

Drainage and Wastewater Management Plan (DWMP)

Overview of the Test and Itchen River Basin Catchment

October 2022

Version 2

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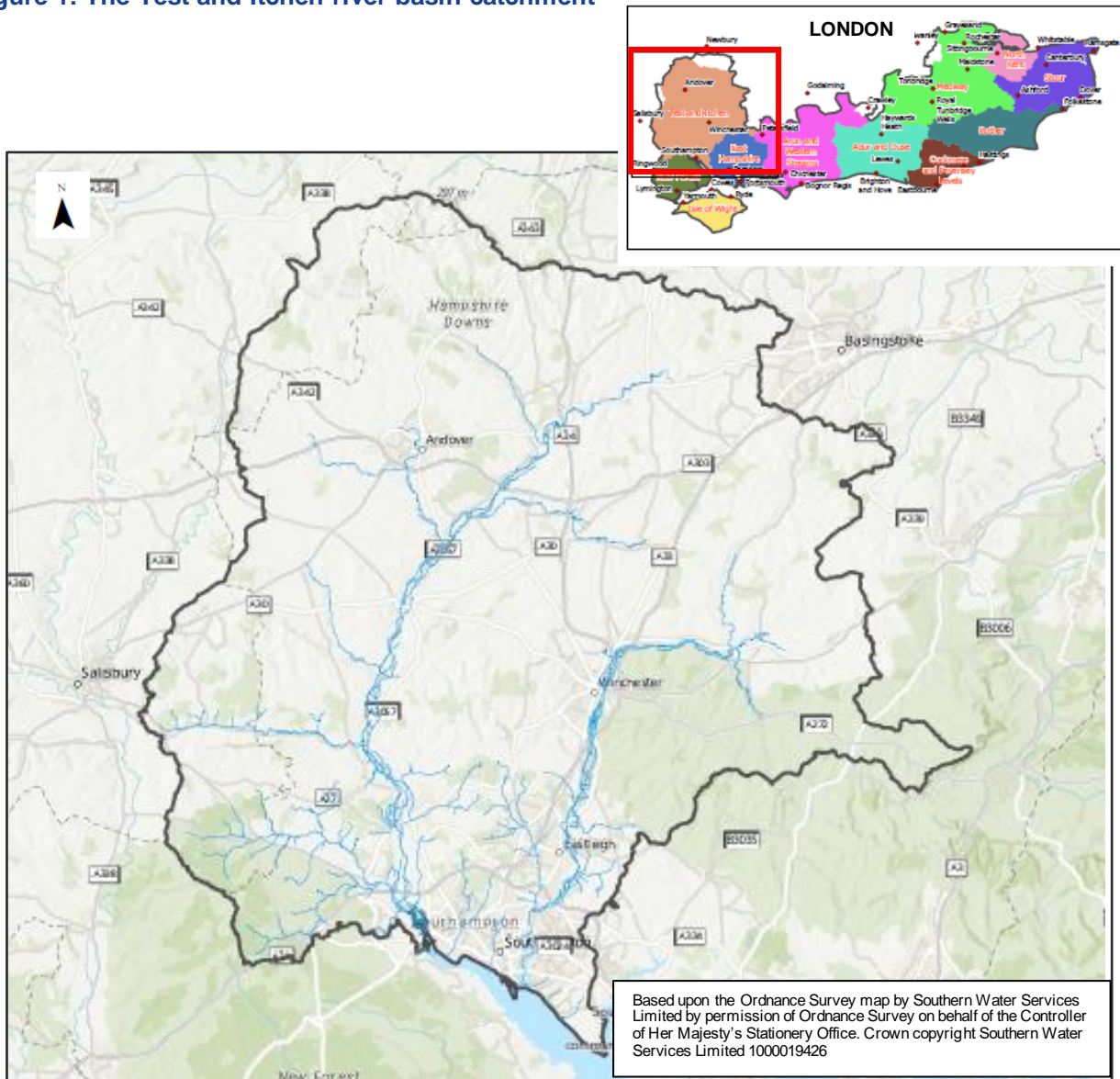


from
**Southern
Water** 

Overview of the Test and Itchen 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 Stour river basin catchment is shown in figure 1.

Figure 1: The Test and Itchen river basin catchment



The Test and Itchen river basin catchment lies in the county of Hampshire and has a population of approximately 800,000 people. The catchment drains around 1,740 km² of mostly rural land which is scattered with villages and small settlements. The main urban locations are Andover and Romsey in the northern reaches, and Totton and Eastleigh along the coastal stretch. The only cities are Winchester, the county town of Hampshire, and Southampton.

Both main rivers rise from springs in the chalk aquifer of the South Downs National Park. The Test rises near the village of Ashe and flows west before it is joined by the Bourne Rivulet which rises at Testbourne in the North Wessex Downs Area of Outstanding Natural Beauty. The Test then turns south and is joined by the rivers Dever, Anton, Dun and Blackwater before it becomes tidal at Romsey. The river widens into the broad Test Estuary, combines with the River Itchen and continues to the sea through Southampton Water.

The source of the Itchen is near Hinton Ampner. It is joined by its tributaries, the River Alre and the Candover Brook just below New Alresford and continues through the upper Itchen Valley before entering Winchester. The river becomes tidal at Woodmill Bridge and joins the Test Estuary at Woolston.

The catchment is also home to the 'winterbournes'. These ephemeral and locally important streams only flow in the winter or when groundwater levels are high by emerging as springs from the chalk aquifer.

The rare chalk stream habitat, landscapes and the wildlife of the Test and Itchen are of international, national, regional and local importance. Significant stretches of both main rivers and their floodplains are designated as Sites of Special Scientific Interest (SSSI). The Itchen and the Solent Maritime also have Special Area of Conservation (SAC) designations, meanwhile, the Solent and Southampton Water are both a Special Protection Area (SPA) and Ramsar site. Both the catchment's main rivers are renowned for their excellent trout and salmon fishing. The rivers also support a large number of commercial fish farms and watercress growers. These businesses are reliant on a reliable and abundant water supply, as is agriculture in the area.

The catchment provides a significant proportion of Hampshire's potable water, as well as the Isle of Wight's. The area features a number of surface water and groundwater abstraction points with considerable abstraction taken from groundwater sources in the upper and middle reaches of the two rivers and from surface water abstraction in the lower catchments. Groundwater abstraction points include Candover Brook, Lower and Upper Anton and the Sombourne Stream. The majority of abstraction is non-consumptive as it is used for agriculture and horticulture and the water is returned locally to the river to augment flows.

Drainage and Wastewater network and 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 agricultural purposes
- highway drainage systems to ensure that roads and car parks remain safe and useable during rainfall
- rivers and streams to transport water running off 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.

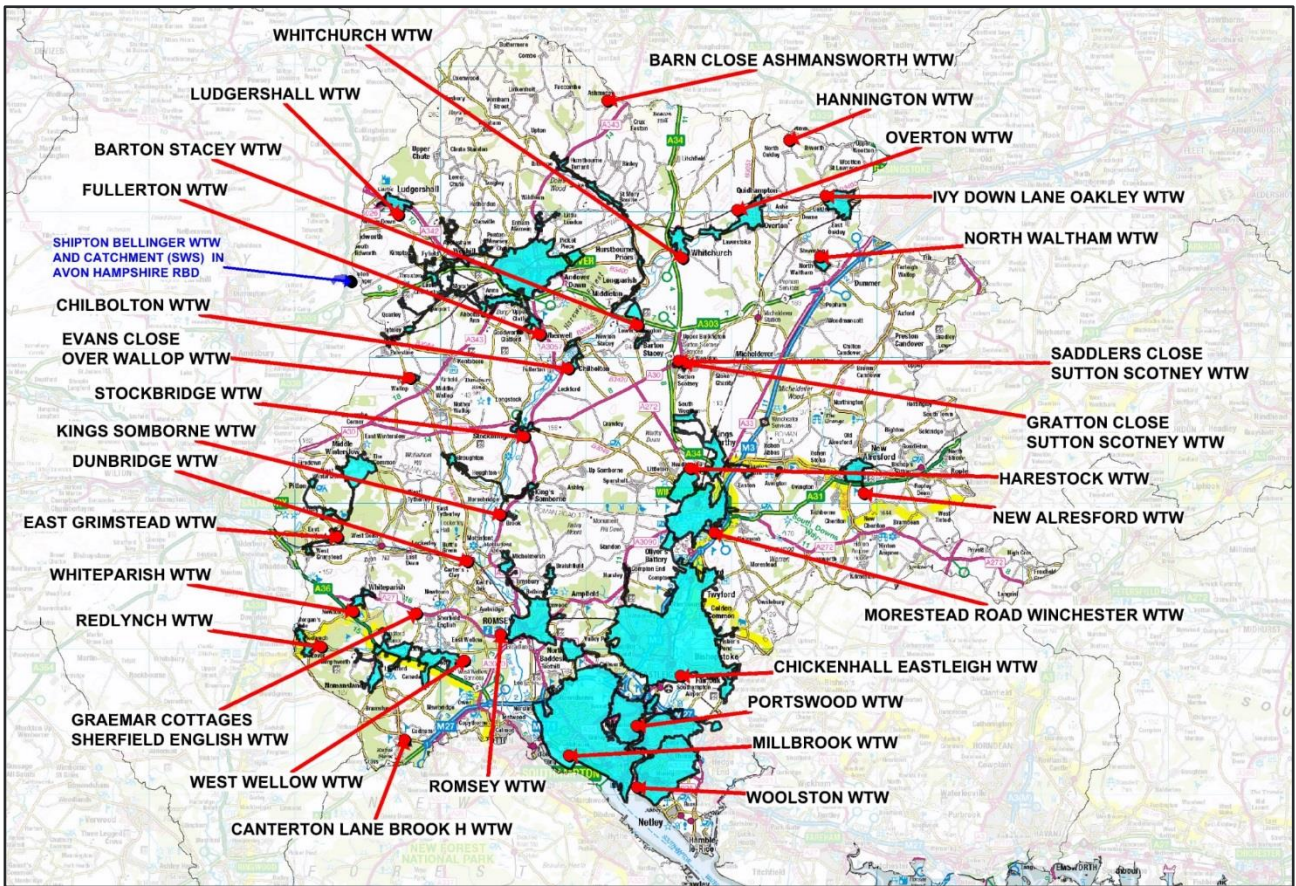
All these systems provide essential services to protect the economy and environment, and ensure public health, safety and hygiene. The links between water use and the management of wastewater is important to protect the wider environment. This excellent independent short film, called "[The Drip](#)",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

In the Test and Itchen catchment, we own and operate 30 separate sewerage systems. Each of these collect wastewater from a geographical area known as a sewer catchment. These areas are shaded blue in Figure 2. Each sewer catchment is drained by a complex sewerage system comprising a network of pipes, wastewater pumping stations (WPSs), and wastewater treatment works (WTWs). These combine to remove wastewater from homes and businesses and transport it to treatment facilities so that it can be recycled and safely discharged back into the environment.

Our sewerage systems generally cover the urban centres and communities. Of the 1,740 km² of land in the river basin catchment, only 187km², or 11%, is covered by our sewerage catchments. However, of the 255,300 residential properties and 13,400 businesses within the Test and Itchen catchment, 93% of the homes and 86% 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.

Figure 2: Map of the Test and Itchen Catchment showing the sewer catchment areas (in blue) and locations of the WTWs



More than 4,563 km of wastewater pipes serve the Test and Itchen catchment. The catchment's network includes 259 pumping stations (WPSs) pumping sewage to 30 wastewater treatment works (WTWs) for treatment. Table 1 provides a summary of the 30 sewer catchments within the Test and Itchen river basin. It includes the population equivalent that each serves and the approximate length of sewers within the sewer catchment

Table 1: Sewerage Catchments in the Test and Itchen River Basin

Sewer Catchment Name	Communities Served	*Population Equivalent	Length of sewers (km)
BARN CLOSE ASHMANSWORTH	Ashmansworth	20	0.2
BARTON STACEY	Barton Stacey, Longparish, Hurstbourne Priors, Middleton, Forton, St Mary Bourne, Stoke, Hurstbourne Tarrant	3,853	56.9
CANTERTON LANE BROOK	Brook	41	0.3

CHICKENHALL EASTLEIGH	Eastleigh, Chandlers Ford, Horton Heath, Otterbourne, Shawford, Hursley, Twyford, Oliver's Battery, Bishopstoke, Colden Common	100,830	922.0
CHILBOLTON	Chilbolton	1,155	12.7
DUNBRIDGE	Dunbridge	106	1.0
EAST GRATTON	Sutton Scotney	367	1.3
EAST GRIMSTEAD	East Grimstead	2,968	61.7
EVANS CLOSE OVER WALLOP	Over Wallop	332	0.0
FULLERTON	Andover, Goodworth Clatford, Thrupton, Monxton, Kimpton, Appleshaw, Penton Mewsey, Upper Enham	62,813	360.4
GRAEMAR COTTAGES	Sherfield English	88	0.0
HANNINGTON	Hannington	38	0.0
HARESTOCK	Harestock, Kings Worthy, Headbourne Worthy, Easton, South Wonston	15,774	140.2
IVY DOWN LANE OAKLEY	Oakley	5,051	37.1
KINGS SOMBORNE	Kings Somborne, Horsebridge, Compton	2,012	38.6
LUDGERSHALL	Ludgershall	4,143	30.7
MILLBROOK	Southampton (Millbrook, Shirley, Lords Hill, Northam, Nursling, Rownhams, Chilworth), North Baddesley	133,121	1,089.6
MORESTEAD ROAD WINCHESTER	Winchester (Stanmore, Bar End, Badgers Farm, St Cross, Winnall)	36,625	228.5
NEW ALRESFORD	New Alresford	5,354	49.0
NORTH WALTHAM	North Waltham	816	5.7
OVERTON	Overton, Laverstoke	4,477	39.4
PORTSWOOD	Southampton (Portswood, Bassett, Bitterne, West End, Swaythling, North Stoneham, St Denys)	72,214	585.2
REDLYNCH	Redlynch, Lover, Bohemia	795	16.0
ROMSEY	Romsey, Braihfield, Michelmersh	18,871	209.6
SADDLERS CLOSE SUTTON SCOTNEY	Sutton Scotney	51	0.8
STOCKBRIDGE	Stockbridge	741	13.2
WEST WELLOW	West Wellow, Landford, Canada	4,341	80.7
WHITCHURCH	Whitchurch	4,757	32.2
WHITEPARISH	Whiteparish	1,101	16.1
WOOLSTON	Southampton (Woolston, Sholing, Thornhill, Itchen)	63,613	534.7

*The population equivalent is a quantity measure used to represent how much sewage the treatment facility needs to treat. It consists of the calculated equivalent number of people who are likely contribute to the amount of sewage in the catchment.

Of the 30 WTWs in the catchment, 11 serve a population equivalent of more than 4,500 per day.

Millbrook WTW serves a population equivalent of 133,12 and is permitted to recycle 40,007m³ of wastewater per day during periods of dry weather (this is referred to as its 'DWF'). Millbrook WTW serves the city of Southampton. The connecting sewage network is a combination of gravity sewers and sewers where the wastewater is pumped (called rising mains). A total of 22 wastewater pumping stations (WPSs) are included in the network. Millbrook WTW recycles the sewage and discharges the final treated water to the estuary water of River Test.

Chickenhall Eastleigh WTW, in the south of the catchment, serves a population equivalent of 100,830. It has a consented discharge of 32,000 m³ per day during dry weather and discharges to the River Itchen. Chickenhall is also a sludge treatment centre (STC). Recycled sludge, in the form of 'cake', is removed from the site in skips and taken to Budds Farm Havant.

Fullerton WTW serves Andover and the surrounding villages in the largely rural area in the north of the catchment. It serves a population equivalent of 62,813. Fullerton also serves as a sludge treatment centre (STC) to process and recycle the 'solids' from within the sewage. It receives around 1,000 m³ of liquid sludge per week, delivered to site by tankers, from several other sites in and around the catchment. The indigenous and imported sludge is screened, thickened and dewatered onsite. The digested sludge cake is stored in sludge bays before being recycled to farmland. The WTW has a consented DWF of 19,291 m³/d and discharges recycled water into the River Test.

Harestock WTW catchment consists of a number of small sub-catchments including Wonston, Kings Worthy and Easton. The WTW serves a population equivalent of 15,774 and has a consented DWF of 6,330 m³/d. It site discharges recycled water to the River Itchen.

Morestead Road Winchester WTW catchment serves a population equivalent of 36,625. It serves people in the central part of the city of Winchester. The WTW has a consented DWF of 9,933 m³/d and recycled water is discharged to land via a soakaway. Liquid sludge from the WTW is transported from the site by tanker to either Fullerton or Slowhill Copse Marchwood for processing.

New Alresford WTW catchment serves a population equivalent of 5,354 and has a consented DWF of 1,153 m³/d. It serves the town of Alresford. Recycled water is discharged to underground strata via a network of soakaways located in the field adjacent to the works.

Ivy Down Lane Oakley WTW serves a population equivalent of 5,051. The site treats all flows, meaning there is no permitted storm discharge. The site has a consented DWF of 722 m³/d and discharges via soakaway.

Portswood WTW serves a population equivalent of 72,214 and has a consented DWF of 27,700 m³/d. It, along with Millbrook and Woolston, serves the city of Southampton. It discharges recycled water to the River Itchen. Liquid sludge from Portswood is transported by barge to Slowhill Copse STC in Marchwood for processing.

Whitchurch WTW serves the town of Whitchurch on the River Test. It serves a population equivalent of 4,757 and has a consented DWF of 2,336m³/d. Recycled water is discharged to underground strata via a soakaway.

Woolston WTW serves a population equivalent of 63,613. It serves the eastern Southampton area. It has a consented DWF of 15,000 m³/d and discharges recycled water to the estuarial waters of the River Itchen. The WTW recently underwent a major upgrade. The majority of the site's plant is completely new, with the exception of the storm tank which was modified from existing assets. The

new plant was commissioned in 2018. The site has also been upgraded to be able to process its own liquid sludge.

Romsey WTW serves a population equivalent of 18,871. The Romsey Sewer Catchment includes 11 pumping stations. The site treats wastewater using adding oxygen and microorganisms to the wastewater. This is known as an activated sludge plant (also known as an activated sewage plant or ASP). The site has a consented DWF of 7,379 m³/d and discharges into the River Test.

The Environment Agency (EA) sets limits on the quality and quantity of recycled 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. river, stream, or 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 30 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

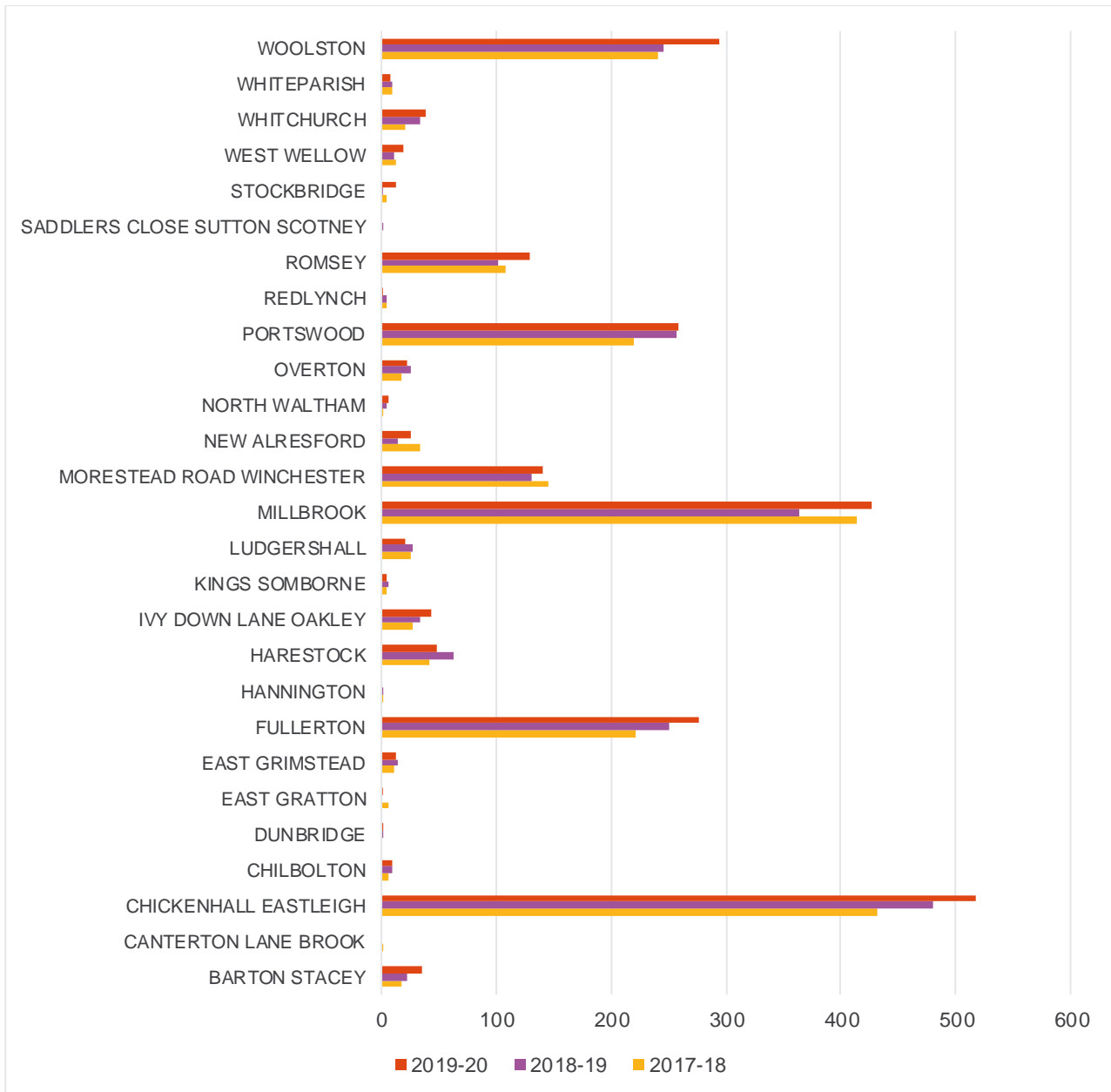
Every year there are thousands of avoidable blockages in our sewers caused by the flushing of wet wipes, cotton buds and other inappropriate items down the toilet, or by pouring fat, oil and grease down the sink. These items cause blockages within the sewer systems, and these blockages often result in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

Figure 3 shows the number of blockages recorded in the Test and Itchen catchment. We have noticed an increasing trend in the number of blockages, which we are tackling through our pollution and flooding reduction programmes.

Millbrook and Chickenhall Eastleigh had the highest number of blockages.

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.

Figure 3: Number of blockages in each of the sewer catchments in the Test and Itchen river basin catchment



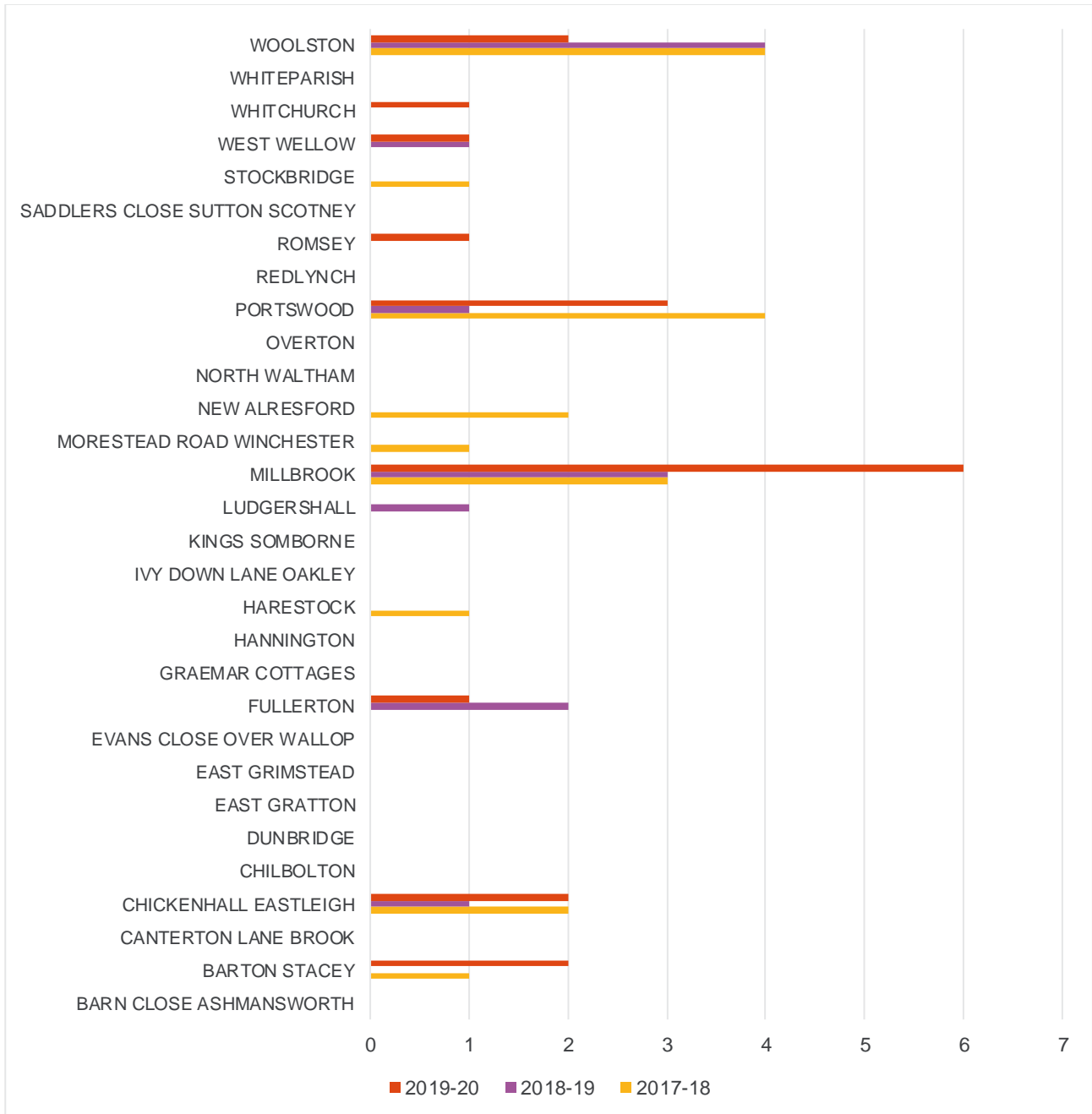
Sewer collapses and rising main bursts

Figure 4 shows the number of sewer collapses and rising main bursts recorded by our Sewer Incident Reporting for public sewers in the Test and Itchen 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 Millbrook and Portswood. A collapse or burst can result in pollution of the environment or flooding. 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 Test and Itchen 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 Test and Itchen 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 62 combined sewer overflows and emergency overflows in the Test and Itchen 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 villages of Kings Somborne, Longparish, St Mary Bourne, Hursley, Fyfield, Appleshaw and Goodworth Clatford. The infiltration has filled the sewer pipes and restricted our customers' use of toilets and washing facilities. When this has occurred, we have removed excess groundwater from the sewers by pumping out the water using road tankers. We have invested in surveys of the sewers and repair works to reduce infiltration in all of these villages. Further information is in our Infiltration Reduction Plans which are available on our website [here](#)

Figures 5 and 6 show the number of internal and external flooding incidents respectively over the last 3 years in the Test and Itchen 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, 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). 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 255,300 homes connected to the 30 sewer systems within the Test and Itchen river basin, 59 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 up from 27 properties that experienced flooding in 2017-18. The data shows a significant increase in the number of floods from the sewer network in the Millbrook and Chilbolton catchments.

Figure 5: Internal Sewer Flooding within properties by sewer catchment (number of incidents)

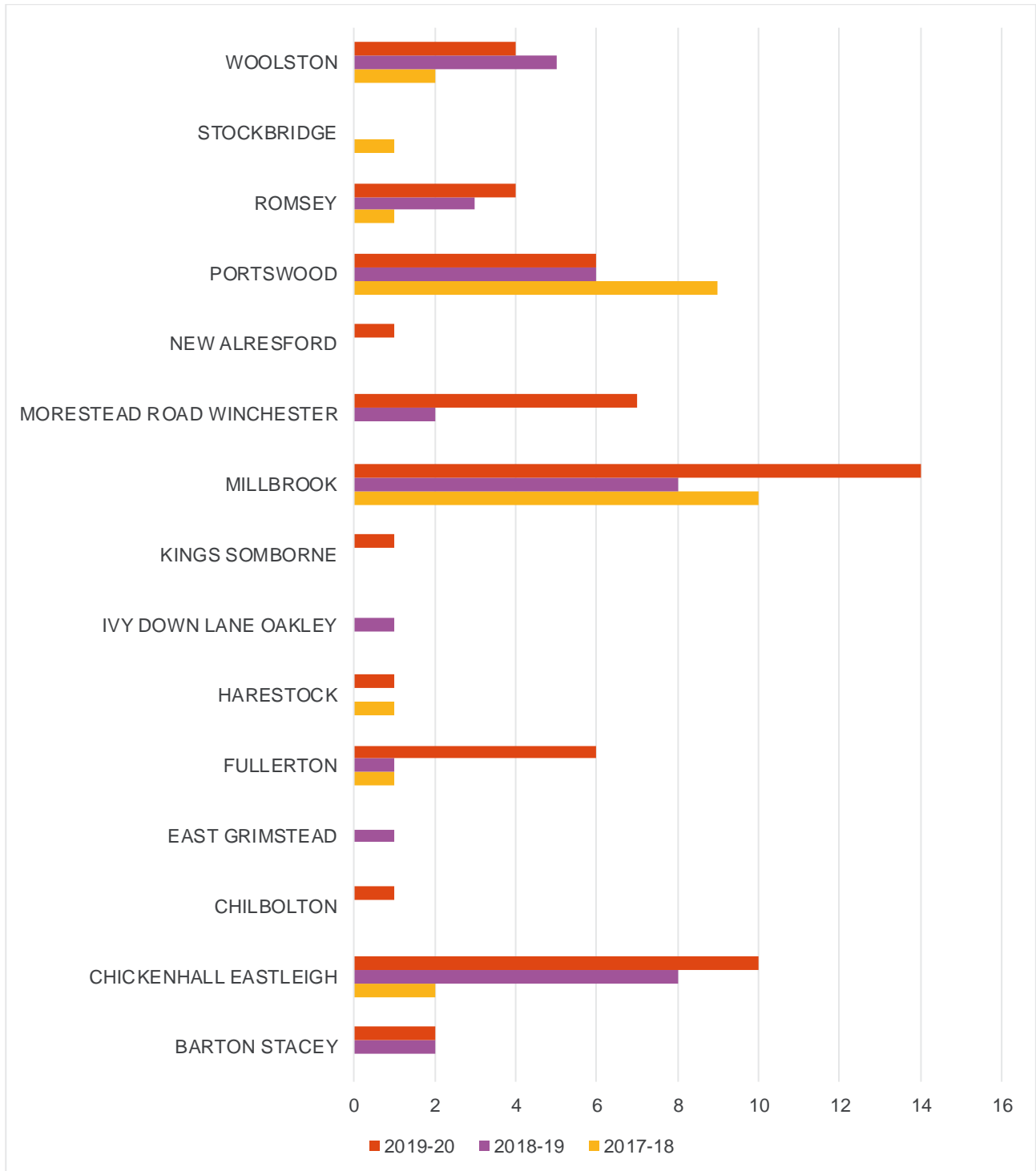
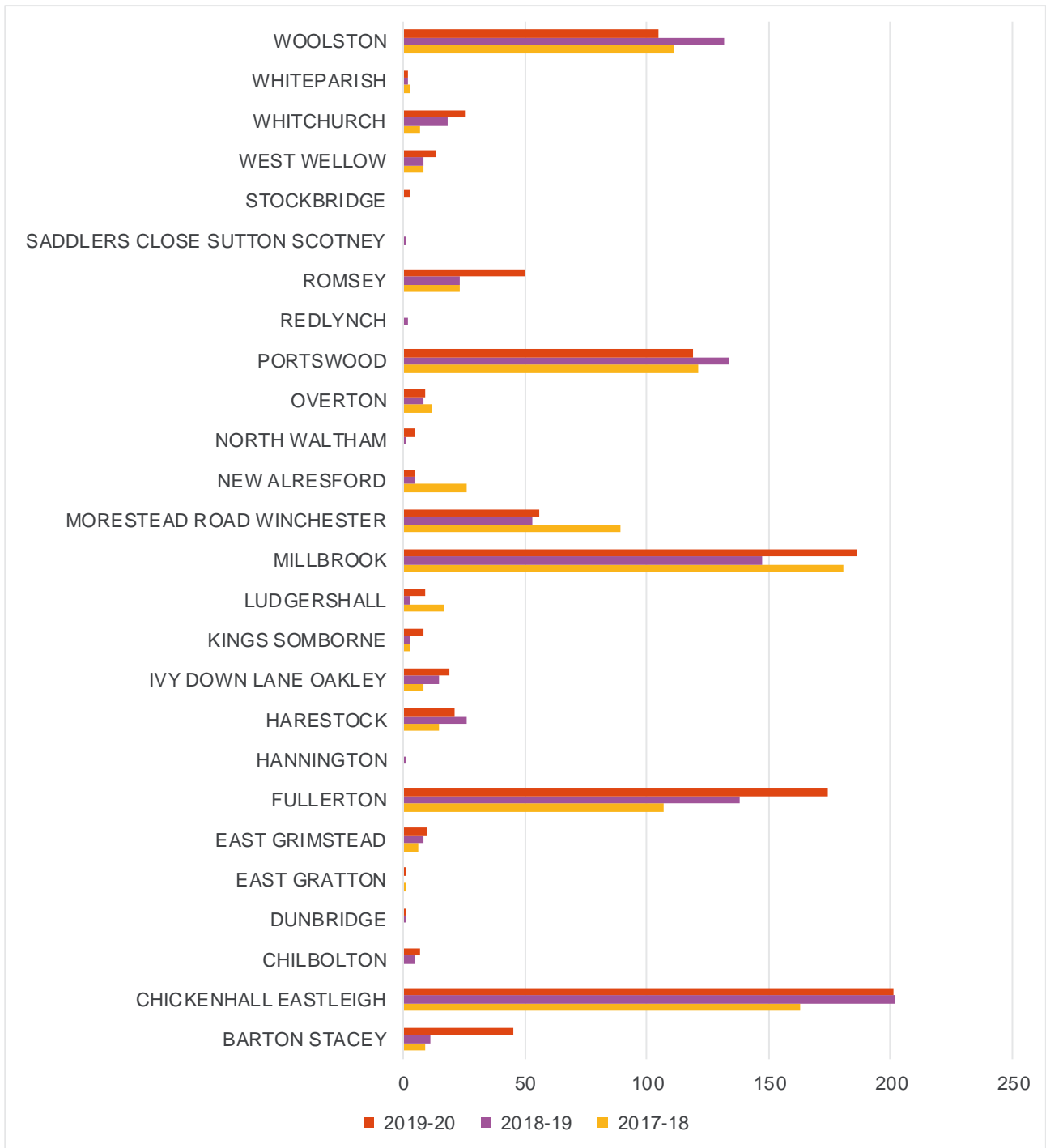


Figure 6: External Flooding within the curtilage of a property (not inside) by sewer catchment in the Test and Itchen river basin (number of incidents)



Within the Test and Itchen catchment, we estimate that there are approximately 29 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.

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.



For each site, we are allowed a certain number of breaches, based on how many samples are taken a year. If the number of breaches exceeds the allowed number, then the site is deemed failed. In the Test and Itchen catchment, there have been no failed sites over the last three years.

Southern Water
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