

Drainage and Wastewater Management Plan

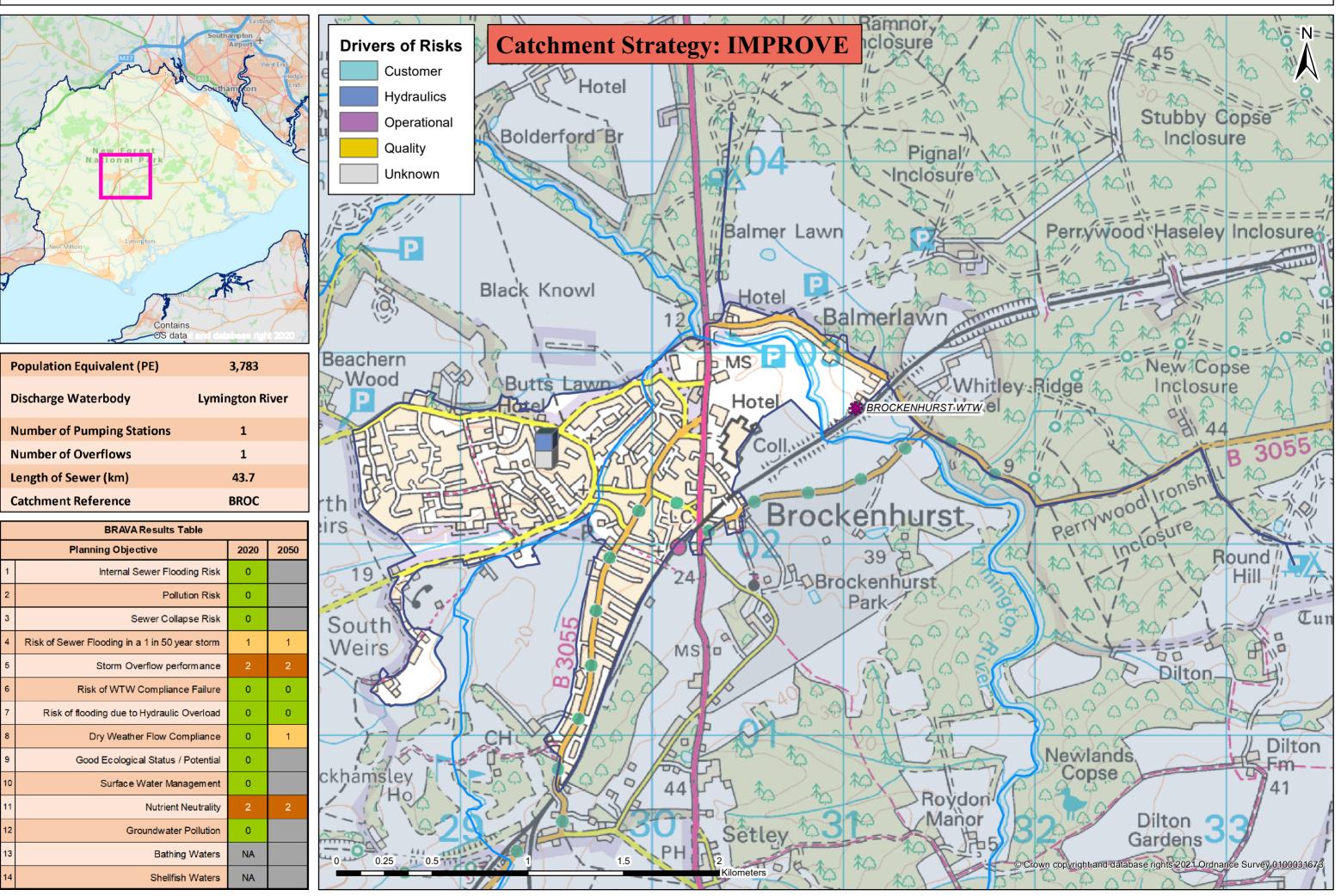
Brockenhurst Wastewater System Plan

> from Southern Water

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Brockenhurst wastewater system: map and key facts





Problem Characterisation Brockenhurst (BROC)

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.

Pla	nning Objectives	2020	Driver	2050
1	Internal Sewer Flooding Risk	0	-	
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	-	0
7	Flooding due to Hydraulic Overload	0	-	0
8	WTW Dry Weather Flow Compliance	0	-	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	NA	-	
14	Shellfish Waters	NA	-	

Table 1: Results of the BRAVA for Brockenhurst wastewater system

Key

BRA	VA Risk Band	*No issue
NA	Not Applicable*	to plannin
0	Not Significant	within Wa
1	Moderately Significant	System
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).



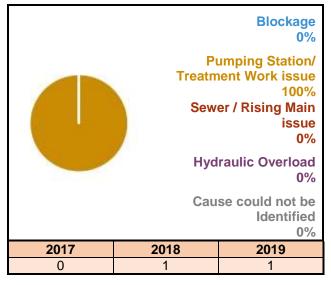
Planning Objective 1: Internal Sewer Flooding Risk

There have been zero (or less than 3) internal flooding incidents reported during the three year period considered by the risk assessment, so the risk is in the 'not significant' band.

Planning Objective 2: Pollution Risk

The number of pollution incidents reported during the three years considered by the risk assessment are shown in Figure 1. 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 1: Number of pollution incidents per annum and causes



Planning Objective 3: Sewer Collapse Risk

There have been no sewer collapses or rising main bursts in the three years considered by this risk assessment so the risk is in the 'not significant' band.

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 40 - 40 properties within this wastewater system are in areas that could flood by water escaping from sewers. The model prediction for 2050 does not identify a notable increase.

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 2 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.'

	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				

Table 3: Overflows exceeding discharge frequency threshold per annum

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).

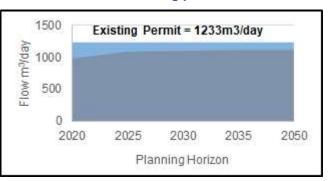
Planning Objective 7: Flooding due to Hydraulic Overload

Our initial assessment is that flooding from hydraulic overload is not significant in this wastewater catchment for both 2020 and 2050. We will use a hydraulic model of the wastewater system to determine if this catchment is at risk for Hydraulic Overload across the various storm events, and update this risk assessment accordingly for the next cycle of DWMPs.

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 2. 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

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

A network model was not available for this assessment, therefore the risk has been moderated to not significant for this planning objective.

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 3.

Table 3: Habitat Sites hydraulically linked to wastewater system

Habitat Sites								
Solent and Dorset Coast	Nitrate permit review required Overflow Spills							
Solent & Southampton Water	No Threat/Remedy Identified or Anticipated							

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.

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Generic Options Assessment for: Brockenhurst (BROC)



		0		0								
	Planning Objectives	2020	Driver	205(Type of Measures	Generic Option Categories	lcon	Take Forward?	Reasons	Examples of Generic Options		
PO1	Internal Flooding	0	-	-		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	-	-	Source (Demand) Measures	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	-	-	(to reduce likelihood)	Improve quality of wastewater	\bigcirc	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.	Domestic and business customer education; incentives an 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 quantity / demand	$(\frac{1}{2})$	Y	-	Water efficient appliances; water efficient measures; blackwater and/or greywater re-use; treatment at source		
PO5	Storm Overflow Performance	2	Hydraulic	2	Pothway	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	-	0	Pathway (Supply) Measures (to reduce	Improve Treatment Quality	(8-8)	Y	-	Increase treatment capacity; rationalisation of treatment works (centralisation / de-centralisation); install tertiary plant; UV plant or disinfection facilities; innovation; improv Technical Achievable Limits; new WTWs		
PO7	Annualised Flood Risk/Hydraulic Overload	0	-	0	likelihood)	Wastewater Transfer to treatment elsewhere)1(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; transpor sewage by tanker to other sites		
PO8	DWF Compliance	0	-	1		Mitigate impacts on Air Quality		N/A	Not included in first round of DWMPs	Carbon offsetting; noise suppression /filtering; odour contr and treatments		
PO9	Achieve Good Ecological Status	0	-	-	Receptor Measures	Improve Land and Soils	<u></u>	N/A	Not included in first round of DWMPs	Sludge soil enhancement		
PO10	Improve Surface Water Management	0	-	-	(to reduce consequences)	Mitigate impacts on receiving waters	8	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	Q	Y	-	Additional data required; hydraulic model development; Wo monitoring and modelling		
PO13	Improve Bathing Water Quality	NA	-	-								
PO14	Improve Shellfish Water Quality	NA	-	-						August 2021 Version 1		

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
				Natural Flood	Attenuation of flows upstream - current ongoing		option	option?			option	Reasons for Rejection
Control/ Reduce surface water entering the sewers	Upstream of catchment	PO4, PO5 - Hyrdaulic Drivers	BROC.SC01.1	Management	project.	No						Do customer support it
Control/ Reduce surface water entering the sewers	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC01.2	Rain Water Harvesting	Use of rain water harvesting techniques using, for example, water butts, rain gardens and ponds in residential gardens to help alleviate summer storm events across the catchment.	No						Risk and uncertainty - future resilience
Control/ Reduce surface water entering the sewers	Site of New Forest Show	PO4 .PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC01.3	Natural Flood Management	Study / Investigation: Identify suitable location/s for surface water separation on the grounds of New Forest Show (update hydraulic model) Use site of the New Forest Show to install natural flood management techniques - attenuation of flows upsream of catchment - in the wetter winter months.	Yes	Yes	Yes	Moderate Positive ++	£TBC - With Partners	No	Best Value
Control/ Reduce surface water entering the sewers	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC01.4	Changes in Rural Land Drainage	Using results of option BROC.	No						Technically feasible
Control/ Reduce surface water entering the sewers	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 -	BROC.SC01.5	Surface Water Seperation	Using results of option BROC.	No						Technically feasible
Control/ Reduce surface water entering the sewers	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC01.6	SuDS	Using results of option BROC.	No						Technically feasible
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)												
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050)- Dry Weather Flow	BROC.SC04.1	Water Efficient Measures	Southern Water aims to reduce water consumption to 100 l/h/d by 2040.	Yes	No					Environmental - Strategic Environmental Assessment
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC04.2	Water Efficient Appliances	Promotion of water efficient appliances.	No						Deliver the required outcome
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO4 PO5 Underste Deisers & PO9	BROC.SC04.3	Grey water Reuse	Reuse of wasewater from sinks, baths, washing machines and other kitchen appliances for use in flushing toilets.	Yes	No					Performance and Sustainability
Control / Reduce the quantity / flow of wastewater entering sewer system	Campsite @ Hollands Wood	PO8 (2050) - Dry Weather Flow	BROC.SC04.4	Water Efficient Measures	Southern Water aim to reduce water consumption to 100 l/h/d by 2040.	No						Deliver the required outcome
Control / Reduce the quantity / flow of wastewater entering sewer system	Campsite @ Hollands Wood	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC04.5	Water Efficient Appliances	Promotion of water efficient appliances - removing excess flows that are a particular challenge on bank holidays.	No						Deliver the required outcome
Control / Reduce the quantity / flow of wastewater entering sewer system	Campsite @ Hollands Wood	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC04.6	Grey water Reuse	Reuse of wasewater from sinks, baths, washing machines and other kitchen appliances for use in flushing toilets.	No						Technically feasible
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.SC04.7	Customer Incentive Programme	Incentivise customers to reduce their consumption rate through bill reduction and voucher schemes.	No						Cost Effective, Environmental risk mitigatable and Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers	BROC.PW01.1	Separate Flows (WfL-H)	Construction of new surface water sewers to channel excess flow away from combined/foul sewers, instead utilsing water to assist in capture of further water for WfL-H project.	No						Technically feasible
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers	BROC.PW01.2	Separate Flows	Seperating surface water flows from sewers.	No						Technically feasible
Network Improvements (eg increase capacity, storage, conveyance)	Targeted locations resulting from results of BROC.OT01.1	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.PW01.3	Additional Storage Capacity	Based on results of new hydraulic model (option BROC.	No						Deliver the required outcome and Risk and uncertainty - future resilience
Network Improvements (eq increase capacity, storage, conveyance)	Targeted locations resulting from results of BROC.OT01.1	DOA DOE Undersalia Deixera 8 DOA	BROC.PW01.4	Additional Conveyance Capacity	Based on results of new hydraulic model (option BROC.	No						Deliver the required outcome
(capacity and quality at existing works or develop new WTWs)	Brockenhurst WTW	PO8 (2050) - Dry Weather Flow	BROC.PW02.1	Permit Review	Increase capacity of the Wastewater Treatment Works (WTW).	Yes	Yes	Yes	Minor Positive +	£3,105K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	Effected Designated Sites/Brockenhurst WTW	PO11 - Nutrient Neutrality	BROC.PW02.2	Install P removal tertiary plant	Remove more P from final effluent, past the currently allowed 1Mg/L permitted rate.	No						Risk and uncertainty - future resilience
mprove treatment (capacity and quality at existing works or develop new WTWs)	Effected Designated Sites/Brockenhurst WTW	PO11 - Nutrient Neutrality	BROC.PW02.3	Install N removal tertiary plant	Currently no Nitrate permit, although there is an Ammonia permit.	No						Risk and uncertainty - future resilience
improve treatment (capacity and quality at existing works or develop new WTWs)	Brockenhurst WTW	PO11 - Nutrient Neutrality	BROC.PW02.4	Install UV removal tertiary plant	Install to remove from final effluent.	No						Cost Effective and Risk and uncertainty - futur resilience
Improve treatment (capacity and quality at existing works or develop new WTWs)	Brockenhurst WTW	PO4, PO5 - PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow & PO11 - Nutrient Neutrality	BROC.PW02.5	Centralisation of Treatment	As mentioned in the stakeholder meeting it could be possible to pump the effluent to a larger catchment treatment works - however, it was noted that issues would arise relating to levels of flow in the river in the summer months - so this would need to be modelled and potentially mitigated.	No						Risk and uncertainty - future resilience
Wastewater Transfer Mitigate impacts on Air Quality												Not included in the first round of DWMPs
(e.g. Carbon neutrality, noise, odour) Improve Land and Soils												Not included in the first round of DWMPs Not included in the first round of DWMPs
Vitigate impacts on Water Quality	Effected Designated Sites	PO11 - Nutrient Neutrality	BROC.RC03.1	River enhancement and mitigation	from CSOs, and providing opportunity for natural	No						Deliver the required outcome
Mitigate impacts on Water Quality	Effected Designated Sites/Brockenhurst WTW	PO11 - Nutrient Neutrality	BROC.RC03.2	Efflent re-use	nutrient removal. Re-use of effluent from site - pumping of this effluent to potable process treatment works.	No						Cost Effective and Risk and uncertainty - futur resilience
Mitigate impacts on Water Quality	Effected Designated Sites/Brockenhurst WTW	PO11 - Nutrient Neutrality	BROC.RC03.3	Catchment permits	Reduce consented permit levels for nutrients and solids in the final effluent from treatment works.	No						Deliver the required outcome, Do customer support it and Risk and uncertainty - future resilience

Brockenhurst 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
Reduce consequences Properties (e.g. Property Flood Resilience)	Catchment Wide	PO4 - Hydraulic Drivers	BROC.RC04.1	Flood Mitigation for	Flooding mitigation to consider options (but not limited to); Non-return Values, Smart Airbricks, Flood Doors.	Yes	No					Operational
Study/ investigation to gather more data	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.OT01.1		Study / Investigation: Update and re-verify the Brockenhurst Hydraulic Model to improve model confidence.	Yes	Yes	Yes	Minor Positive +	£325K	Yes	Best Value
Study/ investigation to gather more data	Catchment Wide	PO4 ,PO5 - Hydraulic Drivers & PO8 - Dry Weather Flow	BROC.OT01.2	Flooding Investigation	Study / Investigation: Identify suitable location/s for surface water separation in the Brockenhurst catchment (update hydraulic model) Collaborate to identify suitable location/s to separate foul and surface water systems.	Yes	Yes	Yes	Minor Positive +	£230K	No	Best Value
Study/ investigation to gather more data	Solent and Dorset Coast Solent & Southampton Water	PO11 - Nutrient Neutrality	BROC.OT01.3	Nutrient Budget	Study / Investigation: Develop a nutrient budget and investigate the risks and sources impacting these named Habitat sites In order to take forward any unconstrained option - BROC.	Yes	Yes	Yes	Minor Positive +	£75K	Yes	Best Value
Study/ investigation to gather more data	High Spilling CSOs - Brockenhurst WTW	PO5 - High Spilling CSOs		Further Study/Investigation	Surface water separation to reduce spills from Brockenhurst WTW storm overflow (average cost assumed to reduce CSO spills to Band 0) Collaborate to identify suitable location/s to separate foul and surface water systems.	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 Version : 1.0





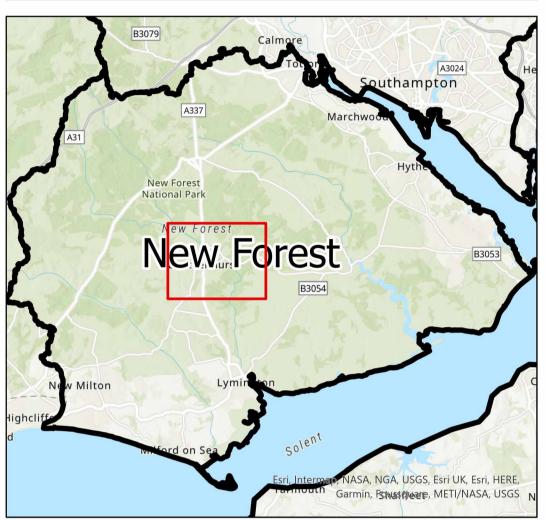
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
New Forest								
Brockenhurst								
BROC.PW02.1	New Forest	Brockenhurst	Brockenhurst WTW	Increase capacity to allow for planned new development	£790K	AMP9	Environment Agency	PO8
BROC.OT01.1	New Forest	Brockenhurst	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£325K	AMP8	New Forest District Council New Forest National Park Authority	PO4 PO5 PO8
BROC.WINEP01.1	New Forest	Brockenhurst	BROCKENHURST SSO	Reduce impact from storm spills from BROCKENHURST SSO through wetland creation and/or sewer lining to reduce infiltration of groundwater	£2,555K	AMP8	-	PO5
BROC.WINEP01.2	New Forest	Brockenhurst	BROCKENHURST CSO	Reduce impact from storm spills from BROCKENHURST CSO through	£1,065K	AMP11	-	PO5
BROC.WINEP.PO2.1	New Forest	Brockenhurst	Brockenhurst WTW	Conversion of existing tertiary treatment to denitrification to achieve 10mg/l Total Nitrogen permit (WINEP action 08SO104003)	£6,812K	AMP8	-	PO11

Drainage and Wastewater Management Plan: Location of Potential Options BROCKENHURST Wastewater system in New Forest River Basin Catchment

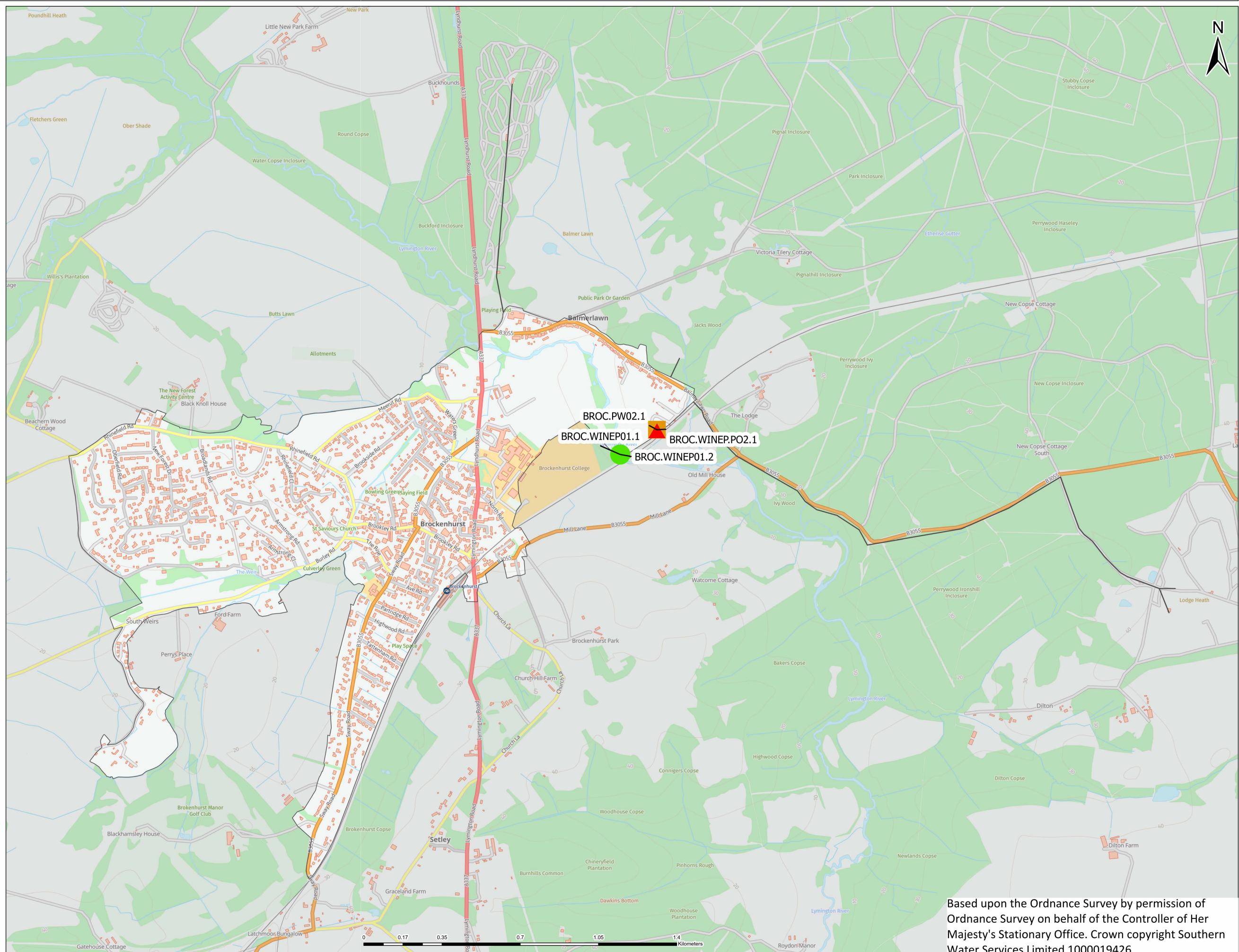
(i) This map should be read in conjunction with the list of Investment Needs for this wastewater system

(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







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