runoff, and therefore the risk of flooding from surface water, and diffuse pollution, and reduce water availability.

SuDS offer a more adaptable way of draining surfaces, controlling the rate and volume of runoff leaving urban areas during high intensity rainfall, and reducing flood risk to downstream communities through storage and controlled release of rainwater from development sites.

Through allowing rainwater to soak into the ground, SuDS are effective at retaining soil moisture and groundwater levels, which allows the recharge of the watercourses and underlying aquifers. This is particularly important where water resource availability is limited, and likely to become increasingly scarce under future drier climates.

Biodiversity

The water within a SuDS component is an essential resource for the growth and development of plants and animals, and biodiversity benefits can be delivered even by very small, isolated schemes. The greatest value can be achieved where SuDS are planned as part of a wider green landscape, providing important habitat, and wildlife connectivity. With careful design, SuDS can provide shelter, food, foraging and breeding opportunities for a variety of species including plants, amphibians, invertebrates, birds, bats and other animals.

Amenity

Designs using surface water management systems to help structure the urban landscape can enrich its aesthetic and recreational value, promoting health and well-being and supporting green infrastructure. Water managed on the surface rather than underground can help reduce summer temperatures, provide habitat for flora and fauna and act a resource for local environmental education programmes and working groups and directly influence the sense of community in an area.

11.5.5 Suitable SuDS Techniques

The hydraulic and geological characteristics of each property development site across Telford & Wrekin should be assessed to identify the most appropriate forms of surface water management and any constraining factors to the utilisation of SuDS. These assessments are designed to inform the early-stage site planning process and should be followed up the site-specific detailed drainage assessments.

Appropriate SuDS techniques have been categorised into five main groups, as shown in Table 11.2. Further site-specific investigation should be conducted to determine what SuDS techniques could be used on a particular development, informed by detailed ground investigations.

Table 11.2: Summary of SuDS Categories

SuDS Type	Technique
Source Controls	Green Roof, Rainwater Harvesting, Pervious Pavements, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance	Dry Swale, Under-drained Swale, Wet Swale

11.5.6 Natural Flood Management

Natural Flood Management (NFM) is used to protect, restore and re-naturalise the function of catchments and rivers to reduce flood risk. A wide range of techniques can be used that aim to reduce flooding by working with natural features and processes in order to store or slow down flood waters before they can damage flood risk receptors (e.g. people, property, infrastructure, etc.). NFM involves taking action to manage flood and coastal erosion risk by protecting, restoring and emulating the natural regulating functions of catchments, rivers, floodplains and coasts. Techniques and measures, which could be applied in Telford & Wrekin include:

- Peatland and moorland restoration in upland catchments
- Offline storage areas
- Re-meandering streams
- Targeted woodland planting
- Reconnection and restoration of functional floodplains
- Restoration of rivers and removal of redundant structures
- Installation or retainment of large woody material in river channels
- Improvements in management of soil and land use

- Creation of rural and urban SuDS

In 2017, the Environment Agency published on online evidence base[68] to support the implementation of NFM and with JBA produced maps showing locations with the potential for NFM measures[69]. These maps are intended to be used alongside the evidence directory to help practitioners think about the types of measure that may work in a catchment and the best places in which to locate them. There are limitations with the maps; however, it is a useful tool to help start dialogue with key partners.

11.5.7 Multiple Benefits of NFM

In addition to flood risk benefits, there are also significant benefits in other areas such as habitat provision, air quality, climate regulation and water quality.

Many NFM measures have the ability to reduce nutrient and sediment sources by reducing surface runoff flows from higher ground, reducing soil erosion, trapping sediment at the edge of agricultural land, or encouraging deposition of sediments behind natural dams upstream in watercourses.

Suitable techniques may include:

- Leaky dams
- Woodland planting
- Buffer strips
- Runoff retention ponds
- Land management techniques (soil aeration, cover crops etc)

68 Working with natural processes to reduce flood risk, Environment Agency (2018). Accessed online at: https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk on: 05/07/2021
69 Mapping the potential for working with natural process, Environment Agency and JBA (2017). Accessed online at: https://www.arcgis.com/home/item.html?id=7315f943998847e2b3797a85665f5438 on: 05/07/2021

Case Study – Black Brook Slow the Flow

Four engineered log dams were installed on Black Brook at an estimated cost of £2,000, funded by Natural England and the Environment Agency to restore Stanley Bank SSSI. The scheme aimed to improve habitat and reduce the risk of flooding. However, the scheme also resulted in reduced levels of phosphate and nitrate in Black Brook, with phosphate concentrations falling by 3.6mg/l. By 2035, it is predicted that 792m^3 of sediment will be stored in three ponds retained by the jams.

Reproduced from Case Study 17. Black Brook Slow the Flow, St Helens, Norbury, Rogers and Brown, EA WwNP Evidence Base 2017. Photograph taken on 8 May 2015; courtesy of Matthew Catherall

11.5.8 Integrated Constructed Wetlands

An integrated constructed wetland (ICW) is an artificial wetland created for the purpose of treating polluted water, whether this is municipal wastewater, grey water from residential properties, or agricultural runoff.

They are usually unlined, free surface flow wetlands, designed to contain and treat influents within emergent vegetated areas.

Defra carried out a systematic review of the effectiveness of various wetland types, including ICWs for mitigating agricultural pollution such as phosphate and nitrate. The overall conclusion was that all wetland types are very effective at reducing major nutrients and suspended sediments, with the exception of nitrite in ICWs. Nitrate is only reduced when passing through overland buffer strips and through constructed wetlands with vegetation, where the systematic review showed a mean reduction of 29% across the evidence included in the study.

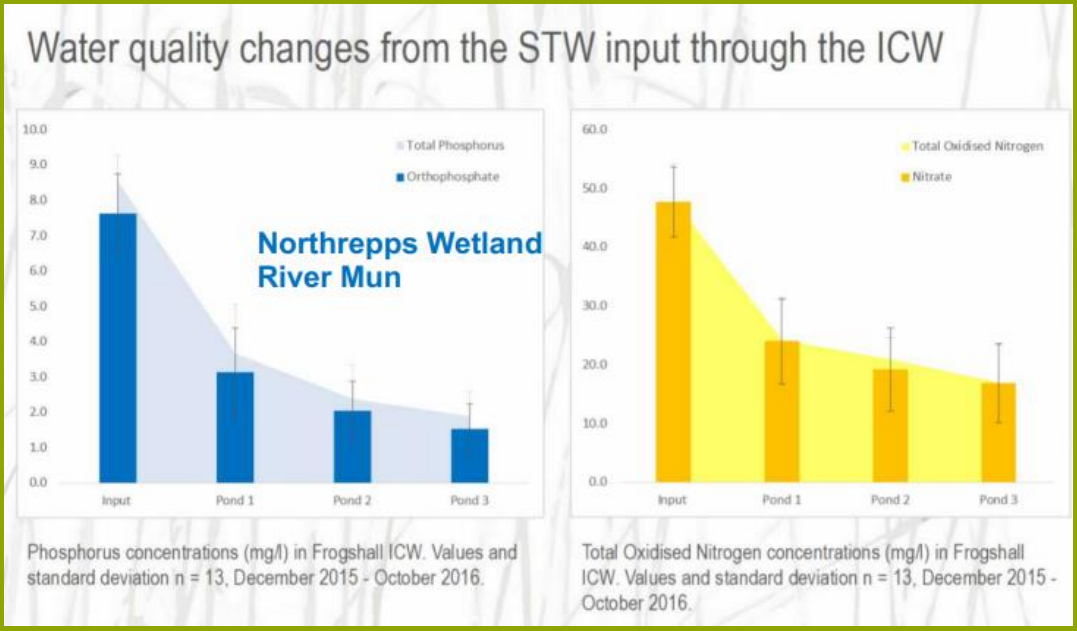
The mean reduction in Total Phosphorus across the evidence base was 78%.

Case Study – Frogshall ICW

The Upper River Mun in Norfolk was experiencing chronic pollution, and a loss in biodiversity in the river. Investigation found that nutrients from a Sewage Treatment Works upstream were contributing to this issue.

A pilot ICW was created consisting of three shallow ponds, filled with 18,000 emergent aquatic plants, and the outfall from the treatment works was diverted to pass through the wetland.

Early monitoring has shown that 90% of the phosphate is being removed by the wetland, and a large increase in biodiversity downstream observed.



Reproduced from "Stripping the Phosphate" a presentation by the Norfolk Rivers Trust (2018).

https://www.theriverstrust.org/media/2018/08/2.-Stripping-the-phosphate-David-Diggens-Norfolk-Rivers-Trust.pdf

11.5.9 Agricultural Management

There is a big potential to improve water quality by interventions aimed at agricultural sources, especially considering the measures already taken by the water companies to reduce their contribution to phosphate load.

Potential schemes could include:

- Buffer strips
- Cross slope tree planting
- Runoff retention basins
- Contour ploughing
- Cover crops

There is considerable overlap with NFM measures, and the challenges are also very similar. Exact impacts are difficult to measure, although modelling tools such as

Farmscoper[70] exist to help with this. Once a scheme is implemented it relies on the landowner to continue to maintain it in order to maintain the mitigation benefit.

Funding for agricultural interventions could come from Catchment Sensitive Farming or a Payment for Ecosystem Services approach.

Case Study – Wessex Water - EnTrade

Wessex Water catchment team used EnTrade to invite farmers to bid to grow cover crops over winter to reduce the nitrogen leaching into the watercourse.

This avoided the need to upgrade Dorchester WwTW to provide the same nitrogen removal capacity.

A trial auction was held in 2015, and two further auctions have since taken place attracting 557 bids from 63 farmers to save 153 tonnes of nitrogen.

"Using EnTrade to create a market in measures to deliver reductions in nitrogen has delivered a 30% saving for Wessex Water compared to traditional catchment approaches."

Ruth Barden, Director of Environmental Strategy, Wessex Water

11.5.10 Barriers

Whilst there are many benefits to implementing NFM and constructed wetlands, or modifying agricultural practises, the impact of these techniques is hard to quantify, and relies on ongoing maintenance to maintain that benefit. Where a potential scheme is not on a development site it will also require permission and support of the landowner. It may not be possible to influence this through planning policy.

11.5.11 Conclusions

- The potential impact of development on a number of protected sites such as SAC, SPAs, Ramsar sites and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There are also a larger number of Priority Habitats and Priority Rivers.

70 Farmscoper webpage, ADAS (2020). https://www.adas.uk/Service/farmscoper Accessed on 05/07/2021

- There are a number of Groundwater Source Protection Zones, primarily in central and eastern areas of the study area. The impact of future development on groundwater should be investigated fully.
- Development sites within the study area could be sources of diffuse pollution from surface runoff.
- SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development.
- Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity.
- Telford & Wrekin Council should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors.
- In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation.

11.6 Recommendations

The recommendations for managing environmental constraints and potential opportunities in Telford & Wrekin is identified below in Table 11.3.

Table 11.3: Recommendations from Environmental Constraints and Opportunities Section

Action	Responsibility	Timescale
Consider the environmental impact of development on protected sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	Telford & Wrekin Council	Local Plan Review Development
The Local Plan Review should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated, in consultation with Natural England (for national and international designations and priority habitats).	Telford & Wrekin Council	Ongoing
The Local Plan Review should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	Telford & Wrekin Council	Ongoing
In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	Telford & Wrekin Council, STW, EA	Ongoing
Developers should include the design of SuDS at an early stage to maximise the benefits of the scheme	Developers	Ongoing
Work with developers to discourage connection of new developments into existing surface water and combined sewer networks. Prevent connections into the foul network, as this is a significant cause of sewer flooding.	Telford & Wrekin Council Developers	Ongoing

Action	Responsibility	Timescale
Opportunities for Natural Flood Management that include schemes aimed at reducing / managing runoff should be considered to reduce nutrient and sediment pollution within Telford & Wrekin.	Telford & Wrekin Council EA and NE	Ongoing

11.7 Requirement for further study in Stage 2

Further assessment of the impact of development on protected sites within Telford & Wrekin WCS is recommended in a Stage 2 WCS. This should use the water quality modelling work to predict the deterioration in water quality in watercourses adjacent to protected sites identified in the section above. This will provide additional evidence to aid to the HRA process.

12 Summary and overall conclusions

12.1 Summary

Telford & Wrekin Council consulted on 3x housing growth scenarios at the Issues & Options consultation stage – for the purpose of assessing impacts of new development as part of this phase 1 WCS the middle scenario of 19,840 dwellings over the Local Plan Period 2020-2040 were selected. The employment growth scenario was also selected to for assessment as part of this study. Much of this has been met through current committed sites, sites with planning permission and allocations which have not yet gained planning permission. However, based on this scenario, there is a net remaining requirement of around 9,679 houses and 90ha of employment land, to be delivered through preferred options sites and a number of larger strategic sites. The aim of this water cycle study is to provide the evidence to inform the selection of sites, taking into account the constraints in the water environment and in water and wastewater infrastructure.

Severn Trent Water supply water and wastewater services for the whole of Telford & Wrekin.

A number of WwTW have limited headroom in their environmental permits and may require changes to their flow permits and accompanying changes to their environmental permits and/or upgrades to treatment performance.

Figure 7.3 shows the RAG results from Severn Trent Water WwTW flow assessments. A score of red or amber does not necessarily mean that development in these areas cannot occur, just that infrastructure upgrades may be required to accommodate growth. The recommendations outlined in the below table should be considered and early engagement between the Council and the water companies is key to ensure the required growth can be realised. STW have stated that having reviewed the potential allocations "…there are no immediate concerns" and "In regards to additional infrastructure to reach new development specifically (e.g. pipes) this would be decided and assessed when new developments come forward for new connections. Based on our current planning and processes we don't anticipate the need for any specific land to be safeguarded"

The conclusions from each topic area are summarised in Table 12.1, alongside the recommendations in Table 12.2.

Table 12.1 Summary of conclusions from the study

Assessment	Conclusion
Water resources	• The growth projections from Telford & Wrekin Council were found to be more than the WRMP projections. **STW have confirmed that the additional growth will be able to be accommodated for.** • TWC may want to consider going further than the 110l/p/d water efficiency target particularly in larger strategic developments. • Policies to reduce water demand from new developments, or to go further and achieve water neutrality in certain areas, could be defined to reduce the potential environmental impact of additional water abstractions in Telford & Wrekin, and also help to achieve reductions in carbon emissions.
Water supply infrastructure	• **Severn Trent stated that there are no immediate concerns with any of the identified potential development sites provided by TWC.** • Early developer engagement is required to ensure that, as development occurs within the study area, detailed modelling of water supply infrastructure will allow any upgrades to be completed without restricting the timing, location or scale of the planned development.
Wastewater collection	• Development in areas where there is limited wastewater network capacity will increase pressure on the network, increasing the risk of a

Assessment	Conclusion
	detrimental impact on existing customers, and increasing the likelihood of storm overflow operation. • Early engagement with Severn Trent Water is required, and further modelling of the network may be required at the planning application stage.
Wastewater Treatment Works Flow Permit assessment	• Several WwTWs are likely to exceed the maximum permitted DWF over the TWLP review period. • At many of these WwTW upgrades are already planned which may alleviate some capacity issues. • **Early engagement between TWC and STW is required to ensure that opportunities to accommodate growth within existing or new upgrade schemes can be realised.**
Odour Assessment	• If a site is identified as being at risk of nuisance odour from a WwTW. An odour assessment is recommended as part of the planning application process, paid for by developers.
Water quality impact assessment	• Growth during the local plan period will increase the discharge of treated wastewater from WwTWs in Telford & Wrekin. There is a potential for this to cause a deterioration in water quality in the receiving watercourses. • Further modelling of this impact is recommended in a Stage 2 WCS as well a discussion of possible mitigation options.
Flood risk from additional WwTW flow	• Further assessment of flood risk should be undertaken in a Stage 2 WCS.
Environmental Constraints and Opportunities	• The potential impact of development on a number of protected sites such as SAC, SPAs, Ramsar sites and SSSIs within, or downstream of the study area should be carefully considered in future plan making. There are also a larger number of Priority Habitats and Priority Rivers. • There are a number of Groundwater Source Protection Zones, primarily in central and eastern areas of the study area. The impact of future development on groundwater should be investigated fully. • Development sites within the study area could be sources of diffuse pollution from surface runoff. • SuDS are required on all development sites. Their design should consider both water quantity and water quality and site level investigations should be undertaken to define the most appropriate SuDS types for each specific development. • Opportunities exist for these SuDS schemes to offer multiple benefits of flood risk reduction, amenity value and biodiversity. • Telford & Wrekin Council should be consulted at an early stage of development to ensure that SuDS are implemented and designed in response to site characteristics and policy factors. • In the wider area, opportunities exist to implement natural flood management techniques to achieve multiple benefits of flood risk, water quality and habitat creation.

12.2 Recommendations

Table 12.2 below summarises the recommendations from each section of the report.

Table 12.2 Summary of recommendations

Aspect	Action	Responsibility	Timescale
Water resources	Continue to regularly review forecast and actual household growth across the supply region through WRMP Annual Update reports, and where significant change is predicted, engage with Local Planning Authorities.	STW	Ongoing
	Provide yearly profiles of projected housing growth to water companies to inform the WRMP.	Telford & Wrekin Council	Annually
	Use planning policy to require the 110l/person/day water consumption target permitted by National Planning Policy Guidance across Telford & Wrekin.	Telford & Wrekin Council	In Local Plan Review
	The concept of water neutrality has the potential to provide a significant benefit in terms of resilience to climate change and enabling all waterbodies to be brought up to Good status. Explore further with the water company and the EA how TWC's planning and climate change policies can encourage this approach. This approach could have particular application in the strategic sites	Telford & Wrekin Council, EA, STW	In Local Plan Review
	of RAF Cosford, and the settlements of Albrighton and Shifnal and should be explored further if required by STW to accommodate growth in these locations.	Telford & Wrekin Council, EA, STW	In Local Plan Review and Climate Change Action Plan
	Water companies should advise TWC of any strategic water resource infrastructure developments within the study, where these may require safeguarding of land to prevent other type of development occurring.	STW, Telford & Wrekin Council	In Local Plan Review
Water supply	Undertake network modelling where appropriate as part of the planning application process to ensure adequate provision of water supply is feasible.	STW Telford & Wrekin Council	As part of the planning process
	Telford & Wrekin and Developers should engage early with STW to ensure infrastructure is in place prior to occupation.	Telford & Wrekin Council STW Developers	Ongoing
Wastewater collection	Early engagement between TWC and STW is required to ensure that where strategic infrastructure is	Telford & Wrekin Council STW	Ongoing

Aspect	Action	Responsibility	Timescale
	required, it can be planned in by STW.		
	Take into account wastewater infrastructure constraints in phasing development in partnership with the sewerage undertaker	Telford & Wrekin Council STW	Ongoing
	Developers will be expected to work with the sewerage undertaker closely and early in the planning promotion process to develop an outline Drainage Strategy for sites. The Outline Drainage strategy should set out the following: **What** – What is required to serve the site **Where** – Where are the assets / upgrades to be located **When** – When are the assets to be delivered (phasing) **Which** – Which delivery route is the developer going to use s104 s98 s106 etc. The Outline Drainage Strategy should be submitted as part of the planning application submission, and where required, used as a basis for a drainage planning condition to be set.	STW and Developers	Ongoing
	Developers will be expected to demonstrate to the Lead Local Flood Authority (LLFA) that surface water from a site will be disposed using a sustainable drainage system (SuDS) with connection to surface water sewers seen as the last option. New connections for surface water to foul sewers will be resisted by the LLFA.	Developers LLFA	Ongoing
Wastewater treatment	Early engagement with STW is required to ensure that provision of WwTW capacity is aligned with delivery of development.	Telford & Wrekin Council STW	Ongoing
	Provide Annual Monitoring Reports to STW detailing projected housing growth.	Telford & Wrekin Council	Ongoing
	STW to assess growth demands as part of their wastewater asset planning activities and feedback to the Council if concerns arise.	STW Telford & Wrekin Council	Ongoing
Odour	Consider odour risk for those sites identified to be at risk from nuisance odour	Telford & Wrekin Council	Ongoing
	Carry out an odour assessment for any site within the 800m potential odour zone at the planning application stage.	Site Developers	Ongoing

Aspect	Action	Responsibility	Timescale
Water Quality	Provide annual monitoring reports to STW detailing projected housing growth in the Local Authority	STW	Ongoing
	Take into account the full volume of growth (from TWC and neighbouring authorities) within the catchment when considering WINEP schemes or upgrades at WwTW	STW	Ongoing
Flood Risk Management	Proposals to increase discharges to a watercourse may also require a flood risk activities environmental permit from the EA (in the case of discharges to Main River), or a land drainage consent from the Lead Local Flood Authority (in the case of discharges to an Ordinary Watercourse).	STW	During design of WwTW upgrades
Environment	Consider the environmental impact of development sites downstream of receiving wastewater treatment works in the Habitats Regulations Assessment	Telford & Wrekin Council	TWLP review
	The Local Plan Review should include policies that require all development proposals with the potential to impact on areas with environmental designations to be considered in line with the relevant legislation and where stated in consultation with Natural England (for national and international designations and priority habitats).	Telford & Wrekin Council	TWLP review
	The Local Plan Review should include policies that require development sites to adopt SuDS to manage water quality of surface runoff.	Telford & Wrekin Council	TWLP review
	In partnership, identify opportunities for incorporating SuDS into open spaces and green infrastructure, to deliver strategic flood risk management and meet WFD water quality targets.	Telford & Wrekin Council STW EA	Ongoing
	Developers should include the design of SuDS at an early stage in their planning application to maximise the benefits of the scheme	Developers	Ongoing
	Work with developers to discourage connection of new developments into existing surface water and combined sewer networks. Prevent connections into the foul network, as this is a significant cause of sewer flooding.	Telford & Wrekin Council Developers	Ongoing

Aspect	Action	Responsibility	Timescale
	Opportunities for Natural Flood Management that include schemes aimed at reducing / managing runoff should be considered to reduce nutrient and sediment pollution within Telford & Wrekin.	Telford & Wrekin Council, EA, NE	Ongoing

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