Drainage and Wastewater Management Plan

Tunbridge Wells South Wastewater System Plan

from Southern Water

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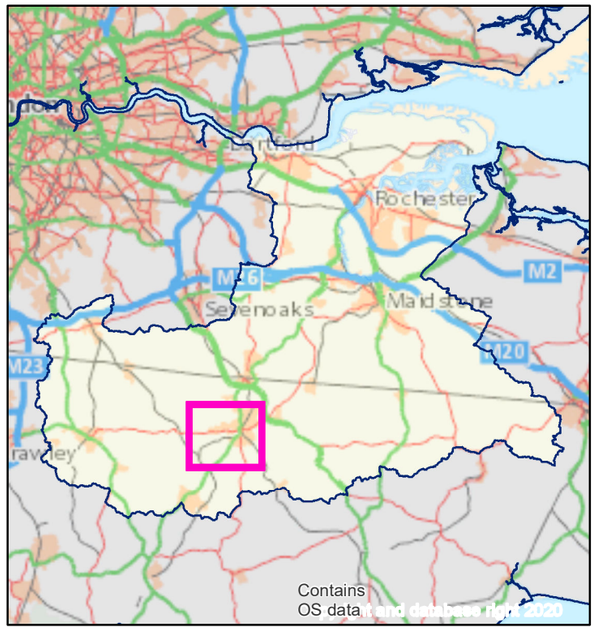
Tunbridge Wells South wastewater system: map and key facts



Population Equivalent (PE)	**29,800**
Discharge Waterbody	**Grom**
Number of Pumping Stations	**35**
Number of Overflows	**5**
Length of Sewer (km)	**259.2**
Catchment Reference	**TUWS**

BRAVA Results Table			
	Planning Objective	**2020**	**2050**
1	Internal Sewer Flooding Risk	1	
2	Pollution Risk	2	
3	Sewer Collapse Risk	2	
4	Risk of Sewer Flooding in a 1 in 50 year storm	2	2
5	Storm Overflow performance	2	2
6	Risk of WTW Compliance Failure	0	0
7	Risk of flooding due to Hydraulic Overload	2	2
8	Dry Weather Flow Compliance	1	2
9	Good Ecological Status / Potential	0	
10	Surface Water Management	1	
11	Nutrient Neutrality	NA	NA
12	Groundwater Pollution	0	
13	Bathing Waters	NA	
14	Shellfish Waters	NA	

Drivers of Risks

- Customer
- Hydraulics
- Operational
- Quality
- Unknown

Catchment Strategy: IMPROVE

TUNBRIDGE WELLS SOUTH WTW

0 0.3 0.6 1.2 1.8 2.4 Kilometers

Problem Characterisation
Tunbridge Wells South (TUWS)

This document describes the causes of the risks identified by the Baseline Risk and Vulnerability Assessment (BRAVA). The BRAVA results for this catchment are summarised in Table 1. The results indicate that flooding, pollution and water quality are the main concerns in this wastewater catchment. We have completed risk assessments for 2050 where we have the data and tools available to do so. For the other planning objectives, we will explore how we can predict future risks for the next cycle of DWMPs. All the risk assessment methods need to be reviewed after the first DWMPs have been produced with a view to improve the methods and data for future planning cycles.

Table 1: Results of the BRAVA for Tunbridge Wells South wastewater system

Planning Objectives		2020	Driver	2050
1	Internal Sewer Flooding Risk	1	Customer	
2	Pollution Risk	2	Operational	
3	Sewer Collapse Risk	2	Operational	
4	Sewer Flooding in a 1 in 50-year storm	2	Hydraulic	2
5	Storm Overflow Performance	2	Hydraulic	2
6	WTW Water Quality Compliance	0	-	0
7	Flooding due to Hydraulic Overload	2	Hydraulic	2
8	WTW Dry Weather Flow Compliance	1	Quality	2
9	Good Ecological Status / Good Ecological Potential	0	-	
10	Surface Water Management	1	Hydraulic	
11	Nutrient Neutrality	NA	-	NA
12	Groundwater Pollution	0	-	
13	Bathing Waters	NA	-	
14	Shellfish Waters	NA	-	

Key

BRAVA Risk Band	
NA	Not Applicable*
0	Not Significant
1	Moderately Significant
2	Very Significant

*No issues relevant to planning objective within Wastewater System

Catchment Investment Strategy

The risks identified in this wastewater catchment mean that we have assigned the following investment strategy:

Improve

This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address current performance issues (and consider future risks when implementing improvements).

Planning Objective 1: Internal Sewer Flooding Risk

The number of internal sewer flooding incidents reported during the three years considered by the risk assessment are shown in Figure 1. The total number of connections in this wastewater system means there have been between 1.68 and 3.35 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'moderately significant' band.

The primary driver for internal sewer flooding in this wastewater system is 'Customer'. Blockages caused 50% of all incidents recorded in this wastewater system. Blockages are often caused by fats, oils, grease, nappies, wet wipes and sanitary products within the system. These items are non-flushable and should not be disposed of into wastewater systems.

Figure 1: Number of internal flooding incidents per annum and causes

Blockage 50%

Pumping Station/ Treatment Work issue 20%

Sewer / Rising Main issue 0%

Hydraulic Overload 30%

Cause could not be Identified 0%

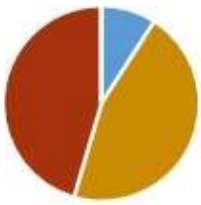
2017/18	2018/19	2019/20
4	4	2

Planning Objective 2: Pollution Risk

The number of pollution incidents reported during the three years considered by the risk assessment are shown in Figure 2. The length of sewer in this wastewater system means there have been more than 49.01 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.

The primary driver for pollution is 'Operational' due to asset operational issues. Asset operational issues at our pumping stations and treatments works are the main cause of incidents, contributing to 45% of all incidents recorded in this wastewater system.

Figure 2: Number of pollution incidents per annum and causes



Blockage 9%

Pumping Station/ Treatment Work issue 45%

Sewer / Rising Main issue 45%

Hydraulic Overload 0%

Cause could not be Identified 0%

2017	2018	2019
5	0	6

Planning Objective 3: Sewer Collapse Risk

The number of sewer collapses reported during the three years considered by the risk assessment are shown in Table 2. The length of sewer in this wastewater system means there have been more then 9.44 incidents per 1,000km per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.

Table 2: Sewer collapses and rising main bursts

Sewer Collapse	2017/18	4
	2018/19	1
	2019/20	3
Rising Main Bursts	2017/18	4
	2018/19	2
	2019/20	1

The primary driver is 'Operational' as the cause of these collapses and bursts is due to the age and condition of the sewers.

Planning Objective 4: Sewer Flooding in a 1 in 50 Year Storm

The risk of flooding in a 1 in 50 year storm is very significant in 2020 and 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 2500 - 2600 properties within this wastewater system are in areas that could flood by water escaping from sewers. This model prediction increases the number of properties in areas at risk from flooding to approximately 3500 - 3600 by 2050.

Our wastewater networks are generally designed with capacity for up to a 1 in 30 year storm, hence flooding is expected to occur during more severe storms such as a 1 in 50 year event. Flooding will occur due to insufficient capacity of the drainage system either on the surface before it enters the drainage system, and/or from manholes, in people's homes or at a low point elsewhere in the system.

Planning Objective 5: Storm Overflow Performance

The storm overflow performance risk has been assessed as very significant for both 2020 and 2050. Table 3 shows the overflows that discharge above the low threshold set for storm overflow discharges to Shellfish Water, Bathing Water and inland rivers.

The primary driver for the Storm Overflow Performance is 'Hydraulic.'

Table 3: Overflows exceeding discharge frequency threshold per annum

	Number of overflows		Threshold for number of discharges per annum		
	2020	2050	Low	Medium	High
Shellfish Waters	0 Medium	0 Medium	Less than 8	Between 8-10	10 or more
Bathing Waters	0 Medium	0 Medium	Less than 3	Between 3-10	10 or more
Freshwater	1 High	1 High	Less than 20	Between 20-40	40 or more

Planning Objective 6: Wastewater Treatment Works Water Quality Compliance

The risk of non-compliance with our wastewater quality permit has been assessed as not significant for both 2020 and 2050. This is because the wastewater treatment works has no record of compliance failure during the last three years (2018-2020).

Planning Objective 7: Flooding due to Hydraulic Overload

This is an assessment of the risk of flooding from sewers during a 1 in 30 year storm, and more frequent rainfall, to understand where flooding could occur. The risk of sewer flooding due to hydraulic overload is very significant in 2020 and 2050. The annualised number of properties in areas at risk of flooding is shown in Table 4.

Table 4: Annualised number of properties at risk per 10,000 connections.

Rainfall Return Period (yr)	Number of Properties at Risk		Annualised per 10,000 connections	
	2020	2050	2020	2050
1 in 1	401	513	253	324
1 in 2	489	667	192	262
1 in 5	965	925	175	168
1 in 10	1458	1969	139	187
1 in 20	1874	2594	91	127
1 in 30	2187	2968	72	97
Total Annualised			**923**	**1166**

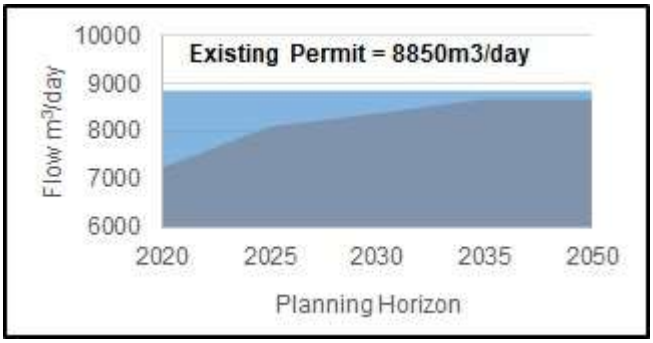
This indicates that the existing capacity of the wastewater network can already be exceeded during 1 in 30 year storms (or more frequent events).

Planning Objective 8: Wastewater Treatment Works Dry Weather Flow Compliance

The risk of Wastewater Treatment Works Dry Weather Flow Compliance is moderately significant for 2020 but is predicted to increase to very significant in 2050. This is because the average annual dry weather flow for 2017, 2018 and 2019 has been between 80% and 100% of the current permit, shown in Figure 3. This is because the predicted DWF in 2050 is expected to exceed the current permit.

The primary driver is 'Quality' due to the permit and capacity at the treatment work.

Figure 3: Recorded and predicted dry weather flow with existing permit



Planning Objective 9: Good Ecological Status / Good Ecological Potential

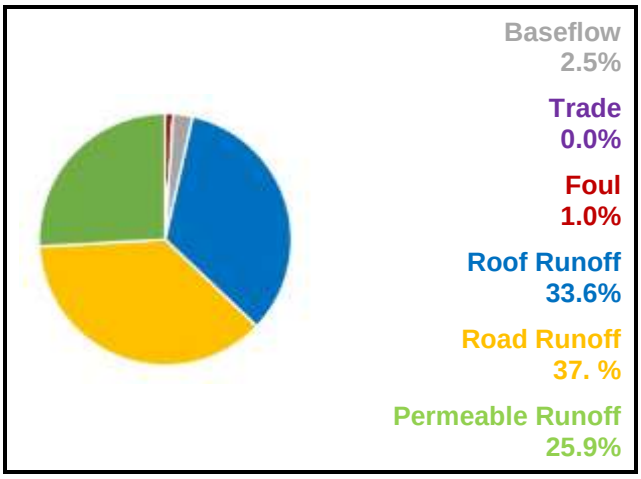
This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

Planning Objective 10: Surface Water Management

Our initial high level assessment indicated that there is moderately significant interaction between surface water flooding and flooding from sewers in this wastewater system.The cause of this localised flooding is the capacity of the drainage network in these areas to convey both wastewater and surface water run-off.

Figure 4 illustrates the sources of water flowing in the wastewater system during a 1 in 20 year storm. It shows that surface water runoff from roofs, road and permeable surfaces constitutes more than 96.5% of the flow in the sewers. The total contribution of foul water from homes is 1.0%The baseflow is infiltration from water in the ground and makes up 2.5% of the flow in the system.

Figure 4: Sources of water flowing in sewers during a 1 in 20 year storm



Planning Objective 11: Nutrient Neutrality

This wastewater system is not hydraulically linked to Habitat Sites noted as under threat by Natural England.

Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is not significant. This is because the wastewater network in this wastewater system does not overlap with any groundwater Source Protection Zones (SPZ) used for water supply.

Planning Objective 13: Bathing Waters

This wastewater system does not discharge into a designated bathing water.

Planning Objective 14: Shellfish Waters

The discharges from this wastewater system do not impact on any designated shellfish waters.

Southern Water
August 2021
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Generic Options Assessment for: Tunbridge Wells South (TUWS)

Planning Objectives		2020	Driver	2050
PO1	Internal Flooding	1	Customer	-
PO2	Pollution Risk	2	Operational	-
PO3	Sewer Collapse	2	Operational	-
PO4	Risk of Sewer Flooding in 1 in 50 yr	2	Hydraulic	2
PO5	Storm Overflow Performance	2	Hydraulic	2
PO6	Risk of WTW Compliance Failure	0	-	0
PO7	Annualised Flood Risk/Hydraulic Overload	2	Hydraulic	2
PO8	DWF Compliance	1	Quality	2
PO9	Achieve Good Ecological Status	0	-	-
PO10	Improve Surface Water Management	1	Hydraulic	-
PO11	Secure Nutrient Neutrality	NA	-	NA
PO12	Reduce Groundwater Pollution	0	-	-
PO13	Improve Bathing Water Quality	NA	-	-
PO14	Improve Shellfish Water Quality	NA	-	-

Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
Source (Demand) Measures (to reduce likelihood)	Control / Reduce surface water run-off		Y	-	Natural Flood Management; rural land management and catchment management; SuDS including blue and green infrastructure; storm management
	Reduce groundwater levels		N	None of the significant risks in this catchment are caused by high groundwater levels. Hence reducing groundwater levels will not impact any of the risks in this catchment.	Reduce leakage from water supply pipes; pump away schemes to locally lower groundwater near sewer network
	Improve **quality** of wastewater		Y	-	Domestic and business customer education; incentives and behaviour change (reduce Fats, Oils & Grease, wet wipes etc.); monitoring trade waste at source; on-site black water and/or greywater pre-treatment
	Reduce the **quantity** / demand		Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source
Pathway (Supply) Measures (to reduce likelihood)	Network Improvements		Y	-	Asset optimisation; additional network capacity; storage; separate flows; structural repairs; re-line sewer pipe and manholes; smart networks.
	Improve Treatment Quality		Y		Increase treatment capacity; rationalisation of treatment works (centralisation / de-centralisation); install tertiary plant; UV plant or disinfection facilities; innovation; improve Technical Achievable Limits; new WTWs
	Wastewater Transfer to treatment elsewhere		Y	-	Transfer flow to other network or treatment sites; transport sewage by tanker to other sites
Receptor Measures (to reduce consequences)	Mitigate impacts on Air Quality		N/A	Not included in first round of DWMPs	Carbon offsetting; noise suppression /filtering; odour control and treatments
	Improve Land and Soils		N/A	Not included in first round of DWMPs	Sludge soil enhancement
	Mitigate impacts on receiving waters		N	The receiving waters are not advserly impacted by our wastewater operations. Hence, offsetting any adverse impacts on receiving waters will not reduce any of the significant risks in this catchment.	River enhancement, aeration
	Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
Other	Study / Investigation		N	No further studies are required at this stage	Additional data required; hydraulic model development; WQ monitoring and modelling

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Tunbridge Wells South Wastewater System - Outline Options Appraisal

Generic Option	Location of Risk	Planning Objective and Description of Risk	Option Reference	Description	Further Description	Unconstrained Option?	Constrained Option?	Feasible Option?	Net Benefits	Estimated Cost	Preferred Option	Best value / Least cost or Reasons for Rejection
Control/ Reduce surface water entering the sewers	Flooding Cluster TUWS FC01 - The Pantiles / Warwick Park / Mt Pleasant Road / Norfolk Road	PO4 and PO7 Flooding	TUWS.SC01.1	Surface Water Separation and Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	No	Best Value
Control/ Reduce surface water entering the sewers	Flooding Cluster TUWS FC02 - Broadwater Lane / Willow Tree Road	PO4 and PO7 Flooding	TUWS.SC01.2	Surface Water Separation and Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	No	Best Value
Control/ Reduce surface water entering the sewers	Flooding Cluster TUWS FC03 - Neville Gate / Upper Cumberland Road / Farmcombe Road	PO4 and PO7 Flooding	TUWS.SC01.3	Surface Water Separation and Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	No	Best Value
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Cambridge Gardens, Maryland Road, Church Road, High Street, Grosvenor Park	PO1 - Internal Flooding	TUWS.SC03.1	Customer Education Programme	Target domestic and business customers in the cluster with a campaign to stop discharges of FOG and unflushables into the sewer network to reduce risk of flooding due to sewer blockages.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Coniston Avenue, Tunbridge Wells	PO2- Pollution Risk	TUWS.SC03.2	Customer Education Programme	Target domestic and business customers in the cluster with a campaign to stop discharges of FOG and unflushables into the sewer network to reduce risk of pollution due to sewer blockages.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Control / Reduce the quantity / flow of wastewater entering sewer system	TUNBRIDGE WELLS SOUTH WTW	PO8 (2050)- Dry Weather Flow	TUWS.SC04.1	Water Efficient Appliance / Measures	South East Water aims to reduce water consumption to under 100 l/h/d by 2040 as part of an existing campaign.	No						Deliver the required outcome
Network Improvements (eg increase capacity, storage, conveyance)	Lime Hill Road, Boyne Park, Molyneux Park Road	PO1- Internal Flooding	TUWS.PW01.1	Storage Tank	Conventional storage tank.	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Cambridge Gardens, Maryland Road, Church Road, High Street, Grosvenor Park	PO1- Internal Flooding	TUWS.PW01.2	Smart Network and Improved Sewer Jetting	Install Smart Network with sewer level monitoring and surcharge level warning system to Improve Sewer Jetting reaction time and reduce flooding due to blockages.	No						Technically feasibleRisk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Florence Farm Groombridge WPS	PO2- Pollution Risk	TUWS.PW01.3	Pipe Rehabilitation Programme	Rehabilitation of rising main and system components to reduce bursts and pollution incidents.	Yes	Yes	Yes	Minor Positive +	£2,110K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Ferrars Estate Hawkenbury WPS	PO2- Pollution Risk	TUWS.PW01.4	Maintenance Programme WPS	An improved maintenance programme reliminate the risk of pollution incidents by increasing resilience to operational failures.	Yes	Yes	Yes	Minor Positive +	£235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Flooding Cluster TUWS FC01 Tunbridge Wells Cricket Club, Nevill Gate	PO4, PO7 & PO10 - Flooding	TUWS.PW01.5	Surface Water Separation using a new ring sewer, Offline Storage Tanks and Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC04 - Ferrars Estate Hawkenbury WPS	PO4 & PO7 - Growth	TUWS.PW01.6	Increase WPS pump rate	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC05 - Ferrars Estate Hawkenbury WPS	PO4 & PO7 - Growth	TUWS.PW01.7	Rising main extension to new ring sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC06 - High Woods Lane	PO4 & PO7 - Growth	TUWS.PW01.8	New ring sewer and pumping station	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC07 - Tunbridge Wells South WTW	PO4 & PO7 - Growth	TUWS.PW01.9	New ring sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC08 - Bayham Road and Benhall Mill Road	PO4 & PO7 - Growth	TUWS.PW01.10	New surface water sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC09 - Culverden Down	PO4 & PO7 - Growth	TUWS.PW01.11	New surface water sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC10 - Hurstwood Tunbridge Wells WPS	PO4 & PO7 - Growth	TUWS.PW01.12	Foul and surface water sewer upsize and relay	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC11 - Hurstwood Tunbridge Wells WPS	PO4 & PO7 - Growth	TUWS.PW01.13	Hurstwood Tunbridge Wells WPS - Operational changes	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC12 - Lonsdale Gardens	PO4 & PO7 - Growth	TUWS.PW01.14	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC13 - Broadwater Lane	PO4 & PO7 - Growth	TUWS.PW01.15	Sewer Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£65K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	TUWS FC14 - Tunbridge Wells South WTW	PO4, PO5, PO7 & P014 - Growth and Storm Overflow Performance	TUWS.PW01.16	Increase storm storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£3,510K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	FLORENCE FARM GROOMBRIDGE EMO	PO5 - Storm Overflow Spill Assessments	TUWS.PW01.17	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£2,325K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Flooding Cluster TUWS FC01 - The Pantiles / Warwick Park / Mt Pleasant Road / Norfolk Road	PO4 and PO7 Flooding	TUWS.PW01.18	Storage Tank	DAP Option.	Yes	Yes	Yes	Major Positive +++	£10,615K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Flooding Cluster TUWS FC02 - Broadwater Lane / Willow Tree Road	PO4 and PO7 Flooding	TUWS.PW01.19	Storage Tank	DAP Option.	Yes	Yes	Yes	Major Positive +++	£15,480K	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Flooding Cluster TUWS FC03 - Neville Gate / Upper Cumberland Road / Farmcombe Road	PO4 and PO7 Flooding	TUWS.PW01.20	Storage Tank	DAP Option.	Yes	Yes	Yes	Major Positive +++	£5,450K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO3- Sewer Collapse Risk	TUWS.PW01.21	Pipe Rehabilitation Programme	Rehabilitation of rising main and system components to reduce rising main bursts.	Yes	Yes	Yes	Minor Negative -	£8,140K	Yes	Least Cost
Improve treatment (capacity and quality at existing works or develop new WTWs)	TUNBRIDGE WELLS SOUTH WTW	PO1 - Internal Flooding	TUWS.PW02.1	Maintenance Programme WTW	An efficient maintenance programme for WTW to elimate the risk of a pollution incident due to an operational failure.	Yes	Yes	Yes	Minor Positive +	£6,970K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	TUNBRIDGE WELLS SOUTH WTW	PO2- Pollution Risk	TUWS.PW02.2	Maintenance Programme WTW	An efficient maintenance programme for the treatment works to elimate the risk of a pollution incident due to an operational failure.	Yes	Yes	Yes	Minor Positive +	£6,970K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	TUNBRIDGE WELLS SOUTH WTW	PO8 (2050)- Dry Weather Flow	TUWS.PW02.3	DWF Permit Increase	Proposed New DWF Permit of 11565m3 / day at the WTW.	Yes	Yes	Yes	Minor Positive +	£2,215K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	TUNBRIDGE WELLS SOUTH WTW	PO8 (2050)- Dry Weather Flow	TUWS.PW02.4	Increase FFT Capacity	Link to AMP7 U_IMP5 Scheme - increase FFT from current 260 l/s to 360 l/s by 2035.	Yes	No					Operational

Tunbridge Wells South Wastewater System - Outline Options Appraisal

Generic Option	Location of Risk	Planning Objective and Description of Risk	Option Reference	Description	Further Description	Unconstrained Option?	Constrained Option?	Feasible Option?	Net Benefits	Estimated Cost	Preferred Option	Best value / Least cost or Reasons for Rejection
Wastewater Transfer	TUNBRIDGE WELLS SOUTH WTW	PO8 (2050)- Dry Weather Flow	TUWS.PW03.1	Construct New WPS & Rising Main	New WPS and rising main to discharge 2175m3 / day DWF (c75 l/s peak rate) from subcacthment to nearby wastewater catchment No other WTWs are within a 20km radius of TUNBRIDGE WELLS SOUTH WTW with spare capacity to take DWF.	Yes	No					Environmental - Strategic Environmental Assessment
Mitigate impacts on Air Quality (e.g. Carbon neutrality, noise, odour)												Not included in the first round of DWMPs
Improve Land and Soils												Not included in the first round of DWMPs
Mitigate impacts on Water Quality												
Reduce consequences Properties (e.g. Property Flood Resilience)	Lime Hill Road, Boyne Park, Molyneux Park Road	PO1- Internal Flooding	TUWS.RC04.1	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	No						Risk and uncertainty - future resilience
Reduce consequences Properties (e.g. Property Flood Resilience)	Flooding Cluster TUWS FC01 - The Pantiles / Warwick Park / Mt Pleasant Road / Norfolk Road	PO4, PO7 & PO10 - Sewer Flooding	TUWS.RC04.2	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	No						Risk and uncertainty - future resilience
Reduce consequences Properties (e.g. Property Flood Resilience)	Flooding Cluster TUWS FC02 - Broadwater Lane / Willow Tree Road	PO4, PO7 & PO10 - Sewer Flooding	TUWS.RC04.3	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	No						Risk and uncertainty - future resilience
Reduce consequences Properties (e.g. Property Flood Resilience)	Flooding Cluster TUWS FC03 - Neville Gate / Upper Cumberland Road / Farmcombe Road	PO4, PO7 & PO10 - Sewer Flooding	TUWS.RC04.4	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	TUWS FC02 River Grom - Tunbridge Wells	PO4, PO7 & PO10 - Flooding	TUWS.OT01.1	Improve Hydraulic Model	DAP Option.	No						
Study/ investigation to gather more data	TUWS FC03 River Grom - Tunbridge Wells	PO4, PO7 & PO10 - Flooding	TUWS.OT01.2	Improve Hydraulic Model	DAP Option.	No						
Study/ investigation to gather more data	TUWS FC15 - FLORENCE FARM GROOMBRIDGE EMO	PO5- Spill Assessments	TUWS.OT01.3	Improve Hydraulic Model	DAP Option.	No						
Study/ investigation to gather more data	Catchment Wide	PO1, PO4, PO7, PO10 - Sewer Flooding PO5 - Storm Overflow Performance	TUWS.OT01.4	Improve Hydraulic Model	Hydraulic surveys and reverification to improve model confidence and accuracy of simulations.	Yes	Yes	Yes	Minor Positive +	£225K	Yes	Best Value

DWMP Investment Needs

1. The options listed in the DWMP Investment Needs below are the preferred options in our DWMP. They will need further refinement as we implement the DWMP to confirm the exact location and scope of action needed, and the cost.

2. The costs are indicative costs for planning purposes only. The basis for the cost estimates, including assumptions and uncertainties, are explained in our DWMP Investment Plans.

3. The table of Investment Need provides an indicative cost so we know what level of funding is needed to reduce the risks. It is not a commitment to fund or deliver any option.

4. The Indicative Timescale is when the investment is needed. Some options may take several investment periods to achieve the desired outcomes.

5. Potential Partners have been identified in the table of Investment Needs. This is to indicate where there may be opportunities for us to work with these partners when developing and delivering these options. It is not a commitment by any of the partners to work with us.

6. These options will inform our future business plans as part of the Ofwat periodic review process to secure the finance to implement these options.

7. The options listed are prioritised by the method stated in the Programme Appraisal Technical Summary.

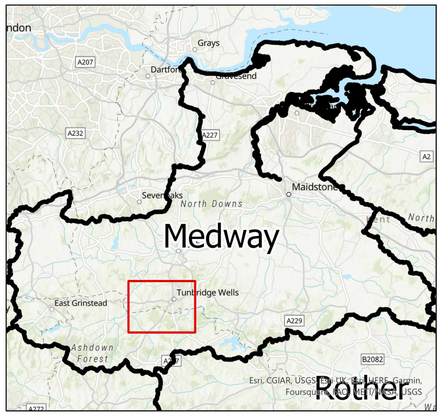
Date : May 2023
Version : 1.0

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
Medway								
Tunbridge Wells South								
TUWS.SC03.1	Medway	Tunbridge Wells South	Cambridge Gardens, Maryland Road, Church Road, High Street, Grosvenor Park	Customer Education Programme: Targeted campaign to reduce the amount of FOG (fats, oils and grease) and unflushables discharged into the sewer network	£115K	AMP8 onwards	-	PO1
TUWS.SC03.2	Medway	Tunbridge Wells South	Coniston Avenue, Tunbridge Wells	Customer Education Programme: Targeted campaign to reduce the amount of FOG (fats, oils and grease) and unflushables discharged into the sewer network	£115K	AMP8 onwards	-	PO2
TUWS.PW01.3	Medway	Tunbridge Wells South	Florence Farm Groombridge WPS	Sewer Rehabilitation: Targeted CCTV or electroscan surveys and sewer rehabilitation to reduce the risk of sewer bursts and collapses	£2,110K	AMP8 onwards	-	PO2
TUWS.PW01.4	Medway	Tunbridge Wells South	Ferrars Estate Hawkenbury WPS	Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents	£235K	AMP8 onwards	-	PO2
TUWS.PW01.6	Medway	Tunbridge Wells South	Ferrars Estate Hawkenbury WPS	Growth scheme from our Drainage Area Plan (DAP): Increase WPS pump rate to accommodate additional flows from future development	£65K	AMP9	-	PO4 PO7
TUWS.PW01.7	Medway	Tunbridge Wells South	Ferrars Estate Hawkenbury WPS	Growth scheme from our Drainage Area Plan (DAP): Rising main extension to new ring sewer to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.8	Medway	Tunbridge Wells South	High Woods Lane	Growth scheme from our Drainage Area Plan (DAP): New ring sewer and pumping station to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.9	Medway	Tunbridge Wells South	Tunbridge Wells South WTW	Growth scheme from our Drainage Area Plan (DAP): New ring sewer to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.10	Medway	Tunbridge Wells South	Bayham Road and Benhall Mill Road	Growth scheme from our Drainage Area Plan (DAP): New surface water sewer to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.11	Medway	Tunbridge Wells South	Culverden Down	Growth scheme from our Drainage Area Plan (DAP): New surface water sewer to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.12	Medway	Tunbridge Wells South	Hurstwood Tunbridge Wells WPS	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of foul and surface water sewers to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.13	Medway	Tunbridge Wells South	Hurstwood Tunbridge Wells WPS	Growth scheme from our Drainage Area Plan (DAP): Operational enhancements to Hurstwood Tunbridge Wells WPS	£65K	AMP9	-	PO4 PO7
TUWS.PW01.14	Medway	Tunbridge Wells South	Lonsdale Gardens	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7
TUWS.PW01.15	Medway	Tunbridge Wells South	Broadwater Lane	Growth scheme from our Drainage Area Plan (DAP): Upsize sections of local sewers to provide capacity for additional flows from future developments	£65K	AMP9	-	PO4 PO7

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
TUWS.PW01.18	Medway	Tunbridge Wells South	The Pantiles, Warwick Park, Mt Pleasant Road, Norfolk Road	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£10,615K	AMP9	Kent County Council, Tunbridge Wells Borough Council	PO4 PO7
TUWS.PW01.20	Medway	Tunbridge Wells South	Neville Gate, Upper Cumberland Road, Farmcombe Road	Flood Alleviation: Separate or attenuate excess rainwater in sewer network using Sustainable Drainage Systems (SuDS) to reduce risk of flooding (Costs based on storage solution but surface water separation is our preferred approach)	£5,450K	AMP9	Kent County Council, Tunbridge Wells Borough Council	PO4 PO7
TUWS.PW01.21	Medway	Tunbridge Wells South	Warwick Park, Florance Lane, London Road, Hawkenbury Road, Halls Hole Road, Camden Park, Franfield Rise, Molyneux Park Road	Sewer Rehabilitation: Targeted CCTV or electroscan surveys and sewer rehabilitation to reduce the risk of sewer bursts and collapses	£8,140K	AMP8 onwards	-	PO3
TUWS.PW02.1	Medway	Tunbridge Wells South	Tunbridge Wells South WTW	Improve the operational resilience of Waste Water Treatment Works (WTW) to flooding flooding	£6,970K	AMP8 onwards	-	PO1
TUWS.PW02.2	Medway	Tunbridge Wells South	Tunbridge Wells South WTW	Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents	£6,970K	AMP8 onwards	-	PO2
TUWS.PW02.3	Medway	Tunbridge Wells South	Tunbridge Wells South WTW	Increase capacity to allow for planned new development	£2,215K	AMP9	Environment Agency	PO8
TUWS.OT01.4	Medway	Tunbridge Wells South	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£225K	AMP8	-	PO1 PO4 PO5 PO7 PO10
TUWS.WINEP01.1	Medway	Tunbridge Wells South	TUNBRIDGE WELLS SOUTH SSO	Reduce impact from storm spills from TUNBRIDGE WELLS SOUTH SSO through wetland creation and/or sewer lining to reduce infiltration of groundwater	£2,785K	AMP8	-	PO5
TUWS.WINEP01.2	Medway	Tunbridge Wells South	TUNBRIDGE WELLS SOUTH CSO	Reduce impact from storm spills from TUNBRIDGE WELLS SOUTH CSO through wetland creation and/or sewer lining to reduce infiltration of groundwater	£18,845K	AMP8	-	PO5
TUWS.WINEP01.3	Medway	Tunbridge Wells South	NEVILLE STREET TUNBRIDGE WELLS CSO	Reduce the number of storm discharges from NEVILLE STREET TUNBRIDGE WELLS CSO by creating below-ground storage	£1,135K	AMP8	-	PO5
TUWS.WINEP01.4	Medway	Tunbridge Wells South	FLORENCE FARM GROOMBRIDGE EMO	Reduce the number of storm discharges from FLORENCE FARM GROOMBRIDGE EMO by creating below-ground storage	£860K	AMP8	-	PO5
TUWS.WINEP01.5	Medway	Tunbridge Wells South	HURSTWOOD TUNBRIDGE WELLS CEO	Reduce the number of storm discharges from HURSTWOOD TUNBRIDGE WELLS CEO by creating below-ground storage	£1,355K	AMP11	-	PO5

Drainage and Wastewater Management Plan: Location of Potential Options TUNBRIDGE WELLS SOUTH Wastewater system in Medway River Basin Catchment

(i) This map should be read in conjunction with the list of Investment Needs for this wastewater system
(ii) The areas shown on this map are the potential locations for the options. The location of the risk may be elsewhere in the system.
(iii) Labels for each location are the option references in the list of Investment Needs
(iv) Drainage Area Plan (DAP) options on flooding and growth are not shown.



- Customer Education
- Pipe Rehabilitation
- Asset Resilience
- Wastewater Treatment
- WINEP Nutient Neutrality
- WINEP Storm Overflows

TUWS.WINEP01.5
TUWS.SC03.1
TUWS.SC03.2
TUWS.PW01.21
TUWN.PW01.7
TUWS.PW02.1
TUWS.PW01.4
TUWS.SC03.2
TUWS.WINEP01.3
TUWS.PW02.1
TUWS.SC03.1
TUWS.PW02.1
TUWS.PW02.2
TUWS.PW02.3
TUWS.PW01.21
TUWS.WINEP01.2
TUWS.WINEP01.1
TUWS.PW01.3
TUWS.WINEP01.4