

IMPROVING URBAN WATERS

Executive Summary

Scotland is renowned worldwide for the environmental quality of our rivers, lochs and seas, which attract visitors and support our key industries. In 2019, 87% of waters achieved good water quality and Scotland's River Basin Management Plan¹ (RBMP) sets out the steps we will take to further protect and improve our water environment, including a commitment to produce a route map for the improvement of urban waters.

The pandemic has seen a shift in public appreciation of their local water environment and there has been a significant increase in outdoor swimming. We know that climate change and customer disposal of inappropriately flushed items will continue to put increased pressure on the sewer network unless we do something different and the current policy and regulatory framework under which we operate was not designed to deal with these issues.

We welcome SEPA's proposal to engage with stakeholders to inform longer-term ambitions for the urban water environment and we are committed to supporting this activity. We are also committed to improving our understanding of how our sewer network operates and how it impacts on the water environment.

We have set out in this route map how we will:

- Improve water quality (to support Scotland's RBMP objectives).
- Increase monitoring and reporting to cover all combined sewer overflows (CSOs) that discharge into the highest priority² waters.
- Significantly reduce sewer related debris in the environment, and
- Reduce spills from the sewer network

We plan to take a circular economy approach to delivering these outcomes which will allow us to balance different environmental outcomes. We cannot do this on our own and achieving these outcomes will require significant effort from many stakeholders, including consumers and businesses, as well as SEPA and local and national government, to find and implement the most sustainable options to reduce sewage litter and spills in the longer-term at an affordable price for the Scottish public.

Progress with the route map will be reported annually to Ministers and key stakeholders and we will continue to update the route map as we gather new knowledge and insights from our activities and through the outcome of wider stakeholder engagement.

¹ Link, published December 2021

² We will agree the prioritisation criteria and list with SEPA in early 2022.

Introduction

Scotland is renowned worldwide for the environmental quality of our rivers, lochs and seas, which attract visitors and support our key industries. It is important for our continued economic success and well-being that we maintain this enviable reputation. Scottish Water has worked together with SEPA to implement the requirements of environmental regulation and have delivered significant improvements to the sewage collection and treatment system over the last 20 years.

Building on the improvements in municipal sewage collection and treatment delivered under the Urban Wastewater Treatment Regulations (UWWTR) 1994, the River Basin Management Plans (RBMP) have achieved much since the first plan was published in 2009. Good water quality has increased from 81% in 2008 to 87% in 2019, with a forward target of 92% by 2027 being set in the next RBMP, due to be published in December 2021. Investment in enhanced sewage treatment and in CSO improvements has helped support this increase in Good water quality.

There are 3,614 CSOs within the 50,000km of sewer network in Scotland (equivalent of one for every 15km). These are intended to spill during heavy rainfall to prevent sewer flooding of properties and uncontrolled pollution of the water environment.

Since 2010, we have improved 279 CSOs where these were shown through study to be impacting water quality and/or causing Sewage Related Debris (SRD) problems in the environment downstream. Solutions have included provision of increased sewer capacity to reduce / eliminate spills and improvements in screening to retain SRD within the sewer system when spills are predicted to remain. Studies have shown that CSOs now play only a limited role in causing water quality downgrading³ and our current investment plan includes an ongoing programme to improve all the remaining CSOs impacting water quality.

The pandemic has seen a shift in public appreciation of their local water environment and there has been a significant increase in outdoor swimming. We know that climate change and customer disposal of inappropriately flushed items⁴ will continue to put increased pressure on the sewer network unless we do something different and the current policy and regulatory framework under which we operate was not designed to deal with these issues.

There does remain concern over spills from CSOs and their possible impact on the urban water environment (see Appendix 1). We have therefore developed this route map for improving urban waters, setting out detailed improvements in the short term as well as longer-term activities to be considered⁵. It is important to note that we cannot deliver this route map alone and other organisations and the public will need to play a key role to secure the intended outcomes.

Outcomes for the route map

The route map will deliver the following outcomes:

- Improved water quality (to support Scotland's RBMP objectives).
- Monitoring and reporting of discharges from all CSOs that discharge into the highest priority waters.

³ Link, RBMP3 identifies 24 CSOs requiring improved to address known water quality needs⁷

⁴ Such as wet wipes, sanitary products and nappies.

⁵ The third River Basin Management Plan makes direct reference to this route map as being a supporting measure.

- Significantly reduced sewer related debris in the environment, and
- Reduced spills from the sewer network.

Using traditional approaches (such as screens and underground storage tanks) to improve known water quality and SRD problems would require investment estimated at around £1bn. Eliminating spills could require duplication of the existing sewer network and have an estimated cost of around £13bn. These traditional approaches would generate significant greenhouse gas emissions due to the concrete and energy required and would cause significant disruption to customers and communities during construction.

In developing this route map, a key principle is that we will adopt a circular economy approach to seek sustainable solutions for water and wastewater management in our sewer networks.

For example, reducing SRD will require progress on three activities: reducing the amount of inappropriately flushed items entering the sewer network, reducing spill frequency and volume and/or providing adequate screening where spills are predicted. Reducing the frequency and volume of spills requires concerted effort to remove surface water from the sewer network. There will be locations where additional storage will be required but we will always look for opportunities to remove surface water from the sewer system before providing increased storage.

We have identified 3 further principles that we will reflect in our activities:

- In working to reduce the impacts from CSOs, we will prioritise the most significant impacts first.
- The public will be able to access accurate information about sewer network performance.
- Governance of investment will be undertaken with water industry stakeholders and progress reported to ministers via the Investment Planning and Prioritisation Group⁶ (IPPG).

In this paper we have set out a range of short and longer-term activities aligned with the four key outcomes above, supported by an overarching commitment for ongoing engagement with SEPA and other stakeholders to inform and direct activity. The short-term activities are by nature clearer and the longer-term activities are presented in the route map as proposals for discussion and development. We would expect these to be shaped by the outcome of the stakeholder engagement and discussions with the wider water industry.

Once this route map is agreed, progress will be reported to Ministers via the IPPG and the route map will be updated annually to include specific named activities once delivery timescales and investment have been agreed.

Short Term Activities (2021 - 2024)

The following short-term activities are commitments for delivery in the period leading up to December 2024. They will be further developed and will be reported to stakeholders on an ongoing basis. It is currently anticipated that the cost of delivering these activities, including

⁶ The Water Sector in Scotland has an existing investment planning and prioritisation group (IPPG) that oversees the development of the rolling Scottish Water investment programme, ensuring we are making progress towards the objectives set by Scottish Ministers for the period 2021 - 2027. Any commitment to investment is subject to approval by this group and post 2027 to alignment with revised objectives. <https://www.gov.scot/publications/investment-planning-and-prioritisation-group-terms-of-reference-2021-27/>

subsequent delivery of specific improvements where solutions are developed, is around £150m - £200m and that this will require rephrasing or reprioritisation of other Scottish Water activities planned for the current 2021-27 regulatory period.

Water Quality

We will:

- Develop solutions for CSOs confirmed as impacting water quality and identified as measures in the third RBMP to allow delivery of improvements by December 2027. Investment is already agreed to deliver these solutions.
- Initiate new studies as required should further water quality impacts be identified through SEPA's ongoing water quality monitoring.

Improving Monitoring

We will:

- Install monitoring on network and treatment works CSOs discharging to the highest priority waters (including all designated shellfish and bathing waters), representing approximately 1,000 CSOs. This will improve our understanding of how these are operating and will provide transparent information on their performance. The improved monitoring activities are currently estimated to cost around £50m - £70m to deliver.
- Examine the costs and benefits of extending monitor coverage to lower priority locations and to where spills are not predicted to be occurring. We anticipate that for around 2,600 CSOs where there is low predicted spill frequency, low amenity and an absence of evidenced environmental impacts, there will be little benefit from monitoring.
- Use spill trigger levels⁷ to drive investigations at monitored network CSOs to determine cause, scale of need and scope for improvement.
- Develop a prioritisation framework to consider the need for increased capacity at treatment works where monitors identify that spills are occurring prior to meeting licensed hydraulic capacity.
- Increase reporting of spill data from monitored CSOs:
 - by December 2022, for monitored CSOs where data are already currently reported to SEPA, publish spill data annually, identifying the main reason for the spills where possible (e.g. heavy rain, blockages or a flow issue at the treatment works).
 - by December 2023, publish spill data annually for all other monitored CSOs.
 - by December 2024, publish near real-time spill data for all monitored CSOs.
- Deliver intelligent wastewater networks⁸ in 3 catchments (East Calder, Erskine and Lossiemouth) to expand our intelligence on network behaviour during dry weather and during rainfall and develop a plan for further roll-out of this approach and alignment with monitoring aspirations.

⁷ Using the spill trigger levels specified in the Environment Agency Storm Overflow Assessment Framework (SOAF)

⁸ A network of sensors will be installed to provide data on sewer network performance within pilot catchments, transmitting data to Scottish Water's Intelligent Control Centre. Data analytics will generate near real time insights that will allow staff to take a rapid, proactive response to avoid blockages. The insights will also contribute to an improved understanding of how the sewer network behaves under different rainfall events, including which conditions lead to spills.

Reducing Sewage Related Debris

Source control:

We will:

- Support the Scottish Government to develop proposals to ban single use plastic products, such as wet wipes, and to improve labelling to promote correct disposal.
- Develop and roll out a campaign to educate customers to reduce instances of flushing items which impact the sewerage system.
- Continue to support UK-wide and create new Scottish initiatives to reduce retail and consumer access to products that are inappropriately flushed to help reduce disposal of these items to the sewer.
- Support research to understand the impacts of sewer spills on microplastics and anti-microbial resistance in our urban waters.

Remove sewer related debris:

We will:

- Continue the prioritisation all CSOs causing SRD problems (currently 630) by reviewing available performance information and undertaking surveys at all CSOs modelled to spill more than once in five years and/or, for monitored CSOs, those exceeding spill frequency triggers.
- Develop solutions for those CSOs that are already confirmed as being high priority having significant SRD impacts on rivers (85 locations).
- Agree delivery timetables for the high priority CSOs (currently estimated to cost around £100m - £130m) and promote for approval to IPPG. Subject to approval, we will plan to deliver these CSO improvements by December 2027.
- Identify the next tranche of priority (medium impact) CSOs and agree timescale for solution development.
- Continue to provide a rapid clean-up service to mitigate the visible impact on the environment when CSOs spill and cause SRD problems.

Reducing Spills

We will:

- Continue to identify solutions to reduce surface water volumes entering the sewer network by working in partnership with SEPA, local authorities, landowners and developers.
- Support the Scottish Government in implementing the Water Resilient Places framework, in particular mechanisms for incentivising and financing surface water removal.
- Identify specific catchment-wide⁹ surface water management opportunities to help resolve the significant spill impacts and to offset any future increases from climate change.

⁹ Partnerships have already been established in Glasgow, Edinburgh and Aberdeen and others should be created where significant impacts exist

- Work with key partners to identify financing and delivery timescales for the delivery of surface water management opportunities on the ground to reduce CSO spills.

Customer, Community and Business Engagement

We will:

- By 2024, we will provide alerts direct to bathing water users when there are sewer spills and support SEPA in incorporating these into bathing water signage as appropriate.
- Provide information to help customers and communities understand how much of their water and sewerage charges are spent fixing sewer blockages, caused by inappropriate disposal of household waste, when money could be spent improving other services.
- Create two transformative (Lighthouse) projects that deliver and showcase water environment improvements including spill reductions, surface water removal and place-making opportunities. A focus of these projects will be partnership working with communities and customers and the scope of these projects will be developed and agreed with SEPA.

Post 2024

The first three years of the route map will deliver significant improvements in our monitoring and reporting of CSO and sewer network performance. We have identified the following continuing actions and will work with SEPA and other stakeholders to consider the learning from enhanced monitoring and intelligent network activities to update the route map with longer-term commitments.

We expect as a minimum to deliver the following actions:

Water Quality

We will:

- Deliver water quality improvements to address all remaining CSO water quality pressures identified within RBMP3. These will be delivered by 2027.
- Review, with SEPA, emerging information on water quality improvement needs and develop, prioritise and deliver solutions as appropriate.

Monitoring

We will:

- Roll out the intelligent network approach to cover additional catchments as appropriate.
- Review the costs and benefits of extending monitor coverage to lower priority waters and agree a programme of work.
- Continue to report spill data in near real-time for all monitored CSOs.

Reducing Sewage Related Debris

We will:

- Develop solutions for all medium priority CSOs (around 150 locations) and agree delivery timetables for these (currently estimated to cost around £150m - £200m). We will promote these as a priority investment in the Ministerial Objectives for the period after 2027 and, subject to these being approved, we will plan to deliver improvements to these CSOs by December 2031.
- Review annually any new emerging information on SRD to inform prioritisation.
- Review the effectiveness of source control and consumer education campaigns and continue community engagement.
- Continue to provide a rapid clean-up service when required.

Reducing Spills

We will:

- Reduce CSO spill volumes in the medium and long-term by maximising surface water management opportunities and minimising infiltration.
- Work on a plan to develop and deliver solutions to achieve zero uncontrolled discharges in the longer term.

SUMMARY

This route map sets out actions which we will take to deliver improvements in the urban water environment.

As our intelligence grows so will our understanding of which initiatives and priorities should be further developed, and we will update the route map accordingly. It is important to highlight that:

- The named actions have significant investment demands and not all are currently set out in Scottish Water's investment planning scenarios. Governance of investment will be undertaken with water industry stakeholders and progress reported to ministers via the Investment Planning and Prioritisation Group.
- Removing surface water from the sewer network is essential for reducing spills from the network and for protecting it against future demands and to achieve this will require considerable partnership working with local authorities and financing.
- We need concerted effort to limit wipes and other 'un-flushable' material being flushed. This is key to reducing the amount of litter that enters the sewer network, causing blockages and ending up in the water environment.

APPENDIX 1

What is a CSO and why do they spill?

There are 3,614 Combined Sewer Overflows (CSOs) within the 50,000km of sewer network in Scotland (equivalent of one for every 15km). These are intended to spill during heavy rainfall to prevent sewer flooding of properties and uncontrolled pollution of the water environment.

However, an increasing number of CSOs spill with high frequency (including a number of CSOs that spill more than once per day on average) due to the following causes:

- Hydraulic overloading from increased flows since the sewer was originally designed. This can be caused: as a result of the connection of additional impermeable surfaces to the sewerage network (housing/business growth and when permeable areas are paved over); from increases in overall rainfall and rainfall intensity due to climate change; and/or from network issues (e.g. siltation and infiltration).
- Blockages (over 35,000/year) caused by 'unflushable' items that customers dispose to sewer (e.g. wet wipes or cooking oils) and from sewer collapses and deterioration of the sewer system.

What impacts do CSOs have?

- Spills can cause **acute environmental pollution incidents**, usually due to blockages. There have however been very few major incidents in the last decade. There are generally fewer than 10 significant incidents and around 200 minor incidents reported each year. Performance in Scotland is slightly below the England and Wales water company average but substantially better than the worst performing E&W companies.
- Screens are fitted to many CSOs where frequent spills occur. However, around 80% of CSOs do not have a screen and therefore have the potential to spill during rainfall causing **sewage litter** in the watercourse. Even where screens are provided, not all sewage debris can be retained within the system since the best performing screen is likely to be only 90% efficient in retaining debris. Over 600 CSOs are currently confirmed as generating unacceptable litter. As spill frequencies increase, further improvements in screening will be required.
- A small number of hydraulically overloaded CSOs result in known **chronic pollution impacts** across significant stretches of rivers (due to widespread increased ammonia and/or reduced dissolved oxygen). The planned CSO enhancements in the River Basin Management Plan (RBMP3) will improve up to 100km of receiving water in 15 waterbodies (0.5% of the total number of waterbodies).
- **Bacterial pollution** from CSOs is investigated and action taken to meet bacterial standards at the 85 designated bathing water areas, but not at undesignated locations.
- There are a number of environmental impacts which are **not fully understood or assessed and, except for some pharmaceuticals, are not considered in the River Basin Management Plan**. These include the effect of macro and micro plastics on the freshwater and marine environment, other persistent chemicals in raw sewage including pharmaceuticals and hormones, viral pollution and microbial development/resistance.