Drainage and Wastewater Management Plan

Canterbury
Wastewater System Plan

from Southern Water

Contents

Canterbury wastewater system: map and key facts

Population Equivalent (PE)	**65,145**
Discharge Waterbody	**Great Stour between A2 and West Stourmouth**
Number of Pumping Stations	**60**
Number of Overflows	**6**
Length of Sewer (km)	**635.3**
Catchment Reference	**CANT**

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

Drivers of Risks

- Customer
- Hydraulics
- Operational
- Quality
- Unknown

Catchment Strategy: IMPROVE

CANTERBURY WTW

0 0.5 1 2 3 4 Kilometers

Problem Characterisation

Canterbury (CANT)

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 Canterbury wastewater system

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

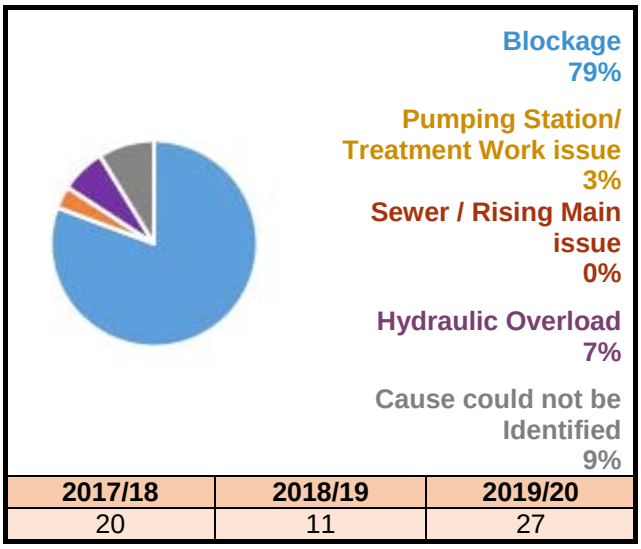
This means that we consider that the current performance of the drainage and wastewater system needs to be improved to reduce the impacts on our customers and/or the environment. We will plan investment to reduce the current risks by actively looking to invest capital funding in the short term to address 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 more then 3.35 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.

The primary driver for internal sewer flooding in this wastewater system is 'Customer'. Blockages caused 79% 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



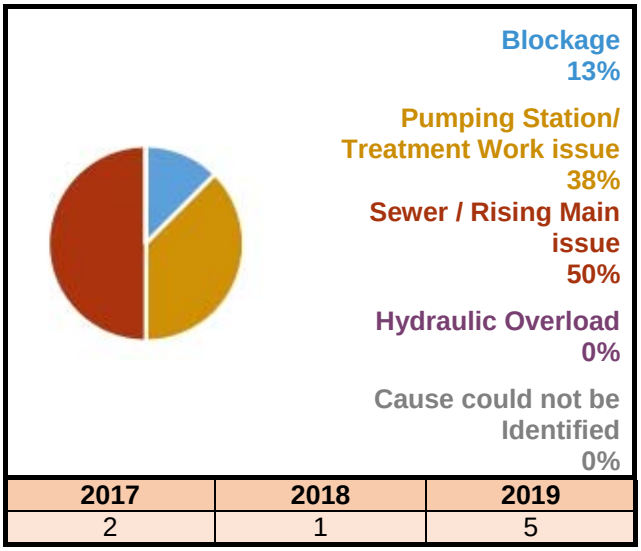
2017/18	2018/19	2019/20
20	11	27

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 between 24.51 and 49.01 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'moderately significant' band.

The primary driver for pollution is 'Operational' due to asset operational issues. Sewer collapses and bursts are the main cause of incidents, contributing to 50% of all incidents recorded in this wastewater system.

Figure 2: Number of pollution incidents per annum and causes



2017	2018	2019
2	1	5

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 between 5.72 and 9.44 incidents per 1,000km per year (a threshold set by Ofwat), the risk is in the 'moderately significant' band.

Table 2: Sewer collapses and rising main bursts

Sewer Collapse	**2017/18**	0
	2018/19	0
	2019/20	3
Rising Main Bursts	**2017/18**	3
	2018/19	3
	2019/20	4

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 moderately significant in 2020 and 2050. This is because our computer model of the sewer network indicate for 2020 that approximately 1500 - 1600 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 2500 - 2600 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 not significant in 2020 and 2050.

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 3.

Table 3: Annualised number of properties at risk per 10,000 connections.

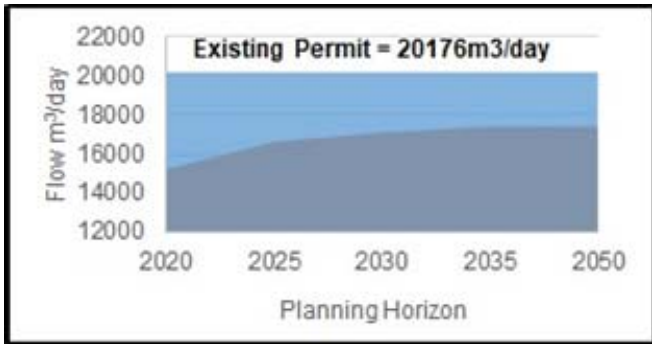
Rainfall Return Period (yr)	Number of Properties at Risk		Annualised per 10,000 connections	
	2020	2050	2020	2050
1 in 1	192	349	121	221
1 in 2	229	499	90	196
1 in 5	596	1036	108	188
1 in 10	922	1354	88	129
1 in 20	1207	1743	59	85
1 in 30	1347	2086	44	68
Total Annualised			**510**	**887**

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 not significant for 2020 but is predicted to increase to moderately significant in 2050, shown in Figure 3. This is because the predicted DWF in 2050 is expected to be between 80% and 100% of the current permit.

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



Planning Objective 9: Good Ecological Status / Good Ecological Potential

Table 4: Waterbodies not achieving GES/GEP

Waterbody	Classification	EA-Status	Activity
Great Stour between A2 and West Stourmouth	Phosphate	Poor	Sewage discharge (continuous)
Whitehall Dyke at Harbledown	Ammonia (Phys-Chem)	Moderate	Incidents
Sarre Penn and River Wantsum	Phosphate	Moderate	Sewage discharge (intermittent)
East Kent Chalk - Stour	Chemical Drinking Water Protected Area	Poor	Leaking utility sewers

Table 4 shows the waterbodies connected to this wastewater catchment are not achieving Good Ecological Status or Potential (GES/GEP). The Environment Agency has attributed the 'reasons for not achieving good status' to water company operations. Our risk assessment has been assessed based on the worst assigned status (Poor) and is very significant. This is because there are potential issues with leaking sewers allowing the sewerage to escape into the ground due to the condition of our sewer network in this wastewater system and because we are might not be complying with our permit from the Environme

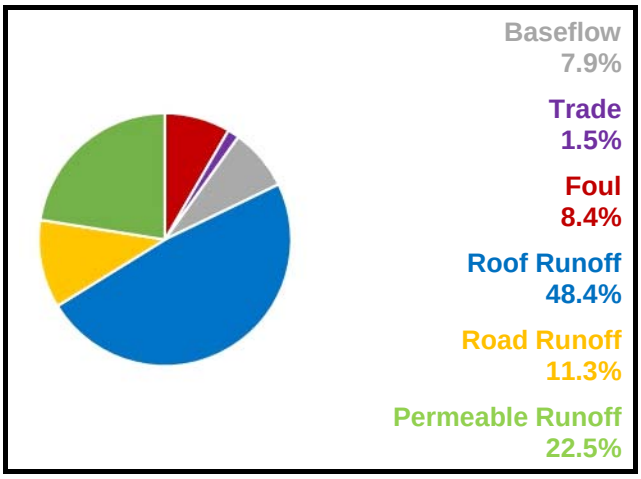
The primary driver is 'Operational'.

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 82.2% of the flow in the sewers. The total contribution of foul water from homes is 8.4% with business contributing 1.5%. The baseflow is infiltration from water in the ground and makes up 7.9% 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

The risk to internationally designated habitat sites from this wastewater system is moderately significant in 2020 but rises to very significant in 2050. This is because Natural England have advised that there is a risk to condition for the habitat sites (hydraulically linked to our wastewater catchment) shown in Table 5.

Table 5: Habitat Sites hydraulically linked to wastewater system

Habitat Sites	
Stodmarsh	Nitrate permit review required

Our growth forecast suggest that more than 2,000 new homes could occur in this wastewater system by 2050 which means the risk to habitat sites increases to very significant by 2050.

Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is moderately significant. The wastewater system network of sewers extends across geographical areas that are designated as a Source Protection Zone (SPZ) for water supply. Sewer survey data indicates that parts of the sewer network are in poor condition and are likely to leak sewage.

The primary driver is 'Operational' due to condition of our assets.

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.

Generic Options Assessment for: Canterbury (CANT)

Planning Objectives		2020	Driver	2050
PO1	Internal Flooding	2	Customer	-
PO2	Pollution Risk	1	Operational	-
PO3	Sewer Collapse	1	Operational	-
PO4	Risk of Sewer Flooding in 1 in 50 yr	1	Hydraulic	1
PO5	Storm Overflow Performance	0	-	0
PO6	Risk of WTW Compliance Failure	0	-	0
PO7	Annualised Flood Risk/Hydraulic Overload	2	Hydraulic	2
PO8	DWF Compliance	0	-	1
PO9	Achieve Good Ecological Status	2	Operational	-
PO10	Improve Surface Water Management	1	Hydraulic	-
PO11	Secure Nutrient Neutrality	1	Unknown	2
PO12	Reduce Groundwater Pollution	1	Operational	-
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	Reducing groundwater levels would reduce the risks from infiltration into the network. However, in practice, reducing groundwater levels will be detrimental to the environment, ground conditions and is prohibitively too costly to implement. For these reasons, this generic option has been discounted.	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		Y	-	River enhancement, aeration
	Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
Other	Study / Investigation		Y	-	Additional data required; hydraulic model development; WQ monitoring and modelling

August 2021
Version 1

Cantebury 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												
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Canterbury	PO1 - Internal Flooding	CANT.SC03.1	Customer Education Programme	Customer education programme to reduce the risk.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Canterbury	PO2- Pollution Risk	CANT.SC03.2	Customer Education Programme	Customer education programme to reduce the risk.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Control / Reduce the quantity / flow of wastewater entering sewer system	Canterbury WTW	PO8 (2050)- Dry Weather Flow	CANT.SC04.1	Water Efficient Appliance / Measures	Southern Water aims to reduce water consumption to 100 l/h/d by 2040.	Yes	No					Environmental - Strategic Environmental Assessment
Network Improvements (eg increase capacity, storage, conveyance)	The Stade Folkstone WPS	PO1- Internal Flooding	CANT.PW01.1	Maintenance Programme WPS	An efficient maintenance programme for pumping stations and/Treatment works to elimate the risk of a pollution incident due to an operational failure.	Yes	Yes	Yes	Minor Positive +	£235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Canterbury	PO1- Internal Flooding	CANT.PW01.2	Additional Storage	TBC by modelling.	Yes	Yes	Yes	Minor Positive +	£1,000 K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Tile Kiln Hill Blean WPS and North Honey Hill WPS	PO2- Pollution Risk	CANT.PW01.3	Maintenance Programme WPS	An efficient maintenance programme for pumping stations to elimate the risk of a pollution incident due to an operational failure.	Yes	Yes	Yes	Minor Positive +	£465K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment wide	PO3- Sewer Collapse 3 Sewer Collapses 10 Rising Main Bursts Total Sewer Length - 635.3km	CANT.PW01.4	Pipe Rehabilitation Programme	Targeted CCTV / electroscan surveys and proactive sewer rehabilitation to reduce risk of sewer collapse.	Yes	Yes	Yes	Minor Positive +	£8,070K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment wide	PO8 - Dry Weather Flow (2050)	CANT.PW01.5	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment.	Yes	No					Environmental - Strategic Environmental Assessment
Network Improvements (eg increase capacity, storage, conveyance)	Sarre Penn and River Wantsum	PO9- GE Status / Potential Sewage discharge (intermittent)	CANT.PW01.6	Additional Storage	Catchment was banded 2 in because; Great Stour between A2 and West Stourmouth-Phosphate (Poor Sewage discharge (continuous)) Whitehall Dyke at Harbledown-Ammonia (Phys-Chem) (Moderate Incidents) Sarre Penn and River Wantsum-Phosphate (Moderate Sewage discharge (intermittent)) East Kent Chalk - Stour-Chemical Drinking Water Protected Area (Poor Leaking utility sewers).	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	East Kent Chalk - Stour	PO9- GE Status / Potential Leaking utility sewers	CANT.PW01.7	Pipe Rehabilitation Programme	Catchment was banded 2 in because; Great Stour between A2 and West Stourmouth-Phosphate (Poor Sewage discharge (continuous)) Whitehall Dyke at Harbledown-Ammonia (Phys-Chem) (Moderate Incidents) Sarre Penn and River Wantsum-Phosphate (Moderate Sewage discharge (intermittent)) East Kent Chalk - Stour-Chemical Drinking Water Protected Area (Poor Leaking utility sewers).	Yes	Yes	Yes	Minor Positive +	TBC	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment wide	PO2 - Pollution Risk & PO12 - Groundwater pollution	CANT.PW01.8	Pipe Rehabilitation Programme	Targeted CCTV / electroscan surveys and proactive sewer rehabilitation to reduce risk of sewer collapse.	Yes	Yes	Yes	Minor Positive +	£6,045K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Cantebury	PO1 - Internal Flooding PO2- Pollution Risk	CANT.PW01.9	Jetting Programme	Increase frequency of MST (Maintenance Scheduled Tasks).	Yes	Yes	Yes	Minor Positive +	£525K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	CANT FC01 LONGPORT ROAD	PO4 & PO7 - Growth	CANT.PW01.10	Pipe Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	TBC	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	CANT FC02 CHAUCER CLOSE TO CANTERBURY WTW	PO4 & PO7 - Growth	CANT.PW01.11	New pumping station and Ring sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	TBC	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	CANT FC03 T SHALLOAK ROAD	PO4 & PO7 - Growth	CANT.PW01.12	New pumping station	DAP Option.	Yes	Yes	Yes	Major Positive +++	TBC	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	CANT FC04 Kingsmead Road	PO4. P05 & PO7 - Growth	CANT.PW01.13	Additional storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	TBC	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	Canterbury WTW	PO2- Pollution Risk & PO9 - GE Status / Potential	CANT.PW02.1	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	No					Operational
Improve treatment (capacity and quality at existing works or develop new WTWs)	Canterbury WTW	PO8 (2050)- Dry Weather Flow	CANT.PW02.2	Increase Capacity	Increase capacity at the Works.	Yes	Yes	Yes	Minor Positive +	£2,065K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	Great Stour between A2 and West Stourmouth	PO9- GE Status / Potential Sewage discharge (continuous)	CANT.PW02.3	Phosphate	Catchment was banded 2 in because; Great Stour between A2 and West Stourmouth-Phosphate (Poor Sewage discharge (continuous)) Whitehall Dyke at Harbledown-Ammonia (Phys-Chem) (Moderate Incidents) Sarre Penn and River Wantsum-Phosphate (Moderate Sewage discharge (intermittent)) East Kent Chalk - Stour-Chemical Drinking Water Protected Area (Poor Leaking utility sewers).	No						Deliver the required outcome and Risk and uncertainty - future resilience
Wastewater Transfer	Canterbury WTW	PO8 (2050)- Dry Weather Flow	CANT.PW03.1	Construct New WPS & Rising Main	Within 20km radius of CANT is WEHB which in 2050 will have approximately 2972m3/day of headroom (until it is above 80% of its DWF permit).	Yes	No					Feasibility and Risk
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)	Canterbury	PO1- Internal Flooding	CANT.RC04.1	Property Flood Mitigation / Resistance	Short-term property level protection ahead of flood alleviation scheme - Non-return valves and flood mitigation doors / gates.	Yes	No					Operational

Cantebury 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
Study/ investigation to gather more data	Hotspot 1 - Canterbury Hotspot 2 - Pean Hill	PO1- Internal Flooding	CANT.OT01.1	Investigation into causes	Further investigation to identify the causes of the internal flooding incidents.	Yes	No					Operational
Study/ investigation to gather more data	Catchment Wide	PO8 (2050)- Dry Weather Flow	CANT.OT01.2	Infiltration Reduction Plan	Relining/improving structural grades of sewers across the catchment.	Yes	Yes	Yes	Minor Positive +	£175 K	Yes	Best Value
Study/ investigation to gather more data	East Kent Chalk - Stour	PO9- GE Status / Potential Leaking utility sewers	CANT.OT01.3	Chemical Drinking Water Protected Area	Catchment was banded 2 in because; Great Stour between A2 and West Stourmouth-Phosphate (Poor Sewage discharge (continuous)) Whitehall Dyke at Harbledown-Ammonia (Phys-Chem) (Moderate Incidents) Sarre Penn and River Wantsum-Phosphate (Moderate Sewage discharge (intermittent)) East Kent Chalk - Stour-Chemical Drinking Water Protected Area (Poor Leaking utility sewers).	Yes	No					Feasibility and Risk
Study/ investigation to gather more data	Great Stour between A2 and West Stourmouth	PO9- GE Status / Potential Sewage discharge (continuous)	CANT.OT01.4	Study and Investigation: Phosphate	Catchment was banded 2 in because; Great Stour between A2 and West Stourmouth-Phosphate (Poor Sewage discharge (continuous)) Whitehall Dyke at Harbledown-Ammonia (Phys-Chem) (Moderate Incidents) Sarre Penn and River Wantsum-Phosphate (Moderate Sewage discharge (intermittent)) East Kent Chalk - Stour-Chemical Drinking Water Protected Area (Poor Leaking utility sewers).	Yes	Yes	Yes	Minor Negative -	£175 K	No	Least Cost
Study/ investigation to gather more data	Stodmarsh	PO11 - Nutrient Neutrality	CANT.OT01.5	Nutrient Budget	Catchment is Hydraulically linked to Stodmarsh (Threat/Remedy Identified or Anticipated) Band 1 (2020): Phosphate (2mg/l) and Ammonia (4mg/l) permits but no Nitrate permit Band 2 (2050): More than 2,000 homes anticipated to be built.	Yes	Yes	Yes	Minor Negative -	£75K	Yes	Least Cost
Study/ investigation to gather more data	Catchment Wide / Overflow Locations	PO4- 1 in 50 year PO7- Hydraulic Overload PO10- Surface Water Management	CANT.OT01.6	Improve Hydraulic Model	Hydraulic Model needs to be improved.	Yes	Yes	Yes	Minor Positive +	£265K	Yes	Best Value
Study/ investigation to gather more data	CANT FC05 Tyler Hill	PO4 & PO7 - Growth	CANT.OT01.7	Study/model investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£265K	Yes	Best Value
Study/ investigation to gather more data	CANT FC6 Canterbury WTW	PO4 & PO7 - Growth	CANT.OT01.8	Study/model investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£265K	Yes	Best Value
Study/ investigation to gather more data												

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

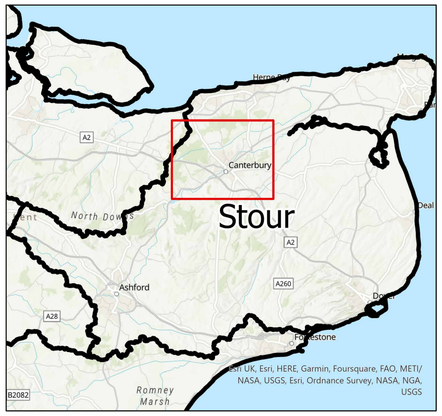
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
Stour								
Canterbury								
CANT.SC03.1	Stour	Canterbury	Ethelbert Road, St. Margarets Street, Downs Road, North Lane, Sun Street, Castle Street, St. Peters Street, Reed Avenue, Wincheap, Palace Street,	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	Canterbury City Council	PO1
CANT.SC03.2	Stour	Canterbury	System Wide	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	Canterbury City Council	PO2
CANT.PW01.1	Stour	Canterbury	The Stade Folkstone WPS	Improve the operational resilience of wastewater pumping station (WPS) to reduce flooding	£235K	AMP8 onwards	-	PO1
CANT.PW01.2	Stour	Canterbury	South Canterbury Road, Tyler Hill Road, and School Lane	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)	£1,000K	AMP9	Kent County Council	PO1
CANT.PW01.3	Stour	Canterbury	Tile Kiln Hill Blean WPS and North Honey Hill WPS	Improve the operational resilience of wastewater pumping station (WPS) to reduce pollution incidents	£465K	AMP8 onwards	-	PO2
CANT.PW01.4	Stour	Canterbury	System Wide	Sewer Rehabilitation: Targeted CCTV or electroscan surveys and sewer rehabilitation to reduce the risk of sewer bursts and collapses	£8,070K	AMP8 onwards	-	PO3
CANT.PW01.8	Stour	Canterbury	System Wide	Sewer Rehabilitation: Targeted CCTV or electroscan surveys and sewer rehabilitation to reduce the risk of sewer bursts and collapses	£6,045K	AMP9	-	PO2 PO12
CANT.PW01.9	Stour	Canterbury	Ethelbert Road, St. Margarets Street, Downs Road, North Lane, Sun Street, Castle Street, St. Peters Street, Reed Avenue, Wincheap, Palace Street,	Enhanced Sewer Maintenance: Increase targeted sewer jetting to reduce the number of blockages in the network	£525K	AMP8 onwards	-	PO1 PO2
CANT.PW02.2	Stour	Canterbury	CANTERBURY WTW	Increase capacity to allow for planned new development	£2,240K	AMP9	Environment Agency	PO8
CANT.OT01.2	Stour	Canterbury	System Wide	Study and Investigation: Identify areas of groundwater infiltration in the wastewater network and scope measures to rehabilitate sewers	£175K	AMP8	Environment Agency	PO8
CANT.OT01.4	Stour	Canterbury	Great Stour between A2 and West Stourmouth	Study and Investigation to understand the impact of wastewater discharges on the local environment and identify measures required to achieve good ecological status in the receiving waterbody	£175K	AMP8	Natural England	PO9
CANT.OT01.6	Stour	Canterbury	System Wide / Overflow Locations	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£265K	AMP8	-	PO4 PO7 PO10
CANT.OT01.7	Stour	Canterbury	CANT FC05 Tyler Hill	Growth scheme from our Drainage Area Plan (DAP): Provide offline storage of approximately 51m3 or separate rainfall runoff at source to reduce spills from the EMO at Tyler Hill; storage volume needs to be confirmed due to discrepancies between DAP and model data	£265K	AMP9	Kent County Council	PO4 PO7
CANT.OT01.8	Stour	Canterbury	CANT FC6 Canterbury WTW	Growth scheme from our Drainage Area Plan (DAP): Provide offline storage of approximately 331m3 or separate rainfall runoff at source to reduce spills from the SSO at Canterbury WTW; storage volume needs to be confirmed due to discrepancies between DAP and model data	£265K	AMP9	Kent County Council	PO4 PO7

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
CANT.WINEP01.1	Stour	Canterbury	HOSPITAL FARM HARBLEDOWN CEO	Reduce the number of storm discharges from HOSPITAL FARM HARBLEDOWN CEO by a combination of SuDS and storage options	£4,730K	AMP11	-	PO4 PO5 PO7 PO9
CANT.WINEP01.2	Stour	Canterbury	FORDWICH ROAD STURRY CEO	Reduce the number of storm discharges from FORDWICH ROAD STURRY CEO by creating below-ground storage	£1,040K	AMP11	-	PO5 PO9
CANT.WINEP01.3	Stour	Canterbury	WINCHEAP CANTERBURY CSO	Reduce the number of storm discharges from WINCHEAP CANTERBURY CSO by a combination of SuDS and storage options	£6,035K	AMP11	-	PO4 PO5 PO7 PO9
CANT.WINEP.PO2.1	Stour	Canterbury	Canterbury WTW	Extend existing biological treatment plant and modify to remove additional phosphorus and nitrate, including ferric dosing and/or alkalinity dosing and/or deep bed sandfilters (WINEP action 08SO102664)	£60,548K	AMP8	-	PO9 PO11

Drainage and Wastewater Management Plan: Location of Potential Options CANTERBURY Wastewater system in Stour River Basin Catchment

WATER for LIFE from Southern Water

(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 Nutrient Neutrality
- WINEP Storm Overflows

CANT.PW01.1
CANT.PW01.3
CANT.PW01.9
CANT.SC03.1
CANT.PW01.8
CANT.PW01.4
CANT.WINEP01.1
CANT.WINEP01.3
CANT.PW02.2
CANT.WINEP.PO2.1
CANT.WINEP01.2
CANT.SC03.2

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