Background document to the Stakeholder Conference on the revision of the Urban Waste Water Treatment Directive (UWWTD)

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Disclaimer: *The objective of this background document is to provide information to participants ahead of the conference. The measures and possible options are included to support conversations and exchanges of views. They should not be considered as the final position of the European Commission. The thresholds and other numerical values given in the tables of chapter 2 of this paper are not final values. All thresholds mentioned in the tables are indicative – the final decision will depend on the results of the costs/benefit analysis.*

1 Revision of the UWWTD

In 2021, the European Commission (DG Environment) launched the impact assessment[1] for the revision of the Urban Waste Water Treatment Directive (UWWTD) [2]. The purpose of the revision is to align the requirements with the new ambitions of the European Union, as outlined in the European Green Deal[3], as well as to address a number of areas of improvement that were identified in the evaluation[4] of the Directive in 2019.

The **areas of improvement** include:

- Pollution coming from smaller agglomerations that are currently not covered to the same extent by the Directive or coming from small-scale or individual systems for waste water treatment (i.e. IAS) or from storm water overflows (SWO) and urban run-off;
- The Directive does not deal with micropollutants from waste water, e.g., the pollution of surface waters by all kinds of micropollutants including pharmaceutical residues or personal care products residues;

[1] European Commission (2020) Roadmap to the revision of the UWWTD
[2] European Commission (1991) Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment
[3] European Commission (2020) A European Green Deal
[4] European Commission (2019) UWWTD evaluation

- More can be done to align the Directive with new ambitions regarding efficient energy use, reduction of greenhouse gas emissions (GHG), and the circular economy, notably for what relates to sewage sludge management;
- The way the Directive covers governance, in particular with regards to transparency, access to justice, affordability, and access to sanitation, is deemed insufficient.

The impact assessment of the UWWTD is currently at its final stage. The impact assessment forms the basis for the Commission's legislative proposal on how to revise the Directive. The European Commission is assessing various **measures** (technical, governance-related) which could best address the areas of improvement identified. The policy measures are grouped into **policy options** representing different ways forward for revising the Directive. For each policy option, we assessed the social, economic, and environmental impacts as well as its coherence with other legislation, effectiveness, costs and benefits, enforceability, and administrative burden.

2 Suggested policy options and their rationale

To present the **policy measures**, we grouped them into three **policy options**. Each policy option reflects specific strategies to address the identified **areas of improvement**. As such, the option packages are mutually exclusive even if, in the end, the final package in the legislative proposal will most probably combine the three approaches depending on the issue to be tackled and the results of the impact analysis. The three option packages are shown in the table below.

Table 2.1-1 Policy option packages and rationale

Policy option	Description
Policy option 1: EU soft guidance for local response	Option 1 reflects a revision of the UWWTD favouring mainly local and regional levels for decision-making. It recognises that Member States and their local authorities will take the required actions to face the identified challenges without EU mandatory requirements. Under this option, the Commission would develop guidance documents to support authorities involved in enforcement and would introduce non-binding requirements for most areas of the Directive. Member States would retain flexibility in deciding where and how to implement these.
Policy option 2: Mix of policy responses	Option 2 has a mix of mandatory and non-mandatory requirements at different levels of governance (local vs. EU-wide) depending on the type of issue to address. By providing a dynamic framework, this option builds on the fact that part of the local/national measures (necessary to face the identified challenges) will not happen without an EU framework.
Policy option 3: Centralised responses setting EU requirements	Option 3 favours binding EU obligations, e.g., a 'command and control' approach based on EU standards and minimum requirements in the Directive applicable to the whole of the EU. This would mean updating existing requirements and enforcing stricter ones.

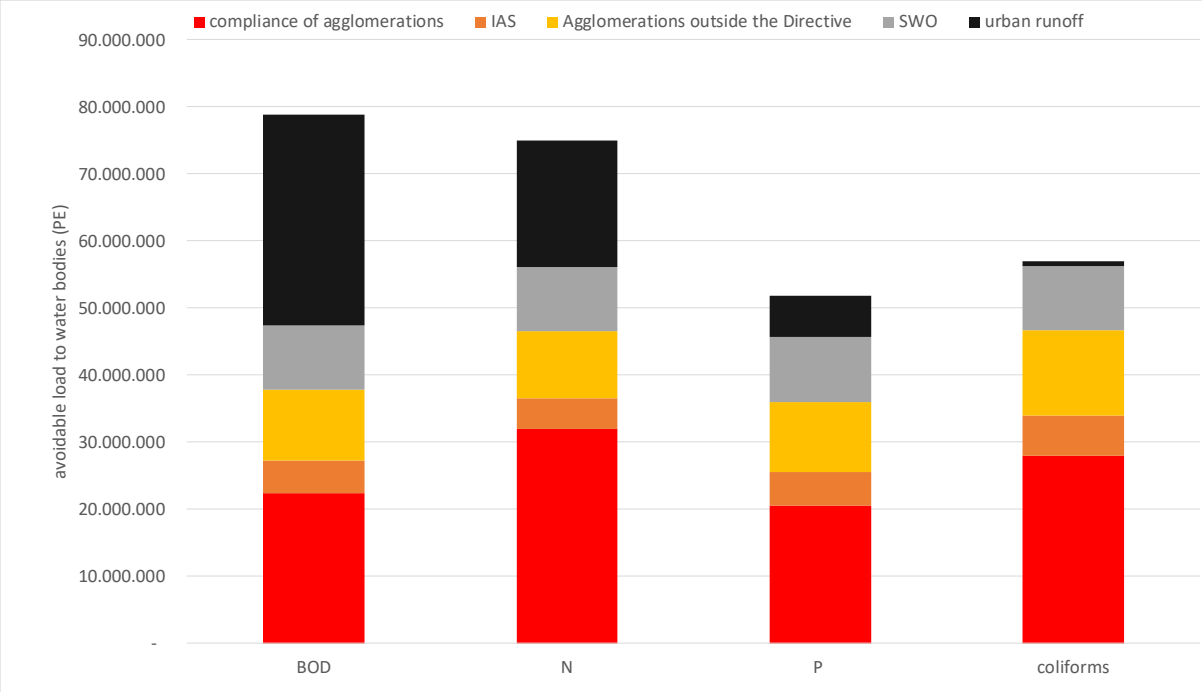
The aim of the conference is to provide an overview of the different **measures** considered to address the identified **areas of improvement** and present the preliminary findings on the **policy options** to determine the best possible path based on the logic of our analysis.

2.1 Addressing urban waste water pollution

The first session concerns a number of topics already covered by the current Directive, which still remain a problem or have been identified as areas that could be improved without excessive costs.

Figure 2.1-1 The remaining load could be significantly reduced if i) compliance of agglomerations was achieved; ii) IAS (individual or other appropriate systems) was managed adequately; iii) agglomerations outside of the Directive (<2 000 p.e.) were covered by the Directive; iv) SWO (storm water overflows) and v) urban run-off were addressed.

Source: Joint Research Centre (2019)



Smaller agglomerations (below 2 000 p.e.) are generally not covered by the Directive but have shown to constitute a significant pressure (up to 11% of the EU's surface water bodies[5]). They are addressed to a very limited extent by the existing provisions in the UWWTD[6]. Untreated waste water of smaller agglomerations in water-scarce areas can worsen the pollution problem locally as a release to waters with low flow, or low dilution rates can cause accumulation and higher concentrations of pollutants.

Individual or other appropriate systems (**IAS**) are used to address 15 million p.e. in agglomerations above 2 000 p.e.. The UWWTD allows the use of IAS where the establishment of a collecting system is not justified because it would produce no environmental benefit or because it would involve excessive cost. In these circumstances, IAS should achieve the same level of environmental protection as collective treatment. However, currently their compliance with the environmental protection requirements of the UWWTD is questionable. Practices of IAS use vary: most Member States use simple IAS, such as septic tanks and storage tanks evacuated by trucks. The lack of specific provisions on IAS in the Directive (extent of use, monitoring, adequate technologies), together with the difficulties to verify the level of environmental protection provided by an individual system, mean in practice that part of the waste water is not properly treated, thus affecting surface and groundwater.

[5] Refers to agglomerations between 2 000 and 10 000 p.e.; based on Member State reporting for 2nd RBMPs under the WFD

[6] See Articles 4 and 7 of the UWWTD requiring that waste water shall be subject to appropriate treatment in agglomerations of less than 2 000 p.e.

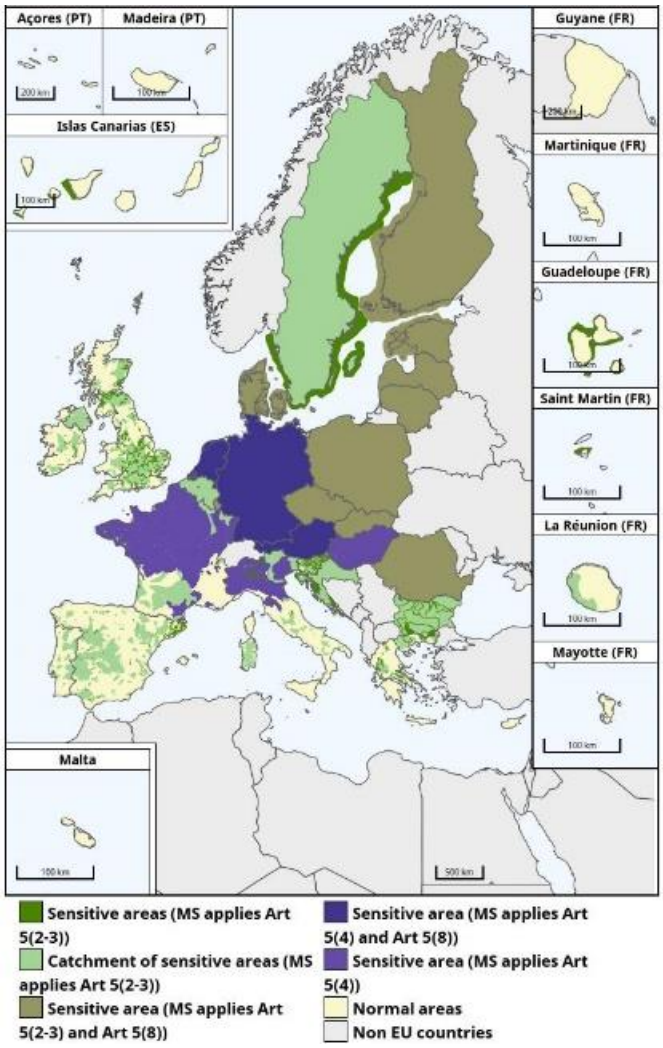
During periods of heavy rainfall, when the public networks and pumping stations become overwhelmed due to excessive urban run-off, **storm water overflows** (SWO) occur. Excess flows are discharged into the sea and rivers in a controlled way but without any treatment (or at best very basic treatment). This is to protect homes, gardens, highways, and open spaces from sewage flooding. Overflows are permitted by the UWWTD, stating that it is not possible in practice to construct systems and treatment plants in a way that all waste water can be treated during situations such as heavy rainfall. However, these direct discharges of untreated sewage cause occasional harm to the ecosystems and recreational activities (such as bathing sites). Moreover, SWO convey pollutants that may, in some case, accumulate in the environment, and consequently be a source of pollution. Member States are required to decide on measures to limit pollution from storm water overflows (Footnote 1, Annex I of UWWTD). The frequency of impacts from urban run-off and storm water overflows tend to increase due to, among others, heavy precipitation becoming more frequent and intense as a result of climate change.

The UWWTD currently states that the required level of treatment depends on the sensitivity of the water body into which waste water is discharged. In those agglomerations which the Directive does not covered and discharging into a sensitive area, there is an obligation for more stringent treatment (e.g., **nutrient removal** to avoid eutrophication). Whether the area is sensitive or normal is determined at a national level. In a quarter of EU territory, more stringent treatment is currently not mandatory.[7] There are no clear guidelines on how Member States should designate sensitive areas and there is an insufficient coherence with other policies e.g., Water Framework Directive, Marine Strategy Framework Directive, Nitrate Directive.

[7] See https://ec.europa.eu/environment/water/water-urbanwaste/pdf/Evaluative%20study_final.pdf

Figure 2.1-2 Map showing that some Member States designate their entire territory as sensitive (green, blue, and purple), while others have identified very few sensitive areas (shown as green patches in yellow areas of the map).

Source: European Commission Implementation Report for the year 2016



Moreover, the current thresholds in the UWWTD for nutrient removal (nitrogen (N) and phosphorous (P)) do not reflect the current knowledge of nutrient impacts on surface waters nor the more efficient technologies for removal of N and P that is now state-of-the-art.

Finally, the current Directive does not require the Member States to report information on **industrial waste water** discharged to public networks after pre-treatment in an industrial facility and received by an urban waste water treatment plant, thus lacking transparency.

Table 2.1-1 Possible policy options relevant to session 1

Addressing urban waste water pollution		
Policy option 1: EU soft guidance for local response	Policy option 2: Mix of policy responses	Policy option 3: Centralised responses setting EU requirements
Commission to provide guidance on i) IAS technologies, registration, monitoring, and inspections; ii) the designation of sensitive areas; iii) strategies for storm water overflows and urban run-off; and iv) on tracking industrial discharge into public networks.	**Commission** i) to revise the EU standard on IAS; ii) to set more stringent nitrogen and phosphorous removal thresholds; iii) to adopt EU targets for big agglomerations on management of storm water overflows and run-off, e.g., >1% of annual sewage volume in overflow.	**Commission** to i) to set more stringent nitrogen and phosphorous removal thresholds; ii) adopt EU targets on management of overflows and run-off for all agglomerations; iii) to impose monitoring & reporting requirements on small and medium-sized businesses (SME) connected to the public networks.
Member State to apply a **risk-based approach** to reduce i) IAS use; ii) storm water overflows; and iii) industrial pollution at source.	**Member State** i) must have a national inventory of IAS and a strategy for inspection & management; ii) Agglomerations >100 000 p.e.[8] must have a strategic plan to manage storm water overflows and urban run-off based on prevention/green infrastructure; iii) Operators must monitor and track industrial pollution in the public networks and at the inlets of the treatment plants. Member States to ensure that agglomerations control pollution at source at industrial site	**Member State** i) must report IAS monitoring data to the Commission if >5% of the country's load is treated by IAS and ensure that a maximum of 2% of load in any agglomeration is addressed by IAS; ii) Agglomerations >50 000 p.e. must have a strategic plan to manage storm water overflows and urban run-off based on prevention /green infrastructure; iii) must establish a discharge permitting system for industries, not covered by Industrial Emissions Directive including for SMEs connected to the public networks
Addressing eutrophication: Member State decides whether more stringent treatment (N/P removal) is required for those treatment plants, which are considered as a major remaining source.	Addressing eutrophication: Member States are required to increase the efficiency of nutrient removal for treatment plants in sensitive/protected areas at risk of eutrophication.	Addressing eutrophication: Member States are required to implement more stringent treatment (N/P removal) in all treatment plants >10 000 p.e.
Scope of UWWTD: Member State decides if the UWWTD applies to a small agglomeration based on a risk-based approach.	Scope of UWWTD: Collection, treatment, and reporting required for **agglomerations > 1 000 p.e.**	Scope of UWWTD: Collection, treatment, and reporting required for **agglomerations > 500 p.e.**

[8] The thresholds and other numerical values given in the tables of chapter 2 in this paper are not final values. All thresholds mentioned in the tables are indicative – the final decision will depend on the results of the costs/benefit analysis.

2.2 Acknowledging and responding to emerging concerns

During the second session, the discussion will focus on how to best address concerns related to micropollutants, the energy efficiency of treatment plants, reuse of water and sewage sludge, and greenhouse gas emissions (GHG), all of which are strongly interlinked.

While the UWWTD has achieved a substantial reduction in emissions of the initially targeted groups of urban waste water pollutants (organic matter and nutrients), it does not directly target **micropollutants,** including pharmaceuticals and personal care products residues. The impacts of additional treatment to remove micropollutants needs to be considered as it will increase energy consumption. Potential effects on concentrations and loads of micropollutants (including microplastics) in sewage sludge should also receive particular attention, specifically when they are used in agriculture.

Sewage sludge of sufficient quality can be an important source of raw materials, particularly of phosphorous and bioenergy. The recovery of nutrients presents an additional economic benefit if the nutrients can be returned back to agriculture ultimately achieving more circularity while respecting the EU waste hierarchy. The Sewage Sludge Directive is currently undergoing an evaluation to determine if it is effective and fit for the future.

The current UWWTD is not fully aligned with the ambitions of the European Green Deal, particularly with regard to **energy efficiency and climate neutrality**. In order to reach carbon neutrality by 2050, all sectors will need to make additional efforts. The waste water sector uses 0.8% of all energy consumed in the EU; the source of this energy includes primarily non-renewable sources. In addition, there is an uneven uptake of energy-efficient technologies and processes due to a lack of knowledge and understanding of energy consumption and potential savings by the operators.

The biological processes required for waste water treatment, including those required for the production of sewage sludge, emit greenhouse gases (GHG) such as carbon dioxide, methane, and nitrous oxide. Similarly, to energy consumption, the waste water sector emits approximately 0.8% of all GHG in Europe[9]. The emissions of GHG through treatment steps, as well as indirect emissions from energy consumption, contribute to climate change. Overall, there remains a poor understanding of GHG emission patterns in treatment plants.

It should also be considered, where possible, to encourage energy generation from sewage (i.e., in the form of biogas from the anaerobic digestion of the sludge). Furthermore, there is a need to better monitor GHG emissions in treatment plants to understand the most efficient way to reduce emissions in waste water management practices. In order to increase the recovery of water and other outputs of waste water management, including sewage sludge, priority needs to be given to the reuse and the recycling of resources as well as the potential recovery of energy from the treatment processes. The ambition should be that water is reused wherever possible and that landfilling and/or incineration of outputs of waste water management is a last resort (in line with the waste hierarchy).

[9] Total EU+UK GHG emissions in 2019 were 4235 Mt CO2e (https://www.eea.europa.eu/data-and-maps/figures/greenhouse-gas-emission-targets-trends-1). JRC estimates for GHG emissions from treatment plants are over 40 Mt/y with approximately 17.9 Mt/y owing to the construction of the infrastructure (the large CO2 footprint of concrete, steel, plastics and fuel).

Finally, the COVID-19 pandemic has shown that waste water surveillance can be used as an early warning signal for viral outbreaks. The use of waste water to detect and/or prevent the spread of viruses and pathogens could be addressed in the revised Directive.

Table 2.2-1 Policy options relevant to session 2

Acknowledging and responding to emerging concerns		
Policy option 1: EU soft guidance for local response	Policy option 2: Mix of policy responses	Policy option 3: Centralised responses setting EU requirements
Commission to provide guidance regarding i) micropollutants removal and monitoring the presence of microplastics in waste water and sewage sludge; ii) phosphorous recovery; iii) evaluating the potential for water reuse by treatment plants (also covering agro-food industry's treatment plants); iv) energy audits of treatment plants; v) reporting of GHG emissions from treatment plants; and vi) surveillance system for viruses and/or other pathogens present in waste waters. **Member States** to apply a **risk-based approach** to i) reduce micropollution; ii) increase the energy efficiency of treatment plants; and iii) reduce GHG emissions of treatment plants	**Commission** to provide minimum levels for phosphorous recovery **Member States** must ensure that i) treatment plants >100 000 p.e.[10] or discharging to waters-at-risk have an advanced treatment stage for micropollutants meeting EU-level set standards. Operators of remaining treatment plants must monitor effluent toxicity and treat, if necessary ii) Treatment plants >100 000 p.e. must recover phosphorous; iii) treatment plants >1mln p.e. improve energy efficiency including regular energy audits for their treatment plants and public networks; iv) that levels of GHG emissions of treatment plants are monitored and reported to the Commission; mandate to fix a GHG target at the by 2030; v) treatment plants >100 000 p.e. establish a permanent surveillance system for viruses and pathogens.	**Member States** must ensure that i) treatment plants >10 000 p.e. monitor and have an advanced treatment stage for micropollutants meeting EU-level set standards; ii) All treatment plants recover phosphorous. If sludge is incinerated, phosphorous recovery is mandatory for min 80% recovery rate for phosphorus; iii) Treatment plants >10 000 p.e. must improve energy efficiency including regular energy audits for their plants and public networks; iii) GHG emissions of treatment plants reach climate neutrality by 2035 for treatment plants >100 000 p.e. and by 2040 for the sector; iv) treatment plants >50 000 p.e. establish a permanent surveillance system for viruses and/or pathogens.

2.3 Raising the ambitions of the Directive and improving governance

The third session will focus on how to improve the UWWTD's governance in relation to transparency — better sharing of information with the public, monitoring, and reporting improving the situation with regard to the enforcement of the UWWTD, and ensuring affordability and access to sanitation. Citizens cannot choose their waste water operator. Therefore, transparency must be ensured not only on the performance of treatment plants related to water quality but also on key additional economic parameters along with GHG emissions and/or energy use. Instilling more transparency in the sector based on the

[10] The thresholds and other numerical values given in the tables of chapter 2 in this paper are not final values. All thresholds mentioned in the tables are indicative – the final decision will depend on the results of the costs/benefit analysis.

existing best practices can be a driver for better overall performances of the sector. This is also indispensable in light of the need for additional (re)investments. In addition, new and better ways of applying the 'polluters pays' principle should be further explored, notably for additional treatment needed for micropollutants.

There has been considerable technological progress in the last 30 years since the adoption of the Directive. As such, the current sampling requirements and frequency are not adapted to the current best practices. Better transparency of information shared with the public is possible today. In addition, opportunities for the digitalisation of monitoring are currently not fully exploited by operators. This consequently limits access to information, which can hinder operators' decisions related to treatment but can also limit access to justice for citizens. Furthermore, there has been a lack of understanding of what the realistic and/or actual scale of investments should be. Finally, access to sanitation is not yet available to all EU citizens, which can result in serious negative human health effects.

Table 2.3-1 Policy options relevant to session 3

Raising the ambitions of the Directive and improving governance		
Policy option 1: EU soft guidance for local response	Policy option 2: Mix of policy responses	Policy option 3: Centralised responses setting EU requirements
Commission to provide guidance i) regarding Extended Producer Responsibility; ii) on methodology, sampling conditions, and frequency to improve reporting; and iii) on minimum EU targets for access to sanitation in agglomerations, **Member States** are i) encouraged to decide whether to fund upgrades of treatment plants by EPR; ii) encouraged to develop a national investment plan but have no reporting obligation under Article 17; iii) to ensure that key information is available at national level; and iv) Operators are encouraged to make key information available on invoices to customers and on websites. Information on treatment plants is to be readily available online.	**Commission** to i) establish rules for Extended Producer Responsibility Scheme for pharmaceutical to fund upgrades of treatment plants to remove micropollutants. **Member States** must i) regularly submit a national investment plan to the Commission if they benefit from EU funding and/or are non-compliant; ii) set up/ host UWWTD data sets and update them annually as well as ensure access to them for the Commission/EEA. Key information from data sets to be published annually on the EEA website; iii) Operators must make key information available on invoices and on websites including treatment plants discharge information, key economic/ GHG indicators, sampling, and frequency will be adapted to current practice; and iv) take measures to ensure access to sanitation for vulnerable and marginalized groups and in public spaces	**Commission** to i) establish requirements for Extended Producer Responsibility Scheme for pharmaceutical and personal care products to fund upgrades of treatment plants to remove micropollutants; ii) improve current reporting system and update parameters (e.g., micropollutants, COD) as well as requirements on sampling conditions, methodology, frequency; and iii) adopt of EU minimum targets for access to sanitation; **Member States** must i) regularly submit a national investment plan to the Commission; ii) report to the Commission annually; iii) host an up-to-date website with key national information and links to websites containing local information.

3 Glossary

Term	Explanation
Agglomeration	According to the UWWTD: 'Agglomeration' means an area where the population and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point. (Article 2(4)). An agglomeration can be a city or municipality, but it can also be a number of smaller cities or towns clustered together.
Collection system	The UWWTD defines this as a system of conduits that collects and conducts urban waste water. (Article 2(5)).
Combined sewers	In the UWWTD: The UWWTD allows for the use of combined and separate sewers. Combined sewers: 'Systems that carry a mixture of both domestic sewage and storm sewage are called combined sewers. Combined sewers typically consist of large-diameter pipes or tunnels because of the large volumes of storm water that must be carried during wet-weather periods. They are very common in older cities but are no longer designed and built as part of new sewerage facilities.' (Britannica, 2019b).
Contaminants of emerging concern	In the UWWTD: The UWWTD does not include a reference to contaminants of emerging concern. According to the Organisation for Economic Co-operation and Development (OECD), "Contaminants of emerging concern (CECs) comprise a vast array of contaminants that have only recently appeared in the water, or that are of recent concern because they have been detected at concentrations significantly higher than expected, or their risk to human and environmental health may not be fully understood. Examples include pharmaceuticals, industrial and household chemicals, personal care products, pesticides, manufactured nanomaterials, and their transformation products (OECD, 2018). The Environmental Quality Standards Directive explains pollutants of emerging concern. Recital 26 states that 'emerging pollutants … can be defined as pollutants currently not included in routine monitoring programmes at Union level but which could pose a significant risk requiring regulation, depending upon their potential ecotoxicological and toxicological effects and on their levels in the aquatic environment.'

Diffuse sources	The E-PRTR Regulation (EC) No 166/2006 gives the following definition of diffuse sources: '"diffuse sources" means the many smaller or scattered sources from which pollutants may be released to land, air, or water, whose combined impact on those media may be significant and for which it is impractical to collect reports from each individual source'. Diffuse sources include agricultural activities, some urban-related emissions, atmospheric deposition, and rural dwellings. Typically, they are more variable in space and time than point sources. (EC, 2012a).
Eutrophication	UWWTD definition: The enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned. (Article 2(11)).
Individual or other appropriate systems	The UWWTD states that 'where the establishment of a collecting system is not justified either because it would produce no environmental benefit or because it would involve excessive cost, individual systems or other appropriate systems which achieve the same level of environmental protection shall be used.' (Article 3(1)).
Microplastics	According to the European Chemicals Agency (ECHA), 'the term "microplastic" is not consistently defined but is typically considered to refer to small, usually microscopic, solid particles made of a synthetic polymer. They are associated with long-term persistence in the environment if released, as they are very resistant to (bio)degradation.' (ECHA, 2019).
More stringent treatment	More stringent treatment or tertiary treatment is the third stage of treatment and can consist of nutrient removal, chemical or physical disinfection (by lagoons or microfiltration). In the UWWTD, table 2 in Annex I lays down the thresholds for nutrient reduction.
Point sources	According to Common Implementation Strategy Technical Report No. 28: 'A point source is a single localised point of discharge of waste water containing one or more pollutant(s). The most important ones are industrial facilities, waste water treatment plants (although strictly speaking the plant itself is not the source), untreated sewage, waste disposal systems, and mining sites.' (EC, 2016).
Population equivalent	UWWTD definition: '1 p.e. (population equivalent)' means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 g of oxygen per day.'

	This means one p.e. broadly corresponds to the average pollution release of one person in one day and describes the pollution load contained in the waste water.
Primary treatment	UWWTD definition: 'Primary treatment' means treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids or other processes in which the BOD of the incoming waste water is reduced by at least 20% before discharge, and the total suspended solids of the incoming waste water are reduced by at least 50%. (Article 2(7)).
Secondary treatment	UWWTD definition: 'Secondary treatment' means treatment of urban waste water by a process generally involving biological treatment with a secondary settlement or other processes in which the requirements established in Table 1 of Annex I are respected. (Article 2(8)).
Separate sewers	The UWWTD allows for the use of combined and separate sewers. Separate systems: "New waste water collection facilities are designed as separate systems, carrying either domestic sewage or storm sewage but not both. Storm sewers usually carry surface run-off to the point of disposal in a stream or river. Small detention basins may be built as part of the system, storing storm water temporarily and reducing the magnitude of the peak flow rate. Sanitary sewers, on the other hand, carry domestic waste water to a sewage treatment plant. Pre-treated industrial waste water may be allowed into municipal sanitary sewerage systems, but storm water is excluded." (Britannica, 2019c).
Storm Water Overflows	A footnote in Annex I to the UWWTD contains states '…during situations such as unusually heavy rainfall, Member States shall decide on measures to limit pollution from storm water overflows. Such measures could be based on dilution rates or capacity in relation to dry weather flow or could specify a certain acceptable number of overflows per year.' As mentioned under combined sewers, these systems carry waste water and storm water. According to Britannica, 'because waste water treatment plants cannot handle large volumes of storm water, sewage must bypass the treatment plants during wet weather and be discharged directly into the receiving water. These combined sewer overflows, containing untreated domestic sewage, cause recurring water pollution problems and are very troublesome sources of pollution.' (Britannica, 2019b).
Surface water	Water Framework Directive definition: Inland waters, except groundwater; transitional waters and coastal waters, except in

	respect of chemical status for which it shall also include territorial waters. (Article 2(1)).
(Total) nitrogen	UWWTD definition: Total nitrogen means: the sum of total Kjedahl nitrogen (organic and ammoniacal nitrogen), nitrate-nitrogen, and nitrite-nitrogen. The UWWTD requires a reduction of total nitrogen in waste water discharges to concentrations of 15 mg/1 N (10 000 - 100 000 p.e.) and 10 mg/1 N (more than 100 000 p.e.). (Annex I). Why nitrogen: Nitrogen is, together with phosphorus, one of the main nutrients in waste water. Nitrogen becomes ammonia/ammonium, creating an additional oxygen demand. This can lead to excessive plant and algae growth, which can then prevent other organisms from living and growing.
(Total) phosphorus	In the UWWTD: The UWWTD requires a reduction of total phosphorus in waste water discharges to concentrations of 2 mg/1 P (10 000 - 100 000 p. e.) and 1 mg/1 P (more than 100 000 p.e.). (Annex I). Why phosphorus: Together with nitrogen, phosphorus is one of the main nutrients in waste water. Phosphorus becomes ortho-phosphate, creating an additional oxygen demand. This can lead to excessive plant and algae growth, which can then prevent other organisms from living and growing.
Urban waste water	The UWWTD defines ‘urban waste water’ as domestic waste water on its own or domestic waste water mixed with industrial waste water and/or run-off rainwater. (Article 2(1)).