

# Drainage and Wastewater Management Plan (DWMP)

## Overview of the Cuckmere and Pevensy Levels River Basin Catchment

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Version 2

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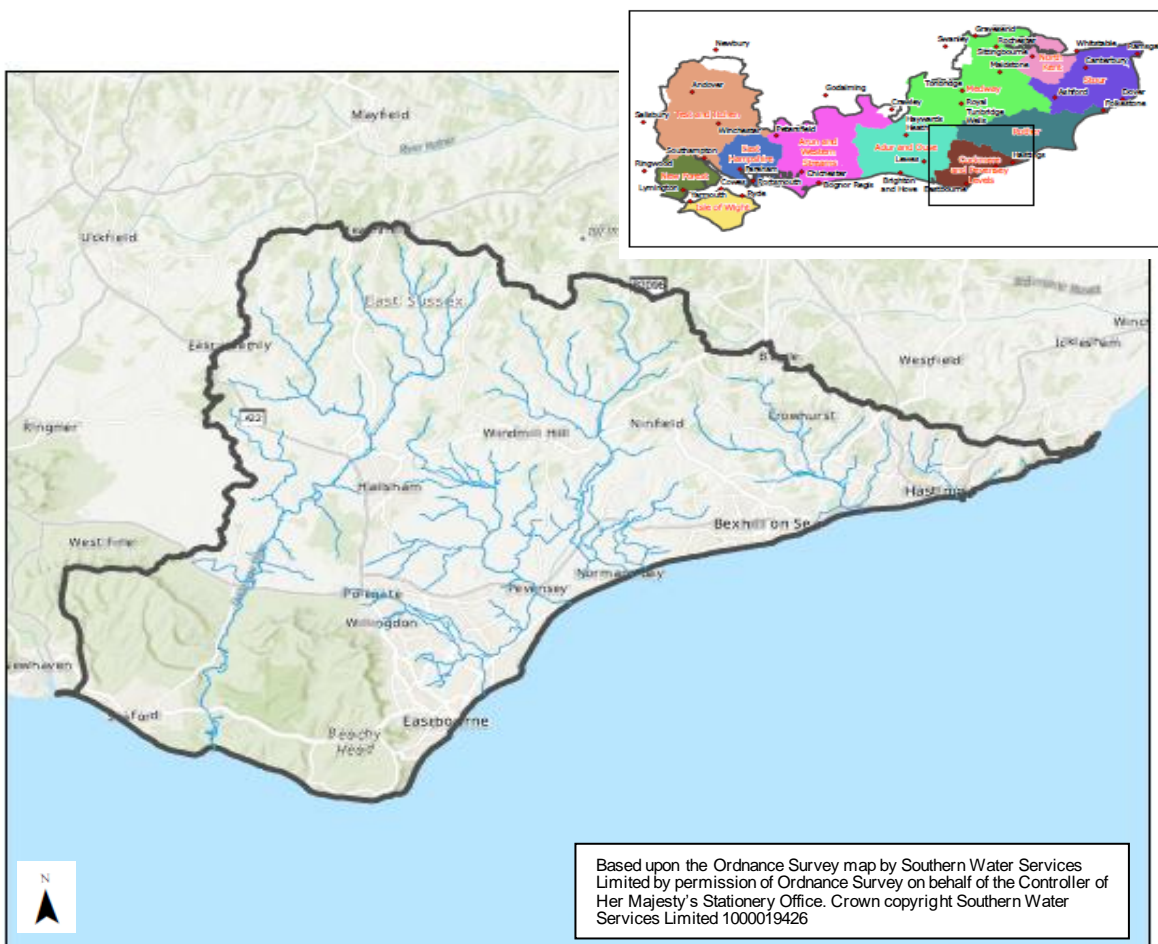


from  
**Southern  
Water** 

## Overview of the Cuckmere and Pevensey Levels Catchment

The Environment Agency has previously defined the River Basin District catchments in their River Basin Management Plans prepared in response to the European Union's Water Framework Directive. These river basin catchments are based on the natural configuration of bodies of water (rivers, estuaries, lakes etc.) within a geographical area, and relate to the natural watershed of the main rivers. We are using the same catchment boundaries for our Level 2 DWMPs. A map of the Cuckmere and Pevensey Levels river basin catchment is shown in figure 1.

Figure 1: The Cuckmere and Pevensey river basin catchment in East Sussex, England



The Cuckmere and Pevensey Levels catchment drains just over 516km<sup>2</sup> of land in East Sussex. The catchment incorporates rivers, lakes, estuarine and coastal waters as well as groundwaters. It includes the rural landscape of the High and Low Weald to the north of the catchment and the South Downs to the South. It has a residential population of around 323,000. The coastal towns of Bexhill, Hastings and Eastbourne lie within the catchment which includes the growing urban area of Hailsham.

The catchment is largely rural and the main land use is agriculture. The underlying geology in the Weald is sandstone, siltstone and clay. On the Weald clay, the river flow increases quickly in response to rainfall. Between Seaford and Eastbourne, the underlying geology is the chalk deposits of the Sussex Downs, Seven Sisters cliffs and Beachy Head. The response of rivers to rainfall is much slower as rain is absorbed into the chalk.

The catchment includes the River Cuckmere, Combe Haven and Pevensey Levels sub-catchments. Much of the area is recognised for its environmental and cultural value and there are many valuable natural habitats in the area. It includes part of the South Downs National Park, Cuckmere Haven and the white cliffs of the Seven Sisters which attract high visitor numbers.

The Cuckmere rises in the High Weald and flows through the South Downs to reach the sea at Cuckmere Haven which is just east of Seaford. The wetlands, floodplain grazing marsh, fens and reed beds of the river's meanders provide particularly important habitats for wildlife and migratory and breeding birds before it discharges into the Beachy Head West Marine Conservation Zone.

Combe Haven comprises the Powdermill, Watermill, Alexandra Park, Egerton Park and Hollington Streams. These drain into Combe Haven before they discharge to the sea at St Leonards, Hastings and Bexhill. Combe Haven, a designated Site of Special Scientific Interest (SSSI), is of outstanding national importance for its varied habitats of woodlands, fens, meadows and one of the largest reedbeds in East Sussex which supports a rich community of breeding birds.

The Pevensey Levels is a marsh covering 4,300 hectares between Eastbourne and Bexhill-on-Sea. It is one of the most environmentally important wetland areas in southern England with plant species that are only found in high quality water. The Levels are also a designated SSSI and a Special Area of Conservation (SAC) and a Ramsar wetland site of international importance for migratory wading birds.

The watercourses in the catchment have been modified over several hundred years. Parts of the natural meanders of the lower Cuckmere were straightened and the Pevensey Levels were reclaimed from saltmarsh as far back as the Middle Ages. During the 1960s and 1970s a comprehensive drainage programme was carried out including installation of weirs, sluices, pumps and other control equipment. These modifications have had a major impact on the rivers and in particular on the nature of flooding. Urbanisation of the countryside can also impact how water infiltrates and runs off the land.

The Cuckmere and Pevensey Levels is in one of the driest parts of the country where water use is amongst the highest. The catchment has an average rainfall of 865 mm per annum (10 year average measured at Cuckmere at Sherman Bridge).

There are two reservoirs within or close to the catchment. The Arlington is in the middle reaches of the River Cuckmere and is managed by South-East Water to store water for public supply. It is filled by pumping water from the Cuckmere when river flows are high. The Darwell Reservoir is just outside the catchment and provides a water supply for Southern Water's customers in Hastings.

## Drainage and Wastewater Systems

Drainage and wastewater systems are designed to convey water. There are several different drainage systems, including:

- land drains in fields to drain the land to enable it to be used for agriculture
- highway drainage systems to ensure that roads and car parks remain safe and useable during rainfall
- rivers and streams to transport water from the land to the sea
- surface water drainage systems that take water from roofs and paved areas to local rivers, and
- sewerage systems that take wastewater away from people's homes and businesses so it can be recycled at the Wastewater Treatment Works (WTW) and released safely back into the environment.

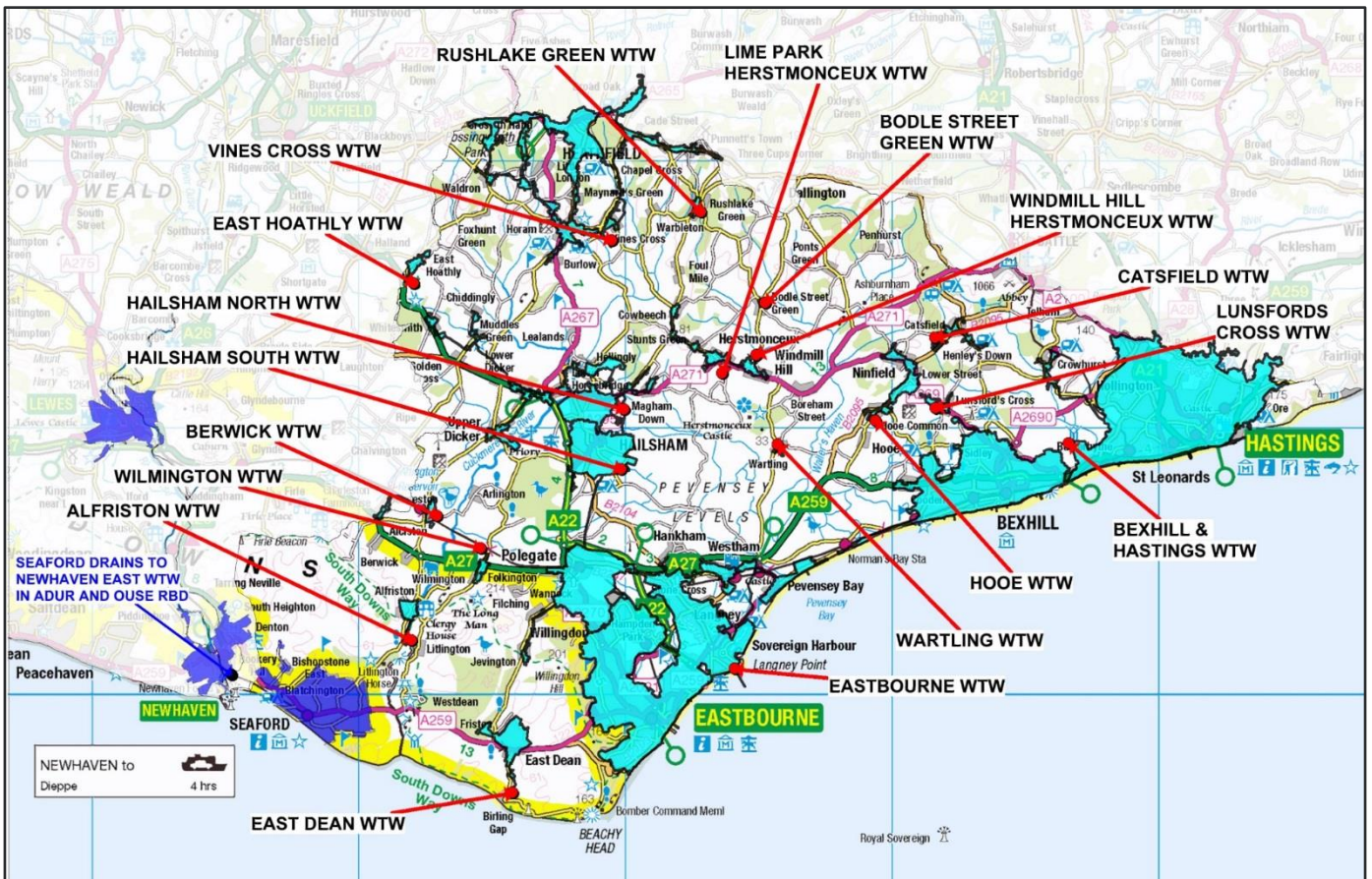
All these systems provide essential services to protect the economy and environment, and ensure public health, safety and hygiene. The links between water use and the management of wastewater is important to protect the wider environment. This excellent independent short film, called "[The Drip](#)", shows how the water cycle links everything together.

In the Cuckmere and Pevensey Levels catchment, we own and operate 18 separate sewerage systems that collect wastewater over a geographical area known as a sewer catchment. These are the areas shaded blue on the map, see figure 2 below. Each sewer catchment is drained by a complex sewerage system comprising a network of pipes, pumps and wastewater treatments works (WTWs) that combine to remove wastewater from homes and businesses and recycle the water so it can be safely discharged back into the environment.

Our sewerage systems generally cover the urban centres and communities. Of the 516km<sup>2</sup> of land in the river basin catchment, only 92km<sup>2</sup>, or 17.8%, is covered by our sewerage catchments. However, of the 154,000 residential properties and 7,600 businesses within the Cuckmere and Pevensey Levels catchment, 97% of the homes and 94% of the businesses are connected to our sewerage system. Remote rural properties are often not connected to sewerage systems and therefore rely upon a septic tank within their property to collect wastewater before it is periodically emptied by tankers and the wastewater is taken to a WTW to be recycled.

More than 2,798 km of wastewater pipes serve the Cuckmere and Pevensey Levels catchment with 194 pumping stations within the network to pump sewage to the 18 WTWs for recycling the water back into the rivers or the sea. Table 1 provides a summary of the 18 sewer catchments within the Cuckmere and Pevensey Levels river basin, including the equivalent population that each sewerage system serves and the approximate length of sewers within the sewer catchment. The Population Equivalent is a measure of the quantity of sewage that the WTW needs to process, and consists of the calculated equivalent number of people who would contribute the amount of sewage from within the sewer catchment from residential and commercial properties.

Figure 2: Map of the Cuckmere and Pevensey Levels Catchment showing the sewer catchment areas (in blue) and locations of the WTWs



Of the 18 WTWs in the catchment, five systems serve more than 10,000 population equivalent per day.

Eastbourne WTW is located in an underground structure on the seafront at Langney Point. The works serves around 110,000 people, and connects to 60 wastewater pumping stations in the network. The works was originally built in 1997 to comply with the EC Urban Wastewater Treatment Directive which was implemented to protect sensitive waters. At Eastbourne WTW, the wastewater receives treatment through a combination of screening, grit and grease removal, primary settlement using lamella plates and secondary treatment in a Biological Aerated Flooded Filter (BAFF) plant. The treated effluent is then pumped out to sea through a long sea outfall with a permitted discharge of 34,733 m<sup>3</sup> per day. The Eastbourne and Bexhill and Hastings WTWs receive high trade loads from industrial units in the region.

In 2019-20, Southern Water completed a £16 million upgrade to Eastbourne WTW which has improved how the site treats up to 86 million litres of wastewater each day.

Bexhill and Hastings WTW is located to the north of Bulverhythe. Similar to Eastbourne WTW, the WTW was constructed to enhance the quality of the treated effluent discharged through two long sea outfalls with a permitted flow of 33,869 m<sup>3</sup> per day. The works serves around 135,000 people, and connects to 49 wastewater pumping stations in the network. Bexhill and Hastings WTW is also

a sludge treatment centre and receives sludge imports from other WTWs for treatment. This produces additional liquor loads for treatment through the WTW process.

**Table 1: Sewerage Catchments in the Cuckmere and Pevensey Levels River Basin**

Sewer Catchment Ref	Sewer Catchment Name	Communities Served	Population Equivalent	Length of sewers (km)
ALFR	ALFRISTON	Alfriston, Pingles Place	813	10.2
BERW	BERWICK	Berwick, Selmeston	201	10.6
HABX	BEXHILL AND HASTINGS	Bexhill, Hastings, Crowhurst, Norman's Bay, St Leonards, Baldslow	141,227	1,225.2
BOSG	BODLE STREET GREEN	Bodle Street Green	95	0.8
CATS	CATSFIELD	Catsfield, Broomham,	532	9.2
EADE	EAST DEAN	East Dean, Friston	1,563	31.9
EAHO	EAST HOATHLY	East Hoathly, Belmont	809	7.4
EALP	EASTBOURNE	Eastbourne, Hampden Park, Langney, Westham, Pevensey, Stone Cross, Meads, Old Town	116,510	914.9
HAIN	HAILSHAM NORTH	North Hailsham, Hellingly, Upper/Lower Dicker, Muddles Green, Whitesmith, Chiddingly, Magham Down	16,415	100.2
HAIS	HAILSHAM SOUTH	South Hailsham, Polegate, Willingdon,	28,533	265.0
HOOE	HOOE	Ninfield, Hooe Common	1,414	23.1
HERS	LIME PARK HERSTMONCEUX	Lime Park (Herstmonceux)	58	0.5
NINF	LUNSFORDS CROSS	Lunsford's Cross	228	5.0
RUGR	RUSHLAKE GREEN	Rushlake Green	176	3.7
VINE	VINES CROSS	Heathfield, Horam, Vines Cross, Cross in Hand, Broad Oak, Punnett's Town, Waldron	13,013	163.7
WART	WARTLING	Wartling	48	0.4
WILM	WILMINGTON	Wilmington	199	4.1
WIND	WINDMILL HILL HERSTMONCEUX	Herstmonceux, Windmill Hill, Stunts Green, Cowbeech Hill, Cowbeech	2,031	22.8

Hailsham North WTW and Hailsham South WTW together serve around 38,400 people. They are permitted to discharge 3,162 and 7,120 m<sup>3</sup> per day respectively to the nearest river. Hailsham South WTW is located adjacent to the Pevensey Levels SSSI. Southern Water are upgrading the treatment works at Hailsham North, Hailsham South, Hooe, Rushlake Green and Windmill Hill to remove a greater amount of phosphorous during the treatment process to benefit the habitat and wildlife in the Pevensey Levels.

In the north of the catchment area, Vines Cross WTW serves over 12,000 people in Heathfield, Horam and surrounding villages. The works is permitted to discharge 2,986 m<sup>3</sup> per day into the Waldron Gill.

The Environment Agency (EA) sets limits on the quality and quantity of treated water (known as effluent) that can be discharged from WTWs. The EA issues discharge permits to ensure the recycled water released from WTWs complies with three main legal provisions

- (i) The Water Resources Act (WRA) 1991;
- (ii) The Environmental Permitting (England and Wales) Regulations 2010 and
- (iii) The Urban Wastewater Treatment Regulations (UWWTR) 1994.

The permits ensure that the quality of the receiving water (i.e. the river or the sea) is protected and that the discharges do not cause an unacceptable impact on the environment. The flow that may be discharged (released) in dry weather is one of the limits set by permits. Our 18 WTWs operate in accordance with their permits and recycle the wastewater to the specifications set out by the EA to ensure it is safe and clean to be released back into the rivers and streams or directly to the sea.

Under heavy storm conditions, rainfall can enter the sewerage systems and significantly increase the flow in the system. The flow of water arriving at the WTWs can exceed the recycling capacity of the works, so any excess water is temporarily stored in large storm tanks. If these tanks ever fill to capacity, then they would discharge water into the rivers or sea through storm overflows. Our aim is to prevent any discharge of water that has not been fully recycled to the required standards. Any water released from storm tanks is screened to remove items such as wet wipes and solids. These discharges are permitted by our regulator and monitored carefully. This control mechanism is required to prevent the backing up of water within the sewers and putting homes at risk of flooding.

## Wastewater System Performance

We routinely monitor, analyse and report the performance of our wastewater sewerage systems to enable us and our regulators to assess the service provided to our customers and the impact of our activities on the environment.

The current performance on the sewerage systems is a good starting point for the DWMP, and enables current issues to be highlighted so the planning objectives can be identified and defined for use throughout the DWMP. These planning objectives will determine the metrics that we used in the next stage of the DWMP, which is to determine the current and future risks to people, property and the environment of changes in the river basin catchment and in the performance of our sewerage systems.

The current performance, based on the last three years of data, is summarised below.

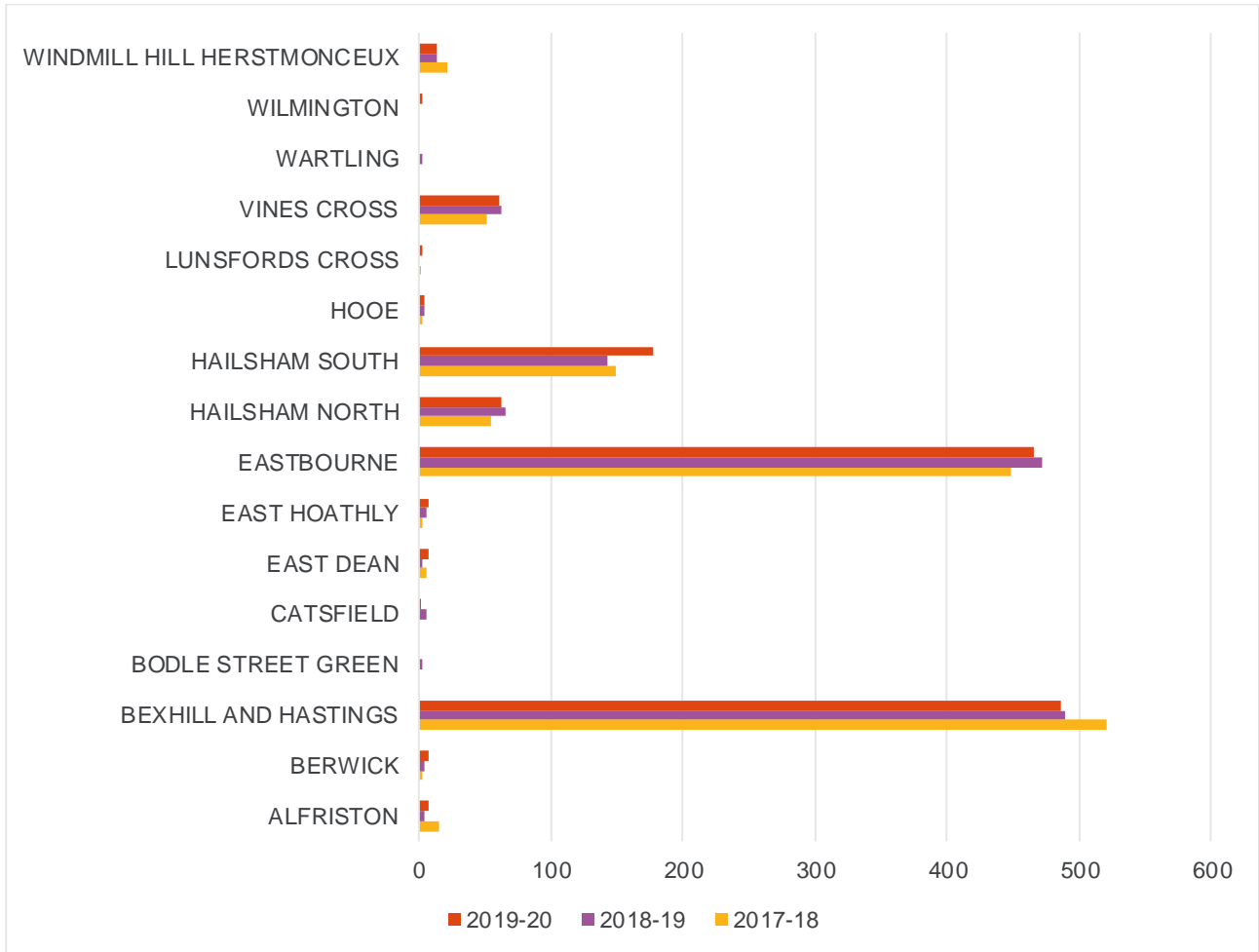
### Sewer Blockages

Every year there are thousands of avoidable blockages in our sewers caused by the flushing of wet wipes, cotton buds and other inappropriate items down the toilet, or by pouring fat, oil and grease down the sink. These items cause blockages within the sewer systems, and these blockages can result in flooding to customers' properties or impact upon watercourses or coastal waters.

Figure 3 shows the number of blockages recorded in the river basin catchment by sewer catchment over the last three years. (Note: catchments with no incidents are not shown in the graph). We have noticed an increasing trend in the number of blockages over the last three years, which we are tackling through our pollution and flooding reduction programmes.

We use high-powered water jets to clear blockages and ensure our sewers are running freely. In 2015, we launched our 'Keep it Clear' campaign which involves teams visiting 'blockage hotspot' areas to educate customers on how to safely dispose of items rather than putting them down their sinks or toilets. We visit almost 20,000 customers a year across the region to promote correct disposal of 'unflushable' items. Between 2016 and 2018, we targeted parts of Hastings for a customer education campaign to reduce "unflushable" items entering the sewer network. This helped to reduce the number of blockages in this area.

**Figure 3: Blockages in the Cuckmere and Pevensey Levels catchment**



### Sewer collapses and rising main bursts

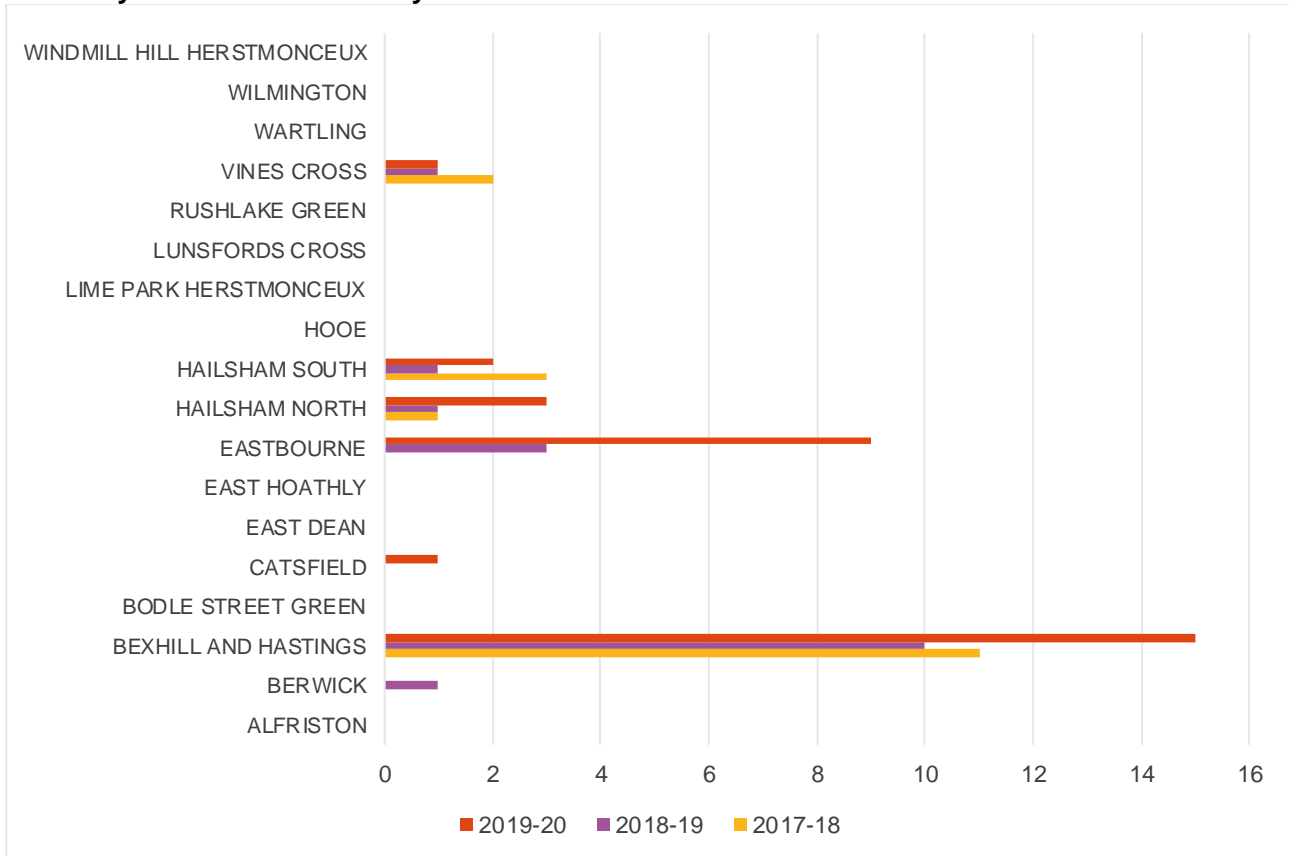
Figure 4 shows the number of sewer collapses and rising main bursts recorded by our Sewer Incident Reporting for public sewers in the Cuckmere and Pevensey Levels catchment over the last three years. Rising mains contain wastewater that is pumped under pressure from our wastewater pumping stations towards the treatment works.

The majority of these collapses and bursts were in Eastbourne and Bexhill and Hastings which contain a larger proportion of the total network. A collapse or burst can result in a discharge to the environment or flooding. We have an ongoing programme to inspect (by CCTV), replace or refurbish ageing sewers at high risk of collapse or where bursts are likely.





**Figure 4: Number of incidents of sewer collapses and rising main bursts in the Cuckmere and Pevensey Levels River Basin by sewer catchment**



## Flooding Incidents

The most common cause of flooding is from blockages of debris such as wet wipes. However flooding can also occur in wet weather when the sewerage system becomes overloaded due to rainwater entering the sewer system.

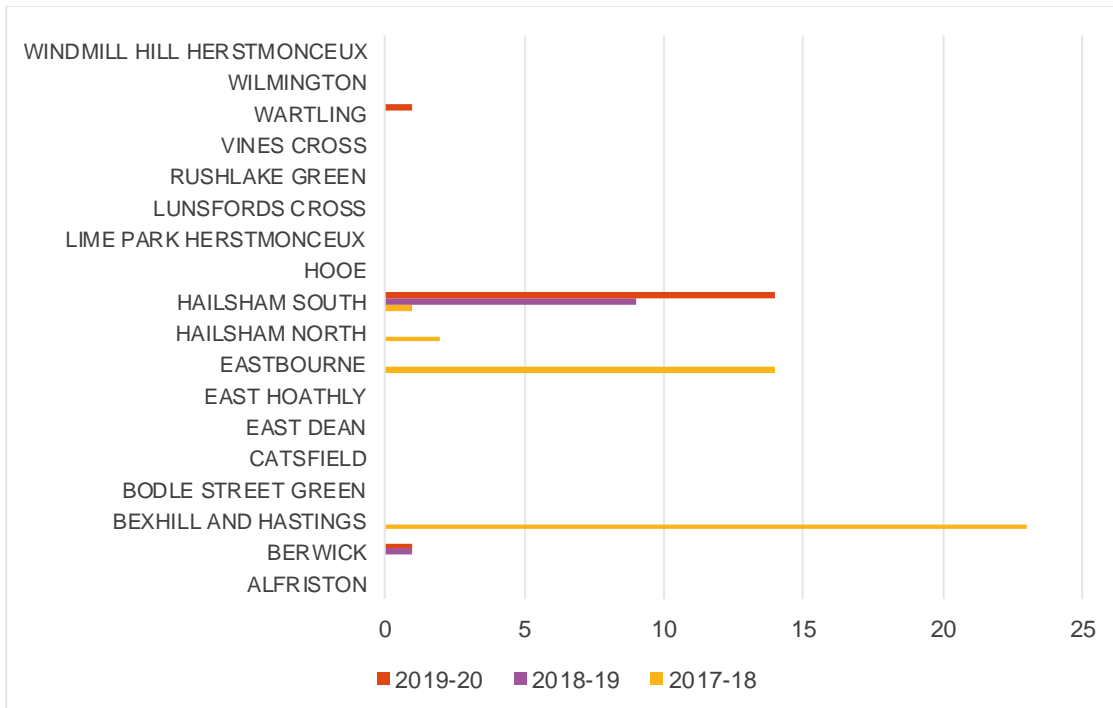
Within the Cuckmere and Pevensey Levels river basin catchment, several of our sewer catchments have both separate and combined sewer systems to carry wastewater. Combined systems convey both sewage from homes and businesses as well as rain and storm water collected from roofs and hard paved areas. During heavy rainfall, the capacity of combined sewers can be exceeded and lead to localised flooding as a result of the water backing up the system to the closest available escape route: manhole, toilet, sink, basement etc. In some combined sewer systems where flooding of properties could occur in heavy rainfall, there are built in overspill weirs, called storm overflows, which release excess water into rivers to prevent flooding of homes or businesses. Storm overflows (also known as Combined Sewer Overflows) are permitted by the Environment Agency (EA) to operate in certain conditions. The majority of storm overflows have equipment installed to record the number of times that water passes through the storm overflow. We monitor these carefully and report this information to the EA. There are 77 combined sewer overflows and emergency overflows in the Cuckmere and Pevensey Levels catchment.

Sewer flooding can also occur as a result of rising groundwater seeping into the underground sewer systems and creating additional flow within the sewer network of pipes. This is called infiltration. High local levels of infiltration have been observed in the Rise Park (Langney) area of Eastbourne. During previous winters, it has been necessary for Southern Water to remove the excess groundwater flow using tankers and/or pumps. In 2013 we surveyed the sewers in the area which identified a number of sources of infiltration resulting in 12 manholes and 225m of sewer being sealed.

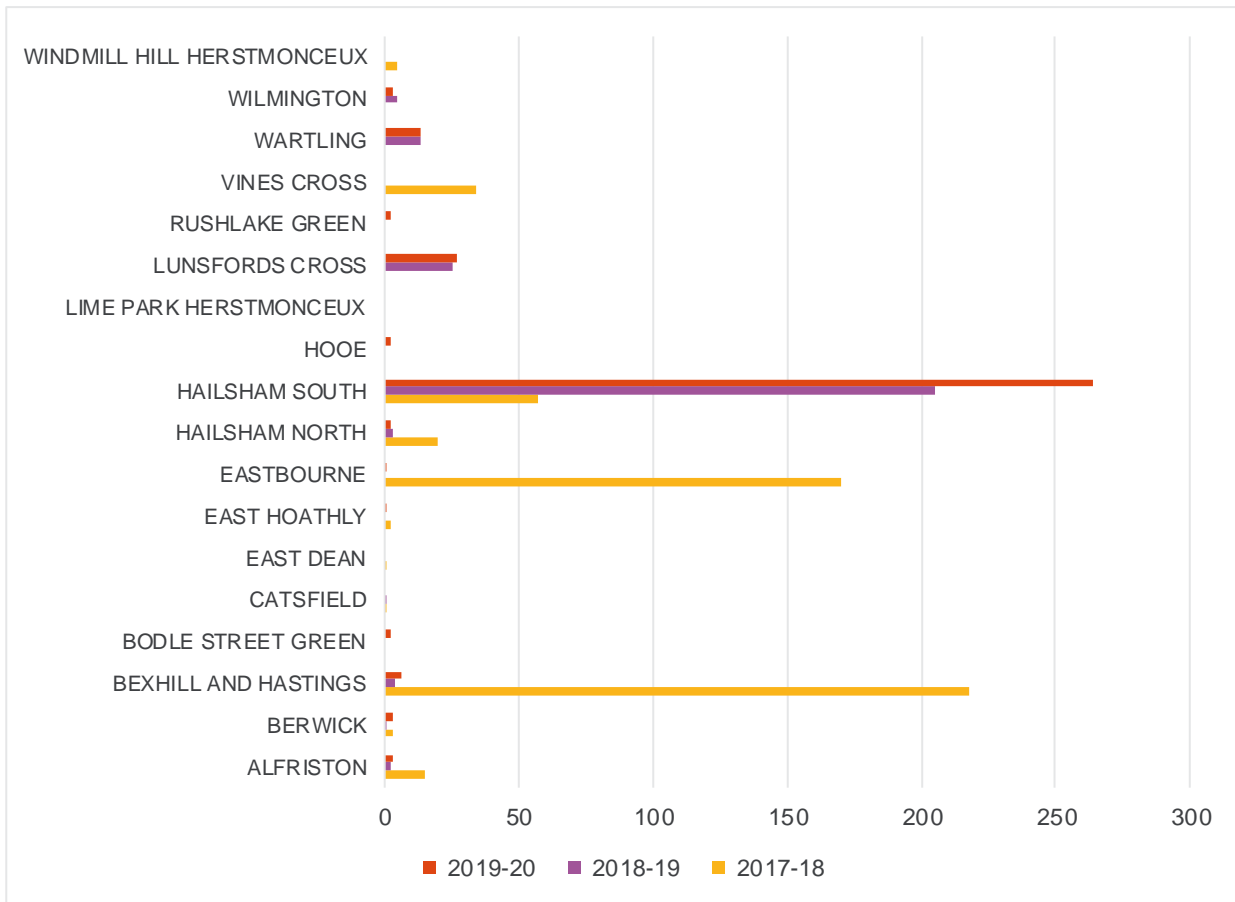
Figures 5 and 6 show the number of internal and external flooding incidents respectively over the last 3 years in the Cuckmere and Pevensey Levels catchment. For the purpose of the DWMP, sewer flooding is defined as incidents caused by an escape of water and sewage from a public sewer due to a blockage, sewer collapse, rising main burst, equipment failure or from too much water entering the system (known as hydraulic overload). Importantly, up until 2020 the definition of sewer flooding excludes extreme storms with a probability of occurring of less than once in 20 years (i.e. less likely than a 5% chance in any given year). In a recent change to our required reporting criteria all incidents of sewer flooding are now reportable including those caused by severe weather. Internal flooding occurs inside a building or cellar, whilst external flooding occurs within a curtilage (garden) or on a highway or public space.

Of the 149,531 homes connected to the 18 sewer systems within the Cuckmere and Pevensey Levels river basin, 16 properties experienced some form of internal flooding (including sewage backing up into a bath or shower tray) during the financial year 2019-20. This figure is down from 40 properties that experienced flooding in 2017-18. The data shows there have been an increase in the number of floods from the sewer network in the Hailsham South catchment which we are targeting in our flooding reduction programme.

**Figure 5: Internal Sewer Flooding within properties by sewer catchment in the Cuckmere and Pevensey Levels catchment (number of incidents)**



**Figure 6: External Flooding within the curtilage of a property (not inside) by sewer catchment in the Cuckmere and Pevensey Levels river basin (number of incidents)**



Within the Cuckmere and Pevensey Levels catchment, we estimate that there are approximately 42 properties currently at risk of internal sewer flooding in any given year due to overloading of the sewers by rainwater in a storm.

## Pollution Incidents

Reducing the number of pollution incidents is a priority for us, our customers and our stakeholders. We have set the target to reduce the number of pollution incidents across the whole of our operating region to 79 incidents by 2024-25, and our aim by 2040 is to have zero pollution incidents. To achieve this we have created an extensive pollution incident reduction plan with the Environment Agency to significantly reduce pollution over the next five years in line with industry targets.

Pollution incidents connected with our wastewater assets (e.g. blocked sewers, pump failures) are reported to the Environment Agency.

The impact an incident has on the environment is categorised into one of four categories using the Common Incident Classification System (CICS). More information on the classification system can be found on the Ofwat website [here](#). There are four categories for pollution incidents: 1 (major), 2 (significant), 3 (minor) or 4 (no pollution). Only category 1, 2 and 3 pollutions are reportable.

We continue to investigate the root causes of pollution incidents. Our improvements in monitoring of assets and data collection are informing our Pollution Reduction Programme and resulting in more pollutions being prevented. We have also strengthened our incident response team and arrangements to improve our response and reporting of a potential pollution incident.

In addition, our new Environment+ programme looks at all aspects of environmental compliance and performance. Our focus on wastewater treatment works compliance will bring about improved river quality, reduced pollution incidents and flooding, and enhance bathing water quality.

We publish pollution data in our Annual Report and on our website. However, we are not yet at the stage where we can publish that data in greater detail or make further detail publically available. To do so would also require the agreement of the Environment Agency as they provide some of the information. We are currently being investigated by the Environment Agency in relation to pollution events, and the management of some of our wastewater treatment works, so what we can say about these at this time is limited.

We recently invested millions of pounds to improve the bathing water quality in Hastings by helping the local council to identify illegal connections of wastewater pipes into the surface water system. Pollution happens when wastewater from washing machines, toilets, dishwashers, baths and sinks is misconnected into surface water sewers. The surface water sewers are designed to transfer only rainwater from roofs, hard paving and landscaped areas and they discharge directly into streams and rivers without treatment. The misconnected wastewater will cause pollution of the river and potentially impact bathing waters.

## **Wastewater Treatment Works Compliance with Permits**

The Environment Agency sets limits on the quality and quantity of recycled water from WTWs entering rivers or the sea so the water does not cause an unacceptable impact on the environment. The flow that may be discharged in dry weather (known as Dry Weather Flow) is one of these limits. Dry weather flow (DWF) is the average daily flow to a wastewater treatment works during a period without rain. Exceedances of the DWF can be caused by a number of factors, but it can be due to the additional flow from new development in the sewer catchment. To enable further development, we work with planning authorities to understand where future development is planned and include growth schemes in our investment programme so we can increase the capacity of WTWs and continue to comply with our permits in the future.

We must comply with permits issued by the EA. Where we do not meet the permit requirement, we call this a compliance failure.

We are investing in improved operational resilience to maintain wastewater treatment compliance at a high standard by achieving 99.0% as a minimum, but continuing to aim for 100% compliance.

In the Cuckmere and Pevensy Levels catchment, there have been no water quality compliance failures over the last three years. In addition, none of the works has had two years or more exceedances of the dry weather flow permit.