



# Drainage and Wastewater Management Plan

Thornham  
Wastewater System Plan



from  
**Southern  
Water** 

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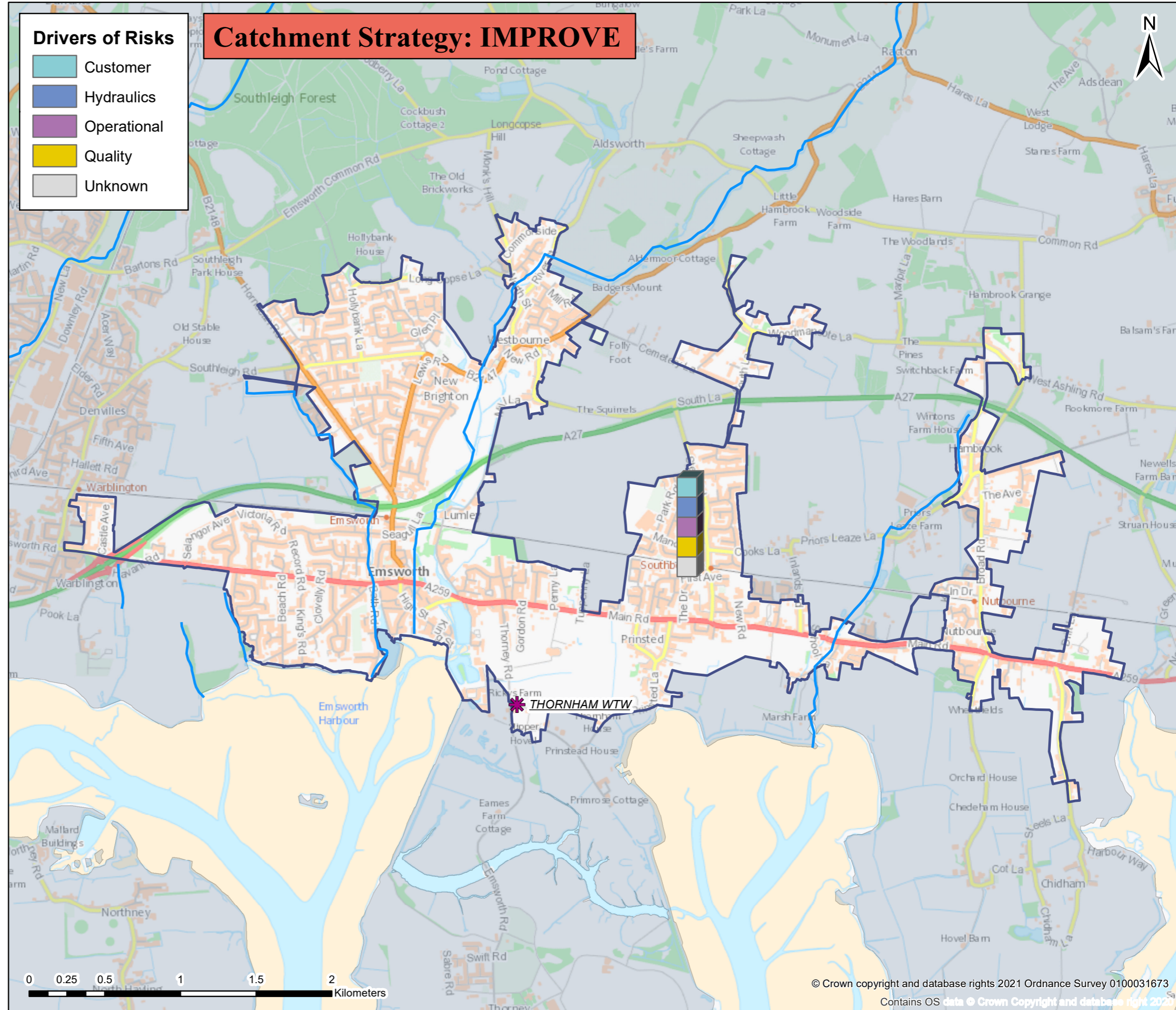
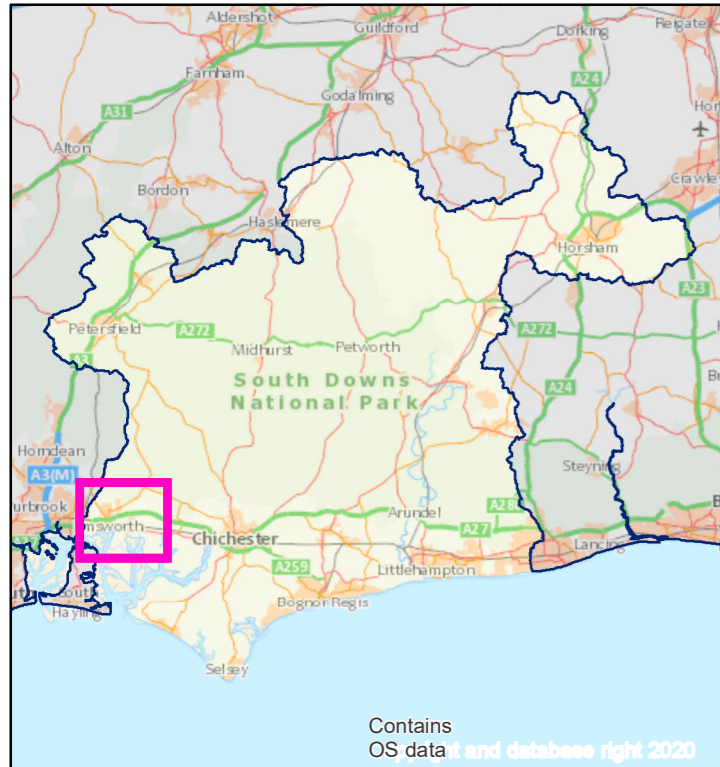
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# Thornham wastewater system: map and key facts



Population Equivalent (PE)	21,339
Discharge Waterbody	Chichester Harbour
Number of Pumping Stations	15
Number of Overflows	6
Length of Sewer (km)	215.9
Catchment Reference	THOR

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



# Problem Characterisation

## Thornham (THOR)

This document describes the causes of the risks identified by the Baseline Risk and Vulnerability Assessment (BRAVA). The BRAVA results for this wastewater system are summarised in Table 1. The results indicate that flooding, pollution and water quality are the main concerns in this wastewater system. 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 Thornham wastewater system**

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

### 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

### Investment Strategy

The risks identified in this wastewater system 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).

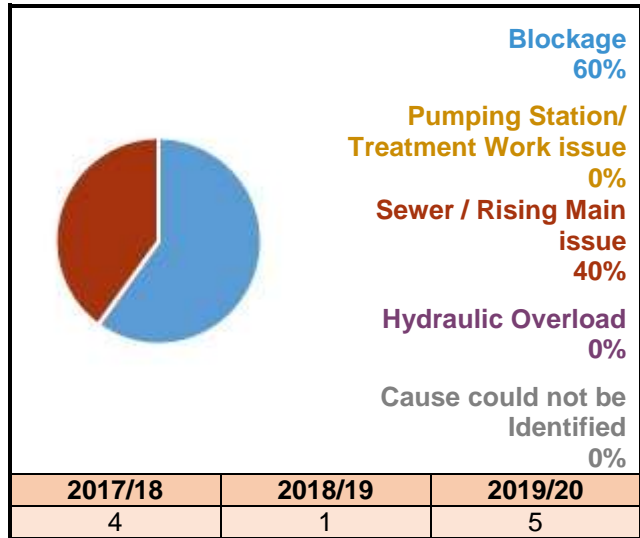


**Planning Objective 1: Internal Sewer Flooding Risk**

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 than 3.35 incidents per 10,000 connections per year (a threshold set by Ofwat) so the risk is in the 'very significant' band.<sup>2</sup>

The primary driver for internal sewer flooding in this wastewater system is 'Customer'. Blockages caused 60% 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.

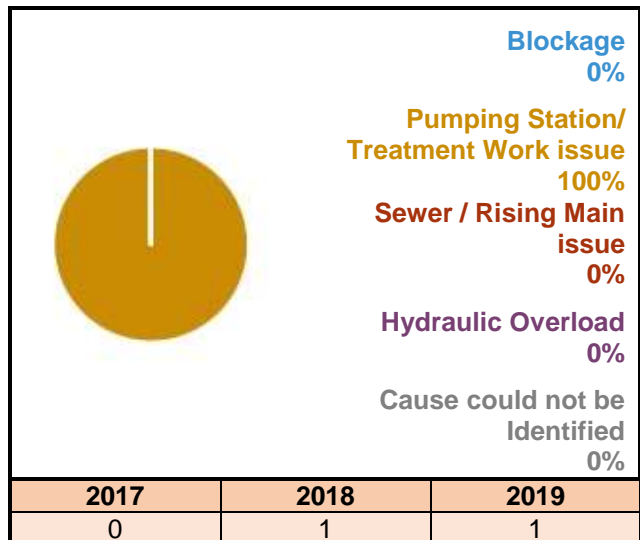
**Figure 1: Number of internal flooding incidents per annum and causes**



**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 less than 24.51 incidents per 10,000km per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

**Figure 2: Number of pollution incidents per annum and causes**



**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 less than 5.72 incidents per 1,000km per year (a threshold set by Ofwat) so the risk is in the 'not significant' band.

**Table 2: Sewer collapses and rising main bursts**

Sewer Collapse	2017/18	1
	2018/19	1
	2019/20	0
Rising Main Bursts	2017/18	1
	2018/19	0
	2019/20	0

### 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 300 - 400 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 700 - 800 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
<b>Shellfish Waters</b>	1 High	1 High	Less than 8	Between 8-10	10 or more
<b>Bathing Waters</b>	0 Medium	1 High	Less than 3	Between 3-10	10 or more
<b>Freshwater</b>	1 Medium	1 Medium	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 2020 but is predicted to increase to moderately significant by 2050. This is because the wastewater treatment works has no record of compliance failure during the last three years (2018-2020). However it was assessed to not have adequate capacity to cope with future growth in the wastewater system.

### 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 moderately significant in 2020. The risk 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	1	108	1	68
1 in 2	10	164	4	65
1 in 5	71	322	13	58
1 in 10	144	431	14	41
1 in 20	253	563	12	27
1 in 30	325	656	11	22
<b>Total Annualised</b>			<b>54</b>	<b>281</b>

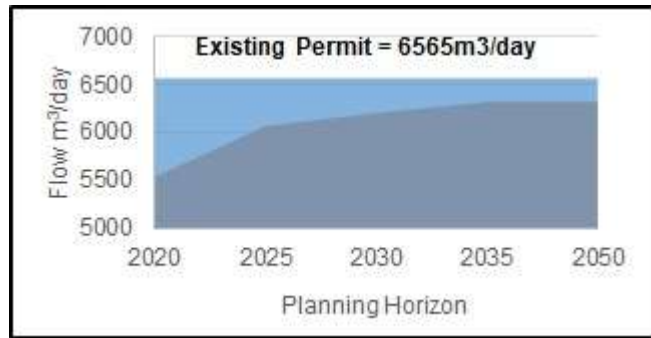
This indicates that the existing capacity of the wastewater network can be exceeded during 1 in 30 year storms (or more frequent events), and that the risk will increase due to future growth, creep and/or climate change by 2050.

**Planning Objective 8: Wastewater Treatment Works Dry Weather Flow Compliance**

The risk of Wastewater Treatment Works Dry Weather Flow Compliance is moderately significant for both 2020 and 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. The predicted DWF in 2050 is also expected to remain below 100% of 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**



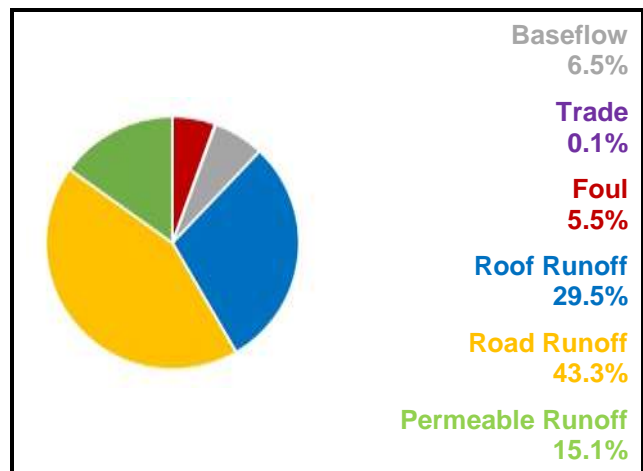
**Planning Objective 9: Good Ecological Status / Good Ecological Potential**

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**

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 87.9% of the flow in the sewers. The total contribution of foul water from homes is 5.5% with business contributing 0.1%. The baseflow is infiltration from water in the ground and makes up 6.5% 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

The risk to internationally designated habitat sites from this wastewater system is very significant in 2020 and 2050. This is because Natural England have advised that there is a risk to condition for the habitat sites that are hydraulically linked to our wastewater system, listed in Table 5.

**Table 5: Habitat Sites hydraulically linked to wastewater system**

Habitat Sites	
Chichester and Langstone Harbours	Phosphate permit review required Overflow Spills
Solent and Dorset Coast	Phosphate permit review required Overflow Spills
Solent Maritime	Phosphate permit review required Overflow Spills

### Planning Objective 12: Groundwater Pollution

The risk of Groundwater Pollution is not significant. Although our wastewater network crosses over Source Protection Zones (SPZ) used for water supply, there is no evidence to suggest our network is leaking into these SPZs.

### Planning Objective 13: Bathing Waters

The designated bathing waters that could be affected by discharges from this wastewater system are shown in Table 6, along with the current classification from the Environment Agency. The risks from this wastewater system on these bathing waters is not significant. This is because all the designated bathing waters affected by this wastewater system have passed annual inspections..

**Table 6: Bathing Water annual results**

Bathing Waters	Annual Results		
	2017	2018	2019
West Wittering	Excellent	Excellent	Excellent
Eastoke	Excellent	Excellent	Excellent

### Planning Objective 14: Shellfish Waters

The discharges from this wastewater system can affect the designated shellfish waters shown in Table 7. The risk of not achieving the faecal standards for shellfish in these designated waters from this wastewater system is moderately significant. This is because the CEFAS classification for the shellfish waters is Long Term Class B.

**Table 7: Shellfish Waters linked to wastewater system**

Shellfish Waters
Chichester Harbour (Emsworth)
Chichester Harbour (Thornham)
Chichester Harbour (Chichester)



# Generic Options Assessment for: Thornham (THOR)



Planning Objectives		2020	Driver	2050	Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
PO1	Internal Flooding	2	Customer	-	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
PO2	Pollution Risk	0	-	-		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
PO3	Sewer Collapse	0	-	-		Improve <b>quality</b> 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
PO4	Risk of Sewer Flooding in 1 in 50 yr	1	Hydraulic	1		Reduce the <b>quantity</b> / demand		Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source
PO5	Storm Overflow Performance	2	Hydraulic	2	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.
PO6	Risk of WTW Compliance Failure	0	Quality	1		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
PO7	Annualised Flood Risk/Hydraulic Overload	1	Hydraulic	2		Wastewater Transfer to treatment elsewhere		N	The causes of risk are not due to where our systems discharge to the environment or our ability to increase the capacity to connect more homes. Transferring wastewater for treatment elsewhere will not reduce any of the significant risks in this catchment.	Transfer flow to other network or treatment sites; transport sewage by tanker to other sites
PO8	DWF Compliance	1	Quality	1	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
PO9	Achieve Good Ecological Status	0	-	-		Improve Land and Soils		N/A	Not included in first round of DWMPs	Sludge soil enhancement
PO10	Improve Surface Water Management	0	-	-		Mitigate impacts on receiving waters		Y	-	River enhancement, aeration
PO11	Secure Nutrient Neutrality	2	Unknown	2		Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
PO12	Reduce Groundwater Pollution	0	-	-	Other	Study / Investigation		Y	-	Additional data required; hydraulic model development; WQ monitoring and modelling
PO13	Improve Bathing Water Quality	0	-	-						
PO14	Improve Shellfish Water Quality	1	Unknown	-						

# Thornham 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	THOR FC01 - Woodlands Avenue	PO4 and PO7 Flooding	THOR.SC01.1	Surface Water Separation	DAP Option.	No						
Control/ Reduce surface water entering the sewers	THOR FC02 -Main Road, Nutbourne	PO4 and PO7 Flooding	THOR.SC01.2	Surface Water Separation	DAP Option.	No						
Control/ Reduce surface water entering the sewers	THOR FC03 -Brook Gardens	PO4 and PO7 Flooding	THOR.SC01.3	Surface Water Separation	DAP Option.	No						
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Watersedge Gardens, Victoria Road, Main Road, Harbour Way	PO1- Internal Flooding	THOR.SC03.1	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	THORNHAM WTW	PO8 (2050)- Dry Weather Flow	THOR.SC04.1	Water Efficient Appliance / Measures	Southern Water aims to reduce water consumption to 100 l/h/d by 2040.	No						Deliver the required outcome
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO1- Internal Flooding	THOR.PW01.1	Pipe Rehabilitation Programme	Pipe Rehabilitation Programme.	Yes	Yes	Yes	Minor Positive +	£255K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO8 (2050)- Dry Weather Flow	THOR.PW01.2	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment.	No						Cost Effective and Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Watersedge Gardens, Victoria Road, Main Road, Harbour Way	PO1- Internal Flooding	THOR.PW01.3	Jetting Programme	Jetting Programme.	Yes	Yes	Yes	Minor Positive +	£70K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC01 - THORNHAM WTW	PO5, PO13 and PO14 - Spill Assessments	THOR.PW01.4	Storage ( FC01 - THORNHAM WTW)	The DAP model has a confidence score of 4 and was last verified in 2006.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC01 - WOODLANDS AVENUE & HORNDEAN ROAD	PO4, and PO7 - Growth	THOR.PW01.5	On-line Storage (THORGR002 Option 2A Plan 1)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC02 - THORNHAM WTW	PO4, and PO7 - Growth	THOR.PW01.6	On-line Storage (THORGR002 Option 2A Plan 2)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC03 - PRINSTED LANE	PO4, and PO7 - Growth	THOR.PW01.7	On-line Storage (THORGR002 Option 2A Plan 3)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC04 - STEIN ROAD, MAIN ROAD & PRINSTED LANE	PO4, and PO7 - Growth	THOR.PW01.8	Upsizing (THORGR002 Option 2A Plan 4)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC05 - PRINSTED LANE	PO4, and PO7 - Growth	THOR.PW01.9	Upsizing (THORGR002 Option 2A Plan 5)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC06 - COOKS LANE	PO4, and PO7 - Growth	THOR.PW01.10	Upsizing (THORGR002 Option 2A Plan 6)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC07 - PRINSTED LANE	PO4, and PO7 - Growth	THOR.PW01.11	Upsizing (THORGR002 Option 2A Plan 7)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC08 - MAIN ROAD	PO4, and PO7 - Growth	THOR.PW01.12	Upsizing (THORGR002 Option 2A Plan 8)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC09 - MAIN ROAD	PO4, and PO7 - Growth	THOR.PW01.13	Upsizing (THORGR002 Option 2A Plan 9)	DAP Option.	No						
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC01 - Woodlands Avenue	PO4 and PO7 Flooding	THOR.PW01.14	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£3,405K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC02 -Main Road, Nutbourne	PO4 and PO7 Flooding	THOR.PW01.15	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,010K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	THOR FC03 -Brook Gardens	PO4 and PO7 Flooding	THOR.PW01.16	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,955K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	THORNHAM WTW	PO6 (2050)- WTW compliance	THOR.PW02.1	Increase Capacity	Increase Capacity.	Yes	Yes	Yes	Minor Positive +	£34,900K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	THORNHAM WTW	PO8 (2050)- Dry Weather Flow	THOR.PW02.2	Permit Review	Proposed permit-8175m3.	Yes	Yes	Yes	Minor Positive +	£2,205K	Yes	Best Value
Wastewater Transfer	THORNHAM WTW	PO8 (2050)- Dry Weather Flow	THOR.PW03.1	Construct New WPS & Rising Main	No other WTWs are within a 20km radius of THORNHAM WTW with spare capacity to take DWF.	No						Technically feasible, Cost Effective, Deliver the required outcome, Environmental risk mitigatable, Do customer support it and Risk and uncertainty - future resilience
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)												
Study/ investigation to gather more data	Catchment Wide	PO8 (2050)- Dry Weather Flow	THOR.OT01.1	Infiltration Reduction Plan	Relining/improving structural grades of sewers across the catchment.	No						Risk and uncertainty - future resilience
Study/ investigation to gather more data	Chichester and Langstone Harbours Solent and Dorset Coast Solent Maritime	PO11 - Nutrient Neutrality	THOR.OT01.2	Nutrient Budget	Catchment is Hydraulically linked to; Chichester and Langstone Harbours (Threat/Remedy Identified or Anticipated) Solent and Dorset Coast (Threat/Remedy Identified or Anticipated) Solent Maritime (Threat/Remedy Identified or Anticipated).	Yes	Yes	Yes	Minor Positive +	£75K	Yes	Best Value
Study/ investigation to gather more data	Catchment Wide	PO4- 1 in 50 year PO5- Storm Overflow PO7- Hydraulic Overload	THOR.OT01.3	Improve Hydraulic Model	Improve Hydraulic Model.	Yes	Yes	Yes	Minor Positive +	£200K	Yes	Best Value

## Thornham 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	THOR FC01 - KINGS ROAD EMSWORTH NO.2 CSO	PO5, PO13 and PO14 - Spill Assessments	THOR.OT01.4	Storage ( FC01 - KINGS ROAD EMSWORTH NO.2 CSO)	The DAP model has a confidence score of 4 and was last verified in 2006.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	THOR FC012 - SCHOOL LANE NUTBOURNE CEO	PO5, PO13 and PO14 - Spill Assessments	THOR.OT01.5	Storage	The DAP model has a confidence score of 4 and was last verified in 2006.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value

## Drainage and Wastewater Management Plan (DWMP)

# 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

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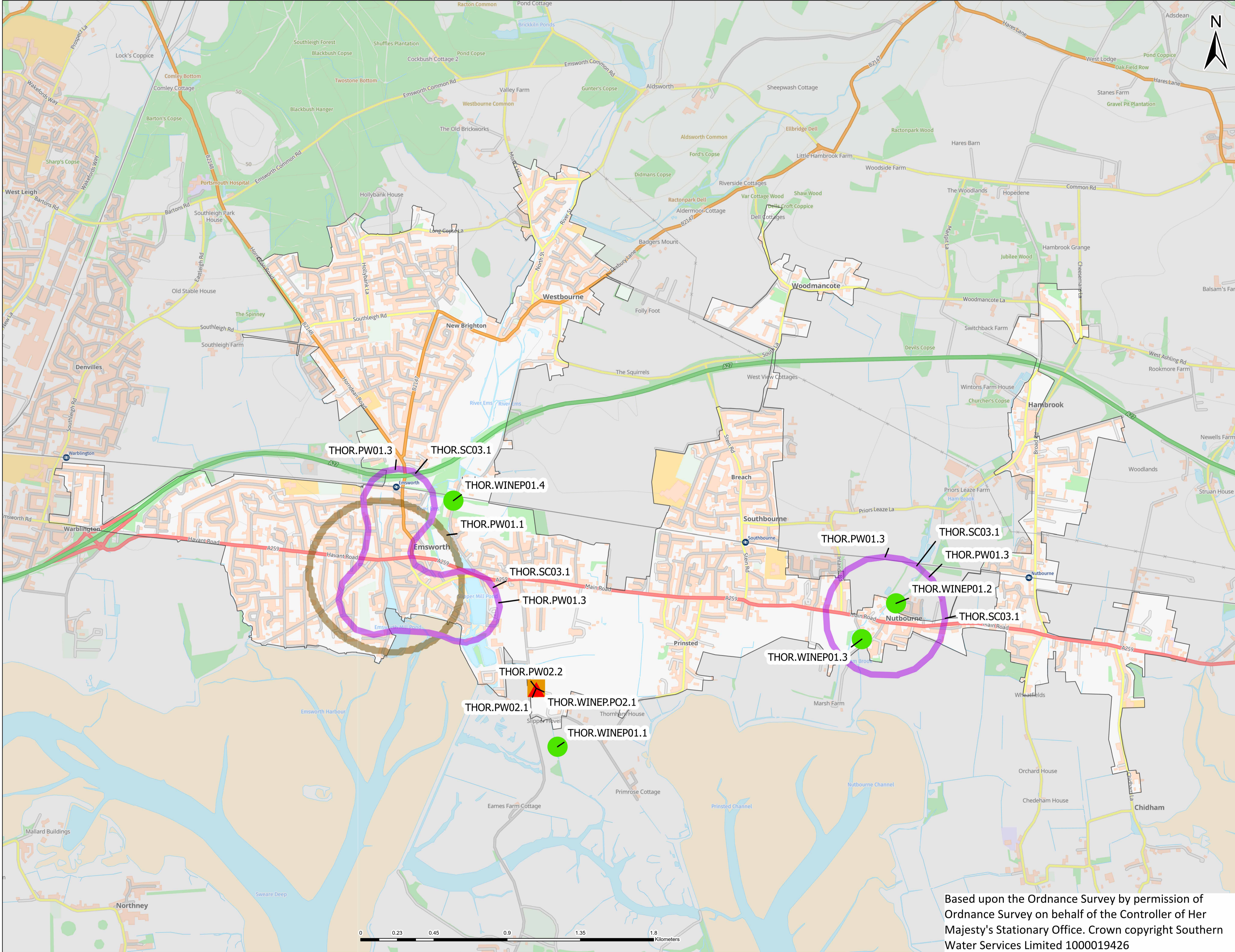
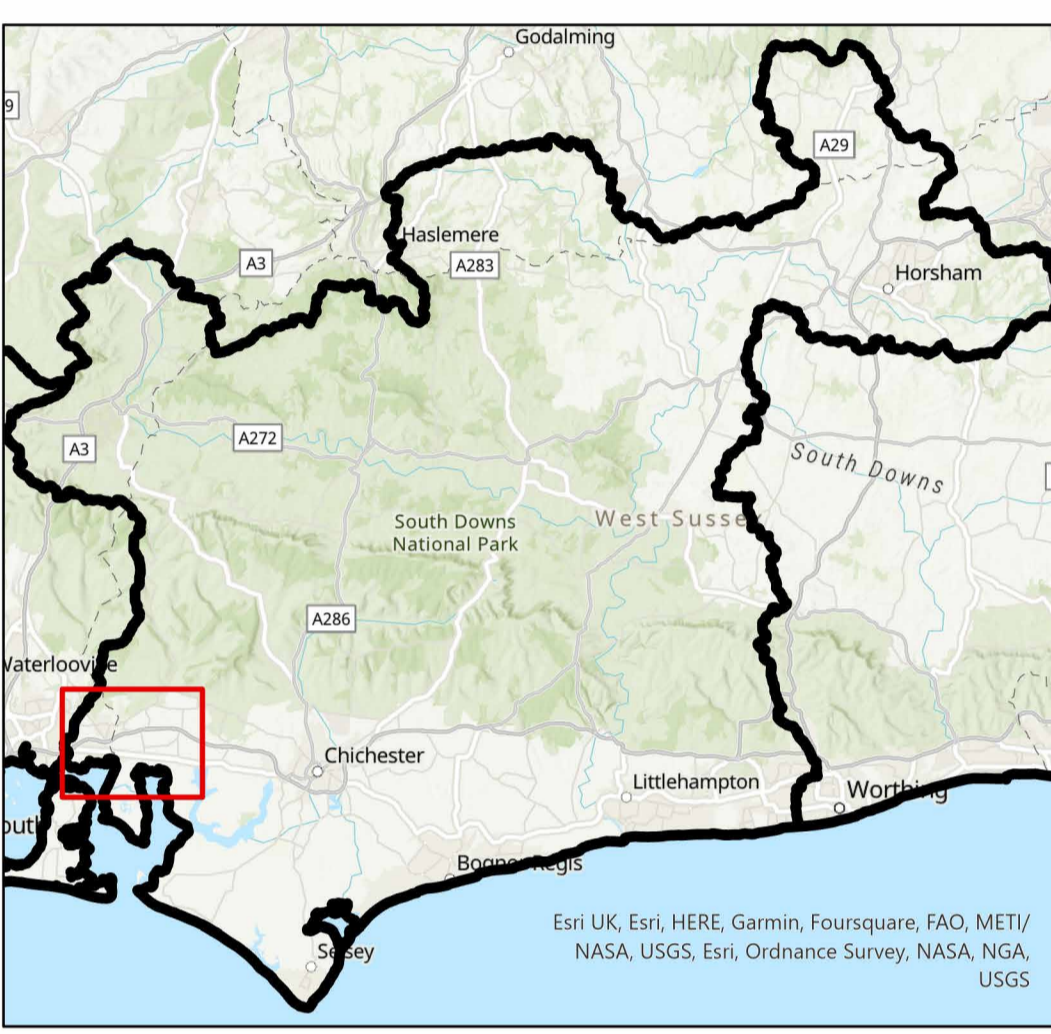
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
<b>Arun and Western Streams</b>								
<b>Thornham</b>								
THOR.SC03.1	Arun and Western Streams	Thornham	Watersedge Gardens, Victoria Road, Main Road, Harbour Way	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	West Sussex County Council Chichester District Council	PO1
THOR.PW01.1	Arun and Western Streams	Thornham	Emsworth	Sewer Rehabilitation: Targeted CCTV or electroscan surveys and sewer rehabilitation to reduce the risk of sewer bursts and collapses	£255K	AMP8 onwards	-	PO1
THOR.PW01.3	Arun and Western Streams	Thornham	Watersedge Gardens, Victoria Road, Main Road, Harbour Way	Enhanced Sewer Maintenance: Increase targeted sewer jetting to reduce the number of blockages in the network	£70K	AMP8 onwards	-	PO1
THOR.PW01.14	Arun and Western Streams	Thornham	Woodlands Avenue	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)	£3,405K	AMP9	West Sussex County Council Chichester District Council	PO4 PO7
THOR.PW01.15	Arun and Western Streams	Thornham	Main Road, Nutbourne	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)	£1,010K	AMP9	West Sussex County Council Chichester District Council	PO4 PO7
THOR.PW01.16	Arun and Western Streams	Thornham	Brook Gardens	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)	£1,955K	AMP9	West Sussex County Council Chichester District Council	PO4 PO7
THOR.PW02.1	Arun and Western Streams	Thornham	Thornham WTW	Increase treatment capacity to allow for planned new development	£34,900K	AMP10	Environment Agency	PO6
THOR.PW02.2	Arun and Western Streams	Thornham	Thornham WTW	Increase capacity to allow for planned new development	£16,500K	AMP8	-	PO8
THOR.OT01.2	Arun and Western Streams	Thornham	Chichester and Langstone Harbours Solent and Dorset Coast Solent Maritime	Study and Investigation to understand the potential impact of wastewater discharges on Habitats and identify measures to prevent deterioration from Natural England's revised Common Standards Monitoring Guidance (rCSMG) targets for Total Phosphorus and Total Nitrogen	£695K	AMP8	Natural England	PO11
THOR.OT01.3	Arun and Western Streams	Thornham	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£200K	AMP8	-	PO4 PO5 PO7
THOR.WINEP01.1	Arun and Western Streams	Thornham	THORNHAM SSO	Reduce the number of storm discharges from THORNHAM SSO by a combination of SuDS and storage options	£4,930K	AMP8	-	PO4 PO5 PO7 PO14
THOR.WINEP01.2	Arun and Western Streams	Thornham	PRIORS LEAZE LANE NUTBOURNE CSO	Reduce the number of storm discharges from PRIORS LEAZE LANE NUTBOURNE CSO by a combination of SuDS and storage options	£955K	AMP8	-	PO4 PO5 PO7 PO14
THOR.WINEP01.3	Arun and Western Streams	Thornham	SCHOOL LANE NUTBOURNE CEO	New or improved screen to reduce aesthetics impacts from storm discharges at SCHOOL LANE NUTBOURNE CEO	£130K	AMP11	-	PO5
THOR.WINEP01.4	Arun and Western Streams	Thornham	LUMLEY ROAD LUMLEY CEO	New or improved screen to reduce aesthetics impacts from storm discharges at LUMLEY ROAD LUMLEY CEO	£130K	AMP12	-	PO5

Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
THOR.WINEP.PO2.1	Arun and Western Streams	Thornham	Thornham WTW	Construct Wetlands to reduce nitrate contributions. (WINEP OAR 08SO104809)	£4,300K	AMP8	-	PO9 PO11

# Drainage and Wastewater Management Plan: Location of Potential Options THORNHAM Wastewater system in Arun and Western Streams 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 Nutrient Neutrality
- WINEP Storm Overflows



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