HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Water quality in rivers, HC 74

Wednesday 26 May 2021

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Watch the meeting

Members present: Philip Dunne (Chair); Duncan Baker; Barry Gardiner; James Gray; Helen Hayes; Ian Levy; Caroline Lucas; Cherilyn Mackrory.

Questions 127 - 199

Witnesses

I: Alastair Chisholm, Director of Policy, Chartered Institution of Water, and Environmental Management; Bronwyn Buntine, Sustainable Drainage Team Leader, Kent Council; and Ian Titherington, Lead Drainage Officer, Cardiff Council.

II: Daniel Johns, Head of Public Affairs, Anglian Water Services Ltd; Lila Thompson, Chief Executive, British Water; and Jo Bradley, UK Director of Operations, Stormwater Shepherds.

Written evidence from witnesses:

Chartered Institution of Water, and Environmental Management

Anglian Water Services Ltd

Stormwater Shepherds

Examination of witnesses

Witnesses: Alastair Chisholm, Bronwyn Buntine and Ian Titherington.

Q127 **Chair:** Welcome to the Environmental Audit Committee for our third oral evidence session on our inquiry into water quality of rivers in the UK. We have two panels today, first a group that includes local authorities and people responsible for the environmental management of water and in particular the drainage aspects at two councils in England and Wales. A second panel will look at some of the challenges of keeping the drainage systems clear and the impact of stuff that is put down our drains that should not be.

I would like to start by inviting our first set of panellists to introduce themselves. Welcome, first, Alastair Chisholm.

Alastair Chisholm: Good afternoon. I am the director of policy at the Chartered Institution of Water and Environmental Management.

Chair: Welcome also to Bronwyn Buntine.

Bronwyn Buntine: Good afternoon. I am the sustainable drainage team leader at Kent County Council and chair of the Association of SuDS Authorities.

Ian Titherington: Good afternoon. I am a drainage engineer based in Cardiff Council and I am a SuDS Board Officer under the Welsh statutory SuDS legislation.

Q128 **Chair:** Thank you. You all have responsibilities in different ways for managing the flow of water that lands at water companies' facilities. It would be very helpful if we could start, perhaps with you, Alastair, setting the scene, giving us an overview of the pressures that the sewage system across the country is under and telling us what you think are the principal reasons for those pressures.

Alastair Chisholm: The current pressures on the sewage network include three factors: first, the age, design and overall condition of the system; secondly what is being put into it; thirdly, how much goes into it. The problems of age and design that we hear a lot about relate to storm overflows—combined-sewer overflows—which are the kinds more commonly found in older urban centres. Historically, sewers collected both foul sewage and surface water into one drain. Combined sewer overflows were designed as the relief valves in the system to stop them backing up through toilets during heavy rainfall events when the surface water component would overwhelm capacity. As I think Members know, combined sewer overflows were designed to discharge infrequently when receiving waters were sufficiently swollen by the rainfall that there would be a good amount of dilution of the sewage load to minimise environmental harm.

It is useful to think about sewer systems as catchments, much as we think of river systems. When you have a combined sewer system in the lower reaches of a sewer catchment, for example in historic town centres,

development in the upper reaches of the catchment can have an impact on the ability of the combined system to handle the flow. There are two pressures from urban development. One is the outward expansion of towns and cities—urban creep—which will result in increasing load on the system. There is an automatic right to connect new developments to the public sewer under section 106 of the Water Industry Act 1991.

Likewise, we have seen increasing density of development in recent decades, specifically of hard surfaces within existing developed areas—effectively urban infill. This will do the same thing as development on the edge of cities but often with a more direct impact on any combined sewers. Over the years our towns and cities have grown and become more dense. We have changed our urban centres, typically making them more impermeable so that rainwater runs off surfaces rather than soaking into the ground—more tarmac, not cobbled streets; more car parks, roads, and retail parks; extensions; patios; driveways; you name it. This means that rather than CSOs overflowing during extreme events only, far smaller events could bring them to the point where they discharge, and indeed that is what we see.

Then we have a potentially big issue—climate change. Climate change projections show that, irrespective of how well we do in meeting zero targets, flood risk will increase. There are different forms of flood risk. We will have river flooding, groundwater flooding, coastal flooding and surface-water flooding. Of these, the types projected to increase the most due to climate change are surface-water flooding and coastal flooding. In this context, this particular issue, the problem is surface-water flooding when it comes to drains and sewers being overloaded.

There are other exacerbating factors. Because the combined sewers were often the first ones that were built in towns and cities, they are old and they may well not be in great condition and therefore they can be prone to groundwater ingress, which will reduce the headroom capacity. We also have challenges associated with fats, oils and greases, wet wipes and other unflushables, which can block or constrict sewers, reducing the capacity in the sewers and making them more likely to back up and overflow.

It is important to state this is not just about sewage pollution from combined sewers. There is a significant challenge with misconnections, where foul sewage can be wrongly connected into surface-water drains, particularly after homes have been modified or extended. Also, while water industry pollution accounts for a larger proportion of water framework directed failure than urban diffuse pollution, pollution from highways is considerable. There are something like a million highway drains discharging rainwater into water courses and there are all kinds of hydrocarbons, metals, and plastics in that run-off, which may or may not be removed by conventional interceptors in those drains. There is a range of factors at play and the difference in factors translates to a range of different organisations having a role to play in the solutions.

Q129 **Chair:** I will ask you to come on to that but before you do, I would like to

ask your view of the independent review published last year, the Jenkins review, which looked in particular at surface-water flooding and who has responsibility for dealing with it. You have mentioned the right to connect to any kind of drainage system that passes by a new development. One of the issues that the review came up with questioned whether it was still appropriate for developers to have a right to connect for surface-water drainage which they are separating through the SuDS but which can then combine with foul water if that is the most available drainage system passing nearby. Could you comment on that?

Alastair Chisholm: The automatic right to connect: I think the right to connect itself is valid but where the problem comes in is that that right is automatic. That was recognised a long time ago. It was recognised not just after the Jenkins review last year but after the Pitt review into the 2007 flooding, which recognised the problem explicitly and made recommendations that were taken forward in the Flood and Water Management Act 2010 to end the automatic right to connect for this very reason and recommended that the right to connect be made conditional on drainage following a hierarchy, effectively a SuDS hierarchy in which it would be managed as close to source as possible, conveyance minimised, multiple benefits delivered, and the lowest option on the hierarchy would be connection to and discharge into a combined sewer. Schedule 3 of the Flood and Water Management Act was not commenced and a decade on, we are in the same position. In the context of both the climate emergency and where we are with that, the nature emergency and the challenges of the pollution of our rivers, that automatic right is part of a wider suite of things that probably need to be revisited.

Q130 **Chair:** Okay. I interrupted you before. You were going on to talk about the wide range of bodies responsible and the range of solutions to some of these problems. We need to hear from the other witness as well, but could you give us your headline view of how we can try to simplify some of the solutions and say who should be involved in undertaking them?

Alastair Chisholm: Characterising them at a high level, solutions lie in two main areas. One is ensuring that sewers are in a decent condition and are performing as they are designed to perform. The understanding of that is starting to improve through the event duration monitoring work that has been going on. We now have a clearer picture of how sewers are performing. We trust that that will lead to an enhanced programme of rehabilitation and upgrade. As for who should be responsible for the delivery of that programme, it is generally a water industry area of responsibility and it should be for water companies to drive those solutions. In the wider context, it is too simplistic to try to tackle this challenge in a water-industry-shaped silo. A lot of other considerations need to be made to deliver the best outcome.

The second main area that I think we need to focus on is keeping as much surface water out of combined sewers as possible. We need to manage surface water at the surface, basically in line with a SuDS management train hierarchy. By SuDS, I mean sustainable drainage systems.

Everything we are doing as a society is driving us to putting more water down surface-water drains rather than less. We are causing more climate change, we are developing more hard, impermeable surfaces, and we need to focus on the concept of slowing the flow. That is a concept that people are quite familiar with in a rural setting, an upland setting, but it is equally applicable in an urban setting, and the way we can do that is through delivering sustainable drainage systems far more widely.

Q131 **Chair:** Thank you very much, Alastair. Could I turn to Ian next, please? Ian, we are aware that in Wales you followed the recommendations and implemented schedule 3, so the right to connect for surface-water drainage systems is now subject to some constraints. Could you describe what the Welsh Government has done and how effective it has been?

Ian Titherington: Good afternoon everyone. On 7 January 2019, we implemented schedule 3 of the Flood and Water Management Act, which brought in six statutory conditions based on 12 principles from the Pitt review. It has been a challenge to deliver it because it is quite a technical area, particularly for local authorities. We are at an advantage in that we have one tier of local authorities in Wales, one set of unitary authorities. The drainage section sits with the planning section in the same authority. The legislation is outside planning and runs parallel with planning, with very similar powers. When you trigger the legislation, you require SAB approval or you cannot build. It is quite draconian legislation, very strong. You are correct in that it controls the right to connect. As SAB officer, it is my decision and not the water authority's, but as a local authority engineer and SAB officer I have a good working relationship with the water companies. We understand the pressures in the system and work with developers at an early stage.

The challenges have been around understanding what the requirements are, and consistency across the authorities, which all have a slightly different approach to the legislation. A bit like planning legislation has developed over 100 years, SuDS will develop and adapt according to the climate of local authority. We are trying to talk to each other through the Welsh Government and the Local government Association to get more consistency and more of a regional approach with developers, because it is a challenge as much for developers, clients and designers as it is for a local authority to make this legislation work.

Above all, it is about putting surface water design at the start of a project and not at the end of a project. It sounds like a very simple concept, but prior to this legislation that did not happen. What that enables us to do is to try to keep the development density that the applicant wants with a better design in terms of sustainable drainage. As Alastair referred to, keeping the water on the surface as long as possible, with new developments creating green-blue corridors so the area is made more use of in terms of amenity and biodiversity.

Another strong element of the legislation is the clear line of responsibility for operation and maintenance. As a SuD, we have a clear responsibility or another organisation has a clear responsibility. They have to produce a

maintenance programme. There are community SuDS involved at times and that maintenance has to be written down before the approval is given. I suppose a key problem that people perceive with SuDS is maintenance and management. That is something that is written in stone in the legislation, which I think is a very important element of it.

Q132 **Chair:** Are you in a position to compel a developer to manage the outfall from the surface water drainage system, so that it goes into water courses without going into sewage systems, or is that part of the negotiation depending on the location and the nature of the development?

Ian Titherington: It falls very much along the hierarchy that Alastair referred to earlier, in terms of the options. Obviously we look for a soakaway or infiltration into the ground as the first option. Because of the last ice age that is not a very good option for Cardiff unfortunately. There is a lot of clay in the area. We follow the hierarchy in terms of water courses, rivers and surface waters, sewers. The last option, the last resort always being a combined sewer. In terms of opportunities, you can avoid a combined sewer. I can insist it doesn't go in and I can stop the development unless they put it into what I perceive to be an acceptable alternative in the hierarchy so, yes, in effect, I can make that decision.

Q133 **Chair:** Thank you. If I turn to Bronwyn, who does not have that power in Kent, can you characterise the main challenges that your local authority faces in coping with, in particular, the surface water issue coming out of developments?

Bronwyn Buntine: After the Flood and Water Management Act, the local flood authorities within England were made a statutory consultee within the planning process. Unlike Ian, we operate purely within the planning process, and the challenge is that we do not have anything that is compulsory. We undertake our reviews using something called the non-statutory technical standards, which were published by DEFRA, very similar to the principles that Ian would refer to, a very similar type of document in overlying objectives, but we cannot compel.

If we had an objection, if we found a scheme proposed either did not follow the drainage hierarchy or did not have the best quality of sustainable drainage approach, we could make an objection, but it would be up to the local planning authority to consider that among all the other material considerations they would hold as to the degree that is pushed through.

I would say that we probably work quite well within the planning system in giving advice to the LPAs. There is a great deal of difference and variation across all the local planning authorities, because there is a different resourcing capacity, but it is a question of the quality of the drainage measures and the drainage systems that we are seeing. You will find that from an overall view, I would say that we have sustainable drainage measures in all of our development encamp. Unfortunately, they may not be vegetative. They may not have taken all the opportunities of

the site to make them multifunctional. They may not give all the 100% water equality benefits that we might be able to achieve through a surface water filtrating-type system.

I think that is our major challenge on top of that. Another thing that is complicating it is the lack of control on who is adopting, managing and maintaining those drainage measures into the future. As they are subject to a different regulatory process, they sit outside planning and, although the local planning authorities were directed to ensure that maintenance occurs in perpetuity, they have little control over that because often the decisions about adoption aren't made until quite late in the process. You may find that the approach that they have taken to the drainage strategy means that it will not be adopted by a sewage undertaker and, therefore, it has to remain private. So the breaking of that sort of process all the way through—Ian has a complete process. It goes through planning. It goes through review and then it goes onto adoption within one authority. We have a multiplicity of partners and parties that we can be dealing with.

Q134 **Chair:** Thank you. A final question from me to Alastair. We had some evidence from DEFRA, who acknowledge that the long-term solution to reducing sewage spillage into our rivers would be to separate the combined sewer system across the country. Given that there are hundreds of thousands of miles of underground drainage, this would be very costly. DEFRA estimates that it would be well over £10 billion and could run into tens of billions of pounds. Has the Chartered Institute done any work in trying to cost dealing with this problem?

Alastair Chisholm: In terms of detailed work, no, we have not done detailed costing. I would say that the views of our practitioner members would chime with what DEFRA is telling you in terms of its quantum of cost.

We need to fully understand the scale and nature of the problem, and what the most appropriate and efficient range of solutions are—and that is going to be different location to location. Every town and city is different: different age, different demographic, different typography, different sewers, different water company. All of those factors have an influence. Obviously, the work that is going on at the moment to put some granular understanding of the challenge out there, you cannot cost it, but definitely you are talking many billions if not into the tens.

Q135 **Chair:** Have you looked at the proposals that Ofwat provisionally approved last week to encourage investment in a number of pilot schemes, primarily, around the country? I think it has provisionally approved about £850 million-worth of badged Green Recovery Challenge Fund schemes by water companies. Do you have a sense of whether these are part of the solution or is it too early to tell?

Alastair Chisholm: I think it is important to pilot different approaches. You referred to DEFRA saying that ultimately the full solution is to completely separate the drainage system, and that is a call that is echoed

elsewhere. Given that a lot of the problematic systems in what are urban centres would require the digging up of an awful lot of streets, that is going to be enormously disruptive. Doing it with a 100% hard engineered approach may not be the most desirable way. It may not be the most cost- efficient way. Therefore, I think it is important that we pilot different approaches and different combinations of interventions.

Certainly, I think the programmes that have been announced are not going to really scratch the surface, but it is important to give us the understanding of what can work, how effective it can be. Also, I think we need to start pricing the benefits that can be delivered by more multifunctional approaches. That is a critical thing in the context of sustainable drainage systems. We do now have mechanisms that can monetise the quite extensive multiple benefits that these technologies can deliver. If that can obviate the need to completely separate a system, because you can get the level of CSO discharges right down through other interventions then, clearly, that is a direction that we need to explore as well, so it is early days I think.

Chair: Bronwyn, I am conscious I am using up other colleagues' time, so I am going to move on now to Barry Gardiner. If you have something to say please feed it into a response.

Bronwyn Buntine: I will comment later.

Q136 **Barry Gardiner:** If I can begin, Alastair, with you and, incidentally, before I do so, let me just pay tribute to the work that CIWEM has been doing over so many years on these issues.

If I were to ask you, what is the common thread between the deluge in New Orleans from Hurricane Katrina and the loss of fisheries in Africa, I think the words that you would provide me with are "nature-based solutions". We lost the tupelo swamp in New Orleans. We lost the mangroves in East Africa. When looking at nature-based solutions, because you are talking about stopping the surface water contamination going into the sewage system, how do you slow the flow of water that is going into the network and how do you treat it at the other end? What role can nature-based solutions play in doing that?

Alastair Chisholm: Thanks, Barry, those are very kind comments. As far as water management is concerned, there are three main outcomes that you would like to achieve through nature-based solutions. One would be to slow the flow. Another would be to completely remove the need for water to leave a site and to be able to infiltrate it completely, if that were possible, and the third is to improve the quality of that water by the time it has left a site. If it ends up in a receiving water, less of it is going into that receiving water and whatever is going into the receiving water is better quality.

There are two main categories of nature-based solutions that we would look at delivering those benefits. I have talked about sustainable drainage systems already. Just digging into those a little bit deeper, SuDS is a kind of a term that it thrown about a lot, but it is actually a

collective descriptor of a whole range of different interventions that manage water in different ways to different ends. For example, you might have silt control components within a SuDS scheme. Those components look to maximise the infiltration of water, minimise the conveyance. Effectively, you are looking at things like green roofs, rainwater harvesting, permeable paving and other permeable surfaces. Those are the things that are right at the top of that substrate.

You might have conveyance components. Obviously, water will flow across a site, so there may need to be channels. You can utilise those channels to slow the water down, either through planting or through physical structures within a channel, effectively mini dams, that slow it down. We can use components that filter the water, so filter strips or bioretention areas. These filter out sediments or pollutants, like metals and plastics, either through vegetated structures or engineered sands and substrates that can be planted as well. These can be worked into tree pits to treat road run-off, for example.

You get infiltration components, like soakaways and rain gardens, and other bigger structures to hold that water, detention and retention basins and ponds. These are the kinds of structures that you will potentially see in a new housing development. You very commonly see a large depression that can fill with water. It may be dry or a shallow pond that can fill, just to hold that water back. You can also have some form of treatment wetlands. You can have some form of planting within those kind of ponds that will use biological processes to help treat the water.

Then you can get dedicated constructed wetlands, which may be a bit more of an end-of-pipe solution. We have constructed wetlands within the waste water management sphere. They tend to be quite large in size, shallow in in terms of water depth, densely planted with aquatic plants, and they deliver the pollutant transformation processes that happen in a normal wetlands, just in a controlled system. In theory, they can treat CSO discharges. They can handle intermittent discharges and they can treat water to an appropriate standard for discharge. Probably the biggest limitation when it comes to treating CSO discharges, particularly in urban contexts, is the amount of space they need. Technologically, they are advancing so that their footprint can be shrunk down a little bit, but it is still a fairly major factor.

The benefit of those kinds of treatment solutions is they are typically lower in cost and particularly operational cost, use less energy obviously than other alternative treatment, technologies like UV treatment, and are generally lower carbon. Those are the kinds of technologies, I guess, that we would be using as nature-based solutions.

Q137 **Barry Gardiner:** Alastair, if I were to summarise what you have said, it would be that nature-based solutions can be cheaper. They can be lower in terms of carbon emissions. They can reduce the pressure on the sewage network and they can have a powerful remediating effect on water quality. Are there any other benefits that you would point to in using nature-based solutions as part of the solution here?

Alastair Chisholm: Yes. If you would indulge me slightly, I may be at risk of getting a little bit evangelical here, but from a sustainable drainage systems perspective, just imagine there was an approach to something—and apologies to Ian as a drainage engineer but I know he is a SuDS engineer, so he won't mind—as boring and mundane as surface water drainage and something so multidimensional that it could basically help deliver against many of the highest-profile Government priorities on the environment. If done well, it could provide a major contribution to ensuring that towns and cities are resilient to the economic and social damages that are projected to grow significantly as a result of climate change.

That could help to reduce the urban heat-island effect during the heatwaves that we are projected to see far more of in the future. Also, when those heatwaves break, as more intense summer rainstorms, you could store and process considerable amounts of the surface water that would otherwise flood our streets, homes and businesses. Obviously, this water, as we have discussed, is the surface water that is potentially exacerbating the problem of stormwater discharges, CSO discharges.

Not only that, that would filter out many of the hydrocarbon pollutants from traffic, which are washed off roads and hard surfaces during those storms, before they reach water courses. They do the same with microplastic pollution from tyre crumb. That is obviously a big contributor to the overall load of microplastics. They help to filter airborne pollutants from the air around these roads. [*Interruption.*]

Barry Gardiner: You are intruding into the session. I don't know if she is a cat or a child but she is very welcome—

Chair: I just muted him.

Alastair Chisholm: I haven't finished either.

Barry Gardiner: Please go on, Alastair. Briefly, we must press on but do finish.

Alastair Chisholm: They would add beauty to our built environments. This is a key priority within the Government's planning reforms at the moment and the proposed national model design codes. They would be creating places with ready access to green-blue infrastructure that is so valuable for mental health and wellbeing.

Last but by no means least, they would be contributing to nature recovery, potential biodiversity net gain in the urban setting. That nature benefit can be delivered both directly in situ through their composition as planted engineer features, so providing in situ habitats for pollinators and other invertebrates—obviously those are in decline at the moment—but also through cleaning the water, which drains and percolates through them so that when that reaches water courses it doesn't pollute those water courses. It recharges and nurtures them. As Ian said before, and Bronwyn said, if they are designed well, that approach can be cheaper to construct and maintain than the conventional way of doing things.

Q138 **Barry Gardiner:** Great. I love your evangelical nature. I am a convert and thank you for that. I think you have given the Committee a lot of ammunition to put in the report about the benefits of nature-based solutions in this area.

If I can turn to Bronwyn Buntine. Bronwyn, how widespread are sustainable drainage systems in England now? We have moved over from a capex to a totex system with Ofwat, which I think has helped, but how does England compare with other countries? If one looks across to the USA, you see the Clean Water Act and what that has managed to achieve there. Are there things that we can learn?

Bronwyn Buntine: There is a lot that we can learn, a wonderful amount we can learn in actual fact. I came to England to work as an engineer back in 2003. I was rather surprised by the state of where the English system was in relation to surface water management, given what was happening both in Australia and the US, so in the last 18 to 20 years we have come quite a way.

I am now in a role looking at drainage schemes coming through and, as I said, the majority of them have some sort of attenuation or control discharge, so I think we are working well in relation to new development on hydraulic control and making sure that we are not exacerbating flood risk, either within the site or offsite. That is our main position that we are looking at.

Where we need to grow is all the extras that we can get out of a sustainable drainage approach for drainage design. With the introduction of multifunctionality as a word in the National Planning Policy Framework, it is pressing the agenda, I think, with local planning authorities to look at amenity, to look at biodiversity. The introduction of biodiversity net-gain regulation has meant that we can then capitalise on it and use it as an opportunity when we look at our drainage systems, so all those other features are what we need to bring forward.

One thing we must remember is that the sustainable drainage approach is not what it is called in the US. It could be water-sensitive urban design, WSUD. It used to be called best management practices. It was introduced originally back in the early 1980s, 1990s because of water-quality concerns. That was its main purpose for being. Since then, they have moved that into low-impact development and it is about greening streets. It is about disconnecting downspouts. It is about addressing that extra water that goes into combined sewer systems, so they have broadened the opportunities that you have.

In Australia, it is about water conservation, collecting water, how else you can use water. That is another thing that we in England are going to be faced with. Kent, with East Anglia, is one of the driest areas within England, so water capture, water reuse, is one of the main things that we could gain by using our drainage measures in different ways.

There is a lot out there that we can expand our approach and implementation of our drainage measures. We are on the cusp of it. The

understanding is there. We have good guidance on certain aspects of design. It is moving forward into implementation, which in some cases may be hampered by adoption or it may be hampered by the fact that other partners in water management have not come together collectively. You have some good partners. Other partners aren't quite there in their business models.

Q139 **Barry Gardiner:** Help me out here. If we as a Committee wanted to make specific recommendations about how to increase the sustainable drainage models, the nature-based solutions, and you were to pick and steal some ideas from elsewhere, what would those ideas be?

Bronwyn Buntine: Pick and steal from elsewhere? I think fundamentally I would look at regulation, and regulation would be focused on going back to section 42, the right to connect, looking at the type, the quality around drainage measures that we are implementing, so raising the bar in the expectation that you do look at vegetative solutions and that you implement soils control and so on, making that the bar that everyone has to get over.

That could have been done through schedule 3, but we are not there so we need to have some other sort of method. Non-statutory technical standards are not going to make it. It needs to be something that is compulsory, so that is the first thing: something that is mandatory that they need to make sure that they comply with.

The second aspect, I would probably consider something that gets very low coverage here, is water reuse. I think that is something that we should pick up from other places in other countries because it is only new. We have a number of EU projects in Kent looking at recharge and looking at how sustainable drainage measures can put water into the ground. It is only in its infancy here. I think that is something that we need to promote much more strongly.

Q140 **Barry Gardiner:** Thank you very much. That is very helpful. Can I just probe you on the first one a little bit more? Are you saying that there should be a statutory obligation to look at sustainable green solutions, nature-based solutions, before looking at the concrete and steel-built solutions?

Bronwyn Buntine: I think there should be compliance with the drainage hierarchy in the first instance, because I have one slight problem. One third of Kent is on chalk. Our first approach is infiltration to ground and we are in a landscape that isn't vegetative. It isn't lush green trees. It is meadow grasslands, wild flower meadows. It is a very different type of landscape, so any measures you implement have to respond to the local landscape that is there. I would much prefer to see infiltration basins that aren't wetlands. I would rather see it going straight into the ground.

On the drainage hierarchy, DEFRA has just completed a review of the non-statutory technical standards. It has reintroduced possibly that consideration of rainwater harvesting is the first instant thing you look at. The second is infiltration. The third is discharge to an ordinary water

course. The fourth would be to a sewer, preferably a surface water sewer. I think making sure that it is demonstrated that all those things have been investigated before you get down to the bottom layers is the best way to go. If you consider multifunctionality, that could be vegetative or it could be a meadow or it could possibly be—somebody did say to me parking is a multifunctionality use—permeable pavement as such, which could be something that might be appropriate for a certain location. It needs to be site-specific and respond to the geology of the situation.

Q141 **Barry Gardiner:** Thank you very much. Ian, if I can turn to you—and you are very site-specific—and ask you to tell us about the work that you have been doing on the Greener Grangetown project and the water quality benefits that you have achieved from implementing sustainable drainage there.

Ian Titherington: It is an idea I came up with about 10 years ago, well before schedule 3 to the Flood and Water Management Act. I had been working about 20 years ago with the council on impounding the River Taff and the River Ely for the Cardiff Bay Barrage. We had to build a series of pumping stations around the bay to stop all the sewage outfalls and industrial outfalls going into the bay because there was no form of treatment at the time. We built this ring of pumping stations and effectively we locked all the combined sewage of central Cardiff in the system to a treatment works in the docks and the treatment works about eight miles away in the adjoining country.

My idea was, "Well, can't we let grass and gravity do the work of eight miles of sewers, three pumping stations and two or three treatment plants?" It was that simple. It was not driven by flooding. It was just driven by the nonsense of water falling 30 yards from the River Taff and travelling eight miles. The idea then was to pick up the surface water. Welsh Water at the time came in with me and we had a very early partnership relationship with the water company, which was really good and positive. We both realised we had the same customers in the area, in Grangetown. We had different priorities but the priorities crossed in that area.

They wanted to remove water from their combined works. We wanted to improve the area, so we created a series of rain gardens around the streets, intercepted all the highway drainage. The roof drainage, the footpath drainage all went into the gullies, previously into the sewers, intercepted that and grass and gravity did all the work for us. Basically, the water goes through, is cleansed by the rain gardens, 130 new trees, a lot of greenery in streets, terraced streets. These are not suburban streets. They are inner-city Cardiff docks. Very multicultural, 49 languages spoken in the local primary school, a very multi-ethnic area. We spent a lot of time consulting with the community and what they wanted within the parameters we could give and came up with 12 different designs because the streets wanted 12 different solutions.

Because we involved the community so much and we had time to do that, which is something you really need to do with a retrofit, they really got

involved. They got passionate and a lot of them now feel a lot of pride in the rain gardens. They even weed them and look after them themselves, put in one or two of the plants themselves when they are not supposed to. They get involved and it has changed people's perceptions of the area. They have greened it up, they have cleaned it up, people are proud of the streets, and it has changed other people's perception of Grangetown; it looks different, it feels different, it even sounds different. A lot of that sounds stupid but when you can hear wind blowing through trees and birds singing it completely changes the perception through what is basically a drainage scheme.

We wanted to do as big an area as we could to show what change we could make. It is not often, as a drainage engineer you get the opportunity of enjoying your work because everything is always buried underground and no one appreciates it. When you do SuDS work in a community and you involve them, the before and after response is quite astounding. As Alistair said earlier, the multi-benefits are quite incredible. They have completely changed the community.

Q142 **Barry Gardiner:** Briefly, could you just say: have you measured the water quality benefits?

Ian Titherington: We have done two things. Welsh Water, in fairness to them, have put a lot of research into it. They have looked at two things. They have looked at the before and after in terms of water quality going through the rain gardens, and I sent some photos to the MPs and the Committee on that. Literally, it is like black soup to clean water in terms of quality. We are picking up 90%,95% of all high-grade pollutants.

The soil system and vegetation improves over time, it gets better. The figure I always give them is if at least 50% of the water is evapotranspirated into the air, so it does not even leave the rain garden, apart from holding it up as a mini reservoir it evaporates, it has a cooling, it helps with air pollutants, cools the area. The other thing was looking at the electricity supply and the pumping station downstream of the area. The electricity demand plummeted on that station a lot more than we thought it would because basically we took out the efficient areas of run-off, so the actual effect on the combined sewer network was astounding.

We created a huge capacity in that system. I doubt the CSO has ever worked into that pumping station and it is quite a new station. The effect on the water system has been quite remarkable. Again, we have achieved more. On every single stat that we set for ourselves we have achieved more. It has been quite surprising to see what is going to happen to the scheme.

Barry Gardiner: That is positive and optimistic. Chair, I have taken a lot time but it has been superb the evidence that we have gathered, so thank you very much.

Q143 **James Gray:** We have already discussed in some detail the relationship between SuDS and the plan-led system but I just want to touch on a couple more. First, a couple of takeaways from your previous remarks.

Do all new developments in Kent have SuDS installed even when it is not compulsory—but you would like it compulsory—but the fact that Kent has been so successful is perhaps an example of what our local authorities could do?

Secondly, the change you see in the 18 years that you have been here, I remember when I was last on this Committee or its predecessor—I think it was 25 years ago—I remember visiting France to see SuDS because we had no idea what it was, we did not have it in this country. It did not exist, we had no clue. I am glad to hear that has occurred. What do you believe therefore that the current plan-led system is helpful in spreading SuDS and to what degree, leaving aside the point you made about its compulsory nature, are there downsides to the plan-led system or does it work?

Bronwyn Buntine: It does work. We promote pre-application in Kent so we often get the major developers coming to talk to us about sites before they even consider what they are doing. They recognise they have possibly a surface water drainage flow path or they have connection issues. They will come and talk to us about how they need to incorporate surface water drainage within their schemes.

Our pre-application I would say has been taken up well but unfortunately you have—even some of the larger ones—smaller to medium-sized builders who do not do that and they will front up, they will submit a plan, and there will not be any proper consideration of what they are doing with surface water. Once they have made a commitment to a layout, they have invested money through their planning consultants, it is sometimes very hard to turn them around to think about other things.

Where we lose out is often with smaller 10 to 15-unit developments, which are very pressed for space. They cannot give up a unit to put a surface water feature at the front for attenuation. More often than not we end up with permeable pavement or geocellular crates below the ground. Permeable pavement might be appropriate for the location, it might be an inner-city area, it might sit well with the streetscape, and so on, but the problem is as soon as you put something under the ground, it is out of sight, out of mind, it is harder to maintain, it is harder to see what is happening. There are potentially increased costs in relation to maintenance.

The difficulty with relying on the planning system is you need to get in early and influence the outcome. The difficulty then is the ability to change that approach. You could make a comment if you have a local planning authority who is supportive of green solutions—for example Tunbridge Wells has a biodiversity officer, who is very prominent in expressing his views and ensuring that a landscape approach is taken. We have support from the local planning authority, we are able to make a comment and say, "This is not the best solution" and we have support from other considerations to make discussion happen with the applicant.

That is one thing I should pull out and make note of. Kent is a two-tier authority. We have 12 LPAs within our area. We are in the top 10 area-wise as a county in England. It means we have to deal with 12 different types of planning priorities. If you are a unitary or a metropolitan council, the lead local flood authority function often sits much closer to planning and you will find that their planning policy is probably much more prominent about a sustainable drainage approach, about landscape-led solutions, about multi-benefits, about multi-functionality, and so on, because they are dealing with a smaller area and they have the two interests—surface-water management and planning—sitting next to each other. In a two-tier authority, it can be very difficult.

Q144 **James Gray:** Wiltshire, where I stand, is of course single tier. I must ask them, I do not quite know how it works there. In that context, have you spent any time having a look at the planning White Paper and do you think that the proposal there, the zonal approach to planning, would be helpful? Presumably it would be because we would end up with one tier rather than several.

Bronwyn Buntine: I have looked only at smaller aspects of the White Paper; Alistair probably has a broader view than me. I have looked specifically at when they start to talk about design codes, and my difficulties are that a lot of the solutions I look at are very site specific. The problem becomes when you start to look at larger areas. We have a garden settlement occurring in Kent, Otterpool, which is going to be 8,000 to 10,000 units. We are making our way through what they are calling tier 1 design at the moment.

The problem is that I found even in the larger scale developments I have dealt with, and when they are master-planned, they wish to take a sustainable drainage approach. They have a beautiful diagram, which is of many colours, and they have green blobs here and blue blobs there and orange is the housing. At the scale it is presented—very large scale—it appears to take a sustainable drainage approach. The problem is when you get stuck getting down the layers into detailed design; everybody else has put the demands on that development and you start to find the area is lost.

One thing in particular I have seen on many developments is they will have a desire to have a roadside swale along the highway circumventing the problems we have with highway run-off. The problem is swales of those size are three to four metres in width. If you are dealing with a highway, which is eight to 10 metres, and then you have a footpath, which is about two metres, you are only starting to see these on main access roads. Even then when you have got down into detailed design, the master planner suddenly goes, "Actually we do not have 16 metres of width to deal with this, something has to go". The swale is the thing that goes because you can put it in a pipe under the footway or in the road and they have saved space.

Those are some of the problems we have when we are starting to deal with things at a higher level. On zonal planning you can say it is going to

be one sort of development but it is the issues that some of these technical details need to be protected at upper layers of planning.

Q145 **James Gray:** What about the other end of the spectrum then? The 10-home threshold, how many developments are slipping through the system and not providing sustainable—

Bronwyn Buntine: We are statutory consultees for major development, which is development of units above 10, sites greater than a hectare, commercial area greater than—I am going to say 1,000 square metres, it has different variations. That means all the minor developments, less than 10 units, we will not see. Dover District Council sought to assess whether they could implement assessment of minor developments. They produced it as an annex to their strategic flood risk assessment.

They got all the way through, understanding what policy they would have to implement, and then they realised that they did not have the resourcing capacity to address it. They came to us and asked us, as Kent, could we give additional support to them. We could do that in a monetary basis if we were reimbursed for our time, because it is outside our remit as a statutory consultee, but it was very difficult to assess what that loading would be.

Their particular concern was they do have an old sewer system, they have strategic flooding on the Dour that goes through Dover, and it is of critical importance from a cumulative perspective because they have a lot of infill development, redevelopment in small terrace houses and small sites. It was that cumulative addition of increased surface water run-off that they could not deal with. If they could restrict it individually at each of these smaller units they could see a beneficial outcome but they just could not address it from a resourcing perspective.

It is very unclear. We cannot find out. We do not record how many minors there are because we only get consulted on majors. It also hard to understand which minors are critical. You could probably look at areas like Dover and say it is important for Dover and other localities within Kent. Paddock Wood, for example, has a chronic critical flood problem in their downtown area. We do look at individual single units in Paddock Wood because the council asks us. They will have a single house, they will send it to us for review, but you can only do that on an as needed basis.

Q146 **James Gray:** Understood. Let's look at the part of the country where it is required, namely Wales. To what degree would you say, Ian, that the compulsory sustainable drainage in Wales interferes with the planning system or makes plans more difficult or delays the consideration of applications? Are there downsides?

Ian Titherington: Because all the drainage conditions have been removed from planning, if it is done early enough it should make it faster and not slower because those conditions being removed from planning allows it to deal with it separately.

When I get a SAB application I have seven weeks to approve it or reject it. Once I have had a pre-application and I can get in early enough in terms of consultation it can speed the process. The problem comes when someone has already put a planning application in, then they ask for SAB approval. That is my difficulty because I am very restricted in what I can do in terms of drainage. I am effectively retrofitting a new site, which is very difficult in terms of costs and very problematic in terms of hydraulics. If I do not get that retrofit done then I have to stop them building because basically the design is unobtainable, which I will do if they do not meet the standards.

As long as they get in early, prior to planning going in, I can deal with it separately and I can talk to the planning officer to make sure we are in touch with each other about what they are proposing and what I want.

The whole point of surface water, to make it successful and cost effective and better design, is to be the first thing on the design sheet. Often I will have a site and they will look at the gas, they will look at the electricity, they look at the clean water, they look at the sewage, all of which highly rely on gravity. You can even pump the sewage. The last thing they look at is the hardest one to design, surface water. It relies on gravity and it falls where you do not want it to fall. It flows where you do not want it to flow and yet instead of it being the first thing to do on a design it is the last thing. As long as it is done at the beginning of the scheme and we work in parallel with planners it should speed up the process and not slow it down.

Q147 **James Gray:** I am confident that your standards in Wales are pretty high on sustainable drainage. As you understand the equivalent system in England, how do the two compare. Are there things that England could learn from you, and it might be Alistair wants to expand on that, or vice versa? Are the systems comparable?

Alistair Chisholm: There is a huge amount of expertise in England, and it is great being on these cyber-Committees so I can pick ideas off them. The statutory element of the legislation gives Wales an edge, because as long as you are consistent and reasonable you get better design and you get more flood-protected design, you get more biodiversity, you get more amenity. There is a lack of consistency at the moment across the councils, there is a lack of expertise in the councils. Obviously Covid has made everything challenging for local authorities, but in a year or two you will see a great consistency and pattern in England, a greater understanding from developers about what we want and hopefully an acceptance from the developers that if they get in early with us it is about better design and generally saving them money. If you can keep water on the surface—it is about what I call the hydraulic magic depth, so from where the water falls to where it goes on the outlet, that hydraulic head is conveyance, quality and storage. The longer you can keep it on the surface the cheaper and easier it is to manage the water.

It is a very simple concept that many designers do not follow. What the SuDS legislation is doing is trying to encourage designers to go down that

route. Generally the development density does not have to be reduced, they can get their profits to pay the banks back and they can come up with a cheaper, more sustainable service or design, which also gives you multi- benefits. My colleague mentioned earlier about having swales, which do take up a lot of space. What we do in new housing estates is we encourage rain gardens to be built in as part of the traffic management system along the road so you keep the same road width, you keep the same house density and have the quality treatment within those rain gardens as part of the conveyance. You don't lose the area, you get the quality and you meet six standards. It can be done within the area as long as they speak to us early on and not too late in the day.

Q148 **James Gray:** Alistair, does England have something to learn from Wales?

Alistair Chisholm: I certainly think so. As Ian says, their standards are statutory, ours are not. We need to think about the drivers. The Welsh standards effectively have six components to them, six standards. The first one sets that drainage hierarchy in place, the second deals with the hydraulic control, then you have water quality, amenity and biodiversity and then maintenance and operation.

The Welsh standards extend, including guidance to companies, to about 60 pages. I do appreciate that there has been concern in Government over the bureaucracy and the weight of planning guidance, and there was a desire to slim that down and make it lighter touch, but I think we swung completely to the opposite end of the spectrum. Our guidance extends to a couple of pages and that is it. It covers that conveyance component, the water quantity component.

Whether or not we need a mandatory approach, I think going back to the automatic right to connect to the sewer, we could make enormous strides by removing that automatic right and making it a conditional right on the basis of delivering against an expanded suite of standards that were fairly well aligned to what they have in Wales.

Bronwyn mentioned that DEFRA have referred the current non-statutory technical standards at the moment. That review did make recommendations that the standards be updated to reflect again six standards broadly aligned with what they have in Wales, that multifunctionality. If you could align a conditional right to connect new developments to the sewer with adherence to those standards—bear in mind we also have design construction guidance that has been developed by Water UK for the water industry that informs which SuDS features water companies may adopt. We could also, given the water company link there to the right to connect, make the right to connect conditional on achieving the guidance that has been set out. At a very high level, make it conditional on achieving some improved standards and I think we would see some significant progress.

Bronwyn Buntine: I will just add very quickly to that. The discussion so far has tied this to connection to sewers, a lot of connections in Kent and a lot of places happen to ordinary water courses, so one thing you have

to keep your mind open to is that if you tie it to the right to connect, which is in the Water Industry Act, it doesn't address all those connections where we have discharges to national systems. You need to make sure that anything you put in place applies to all discharges in all locations.

Chair: We are running slightly over so if we could keep answers reasonably concise. Helen Hayes.

Q149 **Helen Hayes:** My question is for Alistair Chisholm. We have talked quite a bit so far about new-build development. How important is it to retrofit sustainable drainage systems?

Alistair Chisholm: I can keep this pretty quick. It is very important. If you look at the challenge of sewage pollution, where we are now in terms of CSO discharge, look wider into those highway discharges as well. We are in that position as we are now on the basis of, at best, being able to deliver more green infrastructure, more sustainable drainage systems through new developments. We need to make inroads into that current system, having SuDS in new developments is not going to touch the baseline, if you will. We need to start retrofitting to deliver those outcomes. Bear in mind, I mentioned earlier we are predicted to see significant additional surface water flood risk with climate change, you have an additional factor being added in to that picture. Managing water at surface through these kind of interventions is a really obvious no-brainer way to starting to tackle them.

Q150 **Helen Hayes:** Thank you, that is helpful. Following on from that answer, my next question is for Bronwyn Buntine. What are the barriers to retrofitting sustainable drainage systems and how can they be overcome. Who needs to be involved in this?

Bronwyn Buntine: The main barriers for us are the partnership working. We have a sewage undertaker within our county who may or may not have an interest in particular priority areas that we are interested in. It is finding those key locations at which you have multiple partners who will come together.

The second part of that is funding. Retrofitting is expensive. It is more expensive than building it as new, but that is the cost that you have to carry so that is one thing that has to be considered on how it is going to be financed, the financial obligation is going to be met. Again, if it is met by multiple partners then you have different funding streams to do that. The long-term benefits need to be considered. That is one thing that was mentioned, total expenditure versus operational expenditure and that is where we need to move to as well because all the multi-benefits that we get give us economic returns. That needs to be taken into consideration as well, because in the past it has not been.

Q151 **Helen Hayes:** Just following up on that, do you think it is important for local authorities, drainage authorities, to have a plan for retrofitting because otherwise is it not somewhat left to chance? This is an important strand of work that needs to be completed and needs to be worked on. Is

there a planning element that is missing?

Bronwyn Buntine: There is. You need a lot of investigation when you are looking at areas. Kent is now on to our fourth retrofit project. We have put cells in the ground, we have retrofitted in a park in Margate, which cost about £180,000. It was a nice little swale pond thing, good landscape, good trees but there was a lot of work that had to go in before we could even have any potential to putting it in the ground. You need to pick your key critical locations where you think you will have benefit, so you need to do the planning from a highways perspective, critical drainage areas, surface water hotspots, all of those things to pick your key points and then you need to do your initial assessment to work out what the best solution is.

We are looking in Gravesend at the moment, it is going to be on a catchment basis trying to work out whether upper catchment solution is the best move or is it something that is done on a street level because you have a whole toolbox of things that you can use. Unfortunately in a lot of our seaside towns within Kent, they are quite tight, they are not wider streets, they are quite narrow so you are starting to deal with those spatial problems. You have to pick the key point, so planning is quite key and bringing in the highway engineers, the local council people, who are very important, the officers whether it is an open space officer or a landscape officer, bringing those people in to the picture because they can help you along quite a lot.

Q152 **Helen Hayes:** My next question is for Ian Titherington. Further to Bronwyn's answer, how did the cost and benefits of the Greener Grangetown project compare with traditional solutions that might have been used?

Ian Titherington: It was a bit of a—I wouldn't say a one-off, we tried to put as much into the project as we could to try to encourage others to do so. It did overrun in terms of costs. It is hard for the contractors to cost retrofit. It is a new form of engineering, and I describe it as tiptoe civil engineering because you are working in the streets around people, where they live, where they park, where they walk, you have existing trees, you are not cutting those down you are adding to the canopy, a lot of uncharted services. It is more problematic in terms of engineering. With costs we use the CIRIA SUSDRAIN best costing mechanism, which gives you a cost benefit analysis and monetises the benefits you get from the scheme, which was many times more the cost of the scheme over a 20-year period. From a multi-benefit perspective, we felt it was a huge benefit to the community.

The issue with barriers that you mentioned, one of them is when I went to get funding for the project all funding in local government and Welsh Government is siloed vertically and you come along to do a multi-benefit project and you go in horizontal. You go in perpendicular to all the funding mechanisms. If there was a way of incentivising funding siloes to invest in multi-benefit projects, that would help hugely with what we are doing in retrofit. The other thing, as a barrier is I am given ridiculous

deadlines. They will say, "We have found so much money, can you turn out a retrofit project in six months?" No, I can't, because I need to talk to the community. It is so important if you are retrofitting in a community area to involve them in the process, including local businesses. You don't need an unrealistic deadline, you need enough time to design and consult, and you need a funding mechanism, so more than one source in order to invest.

We worked and invested with Welsh Water, with Natural Resources Wales, with the council and Welsh Government, we all saw the joint benefits, created a committee, worked from the start on a project basis. It wasn't run by the council, it was run by all the organisations. When you have that level of trust between organisations, that is where the funding comes from, that is where the drivers come from. It can be done but it needs timing and it needs planning. When you do it right, it is worth it.

Q153 **Helen Hayes:** Thank you. Bronwyn, do you think that separate charging for surface water drainage by area would have an effect in incentivising commercial properties to retrofit sustainable drainage?

Bronwyn Buntine: Yes.

Helen Hayes: That is straightforward.

Bronwyn Buntine: Area based charging has been used elsewhere in the world. It has been used in the US, particularly where it is calculated on impermeable areas. Seattle looked at it back in the 1990s and introduced it in early 2008, and it is based on residential lot size and commercial larger lots of 10,000 square feet.

Ofwat have looked at it. It is something that they permit and I believe in Manchester, United Utilities is moving towards looking at area-based charging. It is akin to the polluter pays principle. If you have a large site that is largely impermeable, you are generating a large amount of water, you are putting a large demand on the surface water sewer system. In that respect it reflects where the demands are coming from and I think it is a way forward to make people consider what they are doing and if you can get an exemption or a reduction in your connection rate because you have implemented controls and vegetative measures, et cetera, and not have downspouts going to the—why would you put clean water in a sewer system, for example, if it is going to go for treatment? It makes no sense at all. That sort of incentivisation is incredibly useful.

Q154 **Helen Hayes:** Great, thank you very much. Turning now to the question of surface water responsibilities. Ian, how well is the Welsh approach working to the adoption and maintenance of sustainable drainage. Have there been any burdens for local authorities with the adoption of new schemes?

Ian Titherington: In terms of the adoption, the SuDS approval board has a mandatory responsibility to adopt when more than one property comes together, when two properties join and there is a SuDS feature we have a mandatory responsibility.

The challenge for local authorities and developers is understanding the payments for the maintenance costs. The maintenance can be over a 60-year period, and a commuted sum is not insignificant over that period of time. Agreeing a way forward in terms of commuted sums or management companies as an alternative—the legislation does not specify any particular choice—that is a current debate we are having within local authorities. I had a meeting this morning with managers to look at how we could make commuted sums affordable, achievable and reasonable in terms of what can be done. What was mentioned by Bronwyn earlier, it is often the choice of the SuDS system you have on site. Often I will try to push a developer towards a cheaper, more sustainable, cheaper to maintain system, first because it is the best choice and, secondly, in recognition that I don't want to make it too expensive in terms of a commuted sum or a maintenance sum for that individual.

It is about getting the design right and agreeing a way forward in terms of management, because there has to be a clear black-and-white responsibility for maintenance over that period so that it is not left unmaintained. When you can see it on the surface and there is a problem, you can resolve it. As Bronwyn said, if you start burying things underground, you are not aware if there is a problem and you are not bothered. The pollution will happen and you will have overflows from systems that will pollute water courses because you do not know what is going on. When it is on the surface, it is very visible and very easy to resolve.

Q155 **Helen Hayes:** That is great. Thank you very much. Finally from me, Bronwyn, how is the approach in England working? Would you like to see sustainable drainage approving bodies created in England? If not, who should manage sustainable drainage systems?

Bronwyn Buntine: I would have loved to have had approving bodies, but unfortunately time has moved on since schedule 3 was written for us. We have had developments with the design and construction codes from the sewerage undertakers. We have had them opening up their consideration of adoption.

The problem is that whoever adopts needs to have a charging regime. If you looked at lead local flood authorities, we do not necessarily have a charging function, so if we were to take it on, how would we collect monies from the people within that area being served by that drainage system? We do not have the capacity or the resources, unless they were gifted to us by the Government, to take on maintenance for a system. As Ian has said, committed sums are not loved by developers because usually they are calculated over 30 years for us, if you are looking at the highways. That means that funding would stop at some point. What happens after that? Who will pay for it?

As to who could take it on, a number of players are out there. The Government could decide that we could have a charging function and

LLFAs could take on that in reality, but sewerage undertakers are a player at the moment and are taking on and adopting systems.

It would be worth considering, as Ian has mentioned, private management companies. There is a lack of faith or trust in them because they are not a regulated body. No one looks after them, but a lot of them have adopted drainage systems. Is there a way of regulating them or adding them to Ofwat's regulatory stable of authorities that it looks after? We need to work within our current arrangements within England. DEFRA will be looking at section 42 and the right to connect. We are looking at national design standards, as Alistair has referenced. A lot of things are happening at the moment. We just need to work out the mechanism.

The other part is that given where we are, it needs to be flexible. I will speak for the housebuilders. They often make a choice in their adoption because they have different build standards. Some of them are very landscape-led and have lots of greenery within their developments, and therefore they have private management companies for the landscape elements. Others are probably more density-led and have more houses and less green stuff. They would want it to be adopted by a sewerage undertaker. You have to think of the commercial current situation with the housebuilders and have flexibility with whatever is pushed through within England. We do not have Welsh Water, which is less commercially driven and has a community aspect to it, whereas our sewerage undertakers do have bottom lines that they need to make.

Chair: Thank you very much. I will draw that panel to a close now. I would like to thank Alistair Chisholm, Bronwyn Buntine and Ian Titherington for your fascinating insights into this complex issue.

Before we move into the second panel, I would like to remind Members that there are votes expected, if not already about to happen. Provided as a result of the proxy voting system we remain quorate, I propose that we continue to sit rather than pausing because there could be up to three votes we are expecting, which could take 45 minutes. As long as we have four of us able to be here, then we will continue with our second panel.

Examination of witnesses

Witnesses: Daniel Johns, Lila Thompson and Jo Bradley.

Q156 **Chair:** I would like to welcome our panellists in the second panel, starting with Daniel Johns from Anglian Water. Could you introduce yourself, Daniel?

Daniel Johns: Thank you, Chair. I am Daniel Johns, Head of Public Affairs at Anglian Water, the largest water company by area in the country, spreading all the way through East Anglia into greater Cambridgeshire and into Lincolnshire to the Humber Estuary.

Q157 **Chair:** Thank you. Lila Thompson from British Water?

Lila Thompson: Thank you, Chair. I am Lila Thompson, Chief Executive of British Water, a trade association of dynamic water and wastewater companies in the supply chain. I am also the Chair of the Grease Contractors Association, an expert group of specifiers, suppliers, installers and maintainers of grease management systems.

Q158 **Chair:** Thank you. And Jo Bradley from Stormwater Shepherds?

Jo Bradley: Thank you, Chair. My name is Jo Bradley. Stormwater Shepherds is a new organisation in the UK, a not-for-profit organisation intent on reducing pollution from urban stormwater with a particular focus on macroplastics, microplastics and road run-off.

Q159 **Duncan Baker:** Thank you very much. Nobody would be able to sit here and not be shocked after watching the Panorama programme, "The River Pollution Scandal". I would urge anyone who has not seen it to watch it. Particularly concerning were the river swimmers unaware of the level of pollution and the blatant disregard of water companies dumping way outside their legal remit. It is very good to have Daniel Johns from Anglian Water here. What is your response to that documentary? What do you make of it and do you accept much of the findings that were aired?

Daniel Johns: Thank you ever so much for the opportunity to take part in today's session. I really welcome the question and I welcome this inquiry. It is massively important and you have real momentum behind this issue, not least because of the success of the Private Member's Bill brought forward by your Chair.

We supported that Bill, because it not only shone a light on the consequences of an overloaded sewerage system but asked the Government to do more to address the causes. As you have heard from previous witnesses, that is about too much surface water getting into combined foul-water systems, compounded by the effects of fats, oils, grease and wet wipes clogging the system, almost like arteries being clogged by cholesterol. In that situation, systems can fail.

In terms of the Panorama programme, two main aspects really struck home. The first was the presenter standing on the wet-wipe reef on the banks of the Thames. That material just should not be there. Wet wipes need to be tackled at source so that it is not possible to buy from a supermarket or a local drugstore chain wet wipes containing plastic fibres. The same should go for sanitary products.

In terms of the accusation that water companies are deliberately releasing stormwater into rivers before works reach their planned capacity, certainly in terms of the data I have seen on the assets we have, that is not the case. There was a basic problem in the methodology, which used the volumes of effluent at the outfall to predict what was happening at the inlet. What is happening at the inlet is important and is relevant to what the permit applies. The error bars on that methodology are so wide that you could quite legitimately have storm overflows discharging while the outfall is measuring well below the permitted capacity of the works.

Q160 **Duncan Baker:** To push you a little bit on that, you mentioned systems failing, but the documentary quite clearly showed days where sewage was flowing out of the outlets when there had been completely dry days running up to that point of time. The data then presented on the show showed exactly that: really a total disregard for the water companies to follow the rules and that they were acting to discharge as and when they liked.

Daniel Johns: No, I do not accept that at all. As you know from your constituency, North Norfolk, we have had one of the wettest winters on record, the wettest in more than 100 years. The groundwater levels are so high that they are infiltrating the sewers. That rainwater—in some cases river water—is inundating the system and backing it up. Even if the rain had stopped, which it finally did sometime in February, those storm overflows were still discharging for some considerable time afterwards.

Q161 **Duncan Baker:** You do not accept some of the findings that effectively showed the water company just opening up and releasing as and when it liked?

Daniel Johns: Not at all, no. Water companies absolutely get this, because at the end of the day we all want the same thing. We all want rivers to return to good ecological status, particularly given that progress on this issue has flatlined since 2015.

Water companies are stepping up. We are investing more than ever before. We have the largest water industry national environment programme here in the east of England. We are spending across the industry £1 billion per day. We have already achieved significant progress since privatisation in the late 1980s by, for example, reducing serious pollution incidents by as much as 90%. The issue here is that it is not only water companies that are responsible for pollution of water bodies. The other sectors are not yet stepping up to the plate.

Duncan Baker: All right. I am sorry if you can hear the Division bell going on in the background. We certainly do want them to improve. Currently only 14% of our rivers are reaching good ecological levels. You are absolutely right. *[Interruption.]* Sorry, Chair, the bell is not going to stop, is it? I will keep pressing on.

Chair: We can hear you, Duncan, so please keep going.

Q162 **Duncan Baker:** Certainly we saw on the show that the pollution that was going into the rivers was sewage, but there is also, as we just now heard from Mr Johns, a disgusting amount of wet wipes. That island in the Thames was particularly shocking. There was an enormous amount of footage of sanitary products floating around in our rivers. What is really the impact of other sources of river pollution that we did not necessarily get to hear about, for instance, agricultural pollution as well? What other sources of river pollution compare to sewage pollution? Should we be focusing our efforts in other areas as well?

Jo Bradley: Thank you for that question. Those of you who know me or who have read my submitted evidence will know that my particular focus is road run-off. I worked for the Environment Agency for a long time. During that time, the Environment Agency commissioned a report on the sources of non-agricultural diffuse pollution, which was duly prepared and 25 sources were identified. I was an officer in the pollution control team at the time and I went through the 25 sources. The only one out of the 25 that had no process in place and no team within the Environment Agency and no attention was the pollution from road run-off, which horrified me at the time. I then made it my job to dig into it.

Road run-off is toxic. We talk a lot about sewage pollution and we talk a lot about CSO discharges, but sewage in its purest form—sewage from humans and washbasins and baths—is organic pollution. Historically, 40 or 50 years ago when CSOs were first a thing, that organic pollution was not ordinarily toxic and the river environment could tolerate it in small doses and break it down. That has changed and the nature of sewage has changed.

People overlook all the time the fact that highway run-off has toxic organic compounds in it every time it rains. These organic compounds are identified as compounds of serious concern under REACH. They are carcinogenic, mutagenic, bioaccumulative and phytotoxic, which means that they sit within organisms and become more toxic as time goes by. They kill microscopic organisms in the sediment of the water course and therefore affect the entire ecosystem within the water course.

I work in this arena and I hear and see television programmes and reports on "Country File" about sewage pollution and agricultural pollution. Although those two pollutant sources are incredibly important, highway run-off sticks out as the poor relation that nobody gives any attention to. It is frustrating because the legislation is there to control highway run-off. The Environmental Permitting (England and Wales) Regulations say that highway run-off discharge should be controlled by permit and that just does not happen. The Environment Agency pays no attention to it.

Mr Johns will tell you that discharges of benzo[a]pyrene from his wastewater treatment works are strictly and tightly controlled by his permit and are monitored by the Environment Agency or by Anglian Water in its self-regulatory role. But the highway authorities and the Highways Agency discharge benzo[a]pyrene every time it rains, in excess of the EQS for some roads and there is no control on that. We need to remember that all sources of pollution should be considered alongside one another.

Q163 **Duncan Baker:** That is valid. I have the Norfolk Broads in my constituency and I absolutely echo what you have said. I know areas where roads have flooded and road run-off is pumped straight back into the Norfolk Broads. No treatment has gone on at all. It is extremely worrying when you say that road run-off is extremely toxic with the organic compounds in it. We should absolutely be following that up.

Thank you very much for that.

Mr Johns, do you want to follow up on that comment as well and also furthermore, on my question about what other pollution we should be concerned about?

Daniel Johns: Absolutely, I completely endorse everything that Jo has just said. Highway run-off is the primary source of microplastics in rivers. Contrary to recent media reports about water company discharges, every survey points to microplastics, tyre dust, petrochemicals and other nasties entering rivers, often without any treatment, effecting pollution in water courses.

Other reasons for rivers not being in good ecological state stem from farmland. Let us not duck that. In our region, more than 40% of the reasons for not achieving good status are because of diffuse pollution from farmland and rural land management. We also have issues with invasive non-native species. We have industry run-off. We have private households with septic tanks and cesspools that are not well maintained and are leaking biological material into rivers. We have a range of different sources of pollution.

To put that into context, combined sewer overflows account for only 4% of the reasons nationally why rivers are not achieving good ecological status. In our region it is less than 1%. Therefore, one single message that I can give to the Committee today is that CSOs are important but, if you had a picture of poor river quality health and you turned it into a 100-piece jigsaw, only the corner pieces would be solved by tackling CSOs. Let that not be the limit of your ambition. You have this momentum behind you now. I have a whole series of recommendations if you were willing to indulge me and things that could make a massive difference both individually and collectively on this should you choose to adopt them.

Q164 **Duncan Baker:** I am going to move on. It sounds like the two questions are answered. The particular issues stem from road run-off and agricultural use. The particular other levels of pollution are coming from there. The inquiry will take that forward. Thank you very much.

Lila, very simply, we did not see perhaps quite so much in the documentary fast-food packaging and that kind of issue. I am from a coastal community and we absolutely know that around coastal communities with heavy domestic tourism, enormous amounts of pollution and wastage ends up in the sea and other places. We have beach cleans and things like that regularly to try to help. Can you outline to us the growth in food outlets in towns and cities and how that is contributing to sewer blockages and other water pollution?

Lila Thompson: Given recent research by an organisation called Catalyst, there are around 427,000 service establishments, including restaurants, cafés, commercial outlets such as supermarkets and takeaways, and universities, colleges, hospitals and care homes.

Arising from the pandemic and lockdown and prior to that, the casual dining sector has been changing and has been in decline for the past three years. We have seen a rise in dark kitchens, also known as virtual kitchens, ghost kitchens and cloud kitchens, industrial units that serve to provide food for delivery only. This area of dark kitchens has grown quite considerably. The number at the moment is around 750 of these dark kitchens exist, but the number could be higher than that. There could be a bit more research. Recently I read a news article about an industrial property developer that bought two sites across London to establish 100 dark kitchens just across those two sites; £13 million was spent. This area is going to grow, so we need to ensure that food service establishments are properly able to manage their fats, oils and grease, which are by-products of food production, food preparation and ware washing.

Q165 **Duncan Baker:** Who should drive that? Local authorities?

Lila Thompson: At the moment, we have key issues that we need to address around FOG. I should say "fats, oils and grease"—you do not like acronyms on this call. We do not have proper and appropriate legislation. We have building regulations, but they are not retrospective. The wording around the management of FOG is weak. It says what commercial kitchens should do rather than what commercial kitchens must do. It also refers to EN 1825, a standard adopted by the British Standards Institute. It refers only to passive grease traps and does not specify the range of grease management solutions out there for food service establishments.

To give you an example, I spoke to Steve Williams, who heads up the Network Protection Forum. He said that if he goes out to investigate a blockage, he may trace that sewage back to food service establishments clustered in particular areas in towns, cities and centres. He will find that 90% of the food service establishments he visits do not have any grease management systems in place, which is not good. If he goes back, it will be around 58%. That leaves 42% of food service establishments at risk of prosecution.

We need to deal with FOG at source. We need to make sure we have legislation in place and effective standards that go across the whole range of grease management systems, and also that FOG is regarded as part of the food waste hierarchy. We cannot hear you, Duncan.

Q166 **Chair:** Duncan, you seem to be unmuted, but we cannot hear you. You have now muted yourself. Okay, are you with us or shall we move on? Try again, Duncan. Okay, thank you.

Lila has very comprehensively answered that question, so I will pick up and conclude the set of questions that Duncan was asking. He was going to ask Daniel a question about monitoring data.

You were kind enough earlier to reference my Private Member's Bill. A feature of that was to try to improve the quality of monitoring what is happening in our inland waterways and the quality of water we have. A lot of work has been done by water companies in coastal areas, not least

by Anglian, in monitoring water quality at our beaches but with less focus on monitoring what is happening in our rivers. Could you indicate your view as to whether it is feasible and affordable for water companies to start monitoring in real time the state of water quality in our rivers?

Daniel Johns: Indeed. I again endorse what Lila said about fats, oils and grease and the importance of regulating food service establishments to make sure they are not disposing of that material into the sewer. The way forward is to regulate FOG as trade effluent. We have had legal opinion which for us confirms that we as a water and sewerage company can regulate FOG as trade effluent and create a permitting system which would require takeaways and restaurants to install grease management equipment. That is the way forward.

In response to Minister Benyon's letter from 2013, water companies have now put monitors on the vast majority of storm overflows—12,000 or more of the 15,000 storm overflows in England and Wales. Every company has committed to achieve 100% coverage where it is physically possible to install a meter by December 2023 and is already publishing data and providing those data from the EDMs—event duration monitors—to The Rivers Trust. We are publishing it on the Anglian Water website as well as providing it to the Environment Agency.

At the moment, real-time data is difficult because there is a huge amount of quality assurance that we need to do before that data tells the real story. We are getting a lot of false positive readings and lots of spill data that is not actually happening in practice because this is quite a harsh environment in which to install a meter or retrofit something into a sewer that could have been built decades ago. The long-term aim has to be much more near real-time event duration monitor data published online and—not only that—provided to Surfers Against Sewage, The Rivers Trust in a way that tells water users useful information about how safe it is to bathe, to canoe and to enjoy those rivers. That will take some investment, but that has to be the goal.

Q167 **Chair:** That is all very well, but that is not what it tells users. It can tell when there has been a spillage of sewage. It does not tell you anything about the water quality. It is an event duration monitor and the clue is in the title. It is not telling you anything about the water quality itself.

Daniel Johns: That is the point. Around the coast, we have developed a Beach Care system, which has the data that feeds to Surfers Against Sewage notifications when a coastal water bathing spot has dipped below the excellent or satisfactory rating. We want to have the same kind of system inland so that users can have an app that does not just tell them if a storm overflow is discharging but tells them useful information and timely information about whether it is safe to go into the water.

Q168 **Chair:** What parameters are those monitors giving to users?

Daniel Johns: The monitors themselves are simple monitors that just measure the timing and duration of those spills.

Q169 **Chair:** They are the same as the event duration monitors and they tell you that there has been a spill but do not tell you what is happening with the water quality around the monitor?

Daniel Johns: That is right. You can use that raw data to feed hydrological models of the rivers and the water bodies, flow rates and other sources of pollutants to give users useful information about how safe it is to bathe at that time.

Chair: Thank you. We must move on now to Ian Levy. I hope your volume is working, Ian.

Q170 **Ian Levy:** You should be able to hear me now, Chair. Thank you very much. Daniel, could you enlighten the Committee about fatbergs? We have all seen documentaries on the TV about these horrible things down the sewers. How do they occur? What problems do they cause to the network? Also, do they attract vermin?

Daniel Johns: Fatbergs occur when wet wipes, sanitary products and other unflushables combine in our sewers with fats, oils and grease from households and food service establishments. In one recent example, we performed a flush-to treatment, a full overhaul of the 80-kilometre sewerage system in Southend. From that, over the course of several months, we pulled out 200 tonnes of unflushables, fatbergs and wet wipes. Somebody volunteered to do a sewer autopsy on that fatberg material. The chief culprit is always the same, time and time again: wet wipes containing plastic fibres, which are marketed today in supermarkets and high-street chains as flushable and yet they do not degrade in sewers and they cause the kinds of wet-wipe reefs that you saw on the "Panorama" programme.

It does not need to be like that. The water industry has developed the Fine to Flush standard. Increasing numbers of products are meeting the Fine to Flush standard. Now is the time to ban wet wipes containing plastic fibres and sanitary products containing plastic fibres because they should never be put into sewers in the first place. It is illegal for households and businesses to put things into sewers that restrict their flow and cause damage, and yet every day 7 million wet wipes, 2.5 million tampons, 1.5 million sanitary pads and 700,000 panty liners are flushed incorrectly down the toilet. For Anglian Water, that means 100 tonnes daily of unflushable material having to be raked out of the wastewater stream when it arrives at our works.

Q171 **Ian Levy:** I do not dispute the findings, but it is quite startling, isn't it, the findings you have there? On the 200 tonnes that you pull out, what happens to that? Is it incinerated?

Daniel Johns: We have to send it to landfill. This is not nice material to have to deal with and our engineers are heroes to be able to pull that much material out of the sewer. This is just one part of one town, 200 tonnes. To put that in context again, that is the size of two blue whales pulled out of one town in one part of the country.

Ian Levy: Lila, did you want to come in?

Lila Thompson: Yes. I wanted to add that there is a focus of water companies on flushing the three Ps, pee, poo and toilet paper, but what we really need to prevent, as Daniel said, is products that are made of plastics going into the toilet. We need to make sure that there are no products that cannot be biodegraded down into the sewer network, if they are in the sewer network. We have to prevent them from being in the marketplace.

Q172 **Ian Levy:** Yes, definitely. While I have you there, Lila, can you explain what can be done to prevent the problem of fats, oils and greases building up in the sewers? What proportion of food service establishments have the proper grease management systems in place?

Lila Thompson: I gave you the example of Southern Water. The representative said that when he went out on a visit there was 90% of food service establishments that had in place grease management systems. I do not have any data right across the UK and the proportion of all food service establishments, but I can look into that for you. The key is that at the moment there is no clear guidance. There is no legislation that says that food service establishments and commercial kitchens should have in place effective grease management systems and what they ought to be. At the moment, the language is very vague.

Q173 **Ian Levy:** Yes, that is certainly something that needs looking at, definitely. Daniel, the onus at the moment rests on water companies to police food establishments, I believe, on the disposal of fats, oils and greases. What problems are there with this? Is it like a dog with no teeth?

Daniel Johns: Certainly, it is illegal under the Water Industry Act, section 111, for anyone to dispose of wet wipes and other unflushables, fats, oils and grease into the sewer because it is likely to restrict flow. What we have at the moment is that we can only adopt retrospective action where we find a blockage and then can trace it back to a clear one or two houses or a certain number of restaurants that are clearly causing the problem.

We think that the way forward is as sewerage companies to regulate takeaways and restaurants under the trade effluent regulations. The problem is that restaurants that cook and then people consume the product onsite count under the legislation as domestic wastewater. We think that, first, it would be very helpful if the Government could first endorse the approach that water companies should regulate FSEs, food service establishments, under the trade effluent regulations, but also to close that loophole whereby restaurants without any takeaway component can also be regulated by that approach.

Q174 **Ian Levy:** That must in itself be hard to come up with the evidence to prove that it relates back to certain food establishments, I would imagine.

Daniel Johns: Indeed, but we can do it. Obviously, if you trace things back and there is fat coming out of the supply pipe that only serves one

restaurant, that is a smoking gun. In that case, we will recharge the costs. We will recharge the costs of the blockages, of clearing that material, and from tankering sewage, which could run into thousands and thousands of pounds. It really is in everyone's interests, not just in terms of water company bills for the tens of millions of pounds, the hundreds of millions of pounds, that water companies across the country spend on reducing and removing blockages each year, but also for those restaurant owners who could be landed with a charge into the thousands of pounds unless they have proper grease management in place.

Ian Levy: Thank you. I think that Lila wanted to come back in.

Lila Thompson: Yes, if you do not mind. To add to that, for example, I mentioned that I am the chair of the Grease Contractors Association. What we have produced is a grease management equipment guide for food service establishments. That went out to consultation to a number of water companies, including the network protection forum. At the moment we have consultation and responses back to that and we hope to launch that out to food service establishments.

That work is going on behind the scenes, as well as the development of a super-guide, which would incorporate the GCA guidance document for food service establishments. It has been incorporated and brought together by FOGWISE working group, which British Water sits on along with the Foodservice Equipment Association, the National Federation of Fish Friers and other key stakeholders. There are people working in the background to help to provide advice and support to food service establishments, but we do need the legislation and the standards behind it.

Q175 **Ian Levy:** Following on from that, Lila, what proportion of these fats, oils and greases could we use in biofuel?

Lila Thompson: That is a very good question. At the moment, we do not consider FOG in the food waste hierarchy and we are behind Northern Ireland and Scotland in how we use FOG and whether it is used as a biofuel. That is an area that still needs to be worked on and addressed. We are quite behind the curve on that. I do not have much data at the moment, but it is something that I think that we need to consider.

We do have a conference that is coming up in October, which is looking at FOG. It is the European FOG summit in October, and it is looking at FOG as a circular economy and its sustainability. As far as research is concerned, there is not much around and we definitely are not ahead of the game in what we are doing in England and Wales.

Ian Levy: Thank you for your answers. That is very informative.

Q176 **Chair:** Following that up, Lila, do you have any data on the volume of reused fats, oils and greases that might be available to a market such as biofuels or potentially as a replacement for kerosene for heating oil?

Lila Thompson: No, unfortunately not. I researched around and tried to get statistics and data, but it was not really available. At the moment

what I understand is that Scotland and Northern Ireland recognise FOG as a food waste. Italy has around 83% take-up of FOG waste and FOG, but in terms of England and Wales, I do not believe that we are doing much work. I can look into that a bit more for you and come back.

Q177 **Chair:** Perhaps for your conference you could ask your members to try to collate some information because that would be very useful to understand. If the recommendation is to regulate, then there needs to be some understanding of what can happen with the waste product. I know that a number of companies exist collecting material from food service establishments, so there must be some estimate.

Finally on that, you mentioned the Grease Contractors Association putting together some standards. There are some standards already in existence, as I understand it, but not for grease removal units. You mentioned earlier in response to one of Ian's questions that you want to see a regulatory backup behind a standard. Is that right and, if that is the case, could you kindly write a note to the Committee afterwards to give an indication of how you think that should be designed?

Lila Thompson: Yes, I will do. To clarify, what the Grease Contractors Association is working on is a guidance document for food service establishments on the types of grease management systems that exist. The issue around the standard is that there is no standard that covers the whole range of grease management systems that are available. I am happy to produce a briefing paper for you and send it to you.

Chair: That would be very helpful, thank you. Now over to Cherilyn Mackrory. Welcome back from the Chamber; I know you have been contributing to the Environment Bill debate.

Q178 **Cherilyn Mackrory:** Thank you, Chair. I even namechecked you in my speech, because I knew you could not be there.

Thank you, everybody. Welcome to the Committee this afternoon. I am following a similar theme to Ian. The Committee has heard that microplastics are now ubiquitous to the UK's freshwater environments and that larger, unflushable plastic products are also causing problems blocking drains. We have heard much about that. Jo, if I could come to you first, you are involved in river clean-ups in your local community. I tend to do an awful lot of beach cleans down here in Cornwall and a lot of that ends up being estuary as well. What problems are plastic products causing in rivers that you have seen? How do we go about managing that?

Jo Bradley: We see lots of problems, particularly with plastic bottles, of course, and other plastic products. We did a litter clean only a couple of weeks ago on a river in Wigan, in Lancashire, where the river has an artificial blockage because the river has to go under the canal. Litter builds up dramatically there behind the blockage. We got a team of partners in to take that litter out. There were over 2,000 plastic bottles and about a thousand tennis balls and footballs, so we have concluded that the dogs of Wigan are very poor at fetch and keep dropping their balls. There were literally hundreds of tennis balls and dog balls in the

river. In that particular location they are unsightly and they can contribute to the creation of microplastics in the water column as they break down.

The other problem I deal with a lot of the time are the tyre-wear particles in road run-off. There are estimated to be 63,000 tonnes of tyre wear particles getting into rivers in the UK every year. That is a significant problem primarily for the rivers. It is in the sediment of the river, so those tyre-wear particles bring with them pollutants, organic compounds, and then they sit in the sediment and cause quite high levels of toxicity to the sediment-living organisms. That then goes into the ecosystem in the river.

You have two problems. You have the macroplastics, which is the litter, the plastic packaging and the plastic bottles, and then the microplastics. Managing them is very different. The plastic litter comes under the umbrella of litter management. It sits very much with the local authorities and it is resolved by controlling that pollution at source, so litter picking, working with supermarkets, "Please could we have deposit return schemes so that people put their plastic bottles back in the deposit return machine?" Those sorts of solutions are proving to be effective in other European countries and we could certainly have those in the UK. I counted something like 175 Foster's lager cans on the bank of the River Douglas in Wigan, and I thought, "If I had been a 10 year-old, as I was many years ago, I would have picked all those up and stuck them in a machine for 10p". Controlling that pollution at source is very doable.

Microplastics is a different kettle of fish because the tyre-wear particles are impossible to eliminate. The tyre manufacturers are looking at other solutions but, to be frank, whatever they make tyres out of, we are always going to have tyre-wear particles. They, along with microfibres from washing machines, clothing, and some of the microplastics that come from cosmetics and suchlike, are almost impossible to remove at source. That is when stormwater treatment steps in.

Stormwater treatment is something that we must do better. We have all the technologies. We have devices. We have sustainable drainage systems. We have vegetative systems. All these stormwater treatment systems can remove those microplastics, but they need to be installed, they need to be designed and they need to be maintained. It is a two-pronged approach: dealing with litter at source and dealing with microplastics using stormwater treatment devices and stormwater treatment systems.

Q179 **Cherilyn Mackrory:** Thank you, Jo. Daniel, we have covered quite a bit of this already, but could you galvanise your thoughts here? There may perhaps be a bit of repeating going on. Is consumer education likely to solve the problem of unflushable plastic pollution, or is there a need for product regulation? Do you see the use of plastic banned in some of the products? There is quite a lot there and we have talked about some of it already, but could you focus your thoughts there?

Daniel Johns: You probably saw me nodding vigorously while Jo was speaking about highways, drains and the potential for SuDS retrofit to provide that treatment of microplastics to stop tyre dust running straight into the river when it rains.

In terms of consumer education, it is part of the puzzle. Again, you can make small steps with consumer education, but the big strides need to be taken by Government in regulating wet wipes and sanitary products that contain plastic. We need to have a simple ban on microplastics. They are single-use plastic items, essentially. Tampons are 8% plastic. In a typical packet of 14 sanitary pads, you get the equivalent of five carrier bags-worth of plastic. The water industry now has a Fine to Flush standard, which means that those wipes break down readily within sewers and do not cause blockages.

Now is the time not only to ban wet wipes containing plastics but to require manufacturers to meet the Fine to Flush standard for toilet wipes and baby wipes in particular. One way to do that might be to apply the extended producer responsibility powers that are within the Environment Bill, which you have just been debating, so that all manufacturers are part of the EPR regime not only to recover the £100 million that water companies have to spend to clear this stuff out of sewers but also the untold environmental damage that those products cause if they are released to the environment. In terms of sanitary products, given they do not necessarily degrade if they do go into the sewer, there will still be a role for consumer education, really clear labelling and messaging on the front of packets and education in schools so that these products are not flushed and also to promote plastic-free periods. If you use reusable pads and so forth, you can save about 94% to 95% of the costs of those sanitary products and, of course, they are plastic-free.

Q180 **Cherilyn Mackrory:** Jo, back to you. Are the manufacturers of wet wipes and plastic sanitary products taking these issues seriously? What feedback have you had? Are they taking responsibility for the whole life of their products or are they going to have to wait for the stick that is coming in the Environment Bill?

Jo Bradley: I am afraid that is not a question I can answer because I do not deal with wet wipes and sanitary products any more. Sewage is no longer part of my remit, I am afraid. Perhaps Lila knows something about that.

Lila Thompson: I probably have as much knowledge as Jo Bradley. Sorry about that.

Jo Bradley: What I can say is that when I worked at the Environment Agency, when the whole concept of using wet wipes for personal hygiene was first introduced, the people working in pollution prevention did say, "That is a nightmare for sewers". We tried to deal with it through trading standards legislation. We tried to get something done about it. It was the same with plastic tampon applicators. It is a shame that these have to become massive problems before we deal with them, when we had an

opportunity to eliminate them before they became a problem. My current worry is little plastic bottles for vape fluids. I think they are going to be our next big problem because there must be millions of those sold every day.

Daniel Johns: There is movement now within the industry. A few years ago there was a reluctance, let us say, to remanufacture products to remove plastic and to meet the Fine to Flush standard. Water UK took one particular manufacturer to the Advertising Standards Authority because they were visibly claiming flushability even though they did not meet the standard, and that was a case that we won. That same manufacturer has now remodelled their products to meet the Fine to Flush standard. It is one of those situations where we now need to increase the pace. Having proven through several manufacturers that the Fine to Flush standard is readily achievable without adding, necessarily, much cost to the product, now is the time for Government to intervene.

Chair: Now we can welcome Caroline Lucas to the Committee, having also been a contributor to the Environment Bill.

Q181 **Caroline Lucas:** Thank you. Apologies, I was indeed in the Environment Bill debate as well.

I want to focus on highways and surface water drainage. Jo, you have already covered some of this in your earlier answer, but I just wanted to ask you in case there was anything more you wanted to add. Essentially, looking at the challenges presented by highways drainage, can you say anything more about the types of pollution entering waterways as the result of run-off that are the main concern?

Jo Bradley: Absolutely. There are three main components of highway run-off that cause me to lie awake at night. One is the suspended solids. The amount of suspended solids in road run-off is immense, comparable to raw sewage, and those particles coat the base of the water course, the bed of the water course, and cause all sorts of problems for spawning grounds for fish but also create a source of pollution that is there all the time, insidiously releasing this pollution into the water column. The suspended solids are the biggest problem for me. Within that, you have the polyaromatic hydrocarbons, which I have already mentioned because they are carcinogenic, and then you have dissolved metals, which are toxic to fish. You have this cocktail of pollutants.

It is interesting that earlier we mentioned CSOs and the impact on people swimming in rivers. There is no research on the impact of people swimming downstream of highway outfalls. I tried to find research on the impact of people coming into contact with benzo[a]pyrene. It is carcinogenic and there is some fairly terrifying data but there is nothing about immersing yourself in water that is contaminated with benzo[a]pyrene and that is something I think we should look into.

Those pollutants I have described in road run-off go into the water environment when it rains. I looked at some data earlier this week for one outfall. Highways England has said that this outfall has been

assessed for its risk and they consider the risk to be acceptable, therefore they are not treating this outfall, but they have no information about the other outfalls coming into that river. It should be the Environment Agency's role to assess that risk and to decide whether or not that outfall should have a permit and should, therefore, have treatment. Highways England do not have the necessary information to allow them to make that assessment properly and the Environment Agency should make that assessment.

Once they have done that, particularly for motorways and trunk roads, when we know what the level of pollution is likely to be, there are loads of potential solutions. We heard earlier about developers not wanting to use swales because they are three metres wide, but filter drains are extremely good at treating road run-off if they are designed properly, and they are only half a metre wide. We need to see more use of manufactured treatment devices like vortex separators and oil water separators, filter drains and stormwater filters, and we need to remember that the poisons in this run-off mean that it is not appropriate to be put straight into sustainable drainage devices. If we throw this straight into an infiltration device and just hope that the soil will break down all that pollution, we are being misled. The level of pollution is so high that the micro-organisms within the soil horizon and the capacity of that soil horizon will very quickly be exhausted and we will be delivering pollution to the underlying groundwater.

We need to get better at recognising the pollution from road run-off for what it is, being honest about the level of treatment that is needed and using all these treatment devices we have available to us to deliver that treatment. We can do it; we just need the wherewithal and enforcement of the existing legislation. We do not need new legislation. It already exists.

Q182 **Caroline Lucas:** That is the bit I was going to press you on. The picture you have been painting is terrifying, but do you think that existing legislation, if it was sufficiently enforced, could do the job well enough or do we need further regulation?

Jo Bradley: The environmental permitting regulations clearly say that discharges from a water discharge activity with poisonous, noxious, polluting matter must be regulated with a permit. There is a provision that says you can put your highway run-off in a river without a permit but it goes on to say that if it is going to cause pollution, it must be controlled with a permit. Legislation already exists that allows the Environment Agency to serve notice on the highway authority and to say, "We think this outfall is causing pollution, we want you to apply for a permit", and the permit would then describe how much treatment was necessary either quantitively or in terms of a SuDS management train. That already exists.

The Environmental Quality Standards Directive says that as part of the Water Framework Directive we must reduce, cease and indeed stop discharges of priority hazardous substances into the water environment.

Here we have an ongoing, significant discharge of priority hazardous substances into the water environment that we have made no effort to stop or to prohibit, and yet we know it is there.

Q183 **Caroline Lucas:** Daniel, you could answer that one, but I will put another one to you quickly as well and maybe you could wrap them up together. What are your thoughts about how drainage and wastewater plans can be used to deliver improvements in water quality?

Jo Bradley: Can I just chip in one thing about drainage and wastewater management plans? They do not consider pollution from surface water sewers. A huge proportion of highway run-off is conveyed into the water environment in water company surface water sewers and the water companies need to have regard for that.

Daniel Johns: The first point I wanted to make was to go back to some evidence you have already heard from previous witnesses at these panels calling for more resources for the Environment Agency for testing and monitoring river water health. There has been a big reduction in Environment Agency testing. The Water Framework Directive only applies to about one third of the water bodies in this country, and we know very little about streams, tributaries, headwaters and ponds, which are massively important for ecology and could well be the source of lots of nasties we are then detecting downstream.

Jo is completely right that drainage and wastewater management plans are water company plans and therefore will not consider the highways drains that flow straight into rivers, but they will be, hopefully, a game-changing plan that water companies are now producing because they are done in a consistent way, they are being done in partnership with lead local flood authorities and highways authorities. While we are not going to get it right first time—this is the first time we have produced these plans—they will highlight all manner of different opportunities to manage surface water so that it does not get into our sewers, causing overflows, and to pinpoint investments that we can make in the network over time to resolve some of these issues.

Q184 **Caroline Lucas:** How is Anglian Water supporting the implementation of sustainable damage systems?

Daniel Johns: We have very good relationships, first of all, with our local planning authorities to encourage them to adopt policies in favour of SuDS within new development. We have for more than 10 years adopted SuDS in new developments if they meet our standard, and we were one of the companies driving the adoption of the design and construction guidance— the DCG—which was mentioned and discussed with your previous witnesses. That promotes not only the water resource, the flow rate benefits of SuDS, but, importantly, water quality, biodiversity and so forth through multifunctional SuDS that are on the surface, exploiting natural systems approaches.

We also have a retrofit programme for SuDS targeting highways drains, particularly where they are flowing into our combined and foul water

sewers. That delivers multiple benefits. One of the really nice projects that I am involved with as a local governor here in London, as well as within Anglian Water, is the potential to retrofit SuDS in schools. Schools have massive areas of impermeable surfacing and by fitting green roofs, rainwater gardens, SuDS and swales, you create a fantastic educational resource as well as helping to attenuate rainwater, allowing us as water companies to manage surface water into our network, reducing CSOs and reducing the potential for both internal and external flooding.

Q185 **Caroline Lucas:** Can I just clarify whether Anglian Water supports area-based charging for surface water to incentivise sustainable drainage?

Daniel Johns: It is something we are looking at. We think it could potentially be a powerful tool because, as previous witnesses have said, there need to be greater incentives for surface water to be managed at source.

One of the problems we have at the moment is that highways authorities, again under the Water Industry Act, have a right to connect. We talked about the automatic right that developers have to connect new surface water drains to combined sewers. Highways authorities have a similar right to connect that we cannot reasonably refuse. Not only is the value of that surface water not being captured, it is not being reused and it is not helping to infiltrate into the ground, highways authorities are able, essentially, to connect their drains to ours without us being able to say no.

Q186 **Chair:** I am going to wrap up with a few quick questions if I may. First, to Jo, following up the points that you were making just now about the role for the Environment Agency in regulating highways authorities—they have this duty to do so—are you aware of any examples of the Environment Agency enforcing action on highways authorities for road run-off pollution?

Jo Bradley: No. There are some examples of partnership working where the highway authorities are working with partners, including the Environment Agency, to build multifunctional treatment schemes. There is one in Exeter at Stover Park where Highways England have worked with Devon County Council, Natural England and the Environment Agency to build a big reed bed to treat some run-off from the A38. That is an example of where they have worked in partnership, but I am not aware of any enforcement action that has been taken against a highway authority for road run-off.

Q187 **Chair:** Do you know whether the Environment Agency has any officers who are dedicated to dealing with highway run-off?

Jo Bradley: There is one gentleman who has it as part of his role but there is nobody who is explicitly in that role.

Chair: For the whole of England or is that for the whole of the UK?

Jo Bradley: The whole of England.

Q188 **Chair:** Lila, can I just ask about, again, the Environment Agency and the role that they do or do not have in relation to FOG disposal? As I understand it, as we have heard earlier, water companies get involved with problems where they start to affect water company assets. If a food service establishment disposes inappropriately of material from their premises it is their responsibility and down to the Food Standards Agency or the public health officers of the local authority to deal with the problem while it is within the premises causing the problem, but as soon as it gets to the water company assets the FSA has no role and it becomes a water company and then, arguably, Environment Agency issue. Is that your understanding of the responsibility?

Lila Thompson: Maybe Daniel can add to this but from the experience that I have had working on fats, oils and grease, it is really the water companies that are the enforcers. They would trace the fats, oils and grease and the blockages in the sewer network back to those particular food service establishments who are polluting, causing the build-up of FOG in the sewer network.

Q189 **Chair:** They play a reactive role in the event of a significant problem arising rather than doing anything preventative?

Lila Thompson: There are water companies who are proactive. Obviously there are water companies that are aware of where FOG tends to reoccur in their networks and there is a sewer network abuse prevention group underneath Water UK. Network protection officers go out to sites where there are regular problems occurring.

However, there is very little enforcement behind the water companies. The Environment Agency is the body that we would like to see as the enforcer, because as one water company person told me, "Who prosecutes their customers?" That is effectively what they are doing if they are visiting an FSC and saying they do not have appropriate grease management systems in place. Also, we already have environmental health officers who go out to premises and they work for their local authorities. They, the Grease Contractors Association and other key stakeholders in the industry such as the Foodservice Equipment Association would be probably the best fit in terms of the people to go out on site and visit.

Q190 **Chair:** That is another body, that is local authority involvement, and how that dovetails with the Environment Agency is one of the problems because there is no smooth responsibility chain. Thank you for that.

Daniel, Anglian are one of the water companies that has been promoting its green credentials quite heavily and I think you published a five or six-point plan for addressing climate change responsibilities last year. Did Anglian submit any proposals to the Green Recovery Challenge Fund that Ofwat recently announced the provisional results from?

Daniel Johns: We did, yes, a Green Recovery five-point plan. One of the calls of that plan was to ask the Environment Secretary to give early approval for £317 million-worth of water industry national environment

projects and we were given that approval in December. We are accelerating those projects now.

Chair: Did you bid for anything under the recent Green Recovery Fund?

Daniel Johns: Not against the Green Recovery Fund, not the additional investment. That £317 million also then comes without having to increase customer bills.

Q191 **Chair:** Why did you not apply for any more?

Daniel Johns: We were in the midst of the CMA process. If you remember, we appealed our business plan to the Competition and Markets Authority, which meant that we did not know where we would end up as a result of that process. That uncertainty meant that we did not know how much additional investment we would be able to spend.

Q192 **Chair:** Understood. In relation to the challenges of the Environment Agency, one of the issues that you as a company have fallen foul of is the way in which the Environment Agency accepts pollution incidents as a result of the operator self-monitoring. There was a case about eight years ago, I think, in Cambridge on the River Cam, where you were prosecuted—this may have predated you arriving at the company; I am not sure how long you have been there—in which Anglian's self-monitoring did not detect a significant amount of ammonia, which was leading to a lot of fish floating around in the River Cam, dead. When the Environment Agency did their reporting, because it was not as part of their routine and regular reporting of samples, it did not count as a breach of permit despite the fact that the ammonia levels were at or very close to the maximum amount permitted. Do you think that that experience illustrated at all the inadequacies of the permitting regime?

Daniel Johns: I am not aware of that particular case but I can write to the Committee afterwards. While the incident was a long time ago, I think there were various legal discussions and maybe even a court case about it. I can give you the very latest on that, perhaps, in writing.

Chair: It would be very helpful if you would, in particular the extent to which that has changed the way in which you undertake monitoring under this operator self-monitoring regime. That would be really interesting to the Committee.

Daniel Johns: Of course, yes, very happy to do that. I would just say that there is a general point here, which, again, is echoed from your previous witnesses, that the Environment Agency needs more resources. It needs more boots on the ground to be able to understand what is actually happening with river water quality and, in particular, to police the farming rules for water system. At the moment, a farmer has less than a one-in-200 annual chance of being inspected against the farming rules. That is probably why 41% of the reason for not achieving good river water quality status in our region is because of agriculture and rural land management shortcomings. You get the environment you pay for. I think now is the time for the Environment Agency to be given the resources they need.

Q193 **Chair:** In which case they would be looking to deploy those resources in more effectively monitoring the outflows from water companies as well. I think you said earlier agriculture accounts for just over 40% of the pollution in our river systems and, of course, water companies account for just under 40%. I know you each like to blame the other and this inquiry is focused more on water companies and highways because we have looked at agriculture before, but I do accept that agriculture has a part of play. One of the Committee's concerns is that we share the view that the Environment Agency needs to put more resource into monitoring, but at the moment they are extremely lax in the permitting regime in which water companies can self-monitor. That is what I am trying to get to with this questioning and your subsequent evidence will be very helpful.

Just a couple more questions if I may. You have touched on the Ofwat pricing regime for the last pricing period, which you have challenged through the CMA. Without wanting to prejudice any of your discussions with the CMA at the moment in relation to the previous price review, what do you want to see in the upcoming price review for which the Government is due to give guidance in draft form to Ofwat later this year?

Daniel Johns: First of all, the CMA process has now concluded and it has brought our business plan back into balance. We are now, obviously, delivering the business plan, the biggest business plan we have ever had in a five-year period.

One of the main lessons to draw from PR19 was that the Government did not set the process off on the right footing. It did not state what it wanted the water industry to deliver through the process of this five years. Of course, the next strategic policy statement—which, as you say, is due to be published this year—will take us through to 2030. That is the end of the next five-year period. The Government has this opportunity to state categorically, really clearly, what it is that the water sector is here to do for the environment and for rivers in terms of eliminating harm from sewer overflows. In the 2017 strategic policy statement, they hedged their bets and ducked the hard choices by asking Ofwat to challenge water companies to do X, Y, Z. Ofwat should challenge water companies to do this. That is a process; it does not describe an outcome. We would very much welcome absolutely explicit, objective measures of success by 2030 that Ofwat can then support companies to achieve.

Q194 **Chair:** Would that encompass nature-based solutions for some of your investment?

Daniel Johns: Absolutely. As you know, we want to take a catchment-first approach. We are getting to the stage where we are running out of road in terms of what we can do end-of-pipe and we think the right way forward is absolutely working in partnership with farmers and other landowners, with wildlife trusts and The Rivers Trust in the same way that we did to build the first constructed wetlands at in Ingoldisthorpe in West Norfolk. We have 34 more treatment wetlands in the pipeline and

that is absolutely the way that we want to go, because they are fantastic from a carbon sequestration point of view and they are fantastic for biodiversity. You might build a wetland to reduce phosphorus but it is going to have much wider benefits beyond that.

Q195 **Chair:** Just as you have raised that, which is really interesting, are these schemes primarily for new developments as an alternative to a chemical or mechanical treatment system or is it an adjunct to an existing treatment plant, typically?

Daniel Johns: It could be either, but certainly the treatment wetlands we have are about adding additional treatment to existing traditional works in order to achieve a lower level of nutrient loading going into the water course.

Q196 **Chair:** Do you have evidence of the capital cost of construction of a wetland as opposed to a mechanical treatment facility that you would be able to supply to us?

Daniel Johns: I would be very happy to supply that kind of evidence. Obviously, it depends. On a case-by-case basis, it will differ. Nature-based solutions are popular and cheaper, which is great, but they are not always cheaper.

Chair: Cheaper to build or cheaper to operate?

Daniel Johns: Cheaper to build and also cheaper to operate, but they take longer to mature. When you have a five-year price for your process and a nature-based solution may take seven or eight years to mature and deliver the benefits that you want, there is a natural disincentive for water companies to take forward nature-based solutions. Defra, Ofwat and the Environment Agency absolutely get the importance of nature-based solutions and they are making changes that hopefully will bring more and more forward.

Q197 **Chair:** Finally from me, there is clearly a balance to be struck between funding the cost of this investment through bills versus alternative forms of funding. Do you think that that should form part of the Government guidance? Should they make it clear where they see the cost of such initiatives falling?

Daniel Johns: Where the wetlands are being built in order for us to be able to achieve nutrient load reductions in P or N, that is really for water companies to fund. What is really interesting and potentially powerful is where we as a water company work in partnership with a landowner and The Rivers Trust potentially to top up money that farmers are getting through public money for public goods, the environmental land management system that is being designed, so that we can drive standards higher, we can reduce diffuse pollution to much lower levels and cut off that source of nutrients from the river in order for the whole catchment to respond. Only addressing things in the pipe addresses the 1% of problems caused by our CSOs, against the 41% of problems caused by farmland. Working at a catchment scale, we can deliver so much more.

Q198 **Chair:** Lila, last word to you.

Lila Thompson: Thank you. I just wanted to highlight the fact that the UK has just under 400,000 kilometres of sewers, with an average age of 70 years. Looking at PR24, one of the things we want to pay attention to is the ageing assets that we have and what we are going to do to replace them and refurbish them for the next AMP cycle. That is something we really do need to talk about, our ageing assets.

Q199 **Chair:** Jo, do you have any advice for PR24?

Jo Bradley: The thing for me is finding a way to fund stormwater management. We have talked a little bit earlier about international models and there are certainly models in Germany and America where there are levies applied to homeowners and businesses that create a fund to manage stormwater assets. That would include Lila's point about stormwater sewers that have not been maintained for many, many decades. They pose a huge risk. If we could create a stormwater utility fund one way or another that would give us the resources to maintain, install and operate nature-based solutions and also to look after our existing infrastructure, it would be a huge step forward.

Chair: Thank you very much indeed. That concludes our questioning and the panel today. I would just like to thank our panellists, Lila Thompson, Jo Bradley and Daniel Johns, for joining us today in a really interesting session. For the areas where you said you would drop us a note with some more evidence, we would really appreciate if you could do that in the next few weeks. Thank you very much indeed.