Clear way forward: Delivering a resilient sewerage and drainage system (2016-17)

November 2017
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Summary of report

- Sewer flooding is an unacceptable service failure for customers. This report considers how the water industry can improve wastewater resilience and reduce sewer flooding. We highlight operational performance in this area and where we are working in partnership with others to help the industry address the challenges.

- Climate change will bring weather conditions that make it more difficult for water companies to deliver resilient sewerage services in the future. Additionally, the expected population growth will increase the demand placed on existing sewers and treatment works.

- There are a number of items that are commonly disposed of in the drainage system incorrectly, such as fats, oils, greases, and those containing plastics such as wet wipes and sanitary items. This is known as sewer misuse and contributes to blockages within the system.

- The industry is now faced with the challenge of addressing these issues, making the sewerage system work for today’s and future generations, whilst still keeping water bills at a price that customers find affordable.

- There are some inconsistencies in the way that water and sewerage companies (companies) are reporting information about sewer flooding, which are being addressed through a consistency project led by Water UK. Comparable information should be available in 2020. This makes it difficult for us to make comparisons across companies in this report, however, we can compare companies year-on-year performance.

- Water and sewerage companies (companies) have shown that they can react well after sewer flooding occurs, providing a satisfactory and quick response for customers. But the aim should be to prevent sewer flooding from happening in the first instance. Based on the information that companies have provided, last year saw an increase of almost a third in the number of properties flooded internally, a total of almost 5,700 properties. This is a disappointing rise, driven by significant increases for two companies, United Utilities and Thames.

- Companies need to take a proactive approach to protect their customers from the devastation that sewer flooding can bring. This could include better modelling to understand which properties are most likely to flood, but also working in partnership with others to put in place solutions to prevent future flooding of homes and properties.

We consider the key challenges over the coming years to be:

- **Reducing sewer flooding due to blockages**: Communication with customers plays a key role in managing this challenge, as the majority of these issues are caused by the disposal of items down the sink or drain, which should be placed in the bin. We will continue to press retailers and manufacturers of wet wipes in particular to ensure that products are appropriately labelled to support awareness raising by companies.

- **Keeping surface water out of the sewerage system**: Upsizing sewers is in many cases an unsustainable solution in the long term. The big challenge facing all stakeholders involved in management of drainage is how to keep rain water out of the existing sewer network. Sustainable drainage systems and better long term planning are two key elements to this challenge:
  - **Sustainable Drainage Systems (SuDs)**: While the industry, particularly in England, has made limited progress on the implementation of SuDS, companies could do a lot more to lead in this area. We also believe that there are opportunities to work with developers to break down some of the barriers to utilising SuDS solutions.
  - **Drainage and Wastewater Management Plans**: Long term planning beyond five-year price review periods will be essential if the sewerage network is to remain fit for purpose for future generations. We are supportive of the 21st Century Drainage Programme’s work to encourage longer term planning. This will be a significant step in the right direction towards demonstrating to consumers that companies are responsible custodians of the sewerage network.
1. Introduction

The sewerage network is already under pressure from blockages and flooding, which can have a big impact on the services provided to customers. Climate change and population growth will add to this pressure in the future.

Climate change is expected to bring drier summers, wetter winters and longer high-intensity rainfall, together with more intense rainstorms. It is also likely to lead to more unpredictable weather, making it difficult for water companies to plan how to make sewerage infrastructure more resilient.

The UK’s population is expected to rise from 65 million to almost 85 million by 2050. This brings a challenge to the industry in the demand placed on existing sewers and treatment works. In addition, more properties being built and home improvements such as extensions, conservatories and block paving means that there is less ground for rain water to naturally soak away (known as urban creep). So there is more water going into the sewer network, putting it under pressure.

The industry is now faced with the challenge of addressing these issues; making the sewerage system work for today’s and future generations, whilst still keeping water bills at a price that customers find affordable.

Although this report focusses on sewer flooding, resilience is a far wider challenge for the water sector. Ofwat has recently launched a report entitled ‘Resilience in the Round’, which encourages the industry to consider resilience as interdependencies between corporate, financial and operation functions. Once this wider picture is considered, the benefits that may be delivered include better customer engagement, better planning and better value options.

We agree that water and sewerage companies (referred to as “companies” in this report) should be considering this wider picture in terms of understanding resilience and how to increase it. However, it is more important for customers to see that the services they receive are resilient, i.e. a reliable, flood free sewerage service.

Companies need to tailor their customer engagement to reflect consumers’ priorities in terms of resilience in the long and short term. Communications will need to be relevant to the customer and set out what resilience means to individuals.

This report considers companies’ performance in relation to internal and external flooding incidents, as well as their most serious pollution incidents. We then go on to discuss the key challenges that companies face when managing these issues, the work that the sector is doing to manage these challenges and our work in each of the areas. This report provides information about how companies are performing, and challenges them to make further, sustained improvements.
2. Company performance

In this section, we consider two areas of company performance which have the biggest impact on customers:

- Sewer flooding (both internal and external); and
- Pollution incidents.

2.1 Sewer flooding

Companies submit information to CCWater on the numbers of properties and areas flooded during the year. Although this is a measure that was previously used by Ofwat, there are some limitations to this information\(^1\) which makes it difficult for us to make direct comparisons between companies in this report. However, we can compare individual companies’ trends.

The differences in how the data is reported has been recognised by the industry with Ofwat proposing that a standard industry-wide metric for sewer flooding is used as a performance commitment at PR19. A project led by Water UK, with support from Ofwat, CCWater and other stakeholders is developing this metric which will come into effect from 2020. We will move towards reporting on this new measure once it is established.

Regardless of the way that the information is recorded, the ultimate aim should be for the industry to reduce the number of times that customers are flooded by sewerage.

Sewer flooding is unacceptable for customers, their families and the wider community. The flooding of homes and communities with sewage, for the few who suffer it, is a catastrophic service failure on the part of sewerage companies. Companies have shown that they can react well when flooding occurs, providing a satisfactory and quick response for customers. But this isn’t enough.

Internal sewer flooding in 2016-17

Weather conditions have an impact on the levels of sewer flooding each year. Despite lower than average rainfall\(^2\) in the UK last year (although there were some localised significant weather events which impacted on the sewerage system) the number of properties flooded internally increased.

In 2016-17, there was a 31% increase in the number of properties flooded internally in comparison to 2015-16. This is a very disappointing increase as we had praised companies for their good work in this area last year.

This rise was primarily driven by large increases for two companies:

- United Utilities saw a 90% increase which it stated was a direct result of summer floods occurring over densely populated areas. As a result the company failed its targets in relation to sewer flooding and will incur a penalty of £1.484m for 2016-17.

\(^1\)There can be some variances between how companies are recording sewer flooding. Additionally, the metrics that have been used in the past to show performance surrounding sewer flooding, while appropriate for the time, are no longer fully appropriate as they do not include all flooding incidents now that companies are responsible for more sewers.

\(^2\)http://www.metoffice.gov.uk/climate/uk/summaries/2016/annual
- Thames reported that its 39% increase was partly due to extreme and localised storms that overwhelmed the sewers in the first half of 2016-17.

The overall performance in relation to internal sewer flooding is not good enough. In particular, we will be pushing United Utilities and Thames to make sure that they understand the issues they face and that they take appropriate action to reduce sewer flooding for their customers.

**Chart 1: The number of properties flooded internally per 10,000 sewerage connections**

Increases were also seen for Dŵr Cymru (+23%) and Severn Trent (+7%), although they both met their sewer flooding targets. We will be monitoring the sewer flooding performance of these companies throughout the year and pushing them to make improvements for their customers.

**External flooding**

There was an 11% reduction in the number of areas flooded externally in 2016-17, compared to the previous year, and a 36% reduction over the last five years. We are pleased with this overall performance.

Last year, all companies reduced the number of areas flooded externally, with the exception of United Utilities that had a 7% increase. It reported that this was due to above average rainfall levels for the region in the first half of the year, with a number of very significant storms occurring over densely populated areas, including Stockport, Manchester, Macclesfield and St Helens.
Approaches for tackling sewer flooding

With the unavoidable effects of climate change and a greater focus on resilience, companies need to change from a reactive approach to managing sewer flooding, to a more proactive one. Companies should make greater use of modelling techniques to understand where properties could flood and take appropriate action. This may involve large schemes to increase sewer capacity or property level protection. There is scope for companies to be innovative in this area, to find cost effective solutions to future sewer flooding which have a lower impact on customers’ bills.

Additionally, we believe that the industry could push itself harder in terms of working with others to plan for reducing sewer flooding. The implementation of Sustainable Drainage Systems (see section 4 below) and working to understand their catchment areas fully through the use of Drainage Management Plans are just two areas where partnership working would be of benefit. Again, we are calling for more innovation and progress from the industry in this area.

At PR14 all companies made commitments that relate to sewer flooding, although these are not consistent across the industry and so cannot be used to make direct comparisons between companies. In Ofwat’s 2014 Final Determinations the industry committed to reducing the number of properties that are flooded by sewage by 33% between 2015 and 2020. We will be working locally with companies, and through Consumer Challenge Groups (CCGs), to make sure that performance commitments in relation to sewer flooding are even more ambitious for the 2019 Price Review (PR19).

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https://www.ofwat.gov.uk/regulated-companies/price-review/price-review-2014/final-determinations/

Customer Challenge Groups (CCGs) are independent local groups of customer representatives and other stakeholders that provide challenge to water companies’ business plans. The CCG should ensure that local and regional issues are properly considered and that the views of the company’s entire customer base are taken into account.
Specific information on how companies are performing against their sewer flooding targets can be found on the Discover Water website here:

https://discoverwater.co.uk/sewer-flooding

2.2 Pollution incidents

England

The Environment Agency (EA) is the environmental regulator for the water industry in England and closely monitors the companies’ environmental performance. They challenge companies to:

- Minimise their environmental impact.
- Improve the environment.
- Share good practice.

Each year, the EA publishes an Environment Performance Assessment (EPA) of the nine companies in England. The assessment outlines how companies are performing comparatively on a number of measures, including pollution incidents. Incidents are categorised on their severity.

- Category 1 incidents have a serious, extensive or persistent impact on the environment, people or property and may, for example, result in a large number of fish deaths.
- Category 2 incidents have a lesser, yet significant impact.
- Category 3 incidents have a minor or minimal impact on the environment, people or property, with only a localised effect on water quality.

In 2016, there were 57 serious pollution incidents (categories one and two) compared to 59 in 2015. However, three companies saw an increase. More information on the EA’s assessment of companies can be found in Annexes 1 and 2 of the Environment Performance Assessment.

In its report, the EA concluded that:

“We are disappointed to see that in 2016, the number of category one incidents (the most serious) rose to nine from the lowest ever level of four seen each year in 2014 and 2015. All nine incidents were associated with sewerage pollution.

Due to recent performance, we asked water companies to review and update their pollution incident reduction action plans. We require them to have effective plans in place that are sufficiently ambitious and achieve timely results to meet our expectations.”

We agree that it is important that the sewerage system is resilient and the avoidance of serious pollution incidents forms part of this. We want to make sure that companies are not mismanaging their networks and sewage treatments works and that they are operating them responsibly and efficiently.
Wales

In Wales, Natural Resources Wales (NRW) is the environmental regulator and performs a similar role to the EA in England. They publish an Annual Performance Report for Dŵr Cymru.

In 2016 they reported that the number of pollution incidents had remained stable over the last three years. In 2016 there was a small increase in overall incidents from 109 to 114. Pollution incidents relating to sewerage (category 1 - 3) fell to 107 from 109.

NRW summarised that:

“Overall we are pleased that Dŵr Cymru remain a good performing company, but there are areas that can be improved upon. By 2020, we would like to see Dŵr Cymru strive to achieve the highest EPA status of a leading company by delivering the following results:

- Further reduction in pollution incident numbers.
- Aim to achieve zero serious pollution incidents.
- 100% compliance with environmental permits.
- Increase self reporting of pollution incidents in line with the water industry sector.
- Achieve the targets for Security of Supply and sludge disposal.
- Continued delivery of improvement schemes to meet the specified deadlines.”

3. 21st Century Drainage Programme

The Water UK-led 21st Century Drainage Programme is tasked with improving drainage systems over the next 25 to 50 years so that they can handle projected increased flows through them and limit incidents of sewer flooding. CCWater has observer status on the Programme Board and we are actively involved in a number of work streams.

The 21st Century Drainage Programme currently has two strategic themes aimed at developing and enhancing integrated long term planning for drainage and wastewater:

- Enhancing the long term planning of drainage and wastewater through developing a framework of drainage and wastewater management plans (DWMPs), building on the existing drainage strategy framework.
- Improving service to customers and the environment by addressing sewer misuse.

Blockages in sewers cause more homes and communities to flood than overloaded sewers. We have, therefore, been actively involved in campaigning on the subject of sewer misuse for many years. We welcome sewer misuse being raised as one of the two strategic themes of the 21st Century Drainage Programme. Our main objectives for this project were to:

- Improve the evidence base on the number of blockages caused by misuse and the costs to customers of clearing blockages.
- Support a campaign that speaks with one voice on behalf of all water and sewerage companies and has a consistent message, e.g. the three Ps - only paper, pee and poo go down the loo.
- Provide a collaborative solution to wet wipes being flushed down the loo, working with manufacturers and retailers to improve product labelling and agree a testing method for wet wipes that are labelled ‘flushable’.
- Provide help and assistance to consumers and businesses on the responsible disposal of Fats Oils and Grease (FOG) that contribute to sewer blockages.

The sewer misuse work stream has made considerable progress in all of the above areas. The industry is now speaking with one voice and is consistent with its messages and data. We have seen encouraging publicity on the issue of wet wipes and awareness campaigns that are creative and innovative in their production and strategy.

To gauge the success of the programme, we want to see a reduction in blockages - which cause 70-80% of sewer flooding incidents. Some companies have already noticed the difference when they target hotspot areas, but only a reduction in either the amount of wipes found in treatment works or a reduction in blockages will prove that consumer awareness is leading to changes in behaviour.

More information can be found here -
4. Sustainable Drainage Systems (SuDS)

Companies have an interest in reducing the amount of surface water entering the sewer network as climate change and urban creep place ever greater demands on the sewer network. Companies also recognise the benefits of taking a more integrated approach towards management of surface water and drainage.

The expected increase in the number of extreme rainfall events caused by climate change means that sewer networks will come under greater risk of overloading due to excess surface water. The risk of sewer flooding could be reduced if sustainable methods of draining and storing surface water are considered. For example, the use of a balancing pond to capture and store surface water run off, instead of allowing it to flow straight off the roads and roofs into the drains and then into the sewers. Sustainable Drainage Systems (SuDS), use a range of measures to capture, hold and release water in a way that utilises or mimics natural processes.

In England, the UK Government has to date not implemented the provisions in Flood and Water Management Act 2010, which would have made sure that SuDS were consistently included within new developments. Local authority planners will have responsibility to ensure that new developments are responsibly drained and this will be reviewed by the Department for Environment, Food and Rural Affairs (Defra) to determine how effective this policy is to ensure sustainable drainage.

Table 1: Examples of SuDS

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<thead>
<tr>
<th>Storm Water Bumpout</th>
<th>Storm Water Planter</th>
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<tbody>
<tr>
<td><img src="image1" alt="Storm Water Bumpout" /></td>
<td><img src="image2" alt="Storm Water Planter" /></td>
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<table>
<thead>
<tr>
<th>Stormwater Tree Trench</th>
<th>Porous Paving</th>
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<tbody>
<tr>
<td><img src="image3" alt="Stormwater Tree Trench" /></td>
<td><img src="image4" alt="Porous Paving" /></td>
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SuDS solutions on a significant scale (especially when retrofitted in existing urban centres) require effective co-operation between a host of stakeholders, including local authorities,
developers and regulators, as well as the companies. This reflects the current complex split of responsibilities on drainage and flood management.

In Wales, we have been actively involved in and support the implementation of a statutory requirement for sustainable drainage to be incorporated into all new developments in Wales through Schedule 3 of Flood & Water Management Act.

We consider that all companies should embark upon a long term costed plan to reduce surface water from the existing combined sewerage network and, thereby, reduce the extent of sewer flooding and minimise the negative effects of climate change, provided that this is supported by customers and is affordable.

We do not think that companies in England are doing enough to utilise SuDS as part of business as usual solutions and we would like to see them commit to achieving a reduced level of flood risk using SuDS techniques. We are encouraged by the work that companies in Wales are doing in this area and consider that there are lessons that could be learnt and implemented across England. Specifically, we would like to see an increase in partnership working on SuDS and we are not seeing enough evidence of this from many companies in England. Therefore, we will continue to encourage companies to work with others on the introduction of SuDS to reduce or control surface water entering the sewerage network, and will push for companies to:

- Work collaboratively with housing developers in order to increase the use of SuDS in new developments.
- Work in partnership with all the other agencies that have a role in flood prevention in order to secure the best outcome for consumers and communities.

We do not consider that these outcomes are best achieved by companies adopting SuDS by default. This places a burden on all customers, undermines the benefit of partnership working and limits the options of homeowners or managing agents to find alternative and more cost effective solutions for long term maintenance. The key to the growth of SuDS is to foster healthy partnership working arrangements where all parties contribute towards achieving a common goal.
5. **Misuse of the sewerage network**

Sewer misuse is the term used to cover the inappropriate disposal of objects or substances into the drainage system. It contributes to blocked sewers that could be avoided if items were disposed of correctly. Blockages caused by sewer misuse account for around 70-80% of flooding and pollution incidents from sewers in the UK. According to data provided by companies, the most common items wrongly disposed of in the sewer network are:

- Wet wipes - baby, makeup, cleaning/surface, moist toilet paper (which may be labelled flushable).
- Sanitary waste - sanitary and incontinence pads, tampons, panty/nappy liners, cotton buds, disposal razors.
- Fats, oils and greases (FOG) from households and businesses.
- Food waste.

The blockages and disruption caused by the incorrect disposal of these items could be avoided if customers were better informed about what can be flushed, and of the environmental and human cost of their actions. Currently, it costs £60-£80 million a year to clear blockages from items incorrectly disposed of in the sewer network.

Our research shows that 15% of customers were unable to correctly identify what could be disposed of down the toilet or sink. The relatively low number of customers who do not know how to dispose of everyday items correctly is a good start, although given that blockages are a major cause of sewer flooding, there is clearly more work that the industry and manufactures can do. This may be better labelling of products, or communications that set out the problems that are caused when items are disposed of incorrectly.

As outlined above, we are currently working with the sewer misuse group of the 21st Century Drainage Programme on a communication project that complements a series of campaigns run by companies to encourage customers to use the sewer network correctly. The group that is leading the current media campaign project - City to Sea - is independent and well respected amongst the environmental community, with good connections in print, TV and digital media. They are in the process of producing several films that can be used on social media and that draw upon other environmental campaigns to promote the water industry’s message - that only paper, pee & poo go down the loo.

For example: [www.youtube.com/watch?v=r0VHr2uBinc](https://www.youtube.com/watch?v=r0VHr2uBinc)

More information can be found on their website: [www.citytosea.org.uk/](http://www.citytosea.org.uk/)

While there is the need for companies to be informing customers about how to correctly dispose of items, we are also pressing manufacturers to make it clear on packaging that items such as wet wipes and sanitary items should not be flushed down the toilet. The sewer misuse group commissioned research into product labelling, which is expected to be published shortly. It is expected that this will provide the industry with a benchmark to measure progress. There has been considerable improvement in both the visibility of “do not flush labels” (see example to the left) and the number of retailers adopting this labelling. The

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6 Source: [CCWater Water Matters 2015](https://www.ccwater.org.uk/).
industry has also worked with the wet wipe manufacturing trade body, Edana, to improve
the guidance it provides to its members on how to label products.

While considerable progress has been made, there is still some way to go in order to
reduce the amount of wipes being flushed and therefore blockages created and homes
flooded as a result.

If every wet wipe pack in the UK could feature the ‘do not flush’ logo above by the end of
2018, it would mean that significant progress had been made in this area, and company
and 21st Century Drainage campaigns could be all the more effective, for the benefit of
all.

Fatbergs - The good, the bad and the smelly

The term fatberg made it into the
Oxford online dictionary in 2015.

fatberg, n.: a very large mass of solid
waste in a sewerage system, consisting
especially of congealed fat and personal
hygiene products that have been flushed
down toilets.

Fatbergs are caused by a build up
of cooking fats, oils and greases (FOGs)
being disposed of down the sink
together with sanitary items and wet wipes being flushed down the toilet.

Thames Water has been particularly successful in generating media interest in the issue
with features on fatbergs in Kingston upon Thames and more recently in Whitechapel, east
London. The Museum of London was also interested in giving part of a fatberg its own
exhibition space.

Media activity has helped bring the issue into the public spot light and raise awareness of
the problems caused by not disposing of FOGs correctly. This helps consumers dispose of
FOGs and bathroom items responsibly, which will reduce sewer blockages, reduce flooding
from sewers and save customers money on their water and sewerage bills.

A major change in consumer behaviour will take time to achieve and companies will need
to work hard to keep the message fresh in consumers’ minds. In the meantime, fatbergs
will continue to block our public sewers and as custodians of the sewerage system
companies will need to work hard to identify areas at risk of these blockages and prevent
fatbergs building up in the first place.
6. Managing drainage misconnections

Drainage misconnections which pollute rivers and streams have always been a concern within the water sector. Resolving and preventing misconnections has in recent years become a higher priority. This is because discharges from sewage misconnections contain a range of pollutants that can have very significant impacts because they bypass sewage treatment. In many urban streams it can be difficult to understand the true impact because of the combined effects of other types of pollution, such as run-off from roads. Misconnections cause failures in water quality standards required by the Water Framework Directive (WFD) and revised Bathing Water Directive (rBWD).

Misconnections happen when appliances are incorrectly plumbed in the surface water system, draining directly into water courses, rivers and the sea. They also occur when storm water (clean rainfall) drains into foul sewers and it takes up sewerage capacity. This causes unnecessary polluting overflows into rivers and beaches. The primary cause of misconnections is due to a lack of knowledge of tradespeople (such as plumbers and builders) and home owners who do not understand the drainage system and the implications of misconnections.

We are part of the ConnectRight working group launched by water companies, Water UK, Defra, the Environment Agency and other stakeholders. The group aims to help raise awareness of the environmental issues brought about by misconnections and improve the enforcement process in order to help customers remedy drainage problems. Awareness of the issue and the campaign is still low, despite the considerable efforts of all the organisations involved. We are looking to companies to invest in this project on a long term basis and to lead the ConnectRight campaign in partnership with the Environment Agency and Natural Resources Wales for the benefit of consumers and the environment.
7. Conclusions

Sewer flooding is unacceptable for customers and the resilience of sewage services a key concern to the industry. There has been a shift in focus towards resilience over the last decade due to increasing awareness of the challenges that are ahead, including population growth, climate change and urban creep.

Companies have shown that they can react well when flooding occurs, providing a satisfactory and quick response for customers. However, the last year saw a disappointing increase of almost a third in the number of properties flooded internally, primarily driven by two companies. Companies need to take a proactive approach to protect their customers from the devastation that sewer flooding can bring. This could include better modelling to understand which properties are most likely to flood, but also working in partnership with others to put in place solutions to prevent future flooding of homes and properties.

Pollution incidents are monitored by the EA in England and NRW in Wales. The EA has challenged companies to update their pollution incident management plans due to an increase in the most severe pollution incidents in 2016. NRW concluded that Dŵr Cymru has performed well, but there is still room for improvement. It is important that companies operate their networks and sewerage treatment works responsibly and effectively.

There are several initiatives that we are working with the industry on to try to address the issue of sewer flooding. - We want to see that these are given sufficient priority by all involved to ensure their success:

- The 21st Century Drainage Programme is focussing on developing and improving long term planning for drainage and wastewater sewer misuse. For this to be successful, there needs to be a notable reduction in blockages which cause the majority of flooding incidents. While some companies have noted an improvement, there is still more work to do.

- The growth of Sustainable Drainage Systems has been limited (with Wales the exception), which is disappointing as they can be effective in improving the way that surface water is managed. We want to see an increase in the number of SuDS that are used across England and Wales. For this to be successful, it is essential that companies improve their partnership working with others, such as developers and Local Authorities.

- Working with City to Sea has produced some innovative communication channels to inform customers about how they can play their part by not putting ‘unflushable’ products into the drainage network. However, there is still work to be done by the industry to clearly communicate what can be flushed down the toilet and disposed of down the drain. Manufacturers of wet wipes, sanitary items etc. also play a part in labelling products correctly and clearly. If every wet wipe pack in the UK could feature the ‘do not flush’ logo by the end of 2018, it would show progress in this area.

We will continue to work with stakeholders on these initiatives and locally with companies to push them to better plan to address sewer flooding, work in partnership with others and clearly communicate with customers to ensure that the sewerage network is not misused. We expect to see further progress against the proposed decrease in sewer flooding that companies have promised to deliver.