



# Drainage and Wastewater Management Plan

Gravesend  
Wastewater System Plan



from  
**Southern  
Water** 

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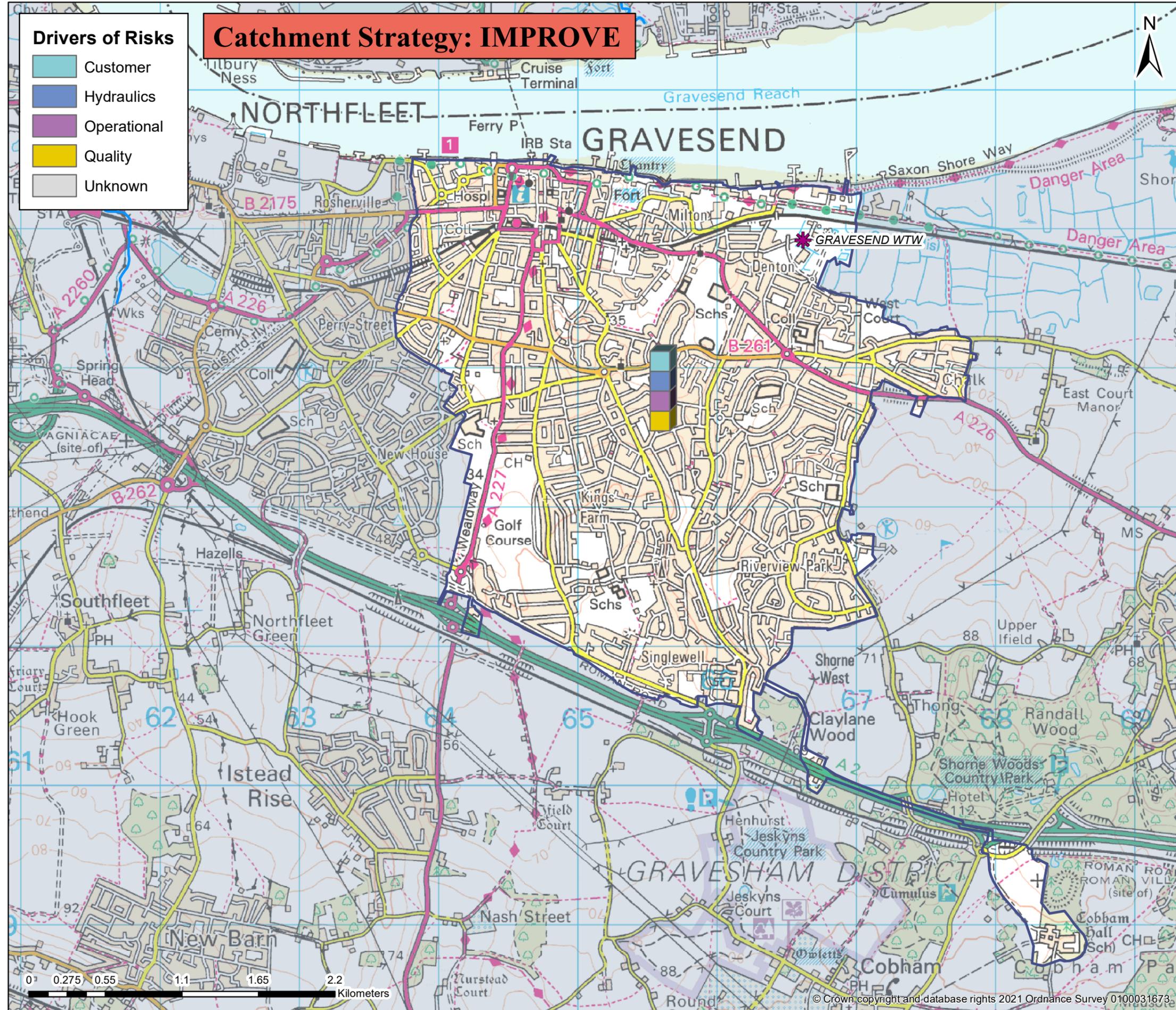
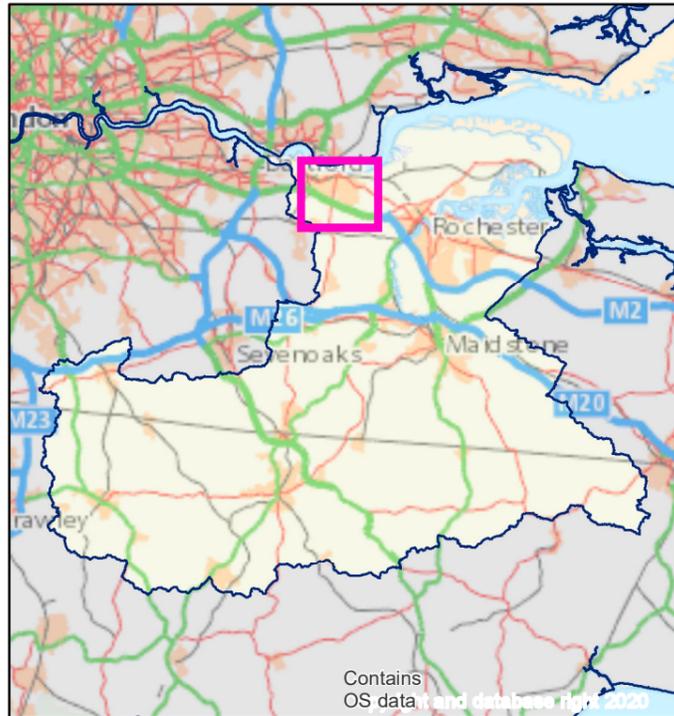
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# Gravesend wastewater system: map and key facts



Population Equivalent (PE)	63,731
Discharge Waterbody	Thames estuary
Number of Pumping Stations	22
Number of Overflows	11
Length of Sewer (km)	417.3
Catchment Reference	GRAV

BRAVA Results Table		
Planning Objective	2020	2050
1 Internal Sewer Flooding Risk	1	
2 Pollution Risk	0	
3 Sewer Collapse Risk	0	
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	2	
11 Nutrient Neutrality	0	0
12 Groundwater Pollution	1	
13 Bathing Waters	NA	
14 Shellfish Waters	NA	



# Problem Characterisation Gravesend (GRAV)

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 Gravesend wastewater system**

Planning Objectives		2020	Driver	2050
1	Internal Sewer Flooding Risk	1	Customer	
2	Pollution Risk	0	-	
3	Sewer Collapse Risk	0	-	
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	2	Hydraulic	
11	Nutrient Neutrality	0	-	0
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).

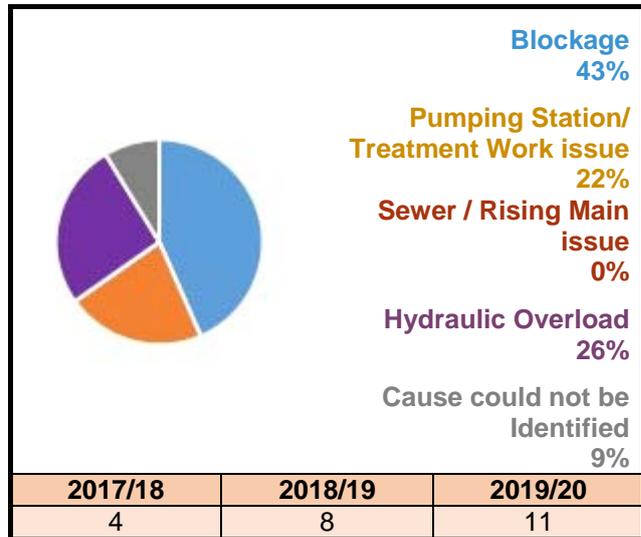


### Planning Objective 1: Internal Sewer Flooding Risk

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 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 43% 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

There has been less than one pollution incident reported on average during the three year period considered by the risk assessment, so the risk is in the 'not significant' band. The exception is if there were two incidents in the most recent year.

### 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

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

### 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 2200 - 2300 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 3200 - 3300 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>	0 Medium	0 Medium	Less than 8	Between 8-10	10 or more
<b>Bathing Waters</b>	0 Medium	0 Medium	Less than 3	Between 3-10	10 or more
<b>Freshwater</b>	2 High	2 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).

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

### 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.

Rainfall Return Period (yr)	Number of Properties at Risk		Annualised per 10,000 connections	
	2020	2050	2020	2050
1 in 1	133	419	84	265
1 in 2	319	508	126	200
1 in 5	736	1104	133	200
1 in 10	1053	1569	100	149
1 in 20	1454	2333	71	114
1 in 30	1714	2754	56	90
<b>Total Annualised</b>			<b>570</b>	<b>1018</b>

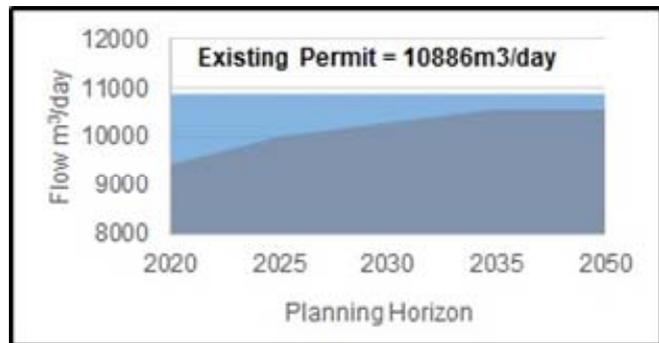
This indicates that the existing capacity of the wastewater network can already be exceeded during 1 in 30 year storms (or more frequent events).

### 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 2. 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

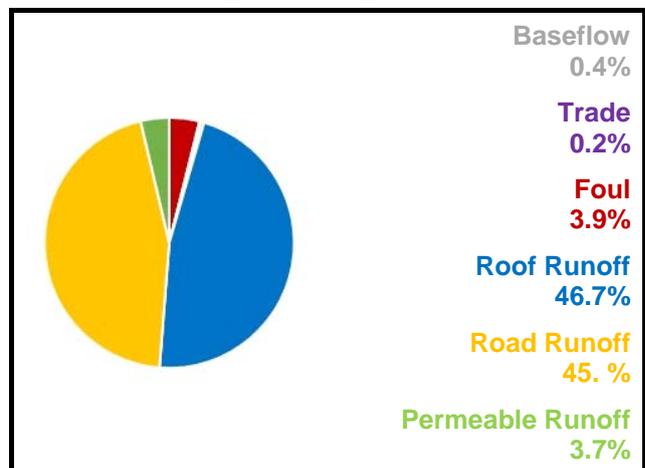
This wastewater system is not hydraulically linked to a waterbody where wastewater operations are contributing to not achieving GES/GEP, therefore the risk is not significant.

### Planning Objective 10: Surface Water Management

Our initial high level assessment indicated that there is very 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 3 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 95.4% of the flow in the sewers. The total contribution of foul water from homes is 3.9% with business contributing 0.2%. The baseflow is infiltration from water in the ground and makes up 0.4% of the flow in the system.

Figure 3: 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 not significant in 2020 or 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: Gravesend (GRAV)



Planning Objectives		2020	Driver	2050	Type of Measures	Generic Option Categories	Icon	Take Forward?	Reasons	Examples of Generic Options
PO1	Internal Flooding	1	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	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
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	2	Hydraulic	2		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	-	0		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	2	Hydraulic	2		Wastewater Transfer to treatment elsewhere		Y	-	Transfer flow to other network or treatment sites; transport sewage by tanker to other sites
PO8	DWF Compliance	1	Quality	2	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	2	Hydraulic	-		Mitigate impacts on receiving waters		N	The receiving waters are not adversely 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
PO11	Secure Nutrient Neutrality	0	-	0		Reduce impact on properties		Y	-	Property flood resilience; non-return valves; flood guards / doors; air brick covers
PO12	Reduce Groundwater Pollution	1	Operational	-	Other	Study / Investigation		N	No further studies are required at this stage	Additional data required; hydraulic model development; WQ monitoring and modelling
PO13	Improve Bathing Water Quality	NA	-	-						
PO14	Improve Shellfish Water Quality	NA	-	-						

# Gravesend 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	River front	PO4, PO7, and PO10 Surface water flooding	GRAV.SC01.1	SuDS for storage	Mitigating surface water flooding in River front through implementation of SuDS (pond / geocellular tank).	Yes	Yes	Yes	Moderate Positive ++	£TBC - With Partners	Yes	Best Value
Control/ Reduce surface water entering the sewers	Southern areas	PO4, PO7, and PO10 Surface water flooding	GRAV.SC01.2	Surface water separation	Opportunities to disconnect surface water runoff from the combined system and direct it to watercourses throughout this area of the catchment.	Yes	Yes	Yes	Moderate Positive ++	£TBC - With Partners	Yes	Best Value
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)	Hotspot 1 - Riverview Park Hotspot 2 - Singlewell Hotspot 3 - Gravesend	PO1- Internal Flooding	GRAV.SC03.1	Customer Education Programme	Customer education programme in Marling Way, Ifield Way, Cross Lane East, Medhurst Crescent, Vigilant Way, St.	Yes	Yes	Yes	Minor Positive +	£115K	Yes	Best Value
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment wide	PO8 (2050) - Dry Weather Flow	GRAV.SC04.1	Water Efficient Appliances / Measures	Link to Target 100 programme to reduce water consumption to 100 l/h/d by 2040.	Yes	No					Environmental - Strategic Environmental Assessment
Network Improvements (eg increase capacity, storage, conveyance)	Northern areas	PO8 - DWF Tidal infiltration	GRAV.PW01.1	Pipe Rehabilitation Programme	Improve resilience to infiltration: sewer sealing in coastal areas under tidal influence and proactive sewer rehabilitation to reduce risk - Link to Sewer Maintenance Programme.	Yes	No					Environmental - Strategic Environmental Assessment
Network Improvements (eg increase capacity, storage, conveyance)	Darney Road WPS, High Street WPS, Mark Lane WPS	PO1- Internal Flooding	GRAV.PW01.2	Maintenance Programme WPS	An efficient maintenance programme for pumping stations to eliminate 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)	Catchment wide	PO8 (2050) - Dry Weather Flow	GRAV.PW01.3	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)	Windmill Hill - inner Zone SP22 TCZ Hazells (Priority zone) - SP22 TCZ	PO12 - Ground Water Pollution	GRAV.PW01.4	Pipe Rehabilitation Programme	Total length of sewer within protection zones: 113 km Sewer Rehab Score: 5582 (therefore Band 1) Infiltration: 5.	Yes	Yes	Yes	Minor Positive +	£4,220K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC01 Three Daws PH, Town Pier	PO1,PO4, PO7 - Flooding	GRAV.PW01.5	Offline Storage Tank	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC02 The Ship & Lobster, Mark Lane	PO1,PO4, PO7 - Flooding	GRAV.PW01.6	Offline Storage and New Sewer	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC03 Upstream of High Street WPS	PO4 & PO7 - Growth	GRAV.PW01.7	Upsizing and Online storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC04 Canal Road WPS and Prospect Grove WPS	PO4 & PO7 - Growth	GRAV.PW01.8	Upsizing and new rising main	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC05 South East Catchment - Riverview Park Area	PO4 & PO7 - Growth	GRAV.PW01.9	New Pumping Station	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC06 South East Catchment - Riverview Park Area	PO4 & PO7 - Growth	GRAV.PW01.10	New sewer section	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC07 South East Catchment - Riverview Park Area	PO4 & PO7 - Growth	GRAV.PW01.11	New Pumping station & Rising main	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC08 Denton Wharf WPS (Ship & Lobster DG5)	PO4 & PO7 - Growth	GRAV.PW01.12	Upsizing / online storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC09 St George's Cof E School playing field	PO4 & PO7 - Growth	GRAV.PW01.13	Upsizing of sewers	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC10 Outfall to Milton Road CSO	PO4 & PO7 - Growth	GRAV.PW01.14	Seal manhole	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC15 Milton Road CSO	PO4 & PO5 - Growth	GRAV.PW01.15	Additional storage volume	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,540K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC16 Old Road West CSO	PO4 & PO5 - Growth	GRAV.PW01.16	Additional storage volume	DAP Option.	Yes	Yes	Yes	Major Positive +++	£660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC17 Gravesend WTW	PO4 & PO7 - Growth	GRAV.PW01.17	Additional pumping capacity	DAP Option.	Yes	Yes	Yes	Major Positive +++	£TBC - With Partners	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC018 - GRAVESEND WTW	PO5 - High frequency of spills affecting Thames Estuary	GRAV.PW01.18	Additional storage volume	Storm Tanks - Offline Storage with pumped return 370m3.	Yes	Yes	Yes	Major Positive +++	£1,650K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	GRAV FC019 - CROSS LANE EAST GRAVESEND CSO	PO5 - Flooding and spill assessments	GRAV.PW01.19	Additional Storage Capacity	The model predicts the below spills for this CSO: Offline storage of 249m3 required to achieve a 3 Spill 2020 solution.	Yes	Yes	Yes	Major Positive +++	£655K	Yes	Best Value
Improve treatment (capacity and quality at existing works or develop new WTWs)	Gravesend WTW	PO8 (2050) - Dry Weather Flow	GRAV.PW02.1	Permit Review	Increase capacity at the Works and permit review to achieve below 80% DWF (Proposed permit: 13,912 m3).	Yes	Yes	Yes	Moderate Positive ++	£2,300K	Yes	Best Value
Wastewater Transfer												
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	Thames Estuary & Marshes	PO10 - Improve Surface Water Management	GRAV.RC03.1	Catchment permits	Enhance river upstream of catchment to provide attenuation of flows, limiting unconsented spills from CSOs, and providing opportunity for natural nutrient removal.	No						Technically feasible
Reduce consequences Properties (e.g. Property Flood Resilience)												
Study/ investigation to gather more data	Northern areas (River front)	PO8 - Dry Weather Flow Significant tidal infiltration	GRAV.OT01.1	Reduction in tidal infiltration	Identify areas where tidal infiltration is more significant (Infiltration validation by CCTV/electroscan surveys/flow monitors in hotspots).	Yes	Yes	Yes	Minor Positive +	£100K	Yes	Best Value
Study/ investigation to gather more data	GRAV FC12 Cobham Street CSO	PO4 & PO5 - Growth and Storm Overflow performance	GRAV.OT01.2	Study / modelling investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	GRAV FC13 Empress Road CSO	PO4 & PO5 - Growth	GRAV.OT01.3	Study / modelling investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	GRAV FC14 High Street Outside No.70 CSO	PO4 & PO5 - Growth	GRAV.OT01.4	Study / modelling investigation	DAP Option.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	GRAV FC020 - CROSS LANE WEST GRAVESEND CSO	PO5 - Storm Overflow performance	GRAV.OT01.5	Additional Storage Capacity	The model predicts the below spills for this CSO: Offline storage of 135m3 required to achieve a 3 Spill 2020 solution.	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
<b>Medway Gravesend</b>								
GRAV.SC03.1	Medway	Gravesend	Marling Way, Ifield Way, Cross Lane East, Medhurst Crescent, Vigilant Way, St. Francis Avenue, Old Road East, Prospect Place	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	Gravesham Borough Council	PO1
GRAV.PW01.2	Medway	Gravesend	Darney Road WPS, High Street WPS, Mark Lane WPS	Improve the operational resilience of wastewater pumping station (WPS) to reduce flooding incidents	£235K	AMP8 onwards	-	PO1
GRAV.PW01.4	Medway	Gravesend	Hazells - SPZ2 TCZ Windmill Hill - inner Zone SPZ2 TCZ	Sewer Rehabilitation: Targeted CCTV or electroscan surveys to check the integrity of sewers and reline or renew them to reduce the risk of groundwater pollution	£4,220K	AMP9	Environment Agency	PO12
GRAV.PW02.1	Medway	Gravesend	Gravesend WTW	Increase capacity to allow for planned new development	£20,000K	AMP8	Environment Agency	PO8
GRAV.OT01.1	Medway	Gravesend	Northern areas (River front)	Increase capacity to allow for planned new development	£100K	AMP8	-	PO8
GRAV.OT01.6	Medway	Gravesend	System Wide	Improve the Hydraulic Model: Surveys and reverification of model to improve confidence and accuracy	£250K	AMP8	-	PO1 PO4 PO5 PO7 PO10
GRAV.WINEP01.1	Medway	Gravesend	GRAVESEND NO.1 SSO	Reduce the number of storm discharges from GRAVESEND NO.1 SSO by a combination of SuDS and storage options	£12,965K	AMP10	-	PO4 PO5 PO7
GRAV.WINEP01.2	Medway	Gravesend	MILTON ROAD GRAVESEND CSO	Reduce the number of storm discharges from MILTON ROAD GRAVESEND CSO by a combination of SuDS and storage options	£8,000K	AMP12	-	PO4 PO5 PO7
GRAV.WINEP01.3	Medway	Gravesend	CRAWLEY COURT GRAVESEND CSO	Reduce the number of storm discharges from CRAWLEY COURT GRAVESEND CSO by a combination of SuDS and storage options	£4,400K	AMP10	-	PO4 PO5 PO7
GRAV.WINEP01.4	Medway	Gravesend	TOWN PIER GRAVESEND CSO	Reduce the number of storm discharges from TOWN PIER GRAVESEND CSO by a combination of SuDS and storage options	£4,120K	AMP10	-	PO4 PO5 PO7
GRAV.WINEP01.6	Medway	Gravesend	OLD ROAD WEST GRAVESEND CSO	New or improved screen to reduce aesthetics impacts from storm discharges at OLD ROAD WEST GRAVESEND CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.7	Medway	Gravesend	CROSS LANE EAST GRAVESEND CSO	Reduce the number of storm discharges from CROSS LANE EAST GRAVESEND CSO by creating below-ground storage	£985K	AMP10	-	PO5
GRAV.WINEP01.8	Medway	Gravesend	HIGH STREET GRAVESEND OUTSIDE 70 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at HIGH STREET GRAVESEND OUTSIDE 70 CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.9	Medway	Gravesend	EMPRESS ROAD DENTON CATCH CHAMBERS 1 CSO	Reduce the number of storm discharges from EMPRESS ROAD DENTON CATCH CHAMBERS 1 CSO by a combination of SuDS and storage options	£3,470K	AMP11	-	PO4 PO5 PO7

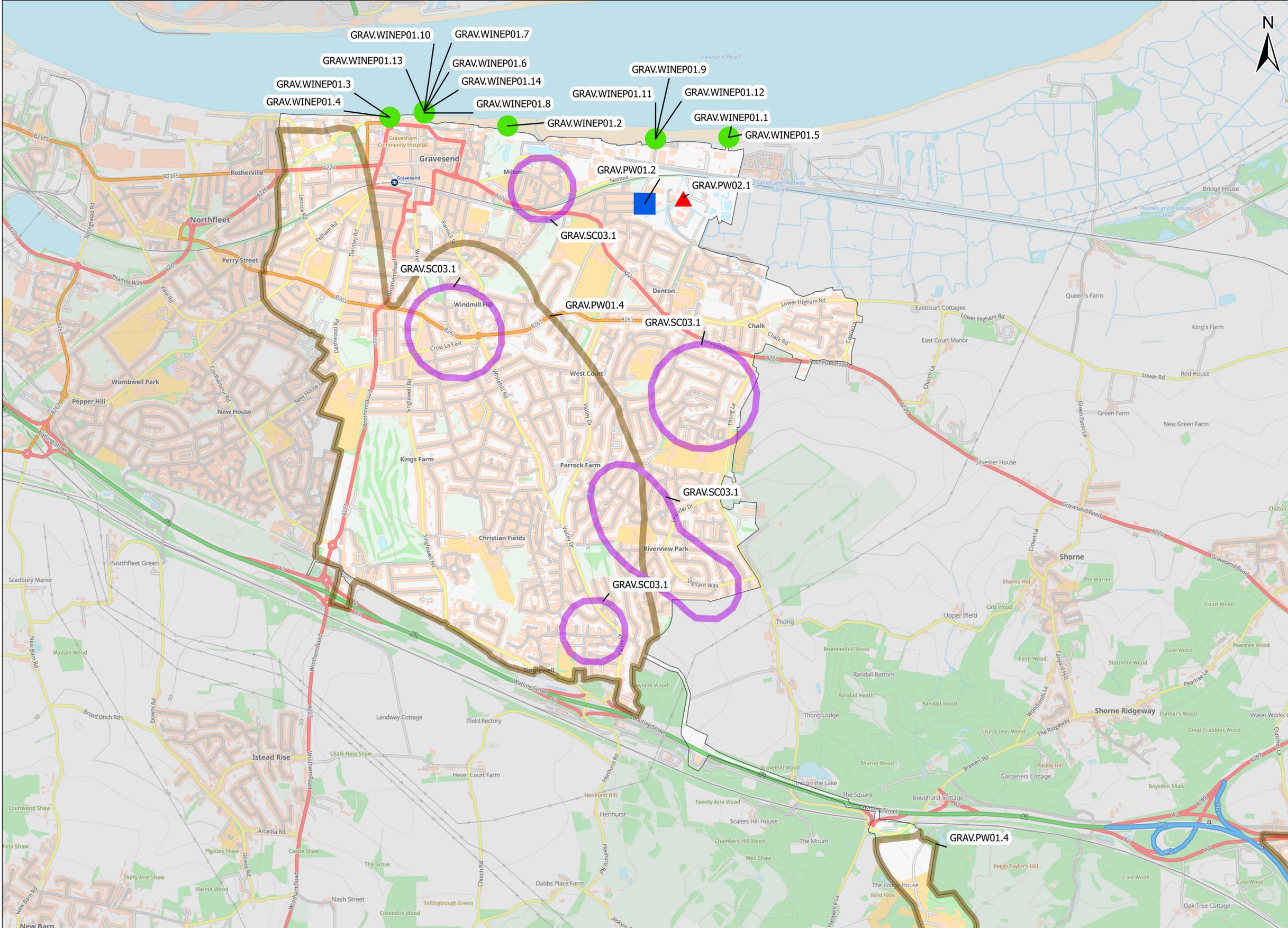
Reference	River Basin (L2)	Wastewater System (L3)	Location	Option	Indicative Cost	Indicative Timescales	Potential Partners	Applicable Planning Objectives
GRAV.WINEP01.10	Medway	Gravesend	CROSS LANE WEST GRAVESEND CSO	Reduce the number of storm discharges from CROSS LANE WEST GRAVESEND CSO by creating below-ground storage	£935K	AMP12	-	PO5
GRAV.WINEP01.11	Medway	Gravesend	EMPRESS ROAD DENTON CATCH CHAMBERS 2 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at EMPRESS ROAD DENTON CATCH CHAMBERS 2 CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.12	Medway	Gravesend	EMPRESS ROAD DENTON CATCH CHAMBERS 3 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at EMPRESS ROAD DENTON CATCH CHAMBERS 3 CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.13	Medway	Gravesend	COBHAM STREET GRAVESEND CSO	New or improved screen to reduce aesthetics impacts from storm discharges at COBHAM STREET GRAVESEND CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.14	Medway	Gravesend	SINGLEWELL ROAD GRAVESEND OUTSIDE 132 CSO	New or improved screen to reduce aesthetics impacts from storm discharges at SINGLEWELL ROAD GRAVESEND OUTSIDE 132 CSO	£130K	AMP12	-	PO5
GRAV.WINEP01.5	Medway	Gravesend	GRAVESEND NO.2 SSO	New or improved screen to reduce aesthetics impacts from storm discharges at GRAVESEND NO.2 SSO	£130K	AMP12	-	PO5

# Drainage and Wastewater Management Plan: Location of Potential Options GRAVESEND MOTNEY HILL

## Wastewater system in Medway 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.



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

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