

Telford & Wrekin Council

Detailed Water Cycle Study

Final report



AMEC Environment & Infrastructure UK Limited

November 2014



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Executive Summary

Purpose of this report

This report has been produced for the purpose of helping Telford and Wrekin Council (TWC) progress its Local Plan '*Shaping Places*' and to establish the constraints to development from existing environmental and water infrastructure capacity. The purpose of this is to provide an informed platform for discussion between the Council development planners, the Environment Agency, and the appropriate water and wastewater service provider (in this case Severn Trent Water), plus other stakeholders. This report is aimed specifically for use by the TWC but recognises that the information within it will also be of interest to neighbouring Local Authorities whilst they develop their own Local Plans.

This report recognises that development is necessary and that whilst these parties have different priorities and responsibilities they have a shared objective in terms of facilitating growth that is sustainable in terms of environmental and water infrastructure conditions.

This report has been commissioned and funded by TWC to provide an evidence base for its development programme. From the outset the study has been supported by the Environment Agency and Severn Trent Water. All parties understand that their planning cycles have developed independently from one another and agree that the Water Cycle Study provides a mechanism to "*understand and take account of each other's processes, practices and issues in order to promote the efficient and sustainable delivery of infrastructure*"¹.

The information used in this study includes data and reports published by TWC, the Environment Agency, and Severn Trent Water, plus finalised and draft data and commentary submitted by the parties specifically to inform the study. It is assumed that all information and documents provided to AMEC by the client in connection with the preparation of this report are accurate, complete and not misleading.

It is assumed that this report will be made publicly available. Third parties should be aware that this report is based on technical data and analyses but it is not intended to be a 'technical' document. Interested third parties should not use the content as an alternative to referencing the original data material and with regard to external parties' development plans it should be used as a starting point to support rather than bypass discussions with Telford & Wrekin Council.

¹ Environment Agency. Water Services Infrastructure Guide: A Planning Framework



How to use this report

This study is designed to reflect the need for assessment in 2014 but also to continue to provide evidence as planning options and priorities continue to evolve.

- Chapter 1 sets out the long term development plans; the rationale, aims and objectives for this study; and the water related sustainability objectives;
- Chapter 2 presents the technical results of the Detailed Assessment of water resources and water supply constraints;
- Chapter 3 presents the technical results of the Detailed Assessment of wastewater treatment capacity and water quality constraints;
- Chapter 4 presents the review of flood risk information relevant to the study area. This builds on and refers to but does not replicate the Strategic Flood Risk Assessments (SFRAs) that have been completed previously. It contains a detailed assessment of the suitability of options available to introduce sustainable drainage systems across the sites identified for development; and
- Chapter 5 presents a proposed development strategy indicating a phased approach that TWC may wish to consider, and the actions that are likely to be required to support the longer term growth proposals up to 2030.

A 'traffic light' system is used to visually present the constraints assessments in each topic area. The key for the traffic light system is as follows:



Summary of findings

Water resource issues relate to growth located within the part of Telford and Wrekin that is served by the Shelton WRZ. Supply is due to decline suddenly in 2024/25 in response to licence revocations to meet environmental (river) flow requirements. This would reduce the security of supply to all customers in the zone. However, Severn Trent Water has a plan to increase the volume of water available for supply (increasing abstraction at the Uckington borehole) but that solution is dependent on ongoing discussions with the Environment Agency as it involves increased groundwater abstraction from an area where groundwater is already over licensed and over abstracted.



A secure supply-demand balance also depends on demand not exceeding the company forecast and that means population growth needs to be monitored and per capita consumption of water managed and kept in check. In relation to the TWC development plan it is highly recommended that TWC integrates water efficiency standards into domestic and commercial planning requirements. The growth rate sensitivity test also shows that the supply-demand balance across the whole zone could be vulnerable to growth rates that exceed the levels forecast by Severn Trent Water. As one of three main urban areas in the zone, and one of the fastest growing towns in the UK, the Shelton supply-demand forecast will be sensitive to what happens in Telford, particularly leading up to and around 2024/25 when the supply base will undergo major changes.

Wastewater treatment capacity is the main environmental and infrastructure constraint to growth in the study area. Based on the consenting data and development per catchment there is sufficient capacity to meet the needs of more than 23,000 new homes (Table 3.3). However, the TWC growth proposals are not distributed in a way that would capitalise on this existing capacity. Other planning factors inevitably mean that growth is in areas where the existing WwTW system is currently a constraint.

One of the treatment works in which growth is planned is already at capacity, Waters Upton WwTW. As it stands this works does not have any additional capacity even to meet the committed growth. Other WwTW catchment areas with capacity issues that could directly constrain the growth plans are; Newport which currently only has capacity to meet around a quarter of the committed sites; Coalport which can meet the committed demand but only a tiny fraction of the allocated growth; and Crudgington which does not have any committed sites but has very little capacity for any of the allocated growth.

Fluvial flood risk is a relatively minor source of flood risk in the study area with only a few risks identified. In contrast to fluvial flood risks which are largely related to specific, localised and isolated sources, risks from surface water flooding are much more widespread across Telford and Wrekin.

Appropriate SuDS have been determined for each site using the 2008 assessment of Sustainable Drainage Systems for Local Development Framework for Telford and Wrekin Council, and also the CIRIA SuDS Manual (2013) and these are presented. Some SuDS have further constraints, such as the space available, the slope of the site, the groundwater depth under the site, and the use the site is intended for. Such information is only available following a detailed site analysis, which is beyond the scope of this project. For example groundwater levels have been identified in Newport and thus after specific site analysis, it may not be appropriate to use infiltrating SuDS.

A suggested timeline of activities is proposed on the basis of the extent of the constraints in different areas, the longer term opportunities to ensure infrastructure upgrades are put in place by Severn Trent Water, and the general assumptions regarding the annual rate of development. Constraints may be resolved sooner than the strategy forecasts and so whilst a detailed phasing approach is set out this should be viewed as a framework within which all future allocations should be considered prior to granting planning permissions.



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1. Introduction

Background

Telford was a 'new town' established in 1963 to help alleviate the housing shortfall experienced in the West Midlands. Since then it has become one of the fastest growing towns in the United Kingdom and as a *regional focus for population and economic growth has become* the largest town in Shropshire with a population of 166,000 to 170,000 people. This trend is set to continue with further growth planned to accommodate a population of more than 200,000 over the next twenty years and this will increase the pressure on existing water services and infrastructure. Telford and Wrekin Council (TWC) is responsible for ensuring that growth requirements are met, including the short-term five year supply targets as well as the longer term aspirations, whilst acknowledging the presumption within the National Planning Policy Framework (NPPF) to favour *sustainable development*. This means that decisions on when and where to locate growth should be informed by evidence setting out the environmental and infrastructure related constraints to growth, including specific regard to the water cycle.

In 2012 a Scoping study was undertaken which provided high level information on the status of the environmental and engineered water cycle and how this could constrain growth. Since then the growth plans have been refined and consulted upon and a more detailed set of planning data is available against which the constraints of the water cycle can be examined. This report documents the most up to date planning, environmental, and water infrastructure data, and presents the constraints and the implications for a growth strategy for TWC.

1.1.1 The planning situation

TWC is currently working towards a growth level of around 20,000 homes and 200 hectares (ha) of land for employment sites. Table 1.1summarises the various stages to produce the Local Plan Shaping Places which will set out the growth plans. The outcomes of this Detailed study will be used by TWC in conjunction with the feedback from the consultation on the Proposed Housing and Employment Sites (PHES) engagement to help inform the next stage of the planning process, which is the selection of 'Preferred Sites' (Phase 3).



Phase	Activity	Dates	Status
Phase 1	Strategy & options consultation	June 2013	Completed
Phase 2	Proposed Housing & Employment Sites (PHES) consultation	May – June 2014	Completed
>	Detailed water cycle study	July – September 2014	Current
Phase 3	Preferred options	October 2014	Pending
Phase 4	Draft plan	February 2015	Pending
Phase 5	Examination stage	Autumn 2015	Pending
Phase 6	Final plan	Spring 2016	Pending

Table 1.1 Timetable for TWC to prepare its Local Plan Shaping Places

Based on table provided by TWC.

Of the 20,000 target approximately 12,000 new homes across 422 sites are already committed (i.e. have been granted planning permission but have not yet commenced construction) and a further 8000 homes are allocated. The sites allocated for additional homes have been consulted upon with the *Proposed Housing & Employment Sites* document and the total number of proposed new homes within this exceed 9000 (based on 35 homes per hectare (ha) gross site area). This will give TWC some flexibility when the time comes to finalise which sites, and how many homes per site to develop.

The development data used in the analyses at the time of this study (July 2014) is as follows:

11,573 committed dwellings:

- 9938 committed dwellings (construction has not started included within 2014 GIS database);
- 844 dwellings completed within 2013/14 (as reported in Appendix 1 of the draft 2013/14 Annual Monitoring Report);
- 791 dwellings under construction within 2013/14 (423 of which are on sites within the GIS, 368 are on sites not included within the GIS).

Allocated dwellings:

- Maximum of 8115 dwellings to be allocated for development;
- 9963 possible dwelling allocations from the Proposed Housing & Employment Sites consultation (contained within the GIS database);
- A further 688 possible dwelling allocations from the Central Telford Area Action Plan.



These figures do not calculate exactly to 20,000, this is a consequence of multiple datasets and ongoing progress between allocated, committed, and completed.

In addition TWC has also allocated 205 ha of land to develop employment sites. These sites will be a mixture of Use Class² B1a, B1b, B1c (office business), B2 (general industry), or B8 (storage). Ongoing completions and planning application approvals continually change the balance between committed and allocated data but the planning data as used within this study is presented in Appendix A. Figure 1.1 maps the committed and allocated housing and employment sites. On the basis that planning applications are valid for five years (after which they are revoked) there is significant potential for pressure on the water cycle and water services infrastructure to be realised within the committed sites in the next five years.

 $^{^{2}\} http://nlpplanning.com/uploads/files/Guide_-_Use_Class_Order-England-May_2013.pdf$

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Each year the total number of completions together with the number that have been started and the total yet to be started are published in TWCs Annual Monitoring Report. The data within this report disaggregates between Telford, Newport, and the Rural Area, all of which are included within the study area for this detailed water cycle study.

The target is to build 20,000 new homes in twenty years but TWC has not yet developed a specific development trajectory. To reach this target an average of 1000 new homes will be required each year. Recent completions data (since 2006) show that growth has been less than 1000 per annum but the trend has been increasing (Figure 1.2).





Source: Telford & Wrekin Annual Monitoring Report data

*Geographic breakdown not available for 2013/14 data

1.2 Scope of detailed water cycle study

The scope of this study is similar to the definition of an Outline Water Cycle study but constitutes a more in-depth analysis of the nature and extent of the water cycle and the potential constraints on the more detailed planning data. It builds on and updates the findings of the 2012 Scoping study and examines the capacity and constraints of the water resource and water supply infrastructure, and the wastewater treatment and sewerage infrastructure. It includes a review of flood risk and the suitability of sustainable drainage techniques across sites in the Telford and Wrekin study area but it does not replicate the analyses of strategic flood risk assessments which have previously been undertaken.

1.2.1 Aims and objectives

The main aim of this study is to identify if there are any water related 'showstoppers' that will affect the success of committed and allocated housing and employment sites. Within this overall aim are a number of more specific project objectives:

- Determine the water cycle study area (which at minimum will cover the local authority area);
- Undertake a review of national, regional and local policies, plans, strategies and investment programmes relating to water services infrastructure and the water cycle strategy for Telford and Wrekin;
- Consider the key issues with respect to the water environment (particularly with water resources and water supply, flood risk management, wastewater collection and treatment) and infrastructure and determine wider key stakeholders;
- Consider the site allocations set out in the 'Proposed Housing & Employment Sites' document and the implications for the growth to be set out in the Shaping Places Local Plan;
- Consider requirements for additional physical infrastructure alongside relevant bodies responsible for providing that infrastructure and provide evidence to support the planning of new infrastructure in the strategic business planning process;
- Develop a strategy for a phased approach to development that allows key growth targets to be met whilst providing sufficient time for the identified infrastructure to be adopted;
- Inform and make recommendations (using accurate information) on final water related policy to be included in the Local Plan including; policy protection for water resources, opportunities available within the water cycle study and what measures will be required to overcome barriers and constraints to 'sustainable development'.

This study has been undertaken on behalf of TWC but the council's objectives extend to address the needs of the Environment Agency and Natural England to receive study outcomes that identify and suggest mitigation options against potential water environment impacts, ensuring sustainable development is delivered in Telford and Wrekin and potential objections to development are minimised.

The study identifies the constraints and the actions that will be required to resolve these issues, but the scope of the study does not extend to undertaking water quality or infrastructure capacity modelling, or any detailed assessment of the costs and funding requirements. Modelling exercises take time which exceed the timescales available for this study, and in many cases (especially sewerage modelling) will only be undertaken once housing sites have definitely been confirmed. The approach taken for this study therefore focuses on gathering information from existing sources through site-specific discussions with Severn Trent Water to deliver appropriate detail to meet Telford and Wrekin Council's requirements without providing unnecessarily detailed information at this stage. Where the need for further modelling is recognised the nature of that work will need to be agreed between TWC, the Environment Agency, and Severn Trent Water to further build the evidence base.





1.3 Study area

The focus for development is the main urban area of Telford but the study also takes into account the growth proposals in the rural area covering the rest of the Council area and the implications of growth in surrounding areas. The study area is thus delineated as the Telford and Wrekin Local Authority area but relevant consideration is given to the catchment areas of the wastewater treatment works (Section 3.3) and the water resource zones and catchments from which water is supplied to Telford (Section 2.2).

1.4 Steering group and stakeholders

This study has been undertaken at the request of TWC but the outcomes are of direct interest to the Environment Agency and Severn Trent Water, representatives of which have been involved in the project steering group. This steering group has been fundamental in providing detailed and confidential data and information that has enabled appropriate analyses of existing constraints and the options available to resolve those constraints. The Environment Agency and Severn Trent Water have played a key role in reviewing the technical outcomes to ensure the conclusions are technically correct. Other stakeholders identified include Natural England and the Strine Internal Drainage Board who have both been informed of the project.

1.5 Sources of information

The Scoping study provided a starting point, having previously examined the environmental and water infrastructure aspects of the water cycle relevant to TWC. The Scoping study report was reviewed and its findings were discussed with TWC, the Environment Agency, and Severn Trent Water to confirm the technical validity of those findings and aspects requiring updating.

To ensure the detailed study approach meets TWCs requirements to comply with national policies and guidance AMEC completed a review of the National Planning Policy Framework (2012); Water Cycle Study Guidance (Environment Agency, 2009); and relevant components of Planning Policy³ (PPS1: Delivering Sustainable Development, PPS3: Housing, PPS9: Biodiversity and Geological Conservation, PPS10: waste management, PPS12: Local Spatial Planning, PPS23: Planning and Pollution Control, and PPS25 Development and Flood Risk).

To support the assessment of water resources AMEC reviewed relevant content of the Water Act 2003; Future Water: the Government's water strategy for England (Defra, 2011); the Severn River Basin District Management Plan (Environment Agency, 2009); the Severn Corridor and Shropshire Middle Severn (CAMS) Catchment Abstraction Management Strategies (Environment Agency, 2013); the Severn Trent Water Resource Management Plan (2014); information on the Shropshire Groundwater Scheme; and guidance on the Code for Sustainable Homes (Department for Communities and Local Government, 2010) for reference to water efficiency in new homes.

To support the assessment of wastewater treatment and water quality capacity AMEC reviewed content of the Water Framework Directive and Habitats Directive with regard to objectives relevant to TWC; detailed information from

³ http://www.planningportal.gov.uk/planning/planningpolicyandlegislation/previousenglishpolicy/ppgpps/



Severn Trent Water on its discharge consents and existing capacity relevant to the study area plus discussions with Severn Trent Water regarding its Asset Management Plan for 2015-19 (AMP5) and options for increasing capacity. The appraisal of this information in the context of the Environment Agency Water Cycle Study guidance is delivered following the principles of the Environment Agency's 'Water Services Infrastructure Guide: A Planning Framework'.

To complete the review of flood risk relevant to development in the study area TWC, the Environment Agency, and Strine Internal Drainage Board were consulted to discuss the issues picked up in the Scoping study and collate more up to date data and information. Full details of the sources of information used in the flood risk review are listed in Section 4.2.

Overview of the Scoping study

The Scoping water cycle study was undertaken prior to the *Strategy and Options Engagement* (Phase 1 of the development of *Shaping Places*) and assessed three growth scenarios in Telford and Wrekin: completions led; housing growth led, and Regional Spatial Strategy (RSS) led. All three scenarios assumed that 85 per cent of the growth would be concentrated in Telford, with 10 per cent in Newport and 5 per cent in rural areas.

The water resource constraint assessment was based on the previous 2009 Severn Trent Water Resource Management Plan which has since been updated. The Scoping study introduced and briefly explained the concept of Water Resource Management Plans (WRMP) and so is not repeated here. However, due to the timing of the previous study in relation to the timing of Severn Trent Water's WRMP, the Scoping study had to reference the water resource situation of the Staffordshire and East Shropshire water resource zone, whilst Severn Trent Water was updating water resource situation data for the newly configured Shelton water resource zone. The Scoping study included some scenarios of the impact of different rates of per capita consumption on total water demand at the parish level and identified the pressure on water catchments in the area and surface water low flow issues which Severn Trent Water and the Environment Agency continually have to work together to manage. The Scoping study includes a brief description of the Shropshire Groundwater Scheme which is a vital component of the system used to regulate (maintain) flows in, and therefore abstraction from, the River Severn. The Scoping study did not include assessment of the water supply infrastructure and recommended that task to be undertaken subsequently.

The wastewater treatment and water quality assessment identified 14 wastewater treatment works in the study area, all operated by Severn Trent Water. It explained the relationship between development, sewerage infrastructure, wastewater treatment, and the influence of the Water Framework Directive on water quality objectives and the constraints this can create to increasing wastewater treatment. The relationship between water courses and important environmental sites were listed. Specifically, the Scoping study highlighted the already limited capacity for additional growth in areas served by Newport WwTW but the larger capacity available in the Rushmoor WwTW catchment. Due to the limited detail on confirmed growth areas the Scoping assessment on wastewater constraint remained at a very high level.

The Scoping study sets out the main types of flood risk in the study area, highlights the lack of any formal, permanent flood defence structures, and the range of structures owned by private landowners that are used to manage water flows in the area (i.e. sluices and weirs). A level 1 SFRA was completed in 2007, followed by a more detailed level



2 SFRA in 2008 and the Scoping study draws out the headline issues for each parish that TWC should consider when devising its growth development plans. Fluvial flooding is an issue but this is generally localised along specific river channels. Of more concern is the risk across the area from surface water flooding, and the risk in certain areas from sewer flooding. The Scoping study introduces the concept of sustainable drainage systems (SUDs), the benefits of integrating SUDs requirements into development plans and policy, but also the factors affecting the feasibility of different types of SUDs across Telford and Wrekin. This Detailed study takes all of these elements and examines them in more detail applied to the specific development plan data that is now available, in particular clarifying which types of SUDs system would or would not be applicable for each development site (Section 4.6.4).

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2. Water Resources and Supply

Water resources are managed at spatial scales far larger in extent than specific towns or council areas. Section 7.2 of the Scoping study provides background information on how water resources are managed (i.e. through the Water Resource Management Planning - WRMP – process). Further to that this section provides:

- analysis of the allocated housing and employment growth per water resource zone (WRZ);
- an update on the water resource situation in the WRZs supplying Telford and Wrekin;
- an overview of Severn Trent Water's preferred solution to secure water supplies in the area;
- information on the assumptions Severn Trent Water has made to forecast demand for water (housing and non-housing); and
- a comparison of the localised demand forecast in the context of Severn Trent Water's zonal forecasts and the implications for phasing development.

Growth and demand in water resource zones

Since the Scoping study Severn Trent Water has revised how it manages its water supply system including its network of water resource zones (WRZs), and in 2014 published an updated Water Resource Management Plan⁴. Severn Trent Water reviewed its organisation of water resource zones to ensure that it complies with the Environment Agency definition of a water resource zone being the "*largest possible zone in which customers share the same risk of a resource shortfall*". The review considered the supply and distribution enhancements undertaken by Severn Trent Water between 2010 and 2015 and resulted in the creation of the Shelton, and Whitchurch & Wem WRZs in the area previously referred to in the Scoping study as the Staffordshire and East Shropshire WRZ.

There are now two WRZs which intersect the parts of TWC's area where growth is either committed or allocated (Figure 2.1).

- Shelton WRZ; and
- Whitchurch & Wem WRZ.

The vast majority of committed and allocated housing and employment sites are in the Shelton WRZ, although some committed and allocated sites are in the Whitchurch & Wem WRZ. There is just one proposed employment site in the Whitchurch & Wem WRZ. The division of sites between these two zones is summarised in Table 2.1(full site listing is available in Appendix A). These data show that the total number of remaining allocated housing plots is 9963 and because TWC only intends to allocate a further 8115 homes there remains flexibility in which sites will ultimately be developed.

⁴ http://www.severntrent.com/future/future-plans-and-strategy/water-resources-management-plan

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Area	Parish	Allocated housing		Committed housing		Employment		WRZ
		No. of sites	No of dwellings	No. of sites	No of dwellings	Allocat ed sites	Commit ted sites	
Newport	Newport	2	184	23	759	2	2	Shelton
North	Hadley and Leegomery	2	550	33	842	20	4	Shelton
Telford	Ketley	2	41	16	506	-	-	Shelton
	Lilleshall, Donnington, & Muxton	11	3168	33	194	3	1	Shelton
	Oakengates	3	57	26	198	2	-	Shelton
	St. Georges and Priorslee	4	1165	22	1148	-	-	Shelton
	Wellington	3	285	60	654	-	-	Shelton
	Wrockwardine Wood and Trench	1	127	16	40	3	-	Shelton
South	Dawley Hamlets	3	195	22	856	-	-	Shelton
Telford	Great Dawley	5	495	32	645	-	-	Sheton
	Hollinswood and Randlay	1	256	2	14	1	-	Shelton
	Lawley and Overdale	10	657	14	3260	2		Shelton
	Little Wenlock	-	-	1	1	-		Shelton
	Madeley	6	415	30	389	10	-	Shelton
	Stirchley and Brookside	5	584	4	34	-	-	Shelton
	The Gorge	2	227	14	591	-		Shelton
Rural	Chetwynd	1	32	2	1			Shelton
	Chetwynd Aston and Woodcote	2	141	2	351	-	1	Shelton
	Edgmond	-	-	-	-	-	-	Shelton
	Ercall Magna	-	-	1	10	-		Shelton
	Eyton upon the Weald Moors	-	-	2	2	-	-	Shelton
	Kynnersley	-	-	1	3	-		Shelton
	Preston upon the Weald Moors	-	-	2	2	-	-	Shelton
	Tibberton and Cherrington	7	226	8	18	-	-	Shelton
	Wrockwardine	3	662	13	31	-		Shelton
	Ercall Magna	3	102	6	5	-	-	Whitchurch & Wem
	Rodington	4	112	4	6	-	-	Whitchurch & Wem
	Waters Upton	5	282	13	34	1	-	Whitchurch & Wem
	Shelton sub-totals:		9467		10,549			Shelton
	Whitchurch & Wem sub- totals:		496		45			Whitchurch & Wem
	Area totals:		9963		10,594			Telford & Wrekin
	Total possible dwellings:						20,557	Telford & Wrekin

Table 2.1 Summary of committed and proposed (allocated) development sites per water resource zone



2.2 Water resource situation in the supply area

This section examines Severn Trent Water's forecasts of supply and demand, the balance between forecast supply and forecast demand, and the company's plan to secure supplies.

2.2.1 Shelton WRZ

Most of TWCs proposed growth is located in the Shelton WRZ. Severn Trent Water has forecast demand (taking into account changes in population and housing using data supplied by the Local Authorities, as well as forecast changes in per capita consumption), and has also forecast its resource base. These baseline forecasts do not take into account the impact of any new water company policies or plans since those agreed in the previous 2009 Water Resource Management Plan. The baseline forecasts a large surplus of supply over demand until 2024-25 when three major water abstraction licences will be revoked (Figure 2.2). The licence revocations will reduce deployable output (the volume of water that the company is able to put into supply) by 28 million litres per day (Ml/d) leaving just a small gap between the volume of supply and the demand (during dry year conditions).





The three sources due to be revoked are:

• 18/54/05/044: Sheriffhales and Hilton Bank. This source has not been providing supply for a while anyway due to water quality issues but an AMP5 (2010-2015) capital scheme to remove nitrate (NO₃)



brings the source back into supply for AMP6 (2015-2020). However, the licence may then be revoked at the end of AMP6 following Restoring Sustainable Abstraction (RSA) investigations;

- 18/54/05/124: Cosford and Neachley. The deployable output of this group of sources is already slightly constrained due to the restricted groundwater yield in the Shelton zone; and
- 18/54/05/128: Lizard and Shifnal. The deployable output of Lizard source is restricted to about half of the volume that it is licensed to abstract, this is due to the restricted groundwater yield.

2.2.2 Whitchurch & Wem WRZ

There is much less growth proposed in the Whitchurch & Wem WRZ. Figure 2.3 shows that both demand (approximately 9MI/d) and supply (approximately 11MI/d) in this zone are relatively small (note the difference in scale on the charts) and that there is a surplus balance between the two. Given the low growth levels proposed in this area there are no significant water resource issues in this area.



Figure 2.3 Severn Trent Water baseline supply-demand balance forecast for the Whitchurch & Wem WRZ



2.2.3 Plan to secure water supplies in the Shelton WRZ

Usually, water companies are only required to develop plans to respond to supply-demand balances if a deficit is forecast but due to the impact of the Environment Agency's 'Restoring Sustainable Abstraction' (RSA) programme reducing abstractions, Severn Trent Water has found it necessary to plan action to resolve the situation from the mid-2020s:

• The main solution proposed by Severn Trent Water is to increase the volume that is abstracted from the Uckington borehole (near Telford) by a further 6.20Ml/d up to its full licensed quantity (10Ml/d average, 12Ml/d during the peak period).

The Scoping study noted that the main water resource issues in the [Staffordshire and East Shropshire] zone relate to the aquifers around Telford which are already over abstracted and over licensed. The Uckington groundwater source is located (to the west of the study area) on the border between the area covered by the '*Shropshire Middle Severn Catchment Abstraction Management Strategy*^{'5} and the '*Severn Catchment Abstraction Management Strategy*^{'6}.

• Figure 2.4 shows the approximate location of the Uckington borehole in relation to the CAMS catchments. The Uckington borehole is located in the area within the red circle, where the groundwater catchments have been assessed as having 'No Water Available'. This assessment means that it is unlikely that any further water abstractions will be licensed.

The Uckington borehole solution requires agreement with the Environment Agency before it can go ahead. This is because the full licensed quantity at Uckington is subject to licence stipulations which prevent abstraction at these rates without first undertaking variation to other licences situated within local catchments. Whilst future RSA investigations pose a risk for many abstraction sites across the UK, Severn Trent Water has been consulting with the Environment Agency about the RSA programme throughout previous AMP periods and they are currently in consultation over the most effective way to meet water supply and environmental water requirements.

The Environment Agency has been engaged with Severn Trent Water throughout the process to develop the 2014 Water Resource Management Plan. The water company is now beginning to move into the feasibility phase and has meetings arranged with the Environment Agency to ensure the two parties are still in agreement with the high level solution to the water supply-demand deficit that has been forecast. The two organisations will continue to engage up until and after each solution is required. As such, Severn Trent Water is confident that the proposed water supply strategy for Telford is consistent with the conclusions of the Environment Agency's CAMS assessment and will be approved.

⁵ <u>https://www.gov.uk/government/publications/cams-shropshire-middle-severn-abstraction-licensing-strategy</u> [Accessed: 21/07/2014]

⁶ <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/291406/LIT_7848_c0b50e.pdf</u> [Accessed: 21/07/2014]



- Figures 2.2 and 2.3 show that quite a large proportion of the demand in both Shelton and Whitchurch & • Wem is leakage (from the supply network). Severn Trent Water intends to continue reducing leakage from its distribution network. Reductions of 0.19Ml/d are planned with immediate effect and these reductions will increase to a maximum of 0.95Ml/d by 2019/20 which will then be sustained across the rest of the planning period. Options to target and reduce leakage are constrained by cost as water companies have to demonstrate to Ofwat that options to manage supply and demand are cost-effective, and for leakage this is determined by the Sustainable Economic Level of Leakage (ELL). In the Shelton zone it has been determined that continuing to reduce leakage below 27Ml/d⁷ will not represent good value for money for customers. What this typically means in practice is that there is leakage, which may be quite large in volume in total, but which may be the result of very small leaks across large parts of aging infrastructure and the cost to reduce this will be too high in relation to the volume of water that would be saved. Costs are high because of the need to identify where the small leaks are, the costs associated with accessing minor leaks (road closures and excavation), the cost of pipe repair or replacement, and the cost of disrupting customers and local residents/businesses which have to be taken into account.
- The company is also upgrading its pipelines to make it easier to transfer water from the west part of the Shelton zone to the east.

⁷ Table 4.3 Severn Trent Water: Final Water Resources Management Plan 2014

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Figure 2.4 Uckington borehole in relation to the CAMS catchments and water availability assessments



The main point is that there is very little supply surplus and relatively little flexibility for Severn Trent Water to increase its resource base above the total volume that will be available including from these options. If demand is not managed and capped at the levels in the WRMP then the risk of a supply deficit (which brings with it risks of water shortages and restrictions) will increase. The next section examines the assumptions that Severn Trent Water has made to derive its zonal level demand forecasts and how the potential growth driven demand in Telford and Wrekin could impact upon this.

Demand assumptions within the WRMP

Severn Trent Water collated the forecast housing trajectories from the Local Development Framework (LDF) annual monitoring reports⁸ from each of the local authorities within its supply area. The company used these data to forecast housing (and population) growth within its 2014 Water Resource Management Plan. At that time TWC forecast a trajectory at the borough level of 700 homes per annum (until the end of the planning period defined as 2020/21).

Severn Trent Water has had to prepare an annual forecast trajectory and so it is against this plan that actual development trends will have to be considered. Severn Trent Water forecast demand up to 2039/40 and used the average of the Local Authorities' final five year net additional dwellings forecasts to populate the latter end of its own forecast⁹. The company has assumed that the average rate of increase will be ~1500 across the whole zone (not just in Telford and Wrekin) per annum between 2021 to 2025, increasing to ~3000 per annum, and then ~3350from 2025 onwards.

The company demand forecast assumes that average per capita consumption in all measured homes (and so including all new homes which will be metered) will fall from a starting point of 120 litres per head per day (l/h/d) to 109 l/h/d in 2034.

120 litres is equivalent to Level 1/2 in the UK Government's Code for Sustainable Homes and so a declining forecast is ambitious and will require commitment from the house building sector to integrate water efficient design within new homes.

Figure 2.5 uses data from Severn Trent Water's WRMP to illustrate how the number of new build homes is forecast to increase across the whole zone.

⁸ released from December 2012

⁹ Severn Trent Water (2014) Water Resources Management Plan. Appendix B.





Figure 2.5 Forecast cumulative housing growth and demand for water in the Shelton zone

The chart demonstrates that the zonal demand forecast (Ml/d) is based on the assumption that the rate of housing growth will increase after 2020/21.

Analysis of Telford's potential demand for water

2.4.1 Housing growth

The study area occupies approximately 12 percent of the Shelton WRZ area but Telford is one of just three main urban areas in the zone (Shrewsbury and the northern parts of Wolverhampton being the other two). As Telford is a major component of the Shelton WRZ its growth rates have the potential to affect the balance between supply and demand, particularly in 2024/25 when the supply resource is due to drop suddenly.

Telford and Wrekin Council has a target to build 20,000 new homes over the next 20 years (almost 12,000 of which are already committed, some of which have been completed and others are under construction). This target equates to approximately 1000 homes per annum which would exceed the estimate (700 homes per year) in the Local Development Framework (LDF) 2012 annual monitoring report, and the completions trend since 2006/07 (the annual average is 560 but the rate has been increasing, 844 in 2013/14, Figure 1.2).



Severn Trent Water has forecast that from 2014 to 2034 the total increase in new homes will be 52,910¹⁰. TWC's maximum allocated growth is 8115 and if all of this were to be allocated in the Shelton WRZ it will equal 15 percent of the total for the whole zone by 2034. The total committed (excluding completed and under construction in 2013/14) plus allocated dwellings (18,365) would represent 35 percent of the total growth forecast by Severn Trent Water in the Shelton WRZ (and require development closer to 920 homes per year). The dwellings in 2013/14 are excluded as the Water Resource Management Plan period begins at 2014/15.

These figures suggest that it is possible that TWC's annual growth plans may be more ambitious than has been taken into account by Severn Trent Water (although this would require a sustained increase in construction levels than experienced in 2013/14). The impact of this on actual demand for water compared to forecast demand for water will also depend on building rates in other parts of the zone but growth plans data for Shrewsbury, northern Wolverhampton and other parts of the zone have not been made available.

If housing growth across Telford and Wrekin starts at 700 per annum from 2014/15 (i.e. less than in 2013/14) this would represent approximately 65 percent for the whole zone in that year. Building rates higher than this will increase the pressure on Severn Trent Water to allocate water supplies to this area. However, development is likely to vary from target and some allowance for this uncertainty is included in Severn Trent Water's overall headroom allocation for the zone.

TWC is not in a position to make definitive statements regarding the trajectory over which growth will take place, including of those sites which have progressed to 'committed' status (any trajectory would be subject to significant uncertainty as the housing and development market can fluctuate considerably). However, it is worth testing how alternative growth rates could compare to the total rate forecast by the water company for the whole zone.

It is the timing rather than the total number of homes to be built that is the most important factor, particularly regarding the number of homes and customers that will already be in place by the time Severn Trent Water loses 28Ml/d of its supply base.

Figure 2.6 shows how the potential cumulative housing growth in Telford & Wrekin could compare to the total for Shelton WRZ over time. According to the Shelton WRZ WRMP table the total number of new homes across the entire zone by 2024/25 is forecast to be 22,450. Three alternative TWC scenarios are charted:

- A flat rate of 700 homes per year (over 20 years this would only lead to 14,000 being built);
- A total of 18,365 to be built at a flat rate across 20 years (20,000 844 completed 791 under construction) –this scenario assumes all allocated homes will be within the Shelton WRZ and as such is a worst case scenario). This would require a building rate of 918 new dwellings per annum; and
- A total of 18,365 to be built with an accelerated growth phase during the next five years (10 per cent of total, 1836 per annum) dropping to 5 per cent of the total (915 per annum) during the next five years, and then the growth rate dropping to 2.5 percent (459 per annum) over the following ten years. This

¹⁰ Line 45.1BL Shelton water resource zone 2014 WRMP table



scenario is in direct contrast to the assumption in Severn Trent Water's WRMP which shows the growth rate starting slower and increasing over time.

The impact of this in terms of actual water demand is examined in Section 2.4.3.





Severn Trent Water has only recently finalised and published its Water Resource Management Plan for the period 2015-2020 and as such should have incorporated the potential demand from the allocated and committed developments.

Figure 2.6 shows clearly how easily possible it would be for growth in Telford and Wrekin in the short-term to dominate the growth that has been forecast for the whole zone. This is not necessarily a problem but it flags up how important it will be for TWC to keep Severn Trent Water aware of its target and actual build rates, particularly if growth is expected to be high up to 2024. If development has already occurred and the new demand is already impacting on supplies then this will increase the pressure to ensure that the option to increase abstraction at Uckington is in place.



2.4.2 Development of employment sites

Demand from non-households is also an important component of the demand forecast. People use water whilst at work and so generating more employment will increase demand for water. Two categories of water use in employment sites are considered:

- Domestic-type demand;
- Process use / consumption.

TWC has allocated approximately 205ha of land for employment sites. It is intended that some of the employment sites that are allocated will be used to support light manufacturing industries which are likely to require more process water than office style employment sites. The majority of these developments will have use classes of B1a, B1b, B1c (office business), B2 (general industry), or B8 (storage). At this stage there is insufficient data on which to estimate a forecast of process water demand (i.e. for the B2 use classes) and only the domestic element of the proposed employment sites is considered.

Severn Trent Water's WMRP Shelton data table shows a forecast of total of Water Delivered to measured nonhouseholds declining from 20.2Ml/d forecast to decline to 17.7Ml/d by 2034 (a drop of 2.5Ml/d). The main reason for this are assumptions of increased water efficiency and forecast changes in the customer base. Disaggregated data on volumes between existing and new non-households is not available. An increase of 0.4Ml/d may not be particularly high in comparison to the total demand but the important point to note is that all existing non-household properties as well as new non-household properties are expected to drive down consumption, and this assumption underpins this part of the water resource management plan for the Shelton WRZ.

2.4.3 Demand for water

The potential demand of both the committed and the allocated housing sites, together with the employment sites are listed in Table 2.2. The total volume of water that could be demanded from new homes in Telford & Wrekin has been calculated using the following assumptions:

- The total number of allocated homes (8115) to be built are within the Shelton WRZ;
- The number of committed homes is 9835. 704 of the 10,549 committed (Table 2.1, but not completed, in the Shelton WRZ were already under construction in 2013/14 and so excluded from forecast comparisons from 2014/15. Total dwellings included in the forecast analysis is 17,950.

Both allocated and committed dwelling numbers are included in this assessment as the forecast property numbers in the WRMP does not distinguish between committed and allocated. The purpose of presenting these two scenarios is to give an indication of how sensitive the water supply environment could be to situations that deviate from the assumptions used by Severn Trent Water to develop its demand forecast and supply-demand balance;



- The average occupancy rate in new homes will be the same as per the WRMP forecast¹¹ (2.53 declining to 2.24 by 2034);
- Three alternative per capita consumption levels are applied: 150 l/h/d (national average), 120 l/h/d (the current average for measured homes in the Shelton zone); and 105 l/h/d (represents an aspirational target and is just below the longer term pcc that is forecast for measured homes in Shelton). The main purpose of this is to test the sensitivity of forecast demand to per capita consumption and to examine the importance of water efficiency in new build homes across Telford & Wrekin);
- Two alternative development trajectories are applied to test the sensitivity.

A forecast of the domestic-type demand in the employment sites has been generated by applying average employment densities per use class¹² to site floorspace estimates. In total the committed and allocated employment sites are expected to generate work for up to 25,000 people. Benchmark water consumption levels for people working in new office style working buildings estimate that on average a Full Time Equivalent (FTE) worker uses 16 l/h/d whilst at work¹³. This suggests total domestic-type demand from employment sites of approximately 400,000 litres per day (0.4Ml/d). This estimate also forms the basis for the wastewater demand assessment in Section 3.

¹¹ Line 54.1BL Shelton WRMP data table

¹² Homes and Communities Agency (2010). Employment Densities Guide

¹³ CIRIA Construction Industry Research and Information Association (2005) Report No.W11: Key Performance Indicators for Water Use in Offices.


Table 2.2 Total estimated household and employment demand (litres) per parish and water resource zone

	Daily d dwellin		Daily demand from committed dwellings		Daily demand from allocated dwellings			Employment sites demand*		
	PCC (l/h/d):	105	120	150	105	120	150	FTE	litres	Water Resource Zone
Area	Parish									
Newport	Newport	191,268	218,592	273,240	46,368	52,992	66,240	1300	20,800	Shelton
North Telford	Hadley and Leegomery	212,184	242,496	303,120	138,600	158,400	198,000	12,600	201,600	Shelton
	Ketley	127,512	145,728	182,160	10,332	11,808	14,760	-	0	
	Lilleshall, Donnington, and Muxton	48,888	55,872	69,840	798,336	912,384	1,140,480	1700	27,200	
	Oakengates	49,896	57,024	71,280	14,364	16,416	20,520	4100	65,600	
	St. Georges and Priorslee	289,296	330,624	413,280	293,580	335,520	419,400	-		
	Wellington	164,808	188,352	235,440	71,820	82,080	102,600	-		
	Wrockwardine Wood and Trench	10,080	11,520	14,400	32,004	36,576	45,720	300	4,800	
South Telford	Dawley Hamlets	215,712	246,528	308,160	49,140	56,160	70,200	-		Shelton
	Great Dawley	162,540	185,760	232,200	124,740	142,560	178,200	-		
	Hollinswood and Randlay	3,528	4,032	5,040	64,512	73,728	92,160	1500	24,000	
	Lawley and Overdale	821,520	938,880	1,173,600	165,564	189,216	236,520	600	9,600	
	Little Wenlock	252	288	360	0	0	-	-		
	Madeley	98,028	112,032	140,040	104,580	119,520	149,400	1600	25,600	
	Stirchley and Brookside	8,568	9,792	12,240	147,168	168,192	210,240	-		
	The Gorge	148,932	170,208	212,760	57,204	65,376	81,720	-		



			and from c	ommitted	Daily dem dwellings	and from a	llocated	Employi demand	ment sites	
	PCC (l/h/d):	105	120	150	105	120	150	FTE	litres	Water Resource Zone
Area	Parish									
Rural	Chetwynd	252	288	360	8,064	9,216	11,520	-		Shelton
	Chetwynd Aston and Woodcote	88,452	101,088	126,360	35,532	40,608	50,760	700	11,200	
	Edgmond				0	0	-	-		
	Ercall Magna	2,520	2,880	3,600	0	0	-	-		
	Eyton upon the Weald Moors	504	576	720	0	0	-	-		
	Kynnersley	756	864	1,080	0	0	-	-		
	Preston upon the Weald Moors	504	576	720	0	0	-	-		
	Tibberton and Cherrington	4,536	5,184	6,480	56,952	65,088	81,360	-		
	Wrockwardine	7,812	8,928	11,160	166,824	190,656	238,320	-		
Rural	Ercall Magna	1,260	1,440	1,800	25,704	29,376	36,720	-		Whitchurch & Wem
	Rodington	1,512	1,728	2,160	28,224	32,256	40,320	-		
	Waters Upton	8,568	9,792	12,240	71,064	81,216	101,520	80	1,280	
		2.66 MI/d	3.04 MI/d	3.80 Ml/d	2.39 MI/d	2.73 MI/d	3.41 Ml/d	19,533	0.31Ml/d	Total Shelton
		0.01 Ml/d	0.01 Ml/d	0.02 Ml/d	0.12 Ml/d	0.14 Ml/d	0.18 Ml/d	80	None	Total Whitchurch & Wem
		2.67 Ml/d	3.05 Ml/d	3.82 Ml/d	2.51 Ml/d	2.87 Ml/d	3.59 Ml/d		0.31Ml/d	Total study area

* domestic-type demand (committed and allocated sites combined)

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Figure 2.7 shows the potential impact on the demand forecast of a 918 homes per year completions trajectory (green line) if per capita consumption in these homes is 120 l/h/d, or worse 150 l/h/d.



Figure 2.7 Impacts of per capita consumption and building rates on demand for water in Telford

The dotted lines show the slightly elevated demand that would result if new homes maintained per capita consumption if 120 l/h/d. Severn Trent Water will be keen to work with TWC and developers to help ensure that that consumption rates are managed. However, it is clear that the more significant effort will be needed to avoid per capita consumption rates exceeding 120 l/h/d. By the end of the 20 year planning period if people living in the 'new homes' are consuming 150 litres per day rather than 120 litres per day (on average) their combined demand will be 1Ml/d more than planned for. In combination with other towns this sort of deviation away from a forecast on which a plan is based could have unsustainable implications on the actions that need to be taken by the water company.

In addition to the pressure on Severn Trent Water to implement options to secure supplies from 2025, different growth trajectories and the demands they would generate could impact on and be affected by the capacity of the local water supply distribution network. This is covered in the next section (Section 2.5).



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2.6 Water supply summary of issues

Section 2 has discussed in detail the water resource situation in which growth across Telford and Wrekin should be considered. The list below gives a summary of the main headline issues:

Water resource zones:

- Water resources providing supplies to Telford & Wrekin come from considerable distances away from the Borough and are shared by other major towns including north Wolverhampton and Shrewsbury;
- The vast majority of committed and allocated growth is within the Shelton water resource zone which is in surplus;

Reductions in water resource availability:

- On the basis of those data Severn Trent Water forecast a continued surplus up until the end of the current water industry planning period, 2039/40. There is currently a large surplus but the revocation of three abstraction licences in 2034/45 as a result of the Restoring Sustainable Abstraction programme will almost remove the surplus leaving a very small balance between supply and demand. These forecasts include some contingency for uncertainty but the baseline situation creates risks, especially if growth across the supply area is more than forecast, or if demand per person is more than forecast;
- Severn Trent Water does have an option to improve the security of supply but this involves increasing a groundwater abstraction in an area where the Environment Agency has determined that groundwater is already over licensed and over abstracted. Severn Trent Water and the Environment Agency are continuing to discuss the options that are available to secure this important source of supply;
- Another round of Water Resource Management Plans in 2019 will give further opportunity for Severn Trent Water to develop and implement its plans to secure water supplies to Telford & Wrekin;

Assumptions in the demand forecast:

- Severn Trent Water's baseline forecasts of supply and demand takes into account the growth figures from the Local Authorities' Local Development Framework documents as available at the end of 2012. At that time Telford & Wrekin forecast a trajectory of 700 new homes per year. the supply-demand balance across the whole zone could be vulnerable to growth rates that exceed the levels forecast by Severn Trent Water;
- A fundamental assumption within Severn Trent Water's demand forecasts is that per capita consumption for water in existing and new households will decline. Telford & Wrekin Council has a responsibility to support the water efficiency plans that underpin the supply-demand balance;
- It is highly recommended that TWC integrates water efficiency standards into domestic and commercial planning requirements.

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3. Wastewater Treatment and Sewerage

This section of the study builds on the previous scoping study (2012) in light of detailed development plans being put forward by TWC. An assessment is made of the Wastewater Treatment Works (WwTW) and sewerage network capacity, based on the more specific development plans. This assessment examines whether wastewater treatment capacity or the sewerage network are potential constraints to the growth plans being considered by Telford and Wrekin. As a prudent measure it also considers the potential future constraints that might arise from stringent discharge consenting criteria in response to requirements of the Water Framework Directive. The assessment confirms whether the WwTW constraints that were identified in the Scoping study are still valid before presenting the constraints within each WwTW catchment more specifically.

Overview of wastewater services

This assessment examines the nine WwTWs that serve areas in which strategic growth is currently being planned (i.e. there are other WwTWs in the Telford and Wrekin area that are not considered in this assessment). Great Bolas, Roden, and Little Wenlock WwTW listed in the Scoping study are no longer relevant whilst Monkmoor WwTW has been introduced into the study. The WwTWs included in this study are:

- 7 WwTWs with catchment areas entirely contained within Telford and Wrekin: Newport WwTW, Rushmoor WwTW, Sambrook WwTW, High Ercall WwTW, Edgmond WwTW, Waters Upton WwTW, and Crudgington WwTW;
- 2 WwTWs with catchment areas that extend beyond the study area:
 - The Coalport WwTW catchment extends south of Telford and Wrekin and also serves Broseley and Benthall,
 - Monkmoor WwTW is located outside the western boundary of Telford and Wrekin but a small part of the catchment includes Rodington.

Severn Trent Water provides wastewater and sewerage services across the whole Telford & Wrekin area and the catchment area and populations served by the individual WwTWs varies across the study area. Figure 3.1 maps the catchment areas and the development sites. Table 3.3 lists the number of dwellings that can be served by each works. Rushmoor WwTW is the largest works in the area with capacity to serve over 60,000 homes, Coalport WwTW can serve 37,000 homes, and Newport WwTW is much smaller but can serve around 6000. Monkmoor WwTW is another very large works with a total capacity to serve over 50,000 homes. In comparison all the other treatment works are very small (many able to serve less than 300 people).

There are seven committed development sites with a total of eight dwellings in the Rural Area that are located more than 500m from their nearest wastewater catchment (Table 3.1). It is possible that these sites may not be served by



mains sewerage, incorporating septic tank facilities instead, and the wastewater constraints assessment excludes the impact of these sites. All of the proposed allocated housing sites can access the mains sewerage system.

Area	Parish	Committed sites not connected to WwTW	Committed dwellings
Rural	Chetwynd	TWC/2013/0625	1
	Ercall Magna	TWC/2013/0140 & TWC/2013/0641*	1 & 1
	Waters Upton	TWC/2013/0036,	1
		TWC/2011/0746	1
	Wrockwardine	TWC/2012/0895	2
		TWC/2013/0867	1
	Little Wenlock	TWC/2012/0359	1
	Wellington	TWC/2011/0352*	2

Table 3.1 Committed sites not connected to a WwTW catchment area

*under construction in 2013/14

3.2 Wastewater treatment and sewerage constraints identified in the Scoping study

The Scoping study provided an initial review of the existing and likely environment and infrastructure capacity for growth within Telford and Wrekin area at the parish level. It identified constraints in Newport as WwTW has limited capacity to serve growth within its current consent. The 2014 data shows that Newport WwTW has total capacity to serve around 14,500 people (approximately 6040 homes) and it currently already serves around 13,300 people (approximately 5550 homes). The works is also constrained by the need for phosphate stripping to achieve Urban Waste Water Treatment Directive (UWWTD) requirements.

The Scoping study claimed there is treatment capacity to serve growth across North and South Telford although sewerage issues could constrain some areas (Scoping study Section 6.3.1). This updated assessment shows that growth within the areas served by Rushmoor WwTW could be supported but growth in the Coalport WwTW catchment will be more challenging and will require careful planning (Section 3.3.2).



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Summary of Approach

The Scoping study made several general recommendations for further assessment. These are listed in Table 3.2 together with the approach that has been taken.

Table 3.2 Scoping recommendations and approach taken

Scoping recommendation*	Approach taken in the Detailed study
The detailed assessment should focus on areas where there are known capacity issues (identified within the scoping report) and look at impacts of these more specific development locations on the WwTW and sewerage network capacity. Provide confirmation of the capability of the more rural WwTWs to accept further growth, based on more detailed site allocations.	Completions data since 2010 has been applied to catchment areas and thus to Severn Trent Water's WwTW assessment dated 2010 to define a revised baseline. Committed and allocated developments have been identified per WwTW catchment area and the demand (measured in terms of population equivalent) added in to determine whether the growth is within the availability capacity – or if it exceeds the permitted volumes, how much growth is beyond the threshold.
The environmental capacity at Newport WwTW should be further investigated, and indicative permit limits determined so that the impact of tightening permits (within the boundaries of conventional treatment) on the ability to at least maintain water quality (no deterioration).	Growth in the Newport WwTW catchment has been calculated and the additional committed housing and employment, and allocated housing demand compared against the available headroom. Maximum growth will drive the need for revised permit but modelling this is outside of the scope of this study.
Where it may be necessary to increase the volumetric discharge consent [dry weather flow] further consultation will be required with the Environment Agency and Severn Trent Water to assess the likelihood of obtaining a permit variation (and the works required).	Permits which would be exceeded by maximum growth are identified and the number of new dwellings exceeding the threshold that can be served are identified. This forms the basis for discussions regarding permit variations and lead-in time to implement required solutions.
Confirm that the infrastructure required to support growth can be delivered within the necessary timescale or suggest an alteration to the phasing of development.	Information on the need for wastewater treatment infrastructure upgrades has been sought from Severn Trent Water for treatment works where exceedances are identified.
Identify where growth may impact on the performance of the sewerage network and what infrastructure may be required to mitigate the risk of increased flooding, pollution, or spills from CSOs.	Potential demand for sewerage has been assessed at parish level and submitted to Severn Trent Water. The company has confirmed that data is not available on which to make general comments. The company is confident that sewerage will not be a constraint but hydraulic modelling will be required to confirm that for individual sites.
The Council should discuss with the Environment Agency and Severn Trent Water a methodology to show that development will not cause water quality to deteriorate (WFD objective) and that the proposed level of development will not jeopardise achieving 'good' status in the receiving waterbodies.	In addition to the wastewater treatment capacity assessment the WFD objective and current status of the receiving waters has been identified. This gives an indication of which treatment works' permits could be subject to increased tightening of permit conditions.
Confirm the necessary key strategic sewerage and WwTW upgrades (or new WwTW) including the production of intervention charts and approximate costs in collaboration with the water company.	High level information on the upgrades required to meet dwellings thresholds is provided but specific inforamtion is subject to further individual modelling assessments.
*Paraphrased	



The approach that has been taken has been to map all of the development sites (committed and allocated, housing and commercial) to the wastewater treatment catchments to identify which wastewater treatment works are and will be affected by growth. Data showing demand for wastewater services from 2010 has been updated with completions data between 2010 and 2014 to calculate a new baseline on which to examine the capacity to serve committed and allocated growth.

Each wastewater treatment works is issued with a discharge consent to limit pollution of the watercourse receiving treated effluent. The consent includes a flow limit based on Dry Weather Flow (DWF). The DWF is the component of sewerage flow made up of domestic sewerage and trade effluent, excluding the additional water from surface runoff, and is measured in cubic metres per second (m^3/s) or cubic metres per day (m^3/d). The rationale for basing consent limits on DWF is that the receiving waters are at most risk from pollution during dry weather when there is reduced capacity to dilute the treated effluent. The DWF volume is commonly translated into a Population Equivalent (PE) value. For the purpose of this study, the volume has also been translated into 'dwellings' to ease comparison with the development plan data. Section 3.3.2 explains how the demand from non-household development is included in this.

Development compared to treatment capacity

Since the Scoping study was completed there has been continued growth within the Telford and Wrekin area, reducing the available capacity within the WwTWs to accommodate future growth. Developments completions data (2010-2014) provided by Telford and Wrekin Council has been used to recalculate the baseline situation within wastewater treatment catchments upon which the future committed and allocated growth is applied. This section also examines the impacts of employment as well as housing growth on the WwTWs available capacity. **Appendix A lists each committed and allocated development site in terms of which treatment works catchment area it is located.**

3.3.1 2014 baseline treatment capacity

Severn Trent Water provided GIS data of its wastewater treatment sites and catchment areas serving the Telford and Wrekin area. The water company provided details of its consented DWFs for each treatment works in terms of Population Equivalent and dwelling numbers (the calculations assume an occupancy rate of 2.4). The existing number of dwellings per WwTW were calculated by applying the 2010/11 - 2013/14 completions data to the previous assessment made in 2010. The DWF (PE and dwellings), the existing dwellings, and the spare capacity are listed in Table 3.3. The table also lists the water quality consent limits against which the treated discharges must comply.

The red cells flag up treatment works that already have no additional capacity. The Council's GIS of development sites was applied to the wastewater catchment area GIS to identify those catchments in which committed and / or allocated growth is planned. The relationship between existing capacity compared to the demand from the committed and the allocated growth is shown in

Table 3.3 Consent limits of treatment works serving growth areas in Telford and Wrekin

		Consente	ed DWF	2014 Status				Со	nsent li	imits	
Sewage Treatment Works	Receiving Waters	Population equivalent*	Dwelling equivalent	Actual dwellings	Spare dwelling capacity	Current treatment process**		Ammonia (Winter)	Biological Oxygen Demand (mg/l)	Suspended solids (mg/l)	Phosphate
Newport	Strine Brook	14,464	6,030	5,550	480	Oxidation Ditch Treatment	3	-	15	20	2
Coalport	River Severn	88,943	37,060	32,910	4,150	Activated Sludge - Diffused Air	10	15	25	45	
Rushmoor	River Tern	145,814	60,750	43,020	17,730	Activated Sludge - Diffused Air	5	7	15	30	2
Edgmond	Tributary of River Strine	3,869	1,610	1,000	610	Primary Sedimentation Tank, Automated sludge	3	0	15	30	Ρ
Ellerdine	Lakemoor Brook	96	40	40	0						
High Ercall	Tributary of River Roden	1,438	600	310	290	Primary Sedimentation Tank, Automated sludge	0	0	80	60	
Monkmoor		119,144	49,640	39,220	10,420	Primary Sedimentation Tank, Automated sludge	10	0	25	45	Ρ
Sugdon	Tributary of River Roden	52	20	20	0						
Waters Upton	River Tern	214	90	90	0	Rotating Biological Contactors (Integral)	0	0	-	-	
Sambrook	River Meese	292	120	60	60	Primary Sedimentation Tank, Automated sludge	0	0	-	-	
Crudgington	River Strine	92	40	20	20	Biological Filter		0	-	-	
				Total:	33,770						
Total (excluding Monkmoor)				23,350							

*based on existing population equivalent (PE) and estimated PE capacity as provided by Severn Trent Water in 2010. Values are rounded to the nearest 10.

**Summary information on treatment processes is provided in Appendix C.

P - Consent is potentially going to have phosphate limits added.



This initial task clearly shows that as it currently stands there is capacity across the area to support approximately 34,000 new homes, although if the capacity from Monkmoor (which is predominantly outside of the study area) is excluded this maximum capacity is reduced to approximately 23,000 (more than the total growth target). However, capacity is not equally distributed and there is currently no capacity to support growth in the areas served by Waters Upton, Sugdon, or Ellerdine WwTWs. Table 3.4 presents how the committed and allocated growth plans compare to this baseline assessment.

3.3.2 Wastewater demand from housing and employment

Committed housing and allocated housing growth will continue to increase the demand put upon the individual WwTWs. Committed sites already have planning permission, some of which were under construction (but not completed) in 2013/14, and therefore the WwTWs serving these areas will almost certainly experience the increase in demand. However, at this stage more allocated housing sites and dwellings are included in the planning set than are ultimately required and so there will be some flexibility regarding which sites progress and which will not.

Historically most employment developments within Telford and Wrekin have been office or warehousing sites (identified as Use Class type B1 and B8) and the majority of the committed and allocated employment sites are similar. Neither of these have a significant impact on demand for wastewater treatment or sewerage beyond normal 'domestic type use'. The demand for sewerage and wastewater treatment is calculated based on the estimated demand for water supply as set out in Section 2.5. As the wastewater treatment assessment in this study refers to the volumetric capacity in terms of population equivalent, or dwelling numbers, the 'FTE water supply demand' has been converted into a 'dwelling equivalent' value.

Detailed lists of the committed and allocated housing and employment sites (per parish) and per wastewater treatment catchment area are provided in Appendix B but a summary showing the total potential additional dwelling sites (plus dwelling equivalents) per WwTW is listed in Table 3.4.

Table 3.4 Wastewater treatment constraints on committed and allocated development

WwTW	Dwelling capacity	Parishes	Commit	tted* Allocated*		d*	Comment on availability of headroom
			No. planned	Exceeds capacity	No. planned	Total exceeds	
Newport	486	Newport; Chetwynd Aston and Woodcote.	1,965	- 1,485	325	-1,810	Committed sites already exceed capacity.
Coalport	4,150	Lilleshall, Donnington and Muxton; Oakengates; St. Georges and Priorslee; Dawley Hamlets; Great Dawley; Hollinswood and Randlay; Lawley and Overdale; Little Wenlock; Madeley; Stirchley and Brookside; The Gorge.	3,644	No	7,854	-7,348	Almost all of the allocated homes cannot be supported.
Rushmoor	17,740	Hadley & Leegomery; Ketley; Lilleshall, Donnington and Muxton; Oakengates; St. Georges and Priorslee; Wellington; Wrockwardine Wood and Trench; Dawley Hamlets; Great Dawley; Lawley and Overdale; Ercall Magna; Eyton upon the Weald Moors; Kynnersley; Preston upon the Weald Moors; Rodington; Wrockwardine.	7,101	No	9,820	No	All the proposed development sites can be supported. Residual capacity for 819 additional dwellings.
Edgmond	610	Tibberton and Cherrington; Edgmond	18	No	226	No	All the proposed development sites can be supported.
Ellerdine	0	Ercall Magna	1	-1	0	-1	No headroom available but no development planned.
High Ercall	290	Ercall Magna	4	No	102	No	All the proposed development sites can be supported.
Monkmoor	10,420	Rodington	2	No	112	No	All the proposed development sites can be supported. Residual capacity for 10,306 additional dwellings (shared with Shrewsbury, Atcham, and North Shropshire).
Sugdon	0	Rodington	1	- 1	0	- 1	A very small treatment works with no capacity.
Waters Upton	0	Waters Upton	33	-33	152	-184	Committed sites already exceed capacity.
Sambrook	60	Chetwynd	1	No	32	No	All the proposed development sites can be supported.
Crudgington	20	Waters Upton	1	No	167	-147	Almost all of the allocated homes cannot be supported.

*Specific housing (as listed in Appendix A) plus approximate dwellings equivalent demand from employment sites

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The committed development within most parishes could be accommodated based on existing WwTW capacity but it is the large proportion of the development plan that is located in the Coalport and Newport WwTW catchment areas, and the smaller scale but constrained developments in Waters Upton that are the most problematic. The specific sites are allocated to those WwTWs are listed in Appendix B. Figure 3.2 shows how the dry weather flow consented volumes for the larger WwTWs compare to the existing and the future dwelling numbers.



Figure 3.2 WwTWs dry weather flow consent compared to existing and future dwelling numbers (large WwTWs)

It is clear that the existing capacity at Newport WwTW will be insufficient to accommodate most of the committed growth and none of the allocated growth, Coalport has capacity to serve the committed growth but hardly any of the allocated growth. Rushmoor has just about enough headroom to accommodate the committed and allocated growth (includes employment growth assumptions).

Allocated Growth

Existing capacity (dwellings equivalent)

Committed Growth

Rushmoor WwTW has capacity to accommodate all of the committed and allocated growth. There is additional spare capacity at Monkmoor WwTW but this predominantly serves Shrewsbury and Atcham, and a small part of North Shropshire.





Figure 3.3 WwTWs dry weather flow consent compared to existing and future dwelling numbers (small WwTWs)

Waters Upton WwTW does not have capacity for any of the committed or allocated growth. Crudgington WwTW can only support a very small number of the allocated growth. Edgmond WwTW has the most capacity.

The Waters Upton constraint affects eight committed sites, the largest two sites including 12 and 8 dwellings (W2008/0619 and TWC/2011/0575 respectively). Severn Trent Water has stated that, "*Due to efficiency reasons we* [Severn Trent Water] *will often operate our treatment works close to our discharge consent limits to optimise operational resources. Consequently where current performance is very close to its consent thresholds it does not always indicate that there is no spare capacity for future development.*"(Personal Comms., Severn Trent Water). This means that Severn Trent Water considers it is actually able to serve the small growth in Waters Upton but it is critical that any additional growth in this area will have to be phased to allow time for a flow consent increase to be granted or upgrades at Waters Upton WwTW to be completed.

The other treatment works that serves the Waters Upton area is Crudgington WwTW and it only has capacity for 20 new dwellings so 110 of the allocated dwellings or employment demand cannot currently be accommodated. Most of this growth is allocated to a single site for up to 130 dwellings (SHLAA900) plus 37 dwellings 'equivalent' from the Dairy Crest employment site. Growth at both of these sites will need to be phased with consent increases or upgrade completion at the WwTW.



The Newport WwTW can only support about a quarter of the committed sites. 624 committed dwellings plus employment demands are unlikely to be met until a flow consent increase and/or upgrade is completed at Newport WwTW. Three of the committed sites (TWC/2011/0827, TWC/2011/0871 and TWC/2011/0821) are for more than 200 dwellings each, and would each use up a considerable proportion of the available capacity at the WwTW. In addition demand from three employment sites would be equivalent to a further 855 dwellings (TWC/2011/0871, W92/0970 and TWC/2011/0853). TWC and Severn Trent Water are advised to make discussions and action to resolve the capacity issues in Newport a primary priority.

All committed sites within the catchment of Coalport WwTW can be accommodated. This includes development sites of more than 300 dwellings each (TWC/2012/0650, TWC/2010/0036, TWC/2012/0530, TWC/2013/0769 and W2002/0392). However, only 6 percent of the allocated dwellings can currently be accommodated. Coalport WwTW is likely to need upgrading and/or have an increased DWF consent to be able to serve the remaining demand (equivalent to 7348 dwellings). This demand includes a number of employment sites including large sites at Naird Lane and Hollinswood Road, which each have an estimated demand that is equivalent to more than 600 dwellings. In addition a number of the proposed sites are for dwellings numbers greater than 100, and include proposed site SHLAA386, with a proposed 1100 dwellings. Phasing of any allocated sites that gain planning permission in addition to the already committed sites will therefore be critical.

Very little demand is expected from the few committed sites in Rodington that will flow to Monkmoor WwTW and these are unlikely to be constrained by WwTW capacity. As some of the Coalport and most of the Monkmoor WwTW catchment areas lie outside the Telford and Wrekin area further information on growth plans in those catchments will be required to fully understand the level of capacity at Monkmoor and the true extent of the pressure on the already over allocated service demands on Coalport WwTW.

Sugdon and Walcot WwTW catchments only have one additional dwelling is planned in each catchment. Should any further growth be identified in the future, then upgrades may be required at those WwTWs.

The recommendations in this section are integrated into the proposed development strategy in Section 5.

3.3.3 Additional demand from light manufacturing

'Shaping Places' plans to introduce more industrial business in the form of light manufacturing (identified as Use Class type B2). Whilst this may be generate higher water supply demands it could increase pressure on the treatment works either by discharge of 'biological' (e.g. from food/drinks manufacturing) or 'chemical' (e.g. engineering outputs) trade effluents. It is assumed at this point that most (if not all) of these would discharge to the sewer rather than directly to the environment. Site owners will need to obtain a permit from the sewerage undertaker (in this case Severn Trent Water) in order to discharge trade effluent into the sewer. The allocated employment sites within Telford and Wrekin that are likely to consist of some 'light manufacturing' are illustrated in Figure 3.4 and listed in Table 3.5. Most of this demand, and trade effluent would be served by Rushmoor WwTw although the seven employment sites in Halesfield could add to the pressure on Coalport WwTW. It is not possible to examine this issue further as the exact nature and therefore potential impact from future industrial or commercial development is unknown.



Area	Parish	Allocated 'light manufacturing' site	WwTW catchment	WwTW capacity
North Telford	Lilleshall, Donnington and Muxton	Deer Park Court, Granville Road, Land at Donnington Wood Way/Granville Road		Ok – although capacity for trade effluent
	Hadley & Leegomery	Hadley Park East, Wheat Leasowes, Hortonwood 65, Hortonwood 40, Hortonwood 35, Hortonwood 45, Hortonwood 45, Hortonwood 40/45, Hortonwood 60, Epson (UK) Ltd, Hortonwood 45, Hortonwood 50, Hortonwood 35, Land at A442/A5223	Rushmoor	constrained
	Wrockwardine Wood and Trench	Hortonwood 1		
South Telford	Madeley	Halesfield 25, Halesfield 24, Halesfield 2, Halesfield 15, Halesfield 15, Halesfield 10, Halesfield 10	Coalport	Exceeded

Table 3.5 'Light manufacturing' allocated employment sites

There are 20 allocated sites that could drive additional 'manufacturing' type wastewater demand on Rushmoor WwTW (which as shown in Table 3.4 has capacity for up to 819 additional 'dwellings' after the committed and allocated growth is taken into account). Within Madeley there are seven allocated sites that have the potential to include 'light manufacturing' that would need to be served by Coalport WwTW (Table 3.5).

As long as the demand from 'light manufacturing' is within the capacity of the wastewater treatment works it will not pose a constraint to the growth. However, it is already clear that Coalport does not have capacity for the allocated housing growth, and so industrial demand in addition to this will also be constrained. The actual capacity in Rushmoor will not be known until water quality modelling of the housing growth has been completed and the subsequent permit limits are known.

It is important that communication is maintained between Telford and Wrekin Council, Severn Trent Water, and the Environment Agency so that existing constraints are accurately understood and the impacts of additional pressure can be identified as early as possible.

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3.3.4 WFD constraints to increasing capacity at WwTWs

To support the committed and allocated development wastewater treatment capacity will need to be increased at some locations, and this may require amended permits. The Environment Agency reviews and grants permits with consents that are designed to either maintain, or enable an improvement in water quality. In receiving waters that are covered by the Water Framework Directive (WFD) this comes with the basic requirement of 'no deterioration' and objective to achieve 'good' status/potential by 2015 (or 2027 as specified).

The receiving waters of the nine WwTWs considered in this study are shown in Table 3.6 and Figure 3.1 based on the current (2012) WFD status. Under this classification all the receiving waterbodies to the WwTWs serving the study area are predicted to be unable to achieve 'good' status by 2015, and the target by which to reach this is 2027 (Table 3.6). Extra time has been given to meet the 'good status' objective in these receiving waters where it would be 'technically infeasible' or 'disproportionately expensive' to implement any improvement mitigation measures (e.g. removing phosphorus at WwTWs) until the sources of failure are confirmed or the most effective mitigation measure identified. Further monitoring, modelling and investigations are being undertaken to provide clarity on these. If investigations confirm the discharge from a WwTW is a significant contributing factor to failing the WFD objective (particularly in the case of high phosphate levels), then mitigation measures will be investigated and mitigation measures such as tighter phosphate consents could be applied. However, it is quite possible that agricultural land-use could be significantly contributing to the water quality status.

It will be important to determine the relative contributions of wastewater treatment discharge and agricultural runoff before assessing whether the further outputs from the treatment works will be constrained because of Water Framework Directive objectives. When Severn Trent Water applies to the Environment Agency for a permit to increase its Dry Weather Flow the Environment Agency will assess whether water quality components in the permit need to be made for stringent. At this stage the Environment Agency will use its Source Apportionment data to examine the contribution from the treatment works to water quality issues in the water course. If the treatment works is shown to be contributing significantly then this is likely to compound the need for more stringent permit conditions.

Where water-dependent protected areas (sites of environmental importance – Section 6.2.3 of the Scoping study) are located downstream of the WwTWs, tighter consents at the WwTWs may be required. The majority these sites of environmental importance within the Telford and Wrekin Council area, that have the potential to be affected by growth, are located along the Rivers Strine and Roden. The Scoping study identified three water-related Sites of Special Scientific Interest (SSSI) that have water quality issues:

- Newport Canal SSSI although downstream of Newport WwTW, there is no direct hydraulic connectivity between the WwTW and the canal;
- Aqualate Mere SSSI the site is eutrophic but the cause is considered to be storm overflows and discharge from Barnhurst WwTW (there is no growth planned within this WwTW and so is not considered within this assessment); and
- Allscott Settling Ponds SSSI the habitat at this site consists of standing open water and canals and is important for breeding and over-wintering birds. It is downstream of Rushmoor WwTW and Natural



England has assessed the site to be in unfavourable condition. However the reasons given for the adverse condition relate to inappropriate land management activities (e.g. weed and scrub control) or inappropriate water levels or structures. The assessment makes no reference to water quality problems. However, this does not mean that work may not be required to ensure water quality complies with the standards in the SSSI. Further modelling may be required to understand the possible constraints arising from this site.

No SPA, SAC, Ramsar or National Nature Reserves have been identified downstream of these receiving watercourses.

Table 3.6 WwTW Receiving water WFD status and objectives

WwTW catchment	Level of constraint	Receiving Water	Current WFD Ecological Status (2012) and reason for failure*	Ecological Objective (2012)	Downstream Protected areas	Overall possible level of constraint
Newport	Very high	Strine Brook	Poor. Phosphate/mitigation measures.	Good potential by 2027 Disproportionately expensive, technically infeasible		Very high (growth will exceed permit limits and WFD pressure already high). Technology options to improve treatment may be limited.
Coalport	Very high	River Severn	Moderate. Phosphate/ cypermethrin	Good potential by 2027 Disproportionately expensive, technically infeasible		Very high (growth will exceed permit limits and WFD pressure already moderate)
Rushmoor	Low	River Tern	Moderate Phosphate/ Phytobenthos.	Good status by 2027 Disproportionately Expensive	Allscott Settling Ponds SSSI	Moderate to high (capacity leaves some headroom but some pressure from WFD and SSSI)
Edgmond	Low	Pipe Strine	Moderate (Poor). Phosphate/ ammonia / invertebrates/ quantity and dynamics of flow.	Good status by 2027 Disproportionately expensive, technically infeasible		Moderate (growth reaching towards works' capacity) and high WFD pressure
High Ercall	Low	High Ercall Brook	Unclassified – d/s R. Roden = Poor Phosphate/ quantity and dynamics of flow.	Good status by 2027 Disproportionately expensive, technically infeasible	Allscott Settling Ponds SSSI	Moderate to high (growth very close to works' capacity) and high pressure from WFD and SSSI
Monkmoor	Low	River Severn	Moderate. Cypermethrin.	Good potential by 2027		Low (significant capacity at works within permit)
Waters Upton	Very high	River Tern	Moderate. Phosphate/ Phytobenthos.	Good status by 2027 Disproportionately Expensive		Very high (growth will exceed permit limits and WFD pressure already moderate)
Sambrook	Low	River Meese	Moderate (Bad). Phosphate/ quantity and dynamics of flow.	Good status by 2027 Disproportionately Expensive		Moderate (growth reaching towards works' capacity) and high WFD pressure
Crudgington	High	River Strine	Poor. Phosphate, quantity and dynamics of flow / mitigation measures.	Good potential by 2027 Disproportionately expensive, technically infeasible		Very high (growth will exceed permit limits and WFD pressure already high)



WwTW catchment	Level of constraint	Receiving Water	Current WFD Ecological Status (2012) and reason for failure*	Ecological Objective (2012)	Downstream Protected areas	Overall possible level of constraint	

* Reasons for failure are based upon information within the 2009 RBMP



Where the WwTW receiving water waterbody status is less than good under WFD (and source apportionment shows that it is the WwTW that is driving the failure), or there is a downstream protected area, there is a risk to growth plans. The WwTW will be required to serve growth whilst also conforming to the requirements of the WFD and any downstream protected sites. The Environment Agency states that from a WFD perspective it could possibly support growth in catchments where the level of constraint in Table 3.6 is low (green) but would be concerned that development could prevent the watercourses from reaching good status. Water quality modelling would be required to understand this and it is recommended that this modelling is undertaken in advance of the development plans being finalised.

The Environment Agency is also concerned about the pressure that development in constrained catchments could have on Severn Trent Water if the permit conditions it has to issue are too challenging. This could drive increased intensity of treatment processes generating high carbon emissions and significant expense and is a situation that the Environment Agency would seek to avoid.

One of the main factors contributing to the receiving water classifications (failures) seen in Table 3.6, with the exception of the River Severn (Monkmoor WwTW receiving water), is elevated phosphate levels. In all cases it has been determined disproportionately expensive to implement phosphate stripping at the WwTWs until the source is confirmed. If investigations confirm that discharge from a WwTW is a significant contributing factor, then mitigation measures such as tighter phosphate consent or phosphate stripping could be applied at these WwTWs.

The following points can be noted based on the information in Table 3.6:

- While the smaller WwTWs of Sambrook, High Ercall, Edgmond have available capacity to accommodate the growth, the remaining capacity is small. Therefore growth at these WwTWs has the potential to be more restricted by any tightened water quality consents needed to achieve WFD requirements (if the WwTWs are found to be at fault). Pressure to improve or prevent deterioration in water quality at Allscott Settling Ponds SSSI could constrain current growth plans at High Ercall WwTW as well as demand from any additional sites in the future;
- Environmental constraints were identified at Newport WwTW due to the stringent permit conditions, poor dilution provided by the River Strine and the poor quality of the receiving water (Scoping study);
- Rushmoor WwTW has capacity to accommodate the committed sites and the proposed growth, with capacity for approximately 819 additional dwellings across the 16 parishes served in part by this WwTW. Phosphate levels contributing to the failure to achieve good status (Table 3.6);
- Newport WwTW and Rushmoor WwTWs have recently been upgraded (i.e. work is complete) to ensure Severn Trent Water meets its obligation as part of the National Environmental Programme (NEP) by agreeing to operate with a quality consent of 2mg/l for phosphate by 30th September 2014. If this does improve the phosphate levels within the receiving watercourse this is one step closer to the WFD requirement to achieve 'good' status by 2027.

The Environment Agency has indicated that of the four treatment works with capacity issues it is Newport WwTW that poses the greatest concern with regards to potential required permit limits and the



Best Available Technology that currently exists. The Environment Agency states that the BAT is able to achieve Ammonia levels down to 3mg/l, a Biological Oxygen Demand of 10mg/l, and Phosphate to 0.5mg/l. The potential non deterioration modelling results for Newport indicate a permit limit of 2mg/l of Ammonia and just 8mg/l of Biological Oxygen Demand will be needed (i.e. limits that are more stringent than the current Best Available Technology is able to deliver); and

• Phosphate has not been identified as the WFD parameter contributing to the failure of Monkmoor WwTW's receiving water (River Severn) to achieve 'good' status. It is likely that demand from housing growth would not cause an increase in Cypermethrin (an insecticide) which is driving the water quality failure. Therefore the Rodington growth plans (to be served by Monkmoor WwTW) are unlikely to be constrained by requirements of the WFD. There are also no protected designated sites located downstream of the WwTW.

There is a planned change to the phosphate targets used for WFD classifications that are likely to be adopted soon (Personal Comms., Environment Agency). These targets are likely to vary between waterbodies. Any modelling undertaken as part of the next phase of the WCS will need to take account of these targets.

Further water quality modelling will be needed to investigate the impact of reduced DWF consents, or tighter quality consents at WwTWs on growth in the catchments, in trying to achieve 'good' status. The possibility of tighter controls on WwTWs to achieve 'good' status/potential cannot be confirmed until after Environment Agency modelling and monitoring has taken place.

The Environment Agency and Severn Trent Water agree that a useful next step would be to undertake water quality modelling to examine what options could be available to Severn Trent Water to change the constraints at Newport, Coalport, Crudgington, and Waters Upton from 'very high/high' to moderate. Currently this remains an important data and knowledge gap.

3.3.5 Options to remove these constraints

Environmental constraints create extra challenges for Severn Trent Water but are not necessarily insurmountable. In order to increase existing treatment whilst maintaining compliance with an existing permit, or meeting more stringent environmental conditions, engineering solutions are possible.

Severn Trent Water does not anticipate any land or other constraints preventing expansion at the WwTWs if required as part of an upgrade. With the exception of works already completed at Rushmoor and Newport WwTWs to operate to tighter phosphate standards, Severn Trent Water has confirmed that *"There are no further quality improvement works planned at any of the remaining works listed"* (Personal Comms., Severn Trent Water).

Severn Trent Water has confirmed that there will be capital maintenance work and, as required, capacity increase at WwTWs to cater for future growth. However this will happen "*when we [Severn Trent Water] are more confident of growth taking place*" (Personal Comms., Severn Trent Water). There are no current plans for 'capital maintenance or capacity increase' at any of the works (Personal Comms., Severn Trent Water).



Table 3.7 identifies the existing level of treatment technology at the WwTWs where the development plans exceed the available capacity of the WwTW. Wastewater treatment processes are designed to achieve improvements in the quality of the wastewater and the level of treatment is closely related to the standards or expectations set for the effluent quality.

Table 3.7	Potential WwTW upgrade requirements
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WwTW catchment	Parishes	Dwellings that cannot be accommodated	Existing level of Treatment
Newport	Newport; Chetwynd Aston and Woodcote	1810	Secondary Treatment Works
Coalport	Lilleshall, Donnington and Muxton; Oakengates; St. Georges and Priorslee; Dawley Hamlets; Great Dawley; Hollinswood and Randlay; Lawley and Overdale; Little Wenlock; Madeley; Stirchley and Brookside; The Gorge.	7348	Secondary Treatment Works
Waters Upton	Waters Upton	184	Secondary Treatment Works
Crudgington	Waters Upton	147	Secondary Treatment Works

As a brief guide to the levels of water treatment:

- Primary treatment: this is a mechanical stage which removes suspended and floating solids. It is a basic pre-requisite for wastewater (sewage) treatment works in the UK;
- Secondary treatment: involves the use of biological methods to remove dissolved organic matter and further removal of suspended solids; and
- Tertiary treatment: address different pollutants using different treatment processes and can remove more than 99 percent of all the impurities from sewage, producing an effluent of almost drinking-water quality. Tertiary treatment can enable a treatment works to process higher volumes of wastewater whilst remaining compliant with the permit conditions.

Tertiary technology can be very expensive, and energy and chemical intensive. An example of a typical tertiary treatment process is the modification of a conventional secondary treatment plant to remove additional phosphorus and nitrogen.

Decisions on the level of treatment to apply at a WwTW are generally made based on the size of the population being served and the sensitivity of the receiving waters to the pollutants that could be discharged. In England and Wales



Secondary treatment is usually applied. A copy of a Severn Trent Water poster describing the stages of wastewater treatment is provided in Appendix C.

As discussed, already committed growth exceeds the capacity at Newport WwTW and Waters Upton. It is important that communication is maintained between Telford and Wrekin Council and Severn Trent Water to clarify the ability of these WwTWs to accommodate the growth at committed sites and timescales that would be required for capacity increase work.

Communication will be required between Telford and Wrekin Council and Severn Trent Water regarding growth within Coalport and Crudgington WwTW catchments. Although not all the proposed sites may be taken forward for construction, strategic planning will be needed to allow time for infrastructure changes to increase the WwTW capacity.

3.3.6 Sewerage constraints

The estimates of additional daily demand for water supply (Figure 2.8) have been used as the basis for the demand for sewerage. In practice sewerage demand is typically slightly less than supply (i.e. to account for consumptive uses such as drinking water and garden watering) but for the purpose of sewerage assessment Severn Trent Water confirms the supply estimates are applicable without a suppression factor.

In the same way that supply requirements were applied at parish level so too were the sewerage requirements. In 2010 Severn Trent Water completed a high level review of capacity across the area based on development figures at that time. The revised development and demand figures were submitted to Severn Trent Water to question, at a high level, what level of impact the up to date development plans would have (Figure 3.5). This has been a desktop exercise based on the specialist knowledge of the sewerage team in Severn Trent Water. Severn Trent Water has not provided a map of its sewer system to compare to the development plans GIS. It must be noted that this assessment is not based on hydraulic modelling of the sewer network and does not take into account the risks from specific Combined Sewer Overflows (CSOs) overflowing in heavy rain and spilling sewage into watercourses.

The Water Framework Directive is concerned with water quality problems from all sources, including CSOs and the expectation of "no deterioration" translates into a requirement of no increase in spill frequency or volume. The acute problem of CSOs is a reminder to local authorities, including TWC that all new developments should be constructed with sewerage network drains and surface water (storm water) drains separated. Further information on 'sustainable drainage' systems is provided in Section 4.8.

The parish based demand assessments and impact queries are illustrated in Figure 3.3 and the results presented in Table 3.8 lists all of the individual allocated sites and associated dwelling numbers per parish area and the impact that these developments could have on the capacity of the existing sewer network. The catchment areas highlighted in red are those in which the wastewater treatment assessment has already identified constraints. Consequently, it is clear that there are 24 allocated sites (and 4113 allocated dwellings) in the Coalport WwTW catchment area that are constrained by both wastewater treatment and sewerage capacity (shown in red).





Area Parish Committed Allocated site references Allocated Potential sites dwellings impact Newport WwTW Catchment: Low Newport Newport 30 sites SHLAA485, 907 184 Rural Chetwynd Aston & 2 sites SHLAA342,597 141 Low Woodcote **Rushmoor WwTW Catchment:** North Telford Hadley & Leegomery 38 sites SHLAA500, 506 550 Medium North Telford 19 sites 41 Low -Ketley SHLAA67, 525 Medium South Telford Lawley and Overdale 13 sites 572 Medium SHLAA445, 569, 591, 613, 908 North Telford Medium Lilleshall, Donnington, & 40sites SHLAA144,351, 401, 482, 504, 2753 Muxton 508, 363,771,901,902, 370 North Telford Oakengates 28 sites SHLAA197, 164, 775 57 Medium Medium North Telford 62 sites 285 Wellington SHLAA356, 661, 748 Rural Medium Wrockwardine 10 sites SHLAA380, 487, 694 662 North Telford Wrockwardine Wood & 16 sites SHLAA118 Low 127 Trench **Coalport WwTW Catchment:** North Telford St. Georges and Priorslee SA9, SA10; SHLAA264 170 24 sites Low North Telford Lilleshall, Donnington, None in Coalport SHLAA386, 658 1550 Medium Muxton catchment South Telford Lawley & Overdale 5 sites SA4, SA5, SHLAA63, 95 337 Medium Low / South Telford Great Dawley 34 sites SA2, SA3, SA12, SHLAA737, 909 765 Medium South Telford **Dawley Hamlets** 25 sites SHLAA65, 165, 372 195 Low South Telford Hollinswood & Randlay 2 sites SHLAA379 256 Medium South Telford Madeley 35 sites SHLAA233,255,461, 514,910 267 Medium South Telford Stirchley & Brookside 4 sites Medium SHLAA605, 607, 608, 612 563 South Telford 18 sites SHLAA375, 378, 603 375 Medium The Gorge Crudgington WwTW Catchment: Rural Waters Upton 1 site SHLAA900 130 [No info] Edgmond WwTW Catchment: [No info] SHLAA457, 509, 552, 580, 582, Rural Tibberton and Cherrington 8 sites 226 583, 734 High Ercall WwTW Catchment: Rural 4 sites SHLAA8, 434, 523 102 Low Ercall Magna Monkmoor WwTW Catchment: Rural Rodington 1 site SHLAA353, 354, 716, 751 112 Low Sambrook WwTW Catchment: Chetwynd Rural 2 sites SHLAA45 32 Low Waters Upton WwTW Catchment: SHLAA43, 404, 406, 635 152 Low Waters Upton 10 sites Rural

Table 3.8 Potential impact of housing sites on the capacity of existing sewerage

SHLAA: Strategic Housing Land Availability Assessment reference SA: Prefix for allocation sites within the Central Telford Area Action Plan (CTAAP)



The results show that out of a total 84 allocated dwelling sites, 24 sites (with a combined total of 4113 dwellings) are identified as potentially creating a 'Medium' risk impact on the capacity of the existing sewerage. These are sites which are likely to require hydraulic modelling to confirm capacity issues once developments are confirmed. Severn Trent Water has confidence that where development will require upgrades to the sewerage network to support demand for additional sewerage the company will be able to provide this. The main issue will be timing the development of these sites in co-ordination with a programme of sewer network upgrades that would be undertaken by Severn Trent Water (Section 5 -Strategy).

3.3.7 Wastewater summary of issues

Section 3 has discussed in detail the wastewater treatment situation in which growth across Telford and Wrekin should be considered. The list below gives a summary of the main headline issues:

Treatment works at capacity:

Overall there is capacity across the existing wastewater treatment works serving towns in Telford & Wrekin to support all 20,000 new dwellings. However, this capacity does not align with the proposed and preferred development locations:

- Newport WwTW only has capacity to serve less than 500 of the 1965 dwellings that are already committed in its catchment area. As it currently stands it does not have capacity to serve any additional allocated development. Newport WwTW discharges into the Strine Brook and there are significant water management issues, raised by Strine IDB over the impact of water flowing from Newport into the Stine system (Section 4 flood risks). Action is needed to resolve the impact of already committed development. It is recommended that the allocated development is put on hold in this area;
- Waters Upton WwTW does not have capacity to serve any of the already committed dwellings in its catchment area. This is only a small treatment works serving a small area but is constrained by the size and the water quality requirements in the River Tern;
- Coalport WwTW has capacity to serve the developments which are already committed but only approximately 500 of the 7850 allocated dwelling numbers;
- Coalport (and Monkmoor WwTW) catchment areas both extend outside the Telford & Wrekin Council area. This assessment has not include growth demands from these additional residential areas outside the Telford and Wrekin Council area;
- There are no committed developments in the Crudgington WwTW catchment area but the works only has capacity to serve approximately 15 of the 167 allocated dwellings in the area.
- Rushmoor WwTW does have capacity within its existing permit for all the committed and allocated developments and has a residual capacity for just over 800 additional dwellings.



• All other treatment works are able to meet the forecast demand from growth in their areas, although this is a vet small proportion of the total development plan.

Preparing for commercial development:

- The capacity assessments have included the impact of committed and allocated employment sites by applying water consumption assumptions to Use Classes and converting the demand into dwelling equivalents;
- It is expected that some of the new employment will be in the form of light manufacturing, some of which may be in the food and beverage sector. No detailed assessment of the additional pressure that trade effluent will have on the wastewater treatment works has been undertaken as there is no information on which to base assessment at this time. However, the study draws attention that trade effluent from light manufacturing is most likely to drain to Rushmoor WwTW, with some draining to Coalport WwTW. It is recommended that the Council keep both the Environment Agency and Severn Trent Water informed as soon as proposals for light manufacturing sites come online.

Potential constraints to increasing capacity:

• Water Framework Directive obligations will make it more difficult to increase the dry weather flows of the discharge permits and it is highly likely that any volumetric increase would have to be accompanied by more stringent water quality consents to prevent a deterioration in water quality status.

The current WFD status (as per 2012) of all the receiving waters of the WwTWs is less than 'good'. In the majority of cases this is partly due to elevated phosphate levels. In order to achieve 'good' status/potential by 2027 tighter quality or DWF consents may be applied or phosphate removal may be required at the WwTWs.

- Even for treatment works with capacity within their existing permits the Environment Agency and Severn Trent Water will continue to monitor water quality in receiving waters and if the erosion of treatment capacity headroom begins to impact on Water Framework Directive objectives (i.e. cause or risk of a deterioration) then the permits may need to be re-assessed.
- Allscott Settling Ponds SSSI is currently in unfavourable condition. It is downstream of Rushmoor WwTW but at this time the hydraulic conductivity between the River Tern (receiving water) and the SSSI is not understood. Natural England assessments state the reasons for unfavourable condition relate to land management and water levels but the relationship between Rushmoor WwTW and the SSSI is yet to be clarified. It is possible that the Rushmoor discharge permit consents were not set taking the SSSI quality requirements into account. This is not an issue that currently constrains development in the Rushmoor WwTW catchment area but is an important issue for the Council to be aware of.

Until a water quality modelling exercise has been completed it is impossible to tell whether the required permit limits for a particular determinand will be too stringent for the WwTW/s to achieve. This re-



emphasises the importance of the Council continuing to work closely with and report development progress to the Environment Agency and Severn Trent Water;

- Both Rushmoor and Newport WwTWs have recently started operating with more stringent phosphate consents, but the Environment Agency has concerns over the ability for Newport WwTW to meet the likely stringent requirements on Ammonia and Biological Oxygen Demand. Increasing the permit at Newport WwTW will not be straightforward as indicative modelling exercises suggest that even the Best Available Technology may not be able to produce treated effluent to good enough quality to meet the standards that would be required.
- The four treatment works that already have capacity problems all operate 'Secondary' level of treatment and so upgrading to Tertiary level could be an option, albeit a very expensive and carbon intensive option.



4. Flood Risk

4.1 Introduction

This section reviews the range of flood risks affecting development sites across the Telford and Wrekin area. The Scoping study and previous Strategic Flood Risk Assessments have concluded that the most significant issue in the area is surface water drainage and the flooding that can occur when the existing drainage system has to respond to heavy rainfall events. The flood risk from fluvial (river), groundwater, and local reservoirs is also reviewed. The content of this section is based on review of pre-existing information and no new technical analyses or modelling has been undertaken. Section 4.3 gives an overview of the key points taken from the Scoping study and information updating the situation since the Scoping was completed. Specific surface water flooding issues associated with the development sites are presented in Section 4.6.2 whilst Section 4.6.4 sets out the suitability of SUDs systems for the different sites across the Telford and Wrekin area.

4.2 Sources of information

AMEC completed a review of national, regional and local policies, plans, strategies and investment programmes relating to the flood risk affecting development in Telford and Wrekin. The Environment Agency, Telford and Wrekin Council, and Strine Internal Drainage Board were consulted to obtain information and clarify issues.

The context of this review was undertaken incorporating knowledge of:

- The Flood and Water Management Act 2010;
- The Flood Risk Regulations 2009;
- Defra (2005) Making Space for Water;
- The outcomes from the Pitt Review, 'Learning lessons from the 2007 floods Full Report' (2008).

Specifically, local flood risk information was gathered from the following documents:

- Lewis, M.A., Cheney, C.S., and ODochartaigh, B.E., (2006) Guide to Permeability Indices, *British Geological Survey Open Report*, CR/06/160N;
- Telford and Wrekin Council (2007) Strategic Flood Risk Assessment: Level 1;
- Telford and Wrekin Council (2008) Strategic Flood Risk Assessment: Level 2;
- Telford and Wrekin Council (2008) Sustainable Drainage Systems for Local Development Framework;
- Environment Agency (2009) River Severn Catchment Flood Management Plan;



- Hyder (2012) Scoping Water Study: Flood Risk Management;
- Telford and Wrekin Council (unpublished). Draft LLFA Flood Risk Management Strategy (LFRM); and
- Telford and Wrekin Council (unpublished). Draft Surface Water Management Plan.

The Flood Risk Management section of the Scoping study highlights several sources of flood risk across the Telford and Wrekin area, with local issues grouped per each of the parishes. That study examined all sources of flooding including: fluvial, surface water drainage, groundwater, and reservoir. Specific issues were examined in selected watercourses whilst at the parish scale general flood issues were assessed. In this detailed study the information in the Scoping report is reviewed in light of the detailed development plans being put forward by TWC. Specific issues that the council Planners should be aware of when revising and refining development plans are highlighted.

4.3 Fluvial flood risks

4.3.1 Previous information on fluvial flood risks

In February 2008, TWC commissioned a Level 2 Strategic Flood Risk Assessment (SFRA) to refine and build upon the work undertaken during the Level 1 assessment. The aim of the study was to improve the Flood Zone information for six watercourses in Telford and Wrekin, assess the flood hazard posed by these watercourses, and assess the residual risk from partial blockage of selected culverts. The study was used to inform the emerging Local Plan 'Shaping Places'.

Fluvial flood risk is a relatively minor source of flood risk in the study area with only a few risks identified. The Scoping study does highlight that in the Hollinswood and Randley parishes flooding has been experienced in and around the Hollinswood School and that surface water flows from St Georges and Priorslee via the Priorslee balancing lake, contribute to flows in Wesley Brook and flooding in the Shifnal area.

The SFRA Level 2 modelled and investigated the flood risks at Wesley Brook and within its tributary using 2D TUFLOW software. The result showed that the risk under a 1 in 100 year event is minimal and the addition of climate change into the model did not cause a significant increase in flood extent, depths or velocity. These results were consistent with the Environment Agency's Flood Zones. Development in Hollinswood and Randlay, and Stirchley and Brookside around the Wesley Brook tributary should therefore still be acceptable, as all potential development sites proposed in this report are sited outside of Flood Zones 2 and 3 along the tributaries corridor.

Similarly the conclusions suggest development close to Hurley Brook (Hadley and Leegomery, North Telford); Hurley Brook tributary (Wellington, North Telford); Wall Brook/Donnington Brook (Lilleshall, Donnington and Muxton, North Telford); and Mad Brook (Stirchley and Brookside, South Telford) should also be acceptable from a flood risk perspective. A model of the Crow Brook situation (Hadley and Leegomery, North Telford) suggests the spatial extent of mapped Flood Zones 3a and 2 is larger than the actual risk area. Site specific FRAs have been undertaken which recommend that the five potential employment sites in Hortonwood are reclassified as being in Flood Zone 1 instead of Flood Zone 3.


Since the Scoping study, TWC in its role as the Local Lead Flood Authority has produced a Local Flood Risk Management (LFRM) Strategy. This is currently in draft form and awaiting consultation, but has been made available for the water cycle study to include other potential flood risk issues. It assesses flood risk from fluvial watercourses that were not included in the Level 2 SFRA, and determines the number of current properties that are potentially at risk. According to the LFRM the most significant risks are:

- The Humber Brook (North Telford);
- Lyde Brook and Coal Brook (South Telford) affects sites in the Gorge parish;
- River Strine (Rural East) and River Roden and River Tern (Rural West) affects sites in the Rodington area and Waters Upton area;
- The LFRM confirms that Wesley Brook presents a minimal fluvial flood risk to properties within Telford and Wrekin. However, there is significant risk to properties in Shifnal downstream in Shropshire.

Lyde Brook was assessed further in the Level 2 SFRA and in contrast to Wesley Brook some serious risks were identified. There are existing properties in Flood Zone 3a of the Lyde Brook (which forms part of the flashy Coalbrookdale Catchment) and this emphasises the importance the Coalbrookdale Rapid Response Catchment Plan. The flood risks in the Moorfield brook affecting Newport are currently being investigated.

4.3.2 Development sites at risk from fluvial flooding

The Environment Agency's Flood Maps help to identify specific sites at risk from fluvial flooding. Development sites which have a culverted section of watercourse running through them, or within a 50 or 200m buffer zone, may also be subject to fluvial flood risk due to capacity of the culvert. Flood Zones and culverted rivers are shown in Figure 4.1. Site development gives an opportunity to de-culvert channels within the sites, which brings flood risk and environmental benefits. GIS analysis identified development sites where culverts are present.



Table 4.1 lists the developments that are either in Flood Zone 2 or 3, or are within at least a 200m buffer zone of a culverted watercourse. The smallest housing development, for just ten new homes is within 200m of a culvert and so the potential for using the development as an opportunity to de-culvert may be minimal. However, the majority of sites are for quite large housing developments or employment sites where the option to de-culvert may be more significant. The Level 2 SFRA discussed development management policies for different areas, often relating to specific culvert issues and development sites. These are listed in



Area	Parish	Site	Dwellings	Flood Zone	Culvert present (or distance (m) to nearest)	Level 2 SFRA development management policy
Newport	Newport	SHLAA485	35	3	<200m	No policy. However the proximity of culverts in relation to the size of these sites may offer potential to include de- culverting during the construction phase.
		SHLAA907	149	1	<50m	
		Newport 1	Employment	1	<200m	
		Newport 2	Employment	1	<200m	
North	Hadley and	Hadley Park 1	Employment	3	No	Hurley Brook Development
renord	Leegomery	Hadley Park 2	Employment	1	<200m	options to de-culvert rivers in
		Hadley Park 3	Employment	3	No	in the vicinity of employment
		Hadley Park 4	Employment	2	Culvert Present	sites to be developed. GIS indicates this could be possible
		Hadley Park 5	Employment	1	<50m	in 4 of the proposed sites. Other options include
		Hadley Park 6	Employment	1	<50m	increasing flood storage upstream of the railway embankment and SuDS to mitigate risk (Section 5.6).
		Hortonwood 3	Employment	3	No	Detailed TUFLOW modeling in
		Hortonwood 4	Employment	3	No	the Level 2 SFRA suggests that actual flood zones may not
		Hortonwood 7	Employment	3	<50m	be as extensive as indicated by the EA maps of Flood Zone 2
		Hortonwood 11	Employment	3	No	and 3. Indicative flood zones from the TUFLOW model
		Hortonwood 12	Employment	3	<50m	suggests the five sites in Hortonwood could be re- classified as Flood Zone 1, following a detailed, site specific FRA.
		Preston 17	Employment	3	<50m	
	Lilleshall,	SHLAA508	700	2	No	Donnington Brook
	and Muxton	SHLAA144	265	1	Culvert Present	Policies: the SHLAA sites in
		SHLAA482	339	3	No	Lilleshall are potential de- culverting opportunities. Other
		SHLAA504	120	1	Culvert Present	opportunities to mitigate flood risk include upstream flood
		SHLAA351	106	1	<200m	storage and SuDS.
		SHLAA901	513	3	No	Specific issues identified for SHLAA508, as flood waters

Table 4.1 Telford and Wrekin allocated housing and employment sites in flood zones and culverted Areas



Area	Parish	Site	Dwellings	Flood Zone	Culvert present (or distance (m) to nearest)	Level 2 SFRA development management policy
		SHLAA902	615	3	Yes	from New Trench Road Culvert encroach onto site – its site
		SHLAA771	10	1	<200m	size means effective open space management can occur whilst still allowing for development, but consideration for safe site access must be given. The Level 2 SFRA considers site SHLAA482 may be unsuitable for residential development.
	St. Georges and Priorslee	SHLAA386	1100	3*	Culvert Present	No policy. However the presence of a culvert on a site where significant development is proposed creates a valuable opportunity. *A very small area at the southern tip of the site layout extends into flood zone 3.
	Wellington	SHLAA356	20	1	No	
		SHLAA661	44	1	No	Hurley Brook Development Management Policy: the Watling Street Culvert is beyond the development sites, but is noted as posing a flood risk. It recommends de- culverting, increasing culvert capacity, or increasing the flood storage capacity upstream of the railway embankment to reduce risk in Wellington.
	Wrockwardine	Hortonwood 13	Employment	1	<200m	Hurley Brook Development
	Wood and Trench	Hortonwood 15	Employment	3	<200m	potential to de-culvert during development. –Other options include increasing flood storage upstream of the railway embankment and installing SuDS to mitigate risk surface water flooding.
South	Hollinswood	SHLAA379	256	1	<200m	No policy. However the
felford	and Randlay	Nedge Hill 1	Employment	1	<200m	proximity of a culvert to a site where significant development is proposed creates a valuable opportunity.



Area	Parish	Site	Dwellings	Flood Zone	Culvert present (or distance (m) to nearest)	Level 2 SFRA development management policy
	Lawley and Overdale	SHLAA569	183	1	<200m	No policy. However the proximity of a culvert to sites with significant development is proposed creates a valuable opportunity.
		SHLAA908	180	1	<50m	
	Madeley	SHLAA461	44	1	<200m	No policy. The potential to de- culvert the river at this site should be assessed locally. The development site may offer an opportunity.
	Stirchley and	SHLAA607	185	1	Culvert Present	No policy. However the
	Brookside	SHLAA608	116	1	<200m	where significant development
		SHLAA612	123	1	<200m	is proposed, and in the vicinity of other significant development sites creates a valuable opportunity.
	Rodington	SHLAA751	51	3	No	
Rural	Waters Upton	SHLAA404	25	1	<200m	No policy. The potential to de-
		SHLAA406	43	1	<200m	these two sites should be assessed locally. The development site may offer an opportunity.
		SHLAA900	130	3	No	
		Rural Area 1	Employment	3	No	
	Wrockwardine	SHLAA694	500	1	Culvert Present	Hurley Brook Development
		SHLAA380	56	1		Watling Street Culvert poses a
		SHLAA487	106	1		culverting, increasing culvert capacity, or increasing the flood storage capacity upstream of the railway embankment. Large scale development such as that proposed suggests that the opportunity to de-culvert could be taken.

In addition to identified flood risks from culverted rivers risks the Level 2 SFRA and LFRM Strategy identified other flood risk issues (Section 4.3.1). These are listed below in relation to specific proposed development sites.



Stirchley and Brookside

• Site SHLAA607 has a small watercourse flowing directly though it and flood waters encroach onto the site. The site is still suitable for development, as its size allows for development alongside effective management techniques. Areas directly affected by flood waters should be left as open space;

Rodington

- Site SHLAA751 is situated within Flood Zone 3 adjacent to the River Roden, and SHLAA716 is close by. The LFRM Strategy further examined the River Roden and confirmed the risk of fluvial flooding at this site.
- Site SHLAA353 and 354 are also in the vicinity of the River Roden, and although it is situated in Flood Zone 1 planners are urged to consider the risk from the Roden in advance of development plans proceeding.

Waters Upton

• Site SHLAA900 and the potential employment site named 'Rural Area 1' are both listed as being in Flood Zone 3 due to the risk from the River Tern. This assessment is supported by the work done for the LFRM Strategy. Planners are urged to examine these risks in more detail if these potential sites progress to specific planning applications.



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4.4 **Groundwater flooding**

There are concerns over the high groundwater levels that have been recorded in Newport but so far there has been little investigation into groundwater flooding across the area. The LFRM Strategy confirms the finding in the Scoping study that there is a potential high risk of groundwater flooding around the Newport area (see Figure 15 in the draft LFRM report) although the LFRM Strategy has only a limited examination of groundwater risks, and so identifying which sites are at specifically at risk from groundwater flooding risks is not yet possible.

4.5 **Reservoir flooding**

4.5.1 Previous information on reservoir flooding

There are no records of reservoir flooding in the area. Shropshire Wildlife Trust secured funding in 2013 to investigate the feasibility of rejoining the upstream of Holmer Lake to its floodplain, as flows are currently culverted and piped to the lake. This funding is part of a wider scheme to address diffuse pollution issues from Madeley (Madeley Neighbourhood Development Plan, 2014). Further detail on the potential flood risk from Middle Pool, Apley Pool, and Trench Pool in Hadley and Leegomery (North Telford) is presented in the Scoping study.

The results of the previous modelling work show that flood risk in Hurley Brook, Hurley Brook Tributary, Wall Brook and Crow Brook could constrain specific development sites assessed in this study. Specific site impacts are presented in Section 4.3.2.

4.5.2 Risks to development sites from reservoir flooding

Environment Agency reservoir flood maps show the areas that would flood in the event of a reservoir overtopping or failing. The maps illustrate the worst case scenario of a full release of the reservoirs water, which is extremely unlikely to occur. The Scoping study refers to flood risks from overtopping, although where this risk has been identified the full risk as shown in the reservoir flood map is included in this section. Reservoirs are routinely monitored by the Environment Agency and water companies to prevent overtopping by managing levels.

The draft LFRAM Strategy document includes a list of the reservoirs in the Borough that are currently covered by the Reservoirs Act (1975) with details on the height, capacity, ownership, and number of properties at risk should a catastrophic embankment failure occur:



Reservoir	Dam Height (m)	Capacity (m ³)	Owner	Properties at Risk
Apley Pool	3	68,000	TWC	0
Holmer Lake	8.2	90,900	STW	43
Horsehay Pool	6	25,000	TWC	345
Ketlet Sands	10.5	148,000	STW	1000
Middle Pool	5	54,800	STW	497
Priorslee Flash	5	25,000	TWC	91
Trench Pool	4	92,360	CRT	465
Withy Pool	4.5	25,000	TWC	1

Table 4.2 Extract from the draft LFRM Strategy document – Large Raised Reservoirs

Newport:

• The Scoping study identified a potential risk from Aston Pool, however, Telford and Wrekin Council has not been able to confirm this and is therefore assumed to be a minor issue.

Oakengates:

• The LFRM Strategy identified potential risks of reservoir flooding from Middle Pool and Trench Pool reservoirs. According to the Environment Agency's reservoir flood risk map the flood risk from Middle Pool is in the area to the north of the reservoir. Site SHLAA164 is immediately to the south of Middle Pool and so is unlikely to be at risk. However, the potential employment sites in Hadley Park are directly in the path of a potential flood from this reservoir.

St Georges and Priorslee:

• The draft LFRM Strategy identified Priorslee Flash reservoir as a potential source of flood risk. In the event of a worst case scenario flood water from the lake would likely flow in a south-easterly direction, passing by the SHLAA 386 site.

Great Dawley:

• The LFRA Strategy identified a potential risk of overtopping from Withy Pool. The site at most risk if Withy Pool does overtop is CTAAP SA2 (up to 180 homes) which lies to the north of the reservoir. The Environment Agency's reservoir flood risk map indicates the flood extent may not quite reach the



southern boundary of the development site, although its proximity to the flood boundaries means this should be investigated in greater detail should the site come to be developed.

4.6 Surface water flooding

4.6.1 Previous information on surface water drainage

Surface water drainage problems are assessed in the LFRM Strategy which indicates that all parishes across Telford and Wrekin are at some risk from 1 in 30, and 1 in 100 year pluvial (surface water flooding) events. The impact of surface water flooding from new developments within the modelled catchment or upstream were not considered in the SFRA and data in the LFRM on at risk properties and modelled flood extents has not been made available in time for this study. Therefore it has not been possible to make specific reference to these issues in relation to the development site. However, it is clear that surface water flows from Stafford Park industrial estate contribute to flood risk issues in Wesley Brook and development sites in the Priorslee area need to be planned carefully, maximising the opportunities to prevent and resolve existing surface water issues through appropriate use of sustainable drainage techniques (Section 4.6.4).

Hollinswood and Randlay, and the Coalbrookdale catchment are prone to surface water flooding as the area responds quickly to rainfall events. TWC is developing a Rapid Response Catchment Plan for Coalbrookdale as a part of its LFRM as the flashy catchment to the flood risk in Lyde Brook and Coalbrookdale Brook, in Little Wenlock, and The Gorge. The Coalbrookdale plan is expected to explore the reasons why runoff responds so rapidly to rainfall in this catchment, and will promote SuDS to attenuate surface water runoff from new developments in The Gorge.

Following the floods across the UK in 2007, The Pitt Review reviewed development regulations and existing flood defences nationwide. Several recommendations were made focusing on developments on flood plains only in the "absolute exception", where there are housing shortages and no alternative land available. TWC's assessment of fluvial flood risk in its Level 2 SFRA addresses these recommendations by identifying development zones associated with specific watercourses that may be fully or partially unsuitable for development due to their fluvial flood risk. It recommends policies for all parishes in the area, including that all 'Greenfield' developments must maintain surface water runoff rates at Greenfield rates, and all 'Brownfield' sites should aim to attenuate runoff so that rates are at least 50 percent improved (i.e. reduced and slowed down) against current site runoff rates.

4.6.2 Risks to development sites from surface water flooding

In contrast to fluvial flood risks which are largely related to specific, localised and isolated sources, risks from surface water flooding are much more widespread across Telford and Wrekin. The Severn Catchment Flood Management Plan (CFMP), LFRM Strategy, the two SFRAs, and the Scoping study all focus on the risks from surface water flooding. Surface water flood risks specific to the proposed development sites are listed in Table 4.3.



Area	Parish	Sites	Surface water / drainage issues		
Newport	Newport	SHLAA485 SHLAA907 Newport 1 Newport 2	Newport sites are upstream of Moorfield Brook and Strine Brook. Surface water management at these sites must consider the high groundwater levels identified for Newport. They may also contribute surface water runoff into the Strine system. This is a specific issue that the Strine IDB has raised regarding development plans in Newport (and Telford). Surface water runoff is less likely to contribute to the Moorfield Brook flood issues identified in the Level 1 SFRA.		
North Telford	Hadley and Leegomery	SHLAA500 SHLAA506	No specific issues noted although all development in North Telford should be considerate of the surface water issues in the Strine system.		
		Hadley Park 1, 2, 3, 4, 5, and 6	Hurley Brook flows through development sites in this parish, which then forms a confluence with the River Tern. The series of drains in the vicinity form an area that is a hydrologically well connected. The River Tern is noted in section 5.3 as a source of flood risk to existing and potential development sites. Strine IDB has also raised the issue of water management problems in the River Tern requiring attention. Thus, emphasis should be placed on these sites to manage run off effectively. Development sites which would contribute surface water runoff to Hurley Brook are Hadley Park PES 3, 4, 5 and 6.		
		Hortonwood 1 to 12 North Telford Fringe 16 Shawbirch 2 Preston 17	Crow Brook flows through development sites in this parish, which then forms a confluence with the Strine Brook and Lower River Strine. Strine IDB is conscious of the volume of surface water runoff that the Strine receives from the North Telford area, as the series of drains running from Crow and Strine Brook form an area that is hydrologically well connected. Flood Zones may be underestimated in this area according to Strine IDB. The Strine also flows into the River Tern, which is noted in section 5.3 as a source of flood risk to potential development sites. Strine IDB has also raised the issue of water management problems in the River Tern requiring attention. Thus, emphasis should be placed on these sites to manage run off effectively, particularly in reducing current Brownfield runoff rates to improve the current situation, as well as maintaining Greenfield rates. Development sites which would contribute surface water runoff to Crow Brook are all Hortonwood PES sites, Preston 17, North Telford Fringe 16 and Hadley Park 2, 1 and 6 PES sites.		
	Ketley	SHLAA67 SHLAA525	No specific issues noted although all development in North Telford should be considerate of the surface water issues in the Strine system.		
	Lilleshall, Donnington, and Muxton	SHLAA401	This is a Brownfield site. A surface water box culvert and a public foul sewer runs within the site along its southeast boundary. This will require an appropriate standoff area which could reduce the developable size of the site. There are also known issues with a mines drainage system on this site highlighted by a recent flood event into a car park. Further investigation into this system would be required.		
		SHLAA508, SHLAA144, SHLAA482, SHLAA504, SHLAA351, SHLAA901, SHLAA902, SHLAA363	These are all Greenfield sites. The area is in FZ2 with pockets of FZ3 associated with the Wall Brook. An FRA will be required. There is no provision for foul or surface water disposal at this point. Wall Brook flows through development sites in this parish, which then forms a confluence with the Upper River Strine. Strine IDB is conscious of the volume of surface water runoff that the Strine receives from the North Telford Area, as the series of drains running in the vicinity form an area that is hydrologically well connected. Flood Zones may be underestimated in this area according to Strine IDB. The Strine also flows into the River Tern,		

Table 4.3 Known surface water issues affecting the development sites



Area	Parish	Sites	Surface water / drainage issues
			which is noted in section 5.3 as a source of flood risk to existing and potential development sites. Thus, emphasis should be placed on these sites to manage run off effectively, particularly in reducing current Brownfield runoff rates to improve the current situation, as well as maintaining Greenfield rates.
		SHLAA658 SHLAA771 Donnington Wood 1, 3, and 3	No specific issues noted although all development in North Telford should be considerate of the surface water issues in the Strine system.
	Oakengates	SHLAA164, SHLAA775, SHLAA197	No specific issues noted.
	St. Georges and Priorslee	SHLAA264, SHLAA370	Priorslee Balancing Lake acts as a balancing pond for the surrounding area, receiving and storing surface water run-off. The lake outflows to Wesley Brook, which currently does not have flood risks specific to development sites in this assessment (section 5.1), however surface water run-off from sites in Priorslee must be carefully managed to ensure Priorslee Lake continues to effectively manage this run off, and does not increase flood risk to the Wesley Brook and Shifnal downstream.
		SHLAA386	This is a Greenfield site. It is upstream of Shifnal on the Wesley Brook therefore very important that surface water flows are properly managed. On site attenuation will be required and possibly some betterment (30-50% to be detemined) if possible. A FRA will be required. Some provision for foul and surface water drainage has been provided in north part of site as part of existing development in Priorslee.
-	Wellington	SHLAA356, SHLAA661, SHLAA748	No specific issues noted.
	Wrockwardine Wood and	SHLAA118	This is a Brownfield site and so will be required to deliver betterment runoff rates.
	Trench	Hortonwood 13, 14, and 15	No specific issues noted.
South Telford	Dawley Hamlets	SHLAA372	This is a Greenfield site and so will be required to minimize surface runoff to a prescribed condition set by the Council. The site includes a stretch of culverted watercourse which should be restored to open channel as part of the development. Public foul and surface water sewers cross through the southern part of the site. Appropriate easements required.
		SHLAA65, SHLAA135	Runoff from these sites could contribute surface water to the Lyde Brook, and on to Coalbrookdale Brook. This is a very flashy catchment and developments will be expected to go beyond current surface water
	Great Dawley	SHLAA732, SHLAA909, CTAAP SA2, CTAAP SA3, CTAAP SA12	management requirements.
	Hollinswood and Randlay	SHLAA379	This site could contribute excess surface water flows from Stafford park to Wesley Brook and contribute to flooding issues in Shifnal. Appropriate sustainable drainage measures will be required.



Area	Parish	Sites	Surface water / drainage issues
		PES Nedge Hill 1	No specific issues noted.
	Lawley and	SHLAA95	These are all Brownfield sites. Previously planning permissions have
	Overdale	SHLAA63	is now working with developers to achieve a more appropriate balance. The
		SHLAA445	M54 culvert acts as control structure to prevent flooding downstream.
		SHLAA569	
		SHLAA591	
		SHLAA613	
		SHLAA671	No specific issues noted.
		SHLAA908	
		Central Telford 2	
	Madeley	SHLAA255	These are Brownfield sites. A public surface water sewer runs through the
		SHLAA233	distance which may render the site undevelopable. The sewer could be diverted subject to agreement with STW however this may be prohibitively expensive.
		SHLAA255	
		SHLAA461	
		SHLAA514	
		SHLAA910	
		SHLAA378	
		Halesfield 1 to 10	
	Stirchley and	SHLAA605	No specific issues noted.
	DIOOKSIDE	SHLAA607	
		SHLAA608	
		SHLAA612	
	The Gorge	SHLAA375	This is a Greenfield site in the catchment of the Coal Brook Rapid Response Catchment therefore careful consideration on how surface water will be dealt with will be required.
		SHLAA603	
Rural	Chetwynd Aston and Woodcote	SHLAA45	This area currently has Surface Water Area Action Plans, which will be incorporated into Local Flood Risk Management Strategy. TWC expects Greenfield sites to manage surface water to Greenfield runoff rates, and Brownfield sites to better their management, aiming towards a 30 - 50% (to be determined) reduction in runoff rates.
	Chetwynd	SHLAA342	No specific issues noted.
		SHLAA597	
	Ercall Magna	SHLAA8*	These are Greenfield sites in an area which has Surface Water Area Action Plans, which will be incorporated into Local Flood Risk Management



Area	Parish	Sites	Surface water / drainage issues
		SHLAA434 SHLAA523	Strategy. TWC expects Greenfield sites to manage surface water to Greenfield runoff rates, and Brownfield sites to better their management, aiming towards a 30 - 50% (to be determined) reduction in runoff rates.
	Rodington	SHLAA353	This area currently has Surface Water Area Action Plans, which will be
		SHLAA354	Greenfield sites to manage surface water to Greenfield runoff rates, and Brownfield sites to better their management, aiming towards a 30 - 50% (to
		SHLAA716	be determined) reduction in runoff rates.
	SHLAA751		
	Tibberton and	SHLAA457	457 is a Greenfield site. It will require an FRA and has both foul and surface water connection issues
Chernington	SHLAA509	The drainage network in Tibberton is a historic combined system and is at	
		SHLAA580	or near capacity. Prior to any development taking place STW must be consulted to assess what impacts this development would have and what
		SHLAA582	necessary improvements will be required.
		SHLAA583	
		SHLAA734	
		SHLAA552	This is a Brownfield site with the same drainage issues as elsewhere in Tibberton and Cherrington.
	Waters Upton	SHLAA43	This area currently has Surface Water Area Action Plans, which will be incorporated into Local Flood Risk Management Strategy. TWC expects Croopfield support to Croopfield support and
		SHLAA404	Brownfield sites to hanage surface water to Greenled fution rates, and Brownfield sites to better their management, aiming towards a 30 - 50% (to be determined) reduction in runoff rates.
		SHLAA406	be determined) reduction in turion rates.
		SHLAA635	
		SHLAA900	
		Rural Area 1	
	Wrockwardine	SHLAA380	This area currently has Surface Water Area Action Plans, which will be
		SHLAA487	Greenfield sites to manage surface water to Greenfield runoff rates, and Brownfield sites to batter that management a giving towards a 20 50% (to
		SHLAA694	be determined) reduction in runoff rates.

*provided by John Bellis for key sites and extrapolated to other sites using locations in the 'Proposed Housing and Employment Sites' consultation document.



4.6.3 Existing surface water management requirements in Telford & Wrekin

Committed sites over 1ha would have had to produce an FRA. Below are some of the standard planning conditions that Telford & Wrekin Council already applies. All planning applications must submit information to close down the following conditions:

1. "Development shall not take place until a scheme for surface water drainage has been submitted to and approved in writing by the Local Planning Authority. The proposed scheme shall reduce the surface water discharge rate by 30 percent of that existing, and any attenuation feature should be designed to attenuate all flows up to and including the 1 in 100 year event +30 percent for climate change. The approved details shall be implemented in full prior to the first occupation of the development.

Applicable to: Brownfield sites.

Reason: To reduce the impact of this development on the surrounding surface water infrastructure.

2. Development shall not take place until a scheme for surface water drainage has been submitted to and approved in writing by the Local Planning Authority. The proposed scheme shall restrict surface water runoff to 5 litres per second per hectare and any attenuation feature should be designed to attenuate all flows up to and including the 1 in 100 year event +30% for climate change. The approved details shall be implemented in full prior to the first occupation of the development.

Applicable to: Greenfield sites.

Reason: To ensure satisfactory drainage of the site and avoid flooding.

3. As the site is over 1ha in size or in areas of Flood Zone 2, 3a, 3b, a full Flood Risk Assessment (FRA) is required in line with the requirements of Section 103 of the National Planning Policy Framework. The FRA should be submitted and agreed in writing by the Local Planning Authority and the agreed recommendations shall be implemented in full prior to the first occupation of the development.

Applicable to: all sites greater than 1ha in size in flood zone 2, 3a, or 3b.

Reason: To ensure that the site can be adequately drained".

4.6.4 Role and suitability of sustainable drainage

Strine Internal Drainage Board (IDB) handles significant quantities of surface water runoff from urbanised areas in the district. During heavy rainfall events the water flow in the channels that carry water away from Telford and Newport increases significantly, and very rapidly. Strine IDB clears these channels but in spite of this the watercourses are often overwhelmed by the volume of water flowing into them. When this happens farm drains and ditches are impacted leading to farmland flooding. Strine IDB recognises the need to accommodate more development but asks that the existing impact of urban surface water runoff on the Strine area is taken into account when planning development site and surface water management conditions. The request from Strine IDB for more



consideration of the impacts of runoff into the Strine system is particularly relevant to development sites in Newport and Telford.

Sustainable Drainage (or Sustainable Urban Drainage Systems – SUDs) is an important technique to manage and limit runoff rates. TWC has fully integrated the requirement for SUDs into its LFRM Strategy, the management policies for which indicate that SUDs should be used to attenuate and reduce run off from all new development sites, regardless of whether the site has been noted for specific surface water flooding issues. Specifically the LFRM states that:

- At developments on Greenfield sites subsequent runoff rates must not exceed the original Greenfield rate;
- Where a site is listed as a brownfield site a 50 percent betterment in the rate of surface water discharge must be provided. This is slightly more than the 30 percent betterment requirement within the existing conditions issued by TWC. At the time of writing (October 2014) the draft policies in the LFRM have not yet been ratified; and
- Open air SuDS should always be used where possible.

TWC is establishing a SUDs Approving Body to coordinate the design and management of SUDs at new development sites. This is in line with the Environment Agency's Catchment Flood Management Plan (CFMP) for the Telford area, (set out in the Severn CFMP), which seeks to restore natural flood storage and attenuation. The CFMP also highlights the requirement for local authorities to take responsibility for surface water flooding in their area, which TWC has demostrated through its LFRM Strategy, and the development of specific Rapid Response Catchment Plans for Coalbrookdale.

TWC has also considered climate change and urban creep in its surface water strategy. All SUDs should be designed to cope with a 1 in 100 year plus climate change (+30 percent) event. In addition to this, the design should also incorporate a further 3 percent allowance for the storm event, to account for residential properties paving areas inside existing development sites.

Strine IDB also makes reference to the need for other factors contributing to water levels in the Strine system to be taken into account via the development strategy:

- Improved management of assets owned by Severn Trent Water, e.g. the Northern Interceptor to reduce impact on farming businesses in the Strine district;
- Specific attention to improve the management of Walcott Weir and flows in the River Tern could reduce the occurence of 'urban water' backing up in the rural area;
- Catchment approach to water management: sustainable drainage is one element of catchment wide water management that the Council can take the lead on. Across England and Wales the Environment Agency and water companies are increasingly advocating and supporting catchment management projects, such as the 'Telford Urban Catchment Restoration Project' that the Council has already been involved in.

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Other opportunities to initiate or engage with catchment management projects, such as the ongoing 'Love Your River Telford' (Appendix D) would contribute to increasing the sustainability of the area and minimising risks from surface water flooding;

The actions proposed by Strine IDB serve two main purposes: to protect urban areas from surface water flooding, and to protect farmers' farmland from being flooded.

4.6.5 SUDs suitability review

In order to undertake a desk based SUDs suitability review for the development locations the geology and groundwater context of the sites was assessed. SUDs are designed to reduce runoff by attenuating water transfer. The permeability of the surrounding soil and the sensitivity of any local groundwater sources determine whether techniques are chosen to carry this out through direct infiltration or offline storage. This section outlines the method used to determine for each of the allocated sites which type of sustainable drainage technique is appropriate.

Step 1: Determine the permeability of the site

The methodology followed is similar to the 2008 assessment of Sustainable Drainage Systems for Local Development Framework, for Telford and Wrekin Council. That document uses soil classes -Hydrology of Soil Types (HOST) - to infer permeability:

- Low permeability: HOST 18; 19; 24
- Moderate permeability: HOST 3; 5, 10.
- High permeability: HOST 4; 11.

Development and drainage has to be sensitive to the risk of contaminating public water supplies (Section 2). The Scoping study explains the concept of Source Protection Zones (SPZs) and shows their location across Telford and Wrekin (all three categories of protection are found in the study area, Figure 4.3). The soil permeability ratings are subcategorised into the three SPZ categories of protection zone (i.e. 'Total Catchment', 'Outer Zone' and 'Inner Zone'). This generates nine categories against which suitable SuDS were nominated, depending on their effectiveness in the soil permeability and appropriateness for the SPZ.

HOST Soil Classes have not been available to this study and so information on Superficial Deposits (Geostore, 2014) has been used to determine soil type at each development site (



Figure 4.2). The British Geological Survey Open Report (2006) categorises soils permeability and those relevant to Telford are listed in Table 4.4. High permeability suggests infiltration type SuDS could be technically feasible, although this is subject to the water protection concerns of the area (Step 2). Moderate to low permeability does not lend itself to infiltration methods and attenuation measures may be more appropriate.

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Table 4.4 Permeability of superficial deposits across Telford and Wrekin

Superficial Deposit	Superficial Permeability (BG	Inferred Permeability for SuDS Suitability Selection	
	Maximum Permeability	Minimum Permeability	
Clay and Silt	Low	Very Low	Low
Clay, Silt, Sand and Gravel	Very High	Low / Very Low	Moderate
Diamicton	High / Moderate	Low	Moderate
Peat	Low	Very Low	Low
Sand and Gravel	Very High	High	High



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4.6.6 Development sites SUDs suitability

Sites that intersect the Inner Zone (SPZ1) inevitably are also within SPZ2 and the wider SPZ3, whereas sites in the lower zones do not necessarily intersect SPZ 1 or SPZ2. Table 4.5 identifies the sites that intersect the SPZs showing the highest zone which they intersect. All other sites not listed are outside of the SPZ area.

SPZ category	Sites	Sector	Implications for SUDs
1 Inner Protection Zone	SHLAA 694, SHLAA 356. The Dairy Crest site in the Rural Area is directly above the Inner Zone of the source protection area.	Residential Employment	Where infiltration SuDS are proposed for anything other than clean roof drainage in a SPZ1 the EA will require a risk assessment to demonstrate that pollution of groundwater would not occur. They will also require approval from the SuDS Approval Body (SAB). Attenuation drainage is more preferable especially if the discharge can drain away from the Inner Zone of SPZ 1.
2 Outer protection zone	SHLAA sites: 144, 342, 351, 356, 457, 482, 504, 508, 509, 552, 580, 582, 583, 597, 694, 734, 900, 901, and 902.	Residential	Strictly controlled – similar to SPZ1. Developers should consult with the Environment Agency and the SUDs approval body (i.e TWC).
	Committed sites: W2008/0059, TWC/2010/0378, TWC/2010/0678, TWC/2011/0015, TWC/2011/0179, TWC/2011/0334, TWC/2011/0821, TWC/2011/0827, TWC/2011/0871, TWC/2011/0930, TWC/2012/0032, TWC/2012/0207, TWC/2012/0295, TWC/2012/0355, TWC/2012/0961, TWC/2012/014, TWC/2013/0081, TWC/2013/0172, TWC/2013/0271, TWC/2013/0297, TWC/2013/0354, TWC/2013/0379, TWC/2013/0574, TWC/2013/0775, TWC/2013/0777, TWC/2013/0870, TWC/2014/0008, TWC/2014/0069, TWC/2014/0085, TWC/2014/0106	Residential	
	TWC/2011/0853, TWC/2011/0871, W92/0970	Employment	
3 Source catchment protection zone	SHLAA sites: 8, 43, 45, 118, 164, 401, 406, 485, 635, 907	Residential	The contamination potential can be lower in SPZ3 but is dependent on the infiltraton potential of the geology. The higher the infiltration potential from surface to groundwater the more restrictive the requirements will be for appropriate SUDs techniques.

Table 4.5 Development sites in source protection zones



SPZ category	Sites	Sector	Implications for SUDs
	Committed sites: TWC/2010/0063, TWC/2010/0070, TWC/2010/0200, TWC/2010/0297, TWC/2010/0359, TWC/2010/0613, TWC/2010/0775, TWC/2011/0050, TWC /2011/0075, TWC/2011/0127, TWC/2011/0249, TWC/2011 /0343, TWC/2011/0474, TWC/2011/0803, TWC/2011/0852 , TWC/2011/0923, TWC/2011/0949, TWC/2011/1039, TW C/2012/0069, TWC/2012/0093, TWC/2012/0211, TWC/20 12/0240, TWC/2012/0320, TWC/2012/0358, TWC/2012/04 01, TWC/2012/0416, TWC/2012/0432, TWC/2012/0493, T WC/2012/0547, TWC/2012/0548, TWC/2012/0493, T WC/2012/0547, TWC/2012/0548, TWC/2012/0493, T WC/2012/0547, TWC/2012/0548, TWC/2012/0433, TWC/2 012/0895, TWC/2012/0916, TWC/2012/1004, TWC/2013/0 036, TWC/2013/0074, TWC/2013/0091, TWC/2013/0214, TWC/2013/0247, TWC/2013/0332, TWC/2013/0339, TWC /2013/0489, TWC/2013/0567, TWC/2013/0625, TWC/2013/0867 , TWC/2013/0879, TWC/2013/0881, TWC/2013/0942, TW C/2013/1006, W2003/0872, W2010/0004, W2010/0076	Residential	
	Committed sites: TWC/2014/0042, TWC/2014/0054	Employment	
	Allocated: Hortonwood 12 and 15; Newport 1 and 2.	Employment	

Direct infiltration is not permitted in areas sited above aquifers that have specifically been designated as the Inner Zone of a Source Protection Zone (SPZ)¹⁴. The implications for SUDs listed in this table are very brief. It is recommended that all developments refer to the Environment Agency guidance, "Sustainable Drainage Systems (SUDS): A guide for developers"¹⁵, or the "*National Standards for sustainable drainage systems: Designing, constructing, operating and maintaining drainage for surface runoff*"¹⁶ published by Defra in 2011 to understand the restrictions.

The development site at Priorslee (SHLAA386) is controversial and is largely opposed by people in Shifnal who are concerned about this development increasing surface water flooding downstream. Surface water flooding is a problem in this area but there will be opportunities to take remedial flood risk measures through the widespread application of sustainable drainage techniques at this site.

¹⁴ The location and concept of Source Protection Zones is given in Section 8.4 of the Scoping study

¹⁵ http://www.rtpi.org.uk/media/12399/suds_a5_booklet_final_080408.pdf

 $^{^{16}\} https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82421/suds-consult-annexa-national-standards-111221.pdf$



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Due to the use of SuDS as pollution treatment, it is assumed that the water quality draining from a development site will be as suitable for direct infiltration into the Outer Zone and Total Catchment parts of the SPZs (zones 2 and 3 respectively) as it would be in an area that is not within a SPZ (zone 0). Therefore, SPZ zones 0, 2 and 3 are grouped together with the same SuDS suitability. Each site has been categorised based on its geology and SPZ (Table 4.6).

Table 4.6 Soil conditions in relation to development sites

Low permeability		Medium permeabili	High permeability		
SPZ 0, 2, or 3	SPZ 1	SPZ 0,2, or 3	SPZ 1	SPZ 0,2, or 3	SPZ1
SHLAA8, 482, 902, Hadley Park 2, 5, 6, North Telford Fringe 16, Preston 17.	None	CTAAP SA2, 3, 12, Donnington Wood 2 and 3, Halesfield 1 to 10, Central Telford 2 Hortonwood 1 to 7 and 10 to 12, and Nedge Hill 1.	SHLAA356 (one site only).	SHLAA485, 500, 506, Newport 1 and 2.	Rural Area 1, SHLAA694, 900.
		SHLAA43, 45,63,65, 67, 95,118, 164, 233, 372, 375, 378, 379, 386, 401, 445, 457, 461, 509, 514, 525, 552, 569, 580, 582, 583, 591, 603, 605, 607, 608, 612, 613, 658, 661, 671, 732, 734, 907, 908, 909, 910.			

Appropriate SuDS have been determined for each site the 2008 assessment of Sustainable Drainage Systems for Local Development Framework for Telford and Wrekin Council, and also the CIRIA SuDS Manual (2013). These are listed in Table 4.7. The table includes design changes that could be required such as impermeable linings. Within this list, some SuDS have further constraints, such as the space available, the slope of the site, the groundwater depth under the site, and the use the site is intended for. Such information is only available following a detailed site analysis, which is beyond the scope of this project. For example groundwater levels have been identified in Newport and thus after specific site analysis, it may not be appropriate to use infiltrating SuDS.



Table 4.7SUDS suitability per site

	Suitable for Zo	ne:			Other SuDS Suitability Considerations				
SuDS Type	Low Permeability		Medium Permeability		High Permeability				
	SPZ 0/3/2	SPZ 1	SPZ 0/3/2	SPZ 1	SPZ 0/3/2	SPZ 1	Site Type	Groundwater	Site Slope
Green/Brown Roofs	Yes	Yes	Yes	Yes	Yes	Yes	Densely developed areas, but must consider building structure		
Rainwater Harvesting	Yes	Yes	Yes	Yes	Yes	Yes	High Density development.		
Swales	Yes	Lined	Yes	Lined	Yes	Lined	Low density development, landscaped.	If intended dry swale, >1m below surface	Ineffective on very flat or very steep slopes (>1 in 40)
Detention Basin	Yes	Lined	Yes	Lined	Yes	Lined	Low density development. Accommodates larger drainage catchment.		Flat area required
Geocellular/ Modular	Yes	Lined	Yes	Lined	Yes	Lined	High density development. Non-polluting catchment if not within SuDS treatment train.		
Bio-retention areas	Yes	Lined	Yes	Lined	Lined	Lined	Small, non-polluted/industrial drainage catchment. Requires landscaping area.		
Ponds	Yes	Lined	Yes	Lined	Lined	Lined	Requires low density development, landscaped areas		Flat area required
Sand Filter	No	Lined	No	Lined	No	Lined	Small catchment drainage area < 4 ha		Ineffective on very flat sites
Filter Strips	Yes	No	Yes	Lined	Yes	Lined	Low density developments, landscaped areas	> 1m below surface	Gentle slope required



	Suitable for Zone:						Other SuDS Suitability Considerations		
SuDS Type	Low Permeability		Medium Permeability		High Permeability				
	SPZ 0/3/2	SPZ 1	SPZ 0/3/2	SPZ 1	SPZ 0/3/2	SPZ 1	Site Type	Groundwater	Site Slope
Filter Trench	Yes	No	Yes	Lined	Yes	Lined	Small catchment drainage area. Effective in densely developed areas.		
Filter Drain	Yes	No	Yes	Lined	No	Lined	Small catchment drainage area. Effective in densely developed areas.		
Permeable Pavements	No	No	Yes	Lined	Yes	Lined	Unsuitable for very heavy / intense loading	> 1m below surface	
Pre- treatment Devices	No	Yes	No	Yes	No	Yes	Industrial / polluting sites	Inner Groundwater Source Protection Zones	
Pipe/Culvert/ Tank	No	Yes	No	Yes	No	Yes	High density development. Non-polluting catchment if not within SuDS treatment train.		
Soakaways	No	No	Yes	No	Yes	No	Non-landscaped areas.	> 1m below surface	Gentle slope required
Infiltration Basin	No	No	No	No	Yes	Lined	Low density development, landscaped areas	seasonal high groundwater >1m below surface	Flat area required
Stormwater Wetland	No	No	No	No	Lined	Lined	Low density development. Can accommodate larger drainage catchment.		Flat area required



4.7 **Flood defence and water management structures**

Few publicly and privately owned water management structures exist in Telford and Wrekin, which influences the flood risk in the area. Discussions with the Environment Agency and TWC confirm that the only publicly owned temporary flood defence in operation is that which is being trialled along the Wharfage and Ironbridge in The Gorge. There are no development sites within the area at risk or protected by this flood defence scheme, the closest being approximately 500 meters away.

Strine Internal Drainage Board (IDB) manages an area covering approximately 2240ha in Northern and Rural Telford. Strine IDB states that there are no privately owned or managed flood defence structures in their operating area. Several siphons do exist, which move water under a watercourse, in order to transfer water from one drainage ditch to another, but these are not for flood management, nor cause issues with flood management. Walcott weir on the River Tern is the only structure which has the potential to exacerbate fluvial flood risk in the Strine IDB drainage area, as its operation maintains water levels at too high a level in the River Tern for water in the River Strine to drain into efficiently. There are no development sites along the River Strine that this would affect directly, however development sites upstream of the River Strine (along the Crow and Wall Brook) contribute peak run off flows to the River Strine.

4.8 Summary of flood risk issues

Section 5 has discussed in the main findings from the Scoping water cycle study and the previous Strategic Flood Risk Assessment in the context of the more recent reports (particularly the Local Flood Risk Management Strategy (LFRM)) and the more detailed information on committed and allocated development sites. The list below gives a summary of the main headline issues:

Developments in Telford & Wrekin are subject to flood risk from a range of sources: fluvial, groundwater, surface water runoff, and reservoirs.

Fluvial flood risks:

- Fluvial flood risk is a relatively minor risk in the area with only a few sites affected. The most significant fluvial risks are in the Humber Brook (North Telford); the flashy Coalbrookdale catchment specifically sites in the Gorge close to the Lyde Brook and Coal Brook; and risks from the Rivers Roden and Tern affecting sites in Rodington and Waters Upton. Planners are urged to consider these risks in advance of development plans proceeding;
- There are existing properties within flood zone 3a of the Lyde Brook emphasising the importance of delivery against the Coalbrookdale Rapid Response Catchment Plan);
- Significant sections of river across Telford & Wrekin have been culverted and these culverts can increase the risk of flooding if their capacity is overwhelmed. Site development creates a perfect opportunity to access and de-culvert river flows so that natural river channels (and habitat) can be



restored, to reduce the risks of water backing up out of culverts, and to create environmental benefits. Large scale development sites where culverted sections intersect the site, or are close by offer the most potential for improvement. It may not be feasible to require smaller scale developments to incorporate de-culverting into their development plans.

Groundwater flooding:

• There has been little scientific research to examine groundwater levels in the area but there are concerns over the high groundwater levels beneath Newport.

Reservoir flooding:

• There are 8 large raised reservoirs in the Telford & Wrekin area that could cause flood risk if they were to overtop or fail but there are no records of any previous reservoir flooding in the area.

Surface water drainage:

Arguably the most widespread flooding issue affecting the development plans is the problem of flooding caused by surface water runoff after heavy rainfall events. All parishes across Telford & Wrekin are at some risk of 1 in 30 year and 1 in 100 year surface water flooding events.

- One of the most high profile risks is the impact of surface water runoff from Telford and Wrekin, particularly in the Priorslee area, on flooding in Shifnal which lies downstream. Development sites in the Priorslee area need to be planned carefully and sustainable drainage techniques must be incorporated to minimise flow towards Shifnal;
- Less high profile but arguably more technically challenging are the surface risks associated with development in Newport and Telford. Strine IDB has raised specific concerns over the flow of water from these towns into the Strine system and the flooding incidents that affect farmers in the Strine area, but also urban areas that experience the impacts of water 'backing up' from the system into the towns. Strine IDB has made specific requests that all developments that could contribute surface water flows into the Strine are considered more closely;
- Surface water runoff in the Coalbrookdale catchment responds very rapidly to rainfall events and the reasons for this will be explored within the LFRM. All new developments in the Gorge area must incorporate appropriate sustainable drainage techniques to counter the existing runoff situation;
- It is good practice within the National Policy Planning Framework for all developments, on brownfield or greenfield sites, to incorporate sustainable drainage systems and Telford & Wrekin Council already has standard conditions that it requires developers to comply with. The 'betterment' rates stated in the standard conditions are slightly less than the rates proposed in TWCs LFRM Strategy and it is recommended that the Council aligns these two policies for clarity.



Flood defence:

- There is very little publicly or privately owned flood defence in Telford & Wrekin. This possibly reflects the relatively small amount of risk from fluvial flooding, which the Environment Agency has responsibility for;
- Walcott Weir on the River Tern has been highlighted as a structure which currently has the capacity to exacerbate flood problems in the Strine system. The weir is used to maintain water levels but it is argued by Strine IDB that the levels in the River Tern are kept too high to enable the River Strine to drain effectively. These are surrounding issues that the Council should be aware of, particularly in relation to the development sites that are located in the rural area;
- Surface water management is the primary flood defence measure against surface water flooding. The Council already applies drainage conditions to all planning applications on either brownfield or Greenfield sites. The most robust way to achieve the desired surface water drainage outcomes is for developers to incorporate appropriate sustainable drainage (SuDS) techniques across the sites. Telford & Wrekin Council is establishing a SuDS Approving Body (SAB) to coordinate SuDS at new development sites. This role is critical to avoiding the surface water flooding issues that could easily arise if drainage is not managed;
- There are two main categories of Sustainable Drainage technique: 1) Infiltration, and 2) Attenuation.

Infiltration techniques can only be supported where the soils and geology are permeable (e.g. sand and gravel) **and** where the infiltration would not pose a risk to groundwater. Three development sites are located directly above Inner Protection Zones and so guidance on SuDS needs to recognise the requirements of the Environment Agency for site risk assessments.

Attenuation techniques (which store water at the surface and release it slowly into the water environment) are more appropriate where soils and geology are impermeable (e.g. clays, diamicton, and peat). There are some development sites on permeable geology but the majority are above clays / diamicton.



5. Strategy recommendations

5.1 General overview

It is clear that whilst there is capacity to support growth across Telford and Wrekin the water environment and water services infrastructure cannot support all of the development in the locations put forward by TWC until a range of investigations and upgrades have been completed. There are some areas where growth is largely unconstrained by the water environment but there are others which are highly constrained and will require concerted joined up effort between TWC, the Environment Agency, and Severn Trent Water to resolve. Inevitably, the development plans need to be phased to enable TWC to meet its 5 year housing requirements by prioritising those sites which are least constrained, and planning well in advance for the sites that likely need to pushed back to give time for the supporting infrastructure to be developed.

This section clarifies the implications of those constraints with regards to development numbers in specific areas, lists the improvements that will be required, and the actions that TWC can take to work with its partners, the Environment Agency and Severn Trent Water to effectively plan and implement development that will be sustainable.

5.2 **Proposed phasing of development**

In the short term, i.e. at least within the next five years TWC should be able to deliver its housing requirement target through the delivery of committed housing, or by focusing allocated development in the areas served by the Rushmoor WwTW. Development could also take place within the Coalport catchment but it is recommended that water quality modelling is undertaken to understand the implications of increased output from Coalport WwTW on Water Framework Directive quality objectives. The Environment Agency does not normally complete such modelling in advance of proposed development, rather modelling tends to be done in response to specific applications (or pre-application) from water companies requesting a change (i.e. increase) to their permitted Dry Weather Flow consent.

Based on the level of constraint and combinations of constraints affecting various sites the following action plan is suggested to phase development appropriately from the perspective of the water environment and water services.

The suggested timeline of activities is proposed on the basis of the extent of the constraints in different areas, the longer term opportunities to ensure infrastructure upgrades are put in place by Severn Trent Water, and the general assumptions regarding the annual rate of development. Constraints may be resolved sooner (or later) than the strategy forecasts and so whilst a detailed phasing approach is set out this should be viewed as a framework within which all future allocations should be considered prior to granting planning permissions:

1. TWC and Severn Trent Water urgently need to discuss the implications of the committed developments in the Newport and Waters Upton WwTW catchments. As committed sites are taken through to completion TWC should relay this information to Severn Trent Water.



- 2. The next priority issue is to make sure that the already committed developments within the Rushmoor and Coalport WwTW catchments can be adequately served by the sewerage system. TWC should provide an up to date list and map of committed sites with expected dwelling numbers to enable Severn Trent Water to assess the sewerage situation of these confirmed sites.
- 3. In parallel with tasks 1 and 2, TWC is urged to prepare guidance for developers on the drainage requirements that planning applications will need to comply with. Surface water flooding and drainage is a major issue everywhere and so, as the Lead Local Flood Authority and SUDs Approval Body TWC needs to be prepared. The guidance should also explain where developers can access technical information on Sustainable Drainage techniques, but also the process that will be in place to examine the credibility of drainage plans and the subsequent developments.
- 4. Of the allocated sites it is recommended that developments in the Wrockwardine Wood and Trench, and Ketley parishes are brought forward first as these are the least constrained by sewerage, wastewater treatment, or flood risk (**combined maximum of 168 allocated dwellings**). However, TWC is reminded to check the feasibility of the Hortonwood15 employment site to confirm its suitability within a flood zone 3.
- 5. Rushmoor WwTW does have capacity to meet the demand of the committed and allocated dwellings but because the Environment Agency is concerned about the potential impact that increasing discharge volumes will have on WFD objectives (especially phosphate levels) it may seek to undertake water quality modelling for Rushmoor WwTW as well as Coalport WwTW (Newport WwTW). This may need to be instigated by the Environment Agency.
- 6. After Wrockwardine Wood and Trench, and Ketley, the next areas to bring forward could be Hadley and Leegomery (looking more closely at the employment sites in flood zone 3), Oakengates, Wellington, and Wrockwardine (**combined maximum of 1554 allocated dwellings**). However, before doing so the sewerage system may need to be upgraded. As soon as TWC is able to confirm that sites will be developed this information needs to be given to Severn Trent Water to assess the potential need for sewerage infrastructure works in each area. At this stage Severn Trent Water is not able to specify which of these areas may be more constrained than others. However, sewerage constraints should not delay development if sufficient notice is provided. TWC and Severn Trent Water are encouraged to discuss with developers opportunities to dovetail sewerage infrastructure with the groundworks' stage of construction.
- 7. The development sites in the Rural Area are less constrained despite the small size of the infrastructure serving them. Growth in Tibberton and Cherrington, Edgmond, Ercall Magna, and Chetwynd can be supported (**combined maximum of 360 dwellings**) although confirmation on the capacity of the sewerage network to serve developments here will be needed before proceeding. Severn Trent Water has also highlighted that any significant development in these areas might need further reinforcements to the water supply network. It might be advisable to delay development in these areas for a short time (i.e. whilst sites in Rushmoor are taken forward) until Severn Trent Water has assessed the requirements and confirmed what, if any, additional infrastructure support would be needed. However, given the rapidity proposed by TWC these assessments should commence immediately.



- 8. Returning to the Rushmoor WwTW catchment the final parishes to develop should be Lawley and Overdale, and Lilleshall, Donnington, and Muxton, focusing on the sites that are served by Rushmoor, rather than Coalport WwTW. Other sites in these parishes should wait until the Coalport WwTW issues have been resolved.
- 9. Whilst development is being planned and rolled out in the Rushmoor WwTW catchment work needs to be done to quantify the impact of increased demand on the future discharge permits at Coalport WwTW and Waters Upton. As soon as TWC can confirm development figures this data must be provided to Severn Trent Water to calculate more precisely what the increases in Dry Weather Flow demand would be. This data then needs to be shared with the Environment Agency to model the water quality impacts of increased volumetric discharge. It is highly likely the growth will require the permits to be tightened, it is also possible that the permit will need to be amended to reduce phosphate concentrations to meet WFD objectives. For Coalport there is a risk that the demands may generate permit requirements which will be very difficult for Severn Trent Water to achieve. It is possible that the maximum level of growth may need to be curtailed to prevent the Environment Agency having to issue unreasonably tight permit conditions. This is why the water quality modelling is a priority.

However, there is a risk that unless the total extra demand, not just a couple of years' growth, is taken into account Severn Trent Water may need to apply for an increased discharge permit, and then repeat the process again as and when the remaining allocations are confirmed.

It is in Severn Trent Water and the Environment Agency's interest to assess the whole demand and to look for a way to model and plan incrementally if necessary but within the context of the full extent of the growth proposals.

- 10. Severn Trent Water should confirm the level of investment required to upgrade Waters Upton WwTW to enable the allocated growth to proceed. Both the Environment Agency and Severn Trent Water agree that the area is operating close to capacity and so any development progress in this area should be preceded and supported through inter-party dialogue. TWC is urged to reconsider SHLAA site 900 (130 dwellings) which is located in flood zone 3.
- 11. When considering growth in the Coalport WwTW catchment the first areas to focus on should be Lawley and Overdale; and Lilleshall, Donnington, and Muxton. TWC should discuss with STW opportunities for sites physically located within the Coalport WwTW catchment (SHLAA sites 63, 95, 386, 658, 671 combined dwellings, 1635) to connect to the sewerage system that drains to Rushmoor WwTW. This would further reduce the available headroom at Rushmoor and as such it is recommended that the impact of these sites are also included in Rushmoor WwTW water quality modelling.

SHLAA sites 482 (339 dwellings) and 901 and 902 (1128 dwellings) are located in flood zone 3. Site 482 in particular was highlighted in the Level 2 SFRA as potentially unsuitable for residential development. **Removing these sites would affect up to 1467 dwelling numbers.**

12. Coalport WwTW does need to be upgraded before any of the allocated dwellings should be built.



- 13. Once Coalport WwTW is ready to begin accepting increased demand it may be advisable to commence development in the Dawley Hamlets area and then Great Dawley. This will provide additional time for developers and TWC to work together and with other stakeholders to ensure the surface water flood issues at St. George Priorslee are robustly mitigated using sustainable drainage techniques. It is recommended that SHLAA site 386 is re-examined in terms of the flood risks.
- 14. Development sites in Madeley (possibly reconsidering the feasibility of SHLAA site 255 major sewer issue); Stirchley and Brookside; Hollinswood and Randley; and The Gorge are more constrained by sewerage capacity and so these sites may be better left until the sewerage capacity in the Coalport WwTW catchment has been assessed.
- 15. Development in Newport is constrained by almost every aspect of the water environment and water services infrastructure and allocated housing in this area should be at the bottom of the priority list. Works needed to support any growth in this area includes:
 - Quantification of the additional Dry Weather Flow demand expected to be generated (Severn Trent Water)
 - Water quality modelling to determine the quality conditions for an amended discharge permit (Environment Agency);
 - Newport WwTW needs to be upgraded to meet the conditions of the future discharge permit (this could be particularly challenging as the Environment Agency is concerned about the level of treatment technology that is available to deliver water quality to the standard that might be required);
 - Plans to ensure that development will not increase surface water runoff into the Strine IDB system (ideally plans that will mitigate existing problems);
 - Investigations into the groundwater level beneath Newport to better understand the risk to property from groundwater flooding;
 - Fluvial flood risks from the Humber Brook and the Moorfield Brook need to be better understood and development sites planned taking the results into consideration.

Severn Trent Water is planning some capital maintenance at Newport WwTW with in AMP6 and it is possible that will include provision of additional capacity at the same time. If this is complete then the allocated sites may be able to be brought forward. However, considering the range of constraints it may be prudent to keep further development in this area until later in the period.

5.3 **Growth rate**

Growth rate is potentially an issue, particularly with regard to water supply. There is currently sufficient supply to meet an increased demand but that supply base is due to be significantly reduced in 2045/25 to meet environmental river flow conditions. Severn Trent Water has an option prepared to secure supplies but the plan is based on assumptions that include growth rate estimates provided by TWC of 700 new homes per annum. If TWC decides to



push forward striving for closer to 1000 new homes per annum, the demand at the point when the supply will be reduced could potentially coincide with a temporary reduction in supply and TWC should maintain dialogue with Severn Trent Water on this. There are other factors that would affect the risk, not least growth rates in Shrewsbury and North Wolverhampton, and climate (the forecast is based on dry year scenarios). However, TWC has no influence on those factors other than its decisions to progress development in its own area.

Housing growth is not expected to exceed 1000 per annum and as over 9000 of the committed sites are yet to commence it is expected that starting from 2014/15 as year 1 the committed sites will dominate the building phase for the first six years up to 2019/20. On this basis TWC and Severn Trent Water have more time to plan the delivery of the allocated sites and required infrastructure, taking the opportunity to incorporate development plans into the 2019 and 2024 Water Resource Management Plans. A suggested timeline is presented in Figure 5.1 which can be cross-referenced against the spatial phasing map in Figure 5.2. The various developments have been grouped by parish into 'phases' which are colour coded for representation in Figure 5.2. The coding is illustrated in Table 5.1

	Parish	Allocated SHLAA				
Committed	All existing committed sites					
Phase 1	Wrockwardine Wood and Trench, and Ketley	SHLAA 67, 118, 525				
Phase 2	Hadley, Oakengates, Wellington, Wrockwardine	SHLAA 500, 506, 164, 197, 775, 356, 661, 748, 380, 487, 694				
	Tibberton and Cherrington, Ercall Magna, Chetwynd, Rodington	SHLAA 08, 45, 353, 354, 434, 457, 509, 523, 552, 580, 582, 583, 716, 734, 751				
Phase 3						
	Lilleshall, Donnington, and Muxton, Lawley and Overdale	SHLAA 144, 351, 363, 401, 445, 504, 508, 569, 591, 613,				
	sites (in the Rushmoor WwIW catchment)	658, 671, 771, 901, 902, 908				
Phase 4						
Phase 5	Lilleshall, Donnington, and Muxton, Lawley and Overdale, Waters Upton	SHLAA 43, 63, 95, 370, 386, 404, 406, 482, 635, 900				
Phase 6	Dawley Hamlets, Great Dawley, St. Georges and Priorslee	SHLAA 65, 135, 264, 372,732, 909				
	Madeley, Stirchley and Brookside, Hollinswood & Randley, The Gorge	SHLAA 233, 255, 375, 378, 379, 461, 514, 603, 605, 607, 608, 612, 910, 912				
Phase 7						
Phase 8	Newport, Chetwynd Aston & Woodcote	SHLAA 342, 485, 597, 907				

Table 5.1 Allocated sites grouped into suggested development phases

This phasing is simply a suggested recommendation taking into account the opportunities that delaying development in the most constrained sites could offer. If individual sites in constrained areas come forward this is an issue that TWC would need to raise with Severn Trent Water at the earliest opportunity. Figure 5.1 illustrates the order in which sites may best be brought forward starting with sites coloured green, then yellow, then orange. Sites coloured black may not be advisable due to flood risk.



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5.4 Actions, duties, and recommendations

Severn Trent Water is appointed as the water and sewerage undertaker for Telford and Wrekin through an appointment made under the Water Industry Act 1991 and the principal duties of a water and sewerage undertaker are set out in that legislation. Section 37 of that Act places a duty upon a water undertaker to develop and maintain an efficient and economical system of water supply within its area. Similarly Section 94 places a duty upon a sewerage undertaker to provide, improve and extend a system of public sewers to ensure that its area is effectually drained and the contents of those sewers effectually dealt with so that there is no deterioration in environmental performance or increase in sewer flood risk

In order to ensure Severn Trent Water can meet its obligations and plan effectively TWC has responsibilities to communicate confirmed development plans to Severn Trent Water as soon as they are available and in line with the statutory timeline for the development of Water Resource Management Plans. Severn Trent Water has already finalised its Business Plan for the 2014 Periodic Review leading into the implementation period of AMP6. The committed growth should already have been taken into account for this period. The next round of statutory planning will commence in the years leading up to the 2019 Periodic Review, i.e. the main timeframes for providing data on the next phase of growth would be 2017 and 2018, although it is recommended that TWC maintains ongoing dialogue. With regard to the council's 20 year planning horizon, the Council should be prepared to submit development plan data in time for the 2024 and subsequent 2029 Water Resource Management Plans.

Information on development will be used by Severn Trent Water to forecast demand for water and thus develop robust plans to secure the supply-demand balance. More locally however, confirmed data will be used to quantify the impacts on water supply and sewerage infrastructure. This has been done at a high level but advice from the water company is that the investment in detailed modelling is usually only undertaken once development plans are confirmed. The location and quantity of housing (and employment) growth is used by Severn Trent Water to quantify the likely increased volumes of sewage that will drain to each respective wastewater treatment works. The proposed increase is combined with the current demand (measured as Dry Weather Flow, DWF).

Once the forecast new DWF has been calculated, if this exceeds the maximum DWF on the treatment works' discharge consent Severn Trent Water contacts the Environment Agency to request a change to the consent. Before a new discharge consent is granted the Environment Agency will model the impact of the increased volume on the receiving water and calculate revised maximum concentrations for the substances within treated effluent, i.e. phosphates, nitrates, ammonia etc. An increased volume is highly likely to require the concentrations to be reduced in order to continue protecting the water quality in the receiving water. Reduced concentrations typically require further upgrades in terms of the level of treatment applied to the sewage.

The Water Framework Directive requires (as a minimum) that the ecological status of water bodies do not deteriorate, and so even for wastewater treatment works that have substantial headroom within their capacity the Environment Agency will be required to ensure that increasing the volume discharged from a treatment works does not cause deterioration. This could potentially put Severn Trent Water into a very difficult situation where the company may need to spend millions of pounds to deliver the requirements.



- **5.5 Funding considerations**
 - Under the Water Industry Act (1991) the water companies have a duty to provide public water supplies for domestic purposes, and to provide public sewer systems. However, they also have an obligation to manage customer bills by delivering a service that is cost-effective and good value for money. Ofwat is the economic regulator for the water and sewerage industry in England and Wales and the water companies are subject to asset planning controls. Water companies are willing to invest in infrastructure improvements once it is certain that investment is required. The timing of that investment is subject to the Asset Management Planning (AMP) cycles;
 - The Water Services Regulation Authority (Ofwat) is the economic regulator of water and sewerage companies in England and Wales. Severn Trent Water funds its activities via revenue raised from customer bills and the amount it can charge is set by Ofwat during the Periodic Review of prices (price determination). For every five year asset management planning (AMP) cycle, companies submit a business plan to Ofwat. The plans set out each company's view of what it needs to do to maintain its assets, improve services to customers and deal with its impact on the environment. Ofwat makes its pricing decision based on the information submitted in the Water Resource Management Plans and overall Business Plans and its own assessment on what level of investment will represent good value for money for customers. Once the price determination is finalised this sets the investment budget for the Asset Management Pleriod (AMP);
 - Any infrastructure requirements which arise after agreement of the five year AMP will normally be considered for the following AMP period. AMP6 will cover the period 2015 to 2019. Water companies are able to submit interim determinations within the five-year planning cycle to seek additional funding for unforeseen requirements, but most plans should be covered by the normal submission process. This Water Cycle Strategy covers a longer planning period and can therefore inform longer term water company asset planning;
 - When a developer wishes to proceed with a particular site, they can requisition the appropriate water company (or companies if separate for water and wastewater) to provide local network infrastructure in accordance with the relevant provisions of the Act (Section 98 for sewerage and Section 41 for water). Severn Trent Water has previously stated that requisitions are a means for a developer to request that a public sewer be provided to serve their development and that payment would not normally be required to create additional capacity in existing public sewers. However, provisions within the legislation do allow cost to be shared between the developer and water undertaker (via a "Requisition Agreement") if it is demonstrated that there is/was no sewerage problem before development and that a specific development is the sole driver for improved services. For local infrastructure serving more than one development site, it is necessary to share costs equitably between developers. Any infrastructure requirements which arise after agreement of the five year AMP will normally be considered for the following AMP. In the case of a dispute Ofwat has a process for handling disputes and appeals regarding the requisitioning of water mains and public sewers¹⁷
 - Water sewerage undertakers expect that they will only be responsible for removing foul waste from new developed sites as the planning system requires surface water drainage to be managed using SuDS techniques;
 - Detailed hydraulic modelling is required to demonstrate the specific infrastructure improvements that would be needed for a specific development. Water companies are unlikely to pay to model particular



¹⁷ http://www.ofwat.gov.uk/consumerissues/selflay/gud_pro_disappmainsewer.pdf

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sites outside of the Asset Management Planning (AMP) cycle. Developers are unlikely to agree to fund modelling where there is potential for the results to prohibit development;

• All parties require some level of certainty in order to move forward.

5.6 **Policy recommendations**

It is recommended that TWC develops a structured reporting system to track and report developments that are under construction, developments that have been given planning permission, and developments which are still in the application or allocation stage. A structured annual system could tie in with the Annual Monitoring Report but could also be supported with a less formal arrangement for TWC to keep key individuals in Severn Trent Water and the Environment Agency up to date with any significant progress or potentially contentious planning applications. This could be part of the official planning application consultation process, or a less formal more open ongoing dialogue could be established.

5.6.1 Water efficiency requirements in residential and commercial development applications

In addition to maintaining regular dialogue with Severn Trent Water on the progress and rate of growth, TWC also has a responsibility to support Severn Trent Water's water demand assumptions by requiring all new homes are built to suitable levels of water efficiency.

TWC is advised to develop robust policies on water efficiency in new developments (homes and employment sites). The Code for Sustainable Homes is a voluntary initiative which includes technical guidance on how to manage demand for water through sustainable design. Per capita consumption across Telford and Wrekin needs to be effectively managed to a level of around 110 litres per person per day. This is challenging but achievable without requiring measures such as rainwater harvesting. However, all opportunities to encourage reduced demand for mains water should be taken to reduce pressure on very limited water resources in the region.

Part G (Approved Document G) of schedule 1 of the Building Regulations covers the requirements with respect to Water Efficiency (in addition to Sanitation and Hot Water Safety). It incorporates guidance from the 'Water Efficiency Calculator for New Dwellings' which sets out the methodology for calculating the level of water consumption that would be expected under according to the water fittings and fixtures installed in new dwellings18. The Code for Sustainable Homes also uses this calculator as its consumption assessment method. The calculator does not take into account water using behaviours. There are different combinations of water efficiency across different water fittings. Table 5.2 provides an example of good practice water fittings that would achieve the water efficiency requirements without impacting on performance or significantly impacting on costs for the developers:

¹⁸ http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partg/waterefficiency



The water calcu	lator for new dwell	ings			
Installation type	Unit of Measure	Capacity / flow rate (1)	Use Factor (2)	Fixed Use (litres/person/day) (3)	Litres /person/day (4) = [(1)x(2)]+(3)
WC (fixed flush)	Flush volume (litres)		4 42	0.00	0.00
WC (dual flush)	Full flush volume	4.5	1.46	0.00	6.57
	Part flush volume	2.6	2.96	0.00	7.70
	(11100)	2.0	2.00	0.00	1.10
WCs (multiple fittings)	Average effective flushing volume (litres)		4.42	0.00	0.00
Taps (excluding kitchen taps)	Flow rate (litres/min)	4	1.58	1.58	7.90
Bath (where shower also present)	Capacity to overflow (litres)	180	0.11	0.00	19.80
Shower (where bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0.00
Shower only	Flow rate (litres/min)		5.60	0.00	0.00
Kitchen sink taps	Flow rate (litres/min)	7	0.44	10.36	13.44
Washing machine	Litres/kg dry load	6.14	2.10	0.00	12.89
Dishwasher	Litres/place setting	0.67	3.60	0.00	2.41
Waste disposal unit	Litres/use		3.08	0.00	0.00
Water softener	Litres/person/day		1.00	0.00	0.00
	(5)		Total calculate Σ (column 4)	ed use (litres/person/day) =	110.04

Table 5.2 Water consumption levels of fittings and fixtures that will achieve 110 litres /person/day

Since 1990 all new homes automatically have a water meter installed so that customers pay for what they use, disincentivising people to waste water. Nationally about a third of all homes now have a water meter, and the Shelton, and Whitchurch and Wem supply zones are in line with this. However, Severn Trent Water would like to increase its meter penetration across its customer base to help manage demand and TWC is encouraged to take opportunities to promote Severn Trent Water's free metering programme and water efficiency advice to residents across the district. Measures to help occupants in new and existing homes to save water will increase resilience across the whole area



as climate change and environmental objectives limit the amount of water that can be taken from the environment. Similarly Council policies targeting domestic type water consumption in new employment buildings would also increase resilience, and help save companies money as all commercial properties are required to have a water meter and to pay for what they use.

BREEAM¹⁹ "the Building Research Establishment Environmental Assessment Method" is a well-established initiative that sets the standard for best practice in sustainable design and has become the de facto measure used to describe environmental performance of buildings and communities. The BREEAM assessment methodology for offices²⁰ specifies the baseline demands of the individual components in offices and light industrial buildings, and the more water efficient levels at which BREEAM credits can be obtained. By applying these baseline demands to usage factors the average baseline demand per FTE in a B Class building is approximately 36 litres per day (24 per cent of the average daily per capita consumption). By improving the consumption level of individual components demand per FTE can be reduced, e.g. to 20 litres per day, and the water saving benefits maximised across multiple sites. It is recommended that TWC uses BREEAM to specify the sustainability performance requirements for new development applications.

Component	Unit	'Ownership' among FTE	No of Uses per FTE/Day	Baseline water volumes	Baseline litres/ FTE/Day	Reduced water volumes	Reduced litres/ FTE/Day
WC	Effective flush	100 %	3	6	18	4	12
hand basin	l/min	100%	3x15 sec	12	9	4	3
Shower	l/min	10%	1x3 min	14	4.2	8	2.4
Urinal 2+	l/bowl/hr	0.8%*	3	7.5	1.8	1.5	0.36
Kitchen tap	l/min	25%**	1x1min	12	3	6	1.5
Domestic sized dishwasher	l/cycle	6%***	1	17	1.02	13	0.78
Total					35.7		20.0

 Table 5.3
 Demand Components in B Class Developments and FTE Consumption Rates

In many cases domestic-type fittings in commercial properties may be set at slightly lower levels than in households reflecting their basic functional use rather than 'life-style' requirements.

*Up to 60 male FTE per every two urinal installations (British Standard 2006)

**Arbitrary assumption. A quarter of workers use a kitchen tap for one minute.

***Assumes 1 dishwasher load per 15 FTE

 $http://www.breeam.org/breeamGeneralPrint/breeam_non_dom_manual_3_0.pdf$

¹⁹ http://www.breeam.org

²⁰ BREEAM New Construction Non-domestic buildings. Technical Manual 2011 SD 5073 2.0 2011.



5.6.2 Sustainable drainage requirements

TWC is advised to re-examine its policies on surface water management with a view to better integration with guidance on sustainable development, to provide clarity for developers. This work should also include clear policies and requirements for water efficiency in new developments. Example policy wording to supplement what may already be available could include:

All development should minimise its impact on the water situation in the region, and on the natural water cycle. This will protect receiving waters from pollution, minimise the risk of flooding, and be sensitive to the resource constraints in this area.

All development, must where technically feasible:

- i. Incorporate appropriate SUDs techniques into water drainage systems to prevent rainfall run-off draining into public sewers, and to reduce and slow down run-off into watercourses at rates characteristic of the undeveloped site.
- ii. Achieve all of the run-off requirements from both roofs and hard surfaces as set out in the Code for Sustainable Homes or BREEAM 'Surface Water Run Off' credits unless it can be proven that this is not technically feasible or financially viable. Opportunities to utilise rainwater harvesting and surface water attenuation systems (where appropriate) to reduce surface water run-off are advisable.



Appendix A Planning data

Table A1 Development sites per water resource zone and wastewater treatment works

Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
Newport	Newport	SHLAA485	35	Shelton	Newport	A
Newport	Newport	SHLAA907	149	Shelton	Newport	А
Newport	Newport	Newport 1	-	Shelton	Newport	А
Newport	Newport	Newport 2	-	Shelton	Newport	А
Newport	Newport	TWC/2010/0678	1	Shelton	Newport	С
Newport	Newport	TWC/2012/1014	4	Shelton	Newport	С
Newport	Newport	TWC/2010/0378	4	Shelton	Newport	С
Newport	Newport	TWC/2011/0075	1	Shelton	Newport	С
Newport	Newport	TWC/2011/0334	33	Shelton	Newport	С
Newport	Newport	TWC/2011/0930	3	Shelton	Newport	С
Newport	Newport	TWC/2012/0211	2	Shelton	Newport	С
Newport	Newport	TWC/2010/0070	1	Shelton	Newport	С
Newport	Newport	W2003/0872	6	Shelton	Newport	С
Newport	Newport	TWC/2012/0916	12	Shelton	Newport	С
Newport	Newport	TWC/2013/0870	1	Shelton	Newport	С
Newport	Newport	TWC/2014/0085	0	Shelton	Newport	С
Newport	Newport	TWC/2013/0574	1	Shelton	Newport	С
Newport	Newport	TWC/2013/0354	2	Shelton	Newport	С
Newport	Newport	TWC/2013/0214	1	Shelton	Newport	С
Newport	Newport	TWC/2013/0775	6	Shelton	Newport	С
Newport	Newport	TWC/2013/0339	1	Shelton	Newport	С
Newport	Newport	TWC/2014/0069	5	Shelton	Newport	С
Newport	Newport	TWC/2011/0179	30	Shelton	Newport	С
Newport	Newport	TWC/2011/0821	285	Shelton	Newport	С
Newport	Newport	TWC/2013/0777	9	Shelton	Newport	С
Newport	Newport	TWC/2013/0297	85	Shelton	Newport	С
Newport	Newport	TWC/2011/0827	215	Shelton	Newport	С
North Telford	Hadley and Leegomery	SHLAA500	500	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	SHLAA506	50	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 1	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 2	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 3	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 4	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 5	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hadley Park 6	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 1	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 2	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 3	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 4	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 5	-	Shelton	Rushmoor	А



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
North Telford	Hadley and Leegomery	Hortonwood 6	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 7	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 8	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 9	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 10	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 11	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Hortonwood 12	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	North Telford Fringe 16	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Shawbirch 2	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	Preston 17	-	Shelton	Rushmoor	А
North Telford	Hadley and Leegomery	W2010/0004	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2011/0541	100	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0453	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2011/0474	7	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0133	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2011/0949	24	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0493	4	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0401	2	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2011/1039	3	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2010/0297	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0125	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0280	3	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0991	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2012/0473	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0960	1	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0606	68	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0720	170	Shelton	Rushmoor	С
North Telford	Hadley and Leegomery	TWC/2013/0567	14	Shelton	Rushmoor	C
North Telford	Hadley and Leegomery	TWC/2012/0320	185	Shelton	Rushmoor	C
North Telford	Hadley and Leegomery	TWC/2013/0953	1	Shelton	Rushmoor	C
North Telford	Hadley and Leegomery	TWC/2013/0083	209	Shelton	Rushmoor	C
North Telford	Hadley and Leegomery	TWC/2013/1006	1	Shelton	Rushmoor	C
North Telford	Hadley and Leegomery	TWC/2013/0997	9	Shelton	Rushmoor	C
North Telford	Ketlev	SHI AA67	19	Shelton	Rushmoor	A
North Telford	Ketlev	SHI AA525	22	Shelton	Rushmoor	A
North Telford	Ketlev	TWC/2011/0357		Shelton	Rushmoor	C
North Telford	Ketlev	TWC/2010/0586	1	Shelton	Rushmoor	C
North Telford	Ketlev	TWC/2012/0358	2	Shelton	Rushmoor	C
North Telford	Ketlev	TWC/2010/0544	- 1	Shelton	Rushmoor	C
North Telford	Ketlev	TWC/2012/0655	4	Shelton	Rushmoor	C
North Telford	Ketlev	TWC/2011/0992	20	Shelton	Rushmoor	C C
North Telford	Ketlev	TWC/2012/0425	1	Shelton	Rushmoor	C C
North Telford	Ketlev	TWC/2013/0474	1	Shelton	Rushmoor	C C
North Telford	Ketlev	TWC/2013/0722	1	Shelton	Rushmoor	C C
North Telford	Ketley	TWC/2013/0096	334	Shelton	Rushmoor	C C
North Telford	Ketlev	TWC/2013/0738	1	Shelton	Rushmoor	C C
North Telford	Lilleshall, Donnington, and	SHLAA401	40	Shelton	Rushmoor	A



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
North Telford	Lilleshall, Donnington, and	SHLAA508	700	Shelton	Rushmoor	A
North Telford	Muxton Lilleshall, Donnington, and Muxton	SHLAA144	265	Shelton	Rushmoor	A
North Telford	Lilleshall, Donnington, and	SHLAA482	339	Shelton	Rushmoor	A
North Telford	Lilleshall, Donnington, and	SHLAA504	120	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	SHLAA351	106	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	SHLAA901	513	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	SHLAA902	615	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	SHLAA363	10	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	SHLAA658	450	Shelton	Coalport	А
North Telford	Lilleshall, Donnington, and	SHLAA771	10	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	Donnington Wood 1	-	Shelton	Rushmoor	А
North Telford	Lilleshall, Donnington, and	Donnington Wood 2	-	Shelton	Rushmoor	A
North Telford	Lilleshall, Donnington, and	Donnington Wood 3	-	Shelton	Rushmoor	A
North Telford	Lilleshall, Donnington, and	W2009/0542	2	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2010/0063	2	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0803	1	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2012/0416	2	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0942	1	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2012/0032	-3	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2010/0613	8	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0050	1	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0343	25	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0363	2	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2011/0011	8	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2014/0106	3	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0487	1	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0271	8	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0719	4	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0881	5	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/1027	9	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0977	9	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and	TWC/2013/0499	16	Shelton	Rushmoor	С
North Telford	Lilleshall, Donnington, and Muxton	TWC/2014/0008	19	Shelton	Rushmoor	С



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
North Telford	Oakengates	SHLAA164	19	Shelton	Rushmoor	A
North Telford	Oakengates	SHLAA775	14	Shelton	Rushmoor	А
North Telford	Oakengates	SHLAA197	24	Shelton	Rushmoor	А
North Telford	Oakengates	TWC/2012/0764	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2010/0740	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0775	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/1046	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0645	2	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0809	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0937	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0822	2	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0597	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/1060	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0852	2	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2010/0483	2	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2010/0200	23	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0572	2	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2010/0713	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0160	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2013/0222	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2011/0642	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2014/0094	1	Shelton	Coalport	С
North Telford	Oakengates	TWC/2012/0732	1	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2013/0806	53	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0056	39	Shelton	Rushmoor	С
North Telford	Oakengates	TWC/2012/0145	30	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	SHLAA264	30	Shelton	Coalport	А
North Telford	Lilleshall, Donnington, and	SHLAA370	35	Shelton	Rushmoor	А
North Telford	Muxton Lilleshall, Donnington, and Muxton	SHLAA386	1100	Shelton	Coalport	A
North Telford	St. Georges and Priorslee	SA9	-	Shelton	Coalport	А
North Telford	St. Georges and Priorslee	SA10	-	Shelton	Coalport	А
North Telford	St. Georges and Priorslee	TWC/2012/0465	1	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2012/0587	56	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2012/0528	1	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2013/0053	3	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2010/0459	33	Shelton	Coalport	С
North Telford	St. Georges and Priorslee	TWC/2012/0993	1	Shelton	Coalport	С
North Telford	St. Georges and Priorslee	TWC/2012/0530	395	Shelton	Coalport	С
North Telford	St. Georges and Priorslee	TWC/2012/0031	6	Shelton	Coalport	С
North Telford	St. Georges and Priorslee	TWC/2011/0157	13	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2011/0124	1	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2012/0243	2	Shelton	Coalport	С
North Telford	St. Georges and Priorslee	TWC/2013/0235	8	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2013/0883	1	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2010/0581	2	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2013/0560	1	Shelton	Rushmoor	С
North Telford	St. Georges and Priorslee	TWC/2013/0769	600	Shelton	Coalport	С



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
North Telford	Wellington	SHLAA356	20	Shelton	Rushmoor	А
North Telford	Wellington	SHLAA661	44	Shelton	Rushmoor	А
North Telford	Wellington	SHLAA748	221	Shelton	Rushmoor	А
North Telford	Wellington	TWC/2011/0177	2	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0519	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0359	16	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2012/0942	4	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2012/0093	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0714	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2012/0337	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0775	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2011/0842	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0097	12	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0068	2	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2013/0091	4	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0743	2	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2011/0043	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2012/0548	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2012/0432	2	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2013/0032	1	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0089	13	Shelton	Rushmoor	С
North Telford	Wellington	TWC/2010/0220	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/0395	6	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/0547	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2010/0550	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2010/0458	12	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2010/0487	41	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0489	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2010/0773	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/0240	103	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2011/1033	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2011/0302	2	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0635	- 1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2014/0030	0	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0994	2	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0265	- 18	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2014/0088	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0417	2	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/1004	2	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/0872	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2012/0012	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0913	10	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2011/0002	10	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0934	1	Shelton	Rushmoor	C
North Telford	Wellington	TWC/2013/0342	140	Shelton	Ruchmoor	C
North Telford	Wellington	TWC/2013/0330	140	Shelton	Ruchmoor	C
North Telford	Wellington	T\\/C/2011/0247	130	Shelton	Ruchmoor	C
North Tolford	Wrockwarding Mood and	SHI ΔΔ110	4	Shelton	Ruchmoor	۵ ۵
	Trench	SHLARITO	127	Shellon	RUSHINOOL	~



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
North Telford	Wrockwardine Wood and	Hortonwood 13	-	Shelton	Rushmoor	А
North Telford	Trench Wrockwardine Wood and Trench	Hortonwood 14	-	Shelton	Rushmoor	A
North Telford	Wrockwardine Wood and Trench	Hortonwood 15	-	Shelton	Rushmoor	А
North Telford	Wrockwardine Wood and Trench	TWC/2012/0833	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and Trench	TWC/2011/0249	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2011/0434	2	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2011/1065	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2010/0593	5	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2011/0127	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2010/0764	3	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2012/0191	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2012/0862	4	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2013/0642	2	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2013/0448	10	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2013/0816	2	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2013/0773	1	Shelton	Rushmoor	С
North Telford	Wrockwardine Wood and	TWC/2012/0824	6	Shelton	Rushmoor	С
South Telford	Dawley Hamlets	SHLAA372	78	Shelton	Coalport	А
South Telford	Dawley Hamlets	SHLAA65	89	Shelton	Coalport	А
South Telford	Dawley Hamlets	SHLAA135	28	Shelton	Coalport	А
South Telford	Dawley Hamlets	TWC/2011/0408	2	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2012/0301	1	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2010/0577	1	Shelton	Rushmoor	С
South Telford	Dawley Hamlets	TWC/2010/0288	26	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2010/0619	1	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2010/0093	9	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2010/0524	4	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2012/0784	2	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2011/0171	0	Shelton	Coalport	С
South Telford	Dawley Hamlets	TWC/2011/0107	- 1	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2010/0607	8	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2011/0186	6	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2011/0187	15	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2011/0993	10	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2013/0106	8	Shelton	Coalport	C
South Telford	Dawley Hamlets	TWC/2013/0259	2	Shelton	Coalport	C
South Tolford	Dawley Hamlets	TWC/2013/0259	460	Shelton	Coalport	C
South Tolford	Dawley Hamlets	TMC/2012/0000	400	Shelton	Coolcort	C C
South Tellord	Dawley Hamlets	TWC/2012/0920	200	Sholton	Coalport	C
South Telford	Croat Dowley		100	Shelten	Coalport	<u>ر</u>
South Tellord			315	Shelten	Coalport	~
Sourr renord	Great Dawley	SULAAAAA	180	SHEILUH	Coaiport	A



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
South Telford	Great Dawley	CTAAP SA2	-	Shelton	Coalport	А
South Telford	Great Dawley	CTAAP SA3	-	Shelton	Coalport	А
South Telford	Great Dawley	CTAAP SA12	-	Shelton	Coalport	А
South Telford	Great Dawley	W2008/0302	8	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2010/0235	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2010/0283	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0041	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0605	2	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0711	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0775	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2012/0185	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0170	14	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2013/0017	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2010/0513	11	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2010/0036	342	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2012/0514	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2012/0867	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2012/0256	2	Shelton	Rushmoor	С
South Telford	Great Dawley	TWC/2011/0185	15	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0070	2	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0053	6	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2012/0781	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2013/0986	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2011/0061	1	Shelton	Coalport	С
South Telford	Great Dawley	W2007/1254	45	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2013/0092	7	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2013/0756	1	Shelton	Coalport	С
South Telford	Great Dawley	TWC/2013/0592	165	Shelton	Coalport	С
South Telford	Hollinswood and Randlay	SHLAA379	256	Shelton	Coalport	А
South Telford	Hollinswood and Randlay	Nedge Hill 1	-	Shelton	Coalport	А
South Telford	Hollinswood and Randlay	W2009/0326	12	Shelton	Coalport	С
South Telford	Hollinswood and Randlay	TWC/2014/0047	2	Shelton	Coalport	С
South Telford	Lawley and Overdale	SHLAA95	35	Shelton	Coalport	А
South Telford	Lawley and Overdale	SHLAA63	24	Shelton	Coalport	А
South Telford	Lawley and Overdale	SHLAA445	80	Shelton	Rushmoor	А
South Telford	Lawley and Overdale	SHLAA569	183	Shelton	Rushmoor	А
South Telford	Lawley and Overdale	SHLAA591	114	Shelton	Rushmoor	А
South Telford	Lawley and Overdale	SHLAA613	38	Shelton	Rushmoor	А
South Telford	Lawley and Overdale	SHLAA671	26	Shelton	Coalport	А
South Telford	Lawley and Overdale	SHLAA908	157	Shelton	Rushmoor	А
South Telford	Lawley and Overdale	Central Telford 2	-	Shelton	Coalport	А
South Telford	Lawley and Overdale	SA4	-	Shelton	Coalport	А
South Telford	Lawley and Overdale	SA5	-	Shelton	Coalport	А
South Telford	Lawley and Overdale	TWC/2010/0502	20	Shelton	Rushmoor	С
South Telford	Lawley and Overdale	TWC/2012/0753	1	Shelton	Rushmoor	С
South Telford	Lawley and Overdale	TWC/2012/0890	1	Shelton	Coalport	С
South Telford	Lawley and Overdale	TWC/2011/0435	1	Shelton	Coalport	С
South Telford	Lawley and Overdale	TWC/2011/0979	80	Shelton	Rushmoor	С



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
South Telford	Lawley and Overdale	TWC/2011/0488	178	Shelton	Rushmoor	С
South Telford	Lawley and Overdale	TWC/2014/0182	0	Shelton	Rushmoor	С
South Telford	Lawley and Overdale	TWC/2013/0034	75	Shelton	Coalport	С
South Telford	Lawley and Overdale	W2004/0980	2521	Shelton	Rushmoor	С
South Telford	Lawley and Overdale	TWC/2012/0419	232	Shelton	Rushmoor	С
South Telford	Madeley	SHLAA233	40	Shelton	Coalport	А
South Telford	Madeley	SHLAA255	25	Shelton	Coalport	А
South Telford	Madeley	SHLAA461	44	Shelton	Coalport	А
South Telford	Madeley	SHLAA514	133	Shelton	Coalport	А
South Telford	Madeley	SHLAA910	25	Shelton	Coalport	А
South Telford	The Gorge	SHLAA378	148	Shelton	Coalport	А
South Telford	Madeley	Halesfield 1	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 2	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 3	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 4	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 5	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 6	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 7	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 8	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 9	-	Shelton	Coalport	А
South Telford	Madeley	Halesfield 10	-	Shelton	Coalport	А
South Telford	Madeley	TWC/2011/0683	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2010/0065	7	Shelton	Coalport	С
South Telford	Madeley	TWC/2012/0537	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2012/0887	29	Shelton	Coalport	С
South Telford	Madeley	TWC/2011/1032	3	Shelton	Coalport	С
South Telford	Madeley	TWC/2010/0629	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2011/0894	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2011/0911	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2013/0019	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2012/0739	2	Shelton	Coalport	С
South Telford	Madeley	W2009/0051	125	Shelton	Coalport	С
South Telford	Madeley	TWC/2013/0060	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2010/0259	23	Shelton	Coalport	С
South Telford	Madeley	TWC/2012/0064	4	Shelton	Coalport	С
South Telford	Madeley	TWC/2013/0583	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2013/0920	1	Shelton	Coalport	С
South Telford	Madelev	TWC/2013/0190	7	Shelton	Coalport	С
South Telford	Madelev	TWC/2013/0145	1	Shelton	Coalport	С
South Telford	Madeley	TWC/2012/0609	87	Shelton	Coalport	C
South Telford	Madeley	TWC/2013/0667	11	Shelton	Coalport	C
South Telford	Madeley	TWC/2013/0010	31	Shelton	Coalport	С
South Telford	Madelev	TWC/2013/0917	2	Shelton	Coalport	С
South Telford	Stirchley and Brookside	SHLAA605	139	Shelton	Coalport	A
South Telford	Stirchley and Brookside	SHLAA607	185	Shelton	Coalport	A
South Telford	Stirchley and Brookside	SHLAA608	116	Shelton	Coalport	A
South Telford	Stirchley and Brookside	SHLAA612	123	Shelton	Coalport	A
South Telford	Stirchley and Brookside	TWC/2012/0778	-23	Shelton	Coalport	С



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
South Telford	Stirchley and Brookside	TWC/2010/0708	2	Shelton	Coalport	С
South Telford	Stirchley and Brookside	TWC/2013/0801	18	Shelton	Coalport	С
South Telford	Stirchley and Brookside	TWC/2013/0808	37	Shelton	Coalport	С
South Telford	The Gorge	SHLAA375	120	Shelton	Coalport	А
South Telford	The Gorge	SHLAA603		Shelton	Coalport	А
South Telford	The Gorge	TWC/2012/0485	1	Shelton	Coalport	С
South Telford	The Gorge	TWC/2011/0500	37	Shelton	Coalport	С
South Telford	The Gorge	TWC/2011/0506	44	Shelton	Coalport	С
South Telford	The Gorge	TWC/2011/0301	2	Shelton	Coalport	С
South Telford	The Gorge	TWC/2012/0815	5	Shelton	Coalport	С
South Telford	The Gorge	TWC/2011/0505	1	Shelton	Coalport	С
South Telford	The Gorge	TWC/2012/0851	1	Shelton	Coalport	С
South Telford	The Gorge	TWC/2013/0665	2	Shelton	Coalport	С
South Telford	The Gorge	W2002/0392	343	Shelton	Coalport	С
South Telford	The Gorge	W2009/0716	2	Shelton	Coalport	С
South Telford	The Gorge	TWC/2013/0902	23	Shelton	Coalport	С
South Telford	The Gorge	TWC/2011/1102	90	Shelton	Coalport	С
Rural	Chetwynd	SHLAA45	32	Shelton	Sambrook	A
Rural	Chetwynd Aston and Woodcote	TWC/2013/0074	1	Shelton	Newport	С
Rural	Chetwynd Aston and Woodcote	TWC/2011/0871	350	Shelton	Newport	С
Rural	Chetwynd	SHLAA342	90	Shelton	Newport	A
Rural	Chetwynd	SHLAA597	51	Shelton	Newport	С
Rural	Chetwynd	TWC/2013/0625	1	Shelton	Sambrook	С
Rural	Ercall Magna	SHLAA8*	52	Whitchurch & Wem	High Ercall	A
Rural	Ercall Magna	SHLAA434	40	Whitchurch &	High Ercall	A
Rural	Ercall Magna	SHLAA523	10	Whitchurch & Wem	High Ercall	А
Rural	Ercall Magna	W2008/0059	7	Whitchurch & Wem	Rushmoor	С
Rural	Ercall Magna	TWC/2012/0314	4	Whitchurch & Wem	High Ercall	С
Rural	Ercall Magna	TWC/2013/0140	1	Whitchurch & Wem	Ellerdine	С
Rural	Ercall Magna	TWC/2013/0924	0	Whitchurch & Wem	Ellerdine	С
Rural	Rodington	SHLAA353	12	Whitchurch & Wem	Monkmoor	A
Rural	Rodington	SHLAA354	16	Whitchurch & Wem	Monkmoor	A
Rural	Rodington	SHLAA716	33	Whitchurch & Wem	Monkmoor	A
Rural	Rodington	SHLAA751	51	Whitchurch & Wem	Monkmoor	A
Rural	Rodington	W2010/0017	1	Whitchurch & Wem	Rushmoor	С
Rural	Rodington	TWC/2012/0504	2	Whitchurch & Wem	Monkmoor	С
Rural	Rodington	TWC/2011/0959	2	Whitchurch & Wem	Rushmoor	С
Rural	Rodington	TWC/2012/0975	1	Whitchurch & Wem	Sugdon	С
Rural	Tibberton and Cherrington	SHLAA457	50	Shelton	Edgmond	А
Rural	Tibberton and Cherrington	SHLAA509	37	Shelton	Edgmond	А
Rural	Tibberton and Cherrington	SHLAA580	28	Shelton	Edgmond	А



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
Rural	Tibberton and Cherrington	SHLAA582	38	Shelton	Edgmond	A
Rural	Tibberton and Cherrington	SHLAA583	25	Shelton	Edgmond	А
Rural	Tibberton and Cherrington	SHLAA734	34	Shelton	Edgmond	А
Rural	Tibberton and Cherrington	SHLAA552	14	Shelton	Edgmond	А
Rural	Tibberton and Cherrington	TWC/2010/0688	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2011/0015	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2012/0295	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2012/0207	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2013/0379	2	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2013/0172	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2013/0081	1	Shelton	Edgmond	С
Rural	Tibberton and Cherrington	TWC/2012/0961	10	Shelton	Edgmond	С
Rural	Waters Upton	SHLAA43	24	Whitchurch &	Waters	А
Rural	Waters Upton	SHLAA404	25	Wem Whitchurch &	Upton Waters	A
Rural	Waters Upton	SHLAA406	43	Whitchurch &	Waters	А
Rural	Waters Upton	SHLAA635	60	Wern Whitchurch &	Waters	А
Rural	Waters Upton	SHLAA900	130	Whitchurch & Wem	Crudgington	А
Rural	Waters Upton	Rural Area 1	-	Whitchurch & Wem	Crudgington	А
Rural	Waters Upton	W2007/0986	1	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	W2010/0053	1	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	W2008/0619	12	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	TWC/2011/0923	2	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	TWC/2013/0036	1	Whitchurch & Wem	Crudgington	С
Rural	Waters Upton	TWC/2013/0711	1	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	TWC/2011/0746	1	Whitchurch & Wem	Waters Upton	С
Rural	Waters Upton	TWC/2011/0575	8	Whitchurch &	Waters	С
Rural	Waters Upton	TWC/2013/0338	1	Whitchurch & Wem	Waters	С
Rural	Waters Upton	TWC/2013/0332	1	Whitchurch & Wem	Waters	С
Rural	Waters Upton	TWC/2013/0685	5	Whitchurch & Wem	Waters Upton	С
Rural	Wrockwardine	SHLAA380	56	Shelton	Rushmoor	А
Rural	Wrockwardine	SHLAA487	106	Shelton	Rushmoor	А
Rural	Wrockwardine	SHLAA694	500	Shelton	Rushmoor	А
Rural	Wrockwardine	TWC/2013/0033	5	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2011/0745	2	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2012/0895	2	Shelton	Walcot	С
Rural	Wrockwardine	TWC/2011/0390	1	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2012/0023	1	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2013/0436	1	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2013/0247	6	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2014/0065	2	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2013/0879	1	Shelton	Walcot	С



Area	Parish	Sites	Dwellings	WRZ	WwTW	Committed / Allocated
Rural	Wrockwardine	TWC/2013/0886	9	Shelton	Rushmoor	С
Rural	Wrockwardine	TWC/2013/0867	1	Shelton	Walcot	С
	Eyton upon the Weald Moors CP	W2010/0076	1	Shelton	Rushmoor	С
	Eyton upon the Weald Moors CP	TWC/2013/0252	1	Shelton	Rushmoor	С
	Kynnersley CP	TWC/2012/0355	3	Shelton	Rushmoor	С
	Little Wenlock CP	TWC/2012/0359	1	Shelton	Coalport	С
	Preston upon the Weald Moors CP	TWC/2010/0413	2	Shelton	Rushmoor	С

Final Appendix A





Appendix B Development Sites Superficial Deposits and SPZ

Area	Parish	Sites	Superficial Deposits	WCS Permeability	SPZ
Newport	Newport	SHLAA485	Sand and gravel	High	3
		SHLAA907	Clay, silt, sand, and gravel	Medium	3
		Newport 1	Sand and gravel	High	3
		Newport 2	Sand and gravel	High	3
North	Hadley and	SHLAA500	Sand and gravel	High	0
lefford	Leegomery	SHLAA506	Sand and gravel	High	0
		Hadley Park 1	Sand and gravel	High	0
		Hadley Park 2	Clay and silt	Low	0
		Hadley Park 3	Sand and gravel	High	0
		Hadley Park 4	Sand and gravel	High	0
		Hadley Park 5	Clay and silt	Low	0
		Hadley Park 6	Clay and silt	Low	0
		Hortonwood 1	Diamicton	Medium	0
		Hortonwood 2	Diamicton	Medium	0
		Hortonwood 3	Diamicton	Medium	0
		Hortonwood 4	Clay, silt, sand, and gravel	Medium	0
		Hortonwood 5	Diamicton	Medium	0
		Hortonwood 6	Diamicton	Medium	0
		Hortonwood 7	Diamicton	Medium	0
		Hortonwood 8	Sand and gravel	High	0
		Hortonwood 9	Sand and gravel	High	0
		Hortonwood 10	Diamicton	Medium	0
		Hortonwood 11	Diamicton	Medium	0
		Hortonwood 12	Clay, silt, sand, and gravel	Medium	3
		North Telford Fringe 16	Clay and silt	Low	0
		Shawbirch 2	Sand and gravel	High	0
		Preston 17	Clay and silt	Low	0
	Ketley	SHLAA67	Diamicton	Medium	0
		SHLAA525	Diamicton	Medium	0



Area	Parish	Sites	Superficial Deposits	WCS Permeability	SPZ
	Lilleshall, Donnington, and Muxton	SHLAA401	Diamicton	Medium	3
		SHLAA508	Sand and gravel	High	2
		SHLAA144	Sand and gravel	High	2
		SHLAA482	Clay and silt	Low	2
		SHLAA504	Sand and gravel	High	2
		SHLAA351	Sand and gravel	High	2
		SHLAA901	Sand and gravel	High	2
		SHLAA902	Clay and silt	Low	2
		SHLAA363	Unknown	Unknown	0
		SHLAA658	Diamicton	Medium	0
		SHLAA771	Unknown	Unknown	0
		Donnington Wood 1	Unknown	Unknown	0
		Donnington Wood 2	Diamicton	Medium	0
		Donnington Wood 3	Diamicton	Medium	0
	Oakengates	SHLAA164	Diamicton	Medium	3
		SHLAA775	Unknown	Unknown	0
		SHLAA197	Sand and gravel	High	0
	St. Georges and Priorslee	SHLAA264	Unknown	Unknown	0
		SHLAA370	Unknown	Unknown	0
		SHLAA386	Diamicton	Medium	0
	Wellington	SHLAA356	Diamicton	Medium	1
		SHLAA661	Diamicton	Medium	0
		SHLAA748	Sand and gravel	High	0
	Wrockwardine Wood and Trench	SHLAA118	Diamicton	Medium	3
		Hortonwood 13	Sand and gravel	High	0
		Hortonwood 14	Sand and gravel	High	0
		Hortonwood 15	Sand and gravel	High	3
South	Dawley Hamlets	SHLAA372	Diamicton	Medium	0
renord		SHLAA65	Diamicton	Medium	0
		SHLAA135	Unknown	Unknown	0
	Great Dawley	SHLAA732	Diamicton	Medium	0
		SHLAA909	Diamicton	Medium	0
		CTAAP SA2	Diamicton	Medium	0



Area	Parish	Sites	Superficial Deposits	WCS Permeability	SPZ
		CTAAP SA3	Diamicton	Medium	0
		CTAAP SA12	Diamicton	Medium	0
	Hollinswood and	SHLAA379	Diamicton	Medium	0
	Kanulay	Nedge Hill 1	Diamicton	Medium	0
	Lawley and Overdale	SHLAA95	Diamicton	Medium	0
		SHLAA63	Diamicton	Medium	0
		SHLAA445	Diamicton	Medium	0
		SHLAA569	Diamicton	Medium	0
		SHLAA591	Diamicton	Medium	0
		SHLAA613	Diamicton	Medium	0
		SHLAA671	Diamicton	Medium	0
		SHLAA908	Diamicton	Medium	0
		Central Telford 2	Diamicton	Medium	0
	Madeley	SHLAA255	Unknown	Unknown	0
		SHLAA233	Diamicton	Medium	0
		SHLAA255	Unknown	Unknown	0
		SHLAA461	Diamicton	Medium	0
		SHLAA514	Diamicton	Medium	0
		SHLAA910	Diamicton	Medium	0
		SHLAA378	Diamicton	Medium	0
		Halesfield 1	Diamicton	Medium	0
		Halesfield 2	Diamicton	Medium	0
		Halesfield 3	Diamicton	Medium	0
		Halesfield 4	Diamicton	Medium	0
		Halesfield 5	Diamicton	Medium	0
		Halesfield 6	Sand and gravel	High	0
		Halesfield 7	Diamicton	Medium	0
		Halesfield 8	Diamicton	Medium	0
		Halesfield 9	Diamicton	Medium	0
		Halesfield 10	Diamicton	Medium	0
	Stirchley and Brookside	SHLAA605	Diamicton	Medium	0
		SHLAA607	Diamicton	Medium	0
		SHLAA608	Diamicton	Medium	0



Area	Parish	Sites	Superficial Deposits	WCS Permeability	SPZ
		SHLAA612	Diamicton	Medium	0
	The Gorge	SHLAA375	Diamicton	Medium	0
		SHLAA603	Diamicton	Medium	0
Rural	Chetwynd Aston and Woodcote	SHLAA45	Diamicton	Medium	3
	Chetwynd	SHLAA342	Unknown	Unknown	2
		SHLAA597	Unknown	Unknown	2
	Ercall Magna	SHLAA8*	Clay and silt	Low	3
		SHLAA434	Sand and gravel	High	0
		SHLAA523	Unknown	Unknown	0
	Rodington	SHLAA353	Sand and gravel	High	0
		SHLAA354	Sand and gravel	High	0
		SHLAA716	Sand and gravel	High	0
		SHLAA751	Sand and gravel	High	0
	Tibberton and Cherrington	SHLAA457	Diamicton	Medium	2
		SHLAA509	Diamicton	Medium	2
		SHLAA580	Diamicton	Medium	2
		SHLAA582	Diamicton	Medium	2
		SHLAA583	Diamicton	Medium	2
		SHLAA734	Diamicton	Medium	2
		SHLAA552	Diamicton	Medium	2
	Waters Upton	SHLAA43	Diamicton	Medium	3
		SHLAA404	Sand and gravel	High	0
		SHLAA406	Unknown	Unknown	3
		SHLAA635	Unknown	Unknown	3
		SHLAA900	Sand and gravel	High	1
		Rural Area 1	Sand and gravel	High	1
	Wrockwardine	SHLAA380	Sand and gravel	High	0
		SHLAA487	Sand and gravel	High	0
		SHLAA694	Sand and gravel	High	1

0 = No SPZ designation; 1 = Total Catchment SPZ; 2 = Outer SPZ; 3 = Inner SPZ



Appendix C Stages of wastewater treatment

Background summary information setting out the stages of wastewater treatment. Available at: http://www.stwater.co.uk/upload/pdf/treatment_of_sewage.pdf

Final Appendix C





Appendix D Love your River Telford

A number of organisations are working together to improve the water environment in Telford under the common banner of 'Love Your River Telford'. Active members include the EA, Shropshire Wildlife Trust, Severn Trent Water and Telford and Wrekin Council. There are others also represented on the steering group including Severn Rivers Trust, The Business Environmental Support Scheme for Telford (BESST), Severn Gorge Countryside Trust, Telford Green Spaces Partnership, The Strine Internal Drainage Board, Natural England, University of Wolverhampton, and the National Farmers Union. The main aim of LYR Telford is to get these groups to work more efficiently together to improve water quality and habitat for the wildlife and people of Telford²⁰.

There is ongoing work that the Council and other parties are already engaged with but several other 'projects' are proposed that are yet to get underway, including a number of specific sustainable drainage schemes.

²⁰ http://www.connectright.org.uk/local/midlands

Final Appendix D



Love your river Telford – Whole catchment approach

Current and proposed work



Pollution prevention campaign to build on previous campaigns and target industries such as hand **MIS-CONNECTIONS** – Working with Housing Associations to reduce mis-connections within **COMMUNITY ENGAGEMENT –** Working with Waterside Care to equip local groups with the tools required to take ownership of MIS CONNECTIONS - Misconnections campaign -Including a multi agency "zap" team to locate and address misconnectioons, community engagement to raise awareness and equipping local groups to **INDUSTRY** - Telford BESST -Industry led group attempting to improve the environmental performance of industry in Telford **PARTNERSHIP -** Love your river Telford group set up with all relevant partners to co-ordinate the water quality work in the town **COMMUNITY ENGAGEMENT -**Water Quality school education programme to be rolled out to the SuDs - Complete a SuDs modelling exercise to locate **INDUSTRY / POLLUTION PREVENTION** - Blue Business Accrediation Scheme - awarded to those businesses who have fully considered pollution prevention and water efficiency **COMMUNITY ENGAGEMENT /** WATER QUALITY - Community Led - Reservoir (balancing lakes) water quality monitoring connected to the current routine inspection programme.

COMMUNITY ENGAGEMENT – Attend town events and use media to highlight the issues within the town and encourage community involvement in sorting them out.

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