The Contribution of Drinking Water Quality Regulations to the implementation of the Water Framework Directive in Northern Ireland issued by the Drinking Water Inspectorate for Northern Ireland in conjunction with Northern Ireland Environment Agency's, Water Management Unit

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Contents

1. Introduction

1.1. The purpose of this document is to provide clarity and guidance on how the implementation of the Water Supply (Water Quality) Regulations (Northern Ireland) 2017 contributes to the implementation of the Water Framework Directive 2000/60/EC ("WFD"). The document also sets out the responsibilities of the Drinking Water Inspectorate for Northern Ireland (DWI) and Northern Ireland Water (NI Water) in relation to the drinking water regulations and those of the Northern Ireland Environment Agency (NIEA) in relation to the WFD, in particular NIEA Water Management Unit (WMU).

1.2. This document is based on the guidance produced by DWI (England & Wales) and the Environment Agency on the 18 June 2012 entitled: 'The Contribution of the Water Supply (Water Quality) Regulations to the implementation of the Water Framework Directive in England & Wales'. The DWI and WMU acknowledge the kind permission granted by DWI (England and Wales) and the Environment Agency to use sections from their guidance in the production of this document.

1.3. This document is intended as a reference point for NI Water and WMU staff to clarify where the requirements of the Water Supply (Water Quality) Regulations complement and support the implementation of the WFD. It also provides guidance on practical steps that can be taken by NI Water and WMU staff to ensure appropriate arrangements are in place to identify and plan measures in catchments that ensure the long-term safety of drinking water supplies. Specifically this document is intended to **clarify responsibilities for raw water monitoring** and serve as the basis for enhanced local liaison between NI Water staff and WMU staff.

1.4. DWI act for, and on behalf of, the Department of Agriculture, Environment, and Rural Affairs (DAERA) in fulfilling its statutory duties in relation to the drinking water quality for public water supplies. DWI staff are appointed under Section 125 of the Water and Sewerage Services (Northern Ireland) Order 2006 and their principal role is to apply and enforce the Water Supply (Water Quality) Regulations (Northern Ireland) 2017. Under this function, DWI issues guidance to NI Water regarding the implementation of its statutory duties.

1.5. NIEA is an agency of the Department of Agriculture, Environment and Rural Affairs and is responsible for drawing up River Basin Management Plans under the Water Framework Directive (WFD) and for planning the implementation of measures to address non-compliance with the WFD.

1.6. It is accepted that for both NIEA and NI Water in implementing their respective duties under the WFD and drinking water quality legislation, there will be a trans-boundary element in relation to a number of shared water bodies with the Republic of Ireland.

SECTION A – BACKGROUND INFORMATION

2. The Water Supply (Water Quality) Regulations (Northern Ireland) 2017

2.1. The Council Directive 98/83/EC of 3 November 1998[1] on the quality of water intended for human consumption (European Drinking Water Directive) sets standards for drinking water quality which apply in all EU member states. Most of these standards are informed by the World Health Organisation's guidelines on drinking-water quality. The objective of the Drinking Water Directive (DWD) is to protect the health of all citizens in the European Union by making sure drinking water is safe and clean. This Directive was amended by Commission Directive (EU) 2015/1787 of 6 October 2015 amending Annexes II and III to Council Directive 98/83/EC on the quality of water intended for human consumption[2]

2.2. The DWD and amending Directive were transposed into national legislation by the Water Supply (Water Quality) Regulations (Northern Ireland) 2017. The Regulations require drinking water to be wholesome the definition of which includes the standards set out in the DWD and other requirements to secure the safety of drinking water.

2.3. The Regulations require NI Water to carry out a risk assessment of every catchment, treatment works and associated supply system. The DWI have advised NI Water that they should use the principles of the World Health Organisation's drinking water safety plan (WSP) approach to assessing and managing risks to the safety of drinking water. The regulations also require a risk assessment is based on the general principles set out in BS:EN 15975-2:2013[3]. This risk assessment activity (as defined by Regulation 30) should be informed by, and in turn should inform, NI Water's statutory raw water monitoring programme. Regulation 20 set out the specific requirements for the collection and analysis of samples of raw water, including minimum frequencies based on the population served within regulation 20(7). The primary purpose of the programme is to ensure the safety of treated drinking water through an understanding of the hazards and challenges posed by the nature of the source (raw) water.

2.4. In many cases, the raw water regulatory monitoring data will be of value to the delivery of the requirements of Article 7 of the WFD. Where the WMU judges it is not adequate for WFD purposes it will arrange for the gathering of further data and information as required.

3. The Water Framework Directive 2000/60/EC ("WFD")

3.1 The Water Framework Directive 2000/60/EC (WFD)[4] came into force on 22 December 2000 and was transposed into national legislation[5] in Northern Ireland in December 2003. The Directive will help to protect and enhance the quality of:

- surface freshwater (including lakes, streams and rivers)
- groundwaters
- groundwater dependant terrestrial ecosystems
- estuaries

[1] *Directive 98/83/EC on the quality of water intended for human consumption*
2 Commission Directive (EU) 2015/1787 of 6 October 2015
3 British Standards Institute ISBN 978 0 580 84737 0
[4] *Directive 2000/60/EC Establishing a Framework for Community action in the field of water policy*
[5] *The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003*

- coastal waters out to one mile from low-water.

3.2 In establishing a framework for the protection of water, the WFD promotes sustainable water use based on the long term protection of water resources thereby contributing to the provision of sufficient supplies of good quality drinking water intended for human consumption.

Article 7 of the WFD

3.3 Requirements for the monitoring and protection of water abstracted for drinking water purposes are set out in several sections of the WFD, in particular, in Article 7, and within its Groundwater Daughter Directive (GWDD)[6].

3.4 Article 7.1 of the WFD requires Member States to identify all water bodies (both surface water and groundwater) from which water is abstracted or intended to be abstracted in the future, for human consumption in excess of 10 m^3/day as an average or which serve more than 50 persons. These are called **Drinking Water Protected Areas (DWPAs)**. As the competent authority for the delivery of the WFD, NIEA identifies these based on information available at the time including that provided by NI Water.

3.5 Article 7.2 of the WFD requires that Member States ensure that, for each water body identified under Article 7.1, taking into consideration the water treatment applied, the resulting water supply complies with the Drinking Water Directive 98/83/EC. The DWI is the competent authority for ensuring the Drinking Water Directive requirements are met in Northern Ireland.

3.6 Under Article 7.3 of the WFD, Member States are required to implement measures in DWPAs with the aim of preventing further deterioration in raw water quality due to anthropogenic[7] sources of pollution, so that as a minimum, the need for additional water treatment to meet drinking water standards is avoided and ideally the level of treatment can be reduced, over a period of time. NIEA puts in place the framework to deliver these measures through River Basin Management Plans (see later). Failure to achieve this Article 7.3 objective does not necessarily mean that the Good Ecological Status objective will not be met for surface water bodies, but does mean that Good Chemical Status cannot be met for groundwater bodies as Article 7.3 is a component of the Good Chemical Status test for groundwater.

3.7 Further guidance on assessing whether 'deterioration' in the quality of the raw water has occurred can be found in the United Kingdom Technical Advisory Group (UKTAG)[8] Guidance on Drinking Water Protected Areas.

3.8 **Safeguard Zones**, can, at the discretion of the Member State, be drawn up to assist with achieving the aims of Article 7.3. A safeguard zone can be a catchment or any other defined area within which measures can be implemented in order to protect water abstracted for drinking water purposes. These zones are not statutory but will be used to target measures that can be taken to protect raw water quality and prevent deterioration, so minimising the need for treatment. Whilst there is a specific role for WMU, a wide range of partners including other regulators, businesses, local communities, NGOs and NI Water would also have a role in delivering the necessary improvements, depending on the issues in each catchment. This can include the

[6] *Directive 2006/118/EC on the protection of groundwater against pollution and deterioration*
[7] Anthropogenic means relating to human activity
[8] *UKTAG Guidance. Assessing the achievement of Drinking Water Protected Area Objectives*

targeting of existing enforcement powers, advice and incentive schemes such as pollution prevention advice, the Pesticides Voluntary Initiative, Environmental Stewardship and other agri-environment initiatives. NIEA will seek to work with all relevant stakeholders including NI Water in developing action plans for Safeguard Zones. An essential precursor to these plans is the investigations to establish source-pathway-target relationships which provide baseline evidence that supports agreement between NIEA and local partners on objectives and measures. NI Water monitoring and risk assessment data can make a valuable contribution to this process.

River Basin Management Plans

3.9 Delivery of Article 7.3 objectives will primarily be through measures set out in River Basin Management Plans (RBMPs) drawn up for the river basin districts for Northern Ireland and the International River Basin Districts shared with the Republic of Ireland.

3.10 RBMPs are plans for protecting and improving the water environment and have been developed by NIEA in consultation with local partners and stakeholders. They contain the main issues for the water environment and the actions that need to be taken to deal with them. The second RBMPs[9] were published in December 2015 and cover the six year period to 2021.

3.11 DWPAs are identified within each relevant RBMP. WMU will use all available evidence to refine the measures required for Article 7 compliance in current and future RBMPs.

Article 8 of the WFD

3.12 Article 8 of the WFD requires Member States to ensure that a monitoring programme is established in order to provide a comprehensive overview of water status within each river basin district. For surface water bodies, this should include monitoring for ecological and chemical status. For groundwater bodies, this should include monitoring for both the chemical status and to detect the presence of long-term anthropogenic induced upward trends in pollutants. Such monitoring should be in accordance with Annex V of the WFD.

3.13 For surface water bodies, Annex V details specific requirements to monitor substances discharged to DWPAs that may cause deterioration in the status class of the water body.

3.14 Annex V additionally requires a map or maps to be provided showing the respective monitoring networks in the RBMPs.

4. WFD Reporting Requirements - The Water Information System for Europe (WISE)

4.1 Member States are required to report against the actions identified in RBMPs to the European Commission, in line with the River Basin Planning timescales. The reporting requirements include specific elements on DWPAs such as the provision of a monitoring network that is representative of the DWPAs identified in the final RBMPs and their associated risks.

4.2 NIEA, as the competent authority for Northern Ireland in conjunction with the Department of the Environment, Heritage and Local Government in the Republic of Ireland is required to report a summary of the risk assessment results of the significant pressures

[9] https://www.daera-ni.gov.uk/topics/water/river-basin-management

in each river basin district and International River Basin District as part of the River Basin Management Plans.

4.3 The monitoring programme covers all surface waters, groundwaters and protected areas and should cover a range of parameters, including:

for surface waters:
- physio-chemical (including pollutants); and
- priority substances and priority hazardous substances.

for groundwater:
- physical parameters, hazardous substances and non-hazardous pollutants.

4.4 Data from the monitoring programme will be used in all stages of subsequent river basin planning cycle to:

- re-assess classification of all water bodies according to their ecological and chemical status;
- refine the risk assessments to improve our understanding of possible threats to the environment; and
- drive programmes of measures to identify why a water body is failing its objective and determine what action is needed.

5. Common Areas Associated with the Implementation of the Regulations and the WFD

5.1 There is a substantial alignment of purpose between the WFD and the Regulations with respect to the protection of raw water quality where the water is abstracted for drinking water purposes. The 2015 amendment to the DWD strengthen this link through requiring NI Water's, under regulation 30(3) to take account of monitoring undertaken under regulation 11 of the Water Environment (WFD) Regulations 2017 in respect of bodies of water used for the abstraction of drinking water when undertaking or reviewing its risk assessments.

5.2 As part of the risk assessment process required by Regulation 30, NI Water was required to have identified any actual or potential risks to human health within the catchments of raw water sources and establish a raw water monitoring programme accordingly. They were also further required to ensure that risk assessments are kept under review to reflect evolving risks and available monitoring programmes. It should be noted that the raw water monitoring required under Regulation 20 needs to address substances, properties and organisms that may pose a risk to wholesomeness or human health (regulation 30 and 31) or where they may have an impact on treatment (regulation 29).

5.3 Risks to raw water quality used for abstraction for drinking water supply should also be identified through a variety of other mechanisms, including information and data gathered by the WMU. WMU is committed to providing NI Water with the data and information it holds that would support the risk assessments required to be undertaken by NI Water.

5.4 NI Water's raw water monitoring data is collected under Regulation 20 to comply with Regulations 29 - 31. This data may also provide WMU with a substantial amount of the information required to fulfil the requirements for the WFD, in particular, Article 7.3.

The data will also supply a significant amount but by no means all of the information that is required to fulfil the requirements of Article 8 with respect to DWPAs and thereby support the implementation of WFD Article 7.3.

5.5 NI Water's raw water monitoring will also be useful in establishing Safeguard Zones and as evidence to support measures that are considered necessary within them.

5.6 It is for WMU to make arrangements for any additional monitoring necessary to fulfil wider WFD requirements, supplementing the regulatory data provided by NI Water.

5.7 Data gathered by NI Water for operational purposes i.e. operational raw water monitoring, is not routinely submitted to the DWI. However, this data may be of use to WMU for DWPA purposes and should be shared where appropriate. Therefore, WMU and NI Water should have arrangements in place for this operational data to be made available where this would be useful and in particular, where it is agreed that such monitoring will form part of the DWPA raw water monitoring network reported under WISE.

5.8 Figure 1 provides an overview of the flow of data to support the identification of Safeguard Zones and the appraisal of measures to manage and reduce risks to raw water quality. The diagram also shows the key areas where close liaison between WMU and NI Water is needed to assess and manage the risk to raw water quality.

5.9 Figure 2 explains the broad relationships between the River Basin Planning cycle and NI Water's risk assessment process (Water Safety Plan cycle). It highlights that for both processes to work effectively there must be sharing of data and good communication between all stakeholders but particularly WMU and NI Water.

5.10 DWI considers that where a non-compliance with the requirements of the Drinking Water Directive necessitates additional treatment to be put in place at a WTWs as a remedial measure to deal with a risk within a catchment, this requirement would take precedent over the aim within the WFD of maintaining or reducing treatment at WTWs.

5.11 In summary, NI Water's risk assessments, NIEA's WFD risk assessments and the raw water monitoring carried out by both NI Water and WMU all contribute to identifying DWPAs and associated Safeguard Zones. The collation of relevant information should enable medium to long term catchment–based solutions to be established that will mitigate the risks in the long term so that as a minimum, the need for additional water treatment is avoided and ideally the level of treatment can over time be reduced. All relevant local partners should be engaged to find long-term sustainable solutions to priority issues that may compromise future water supplies

Figure 1: Information Flow to Support Identification of Safeguard Zones (SGZs) and Appraisal of Measures to Manage and Reduce Risks to Raw Water Quality

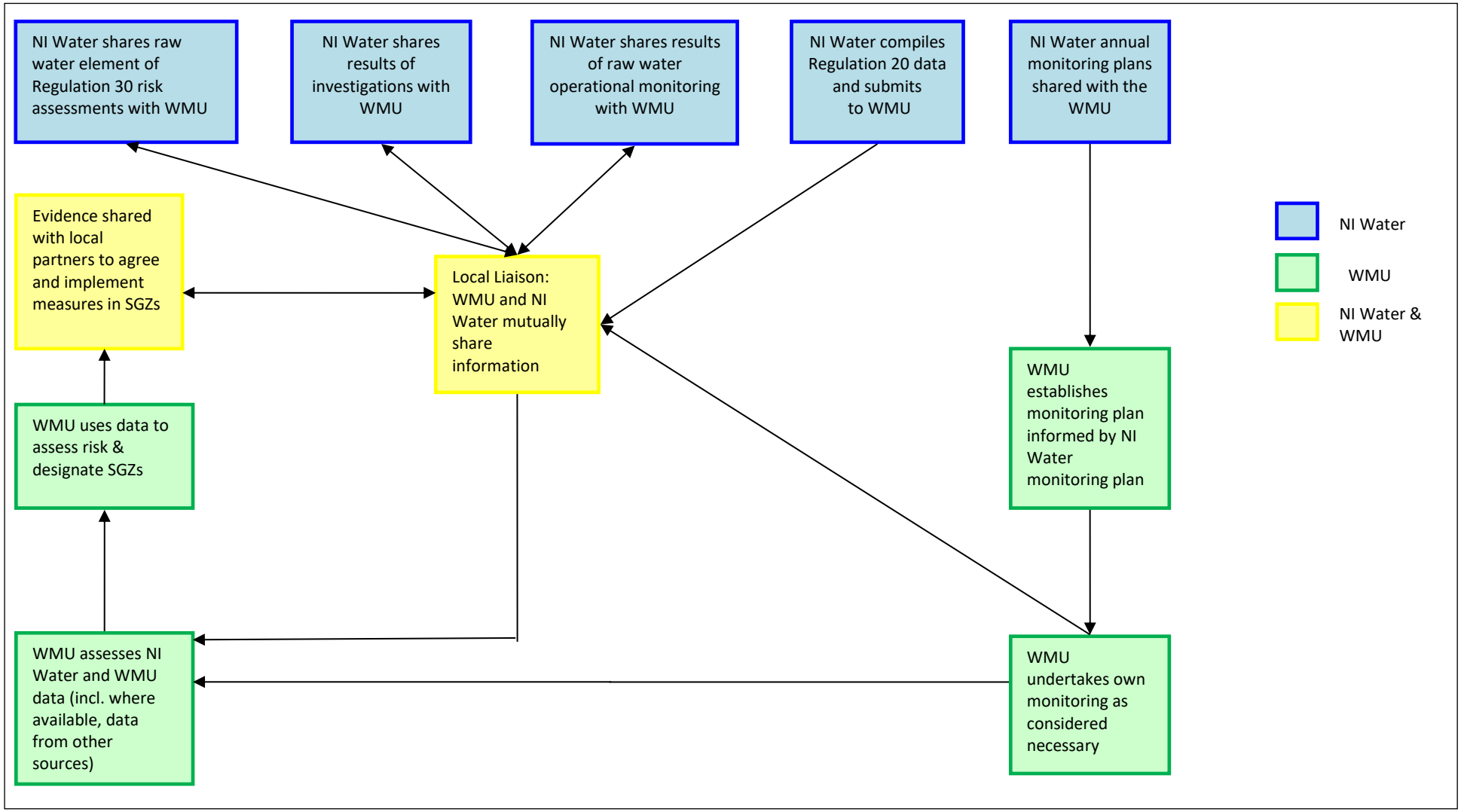
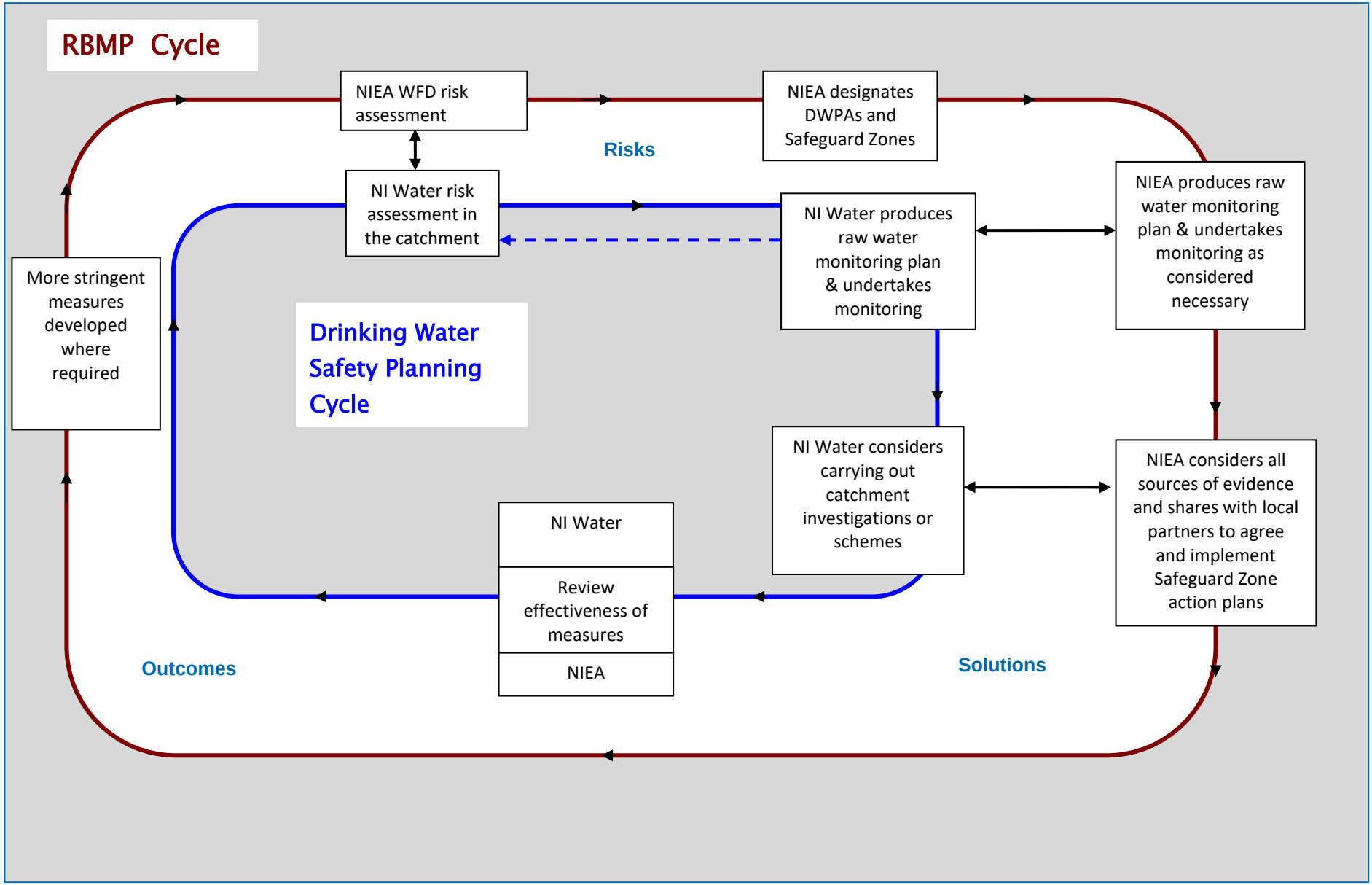


Figure 2: Broad Relationships between the River Basin Management Planning and Drinking Water Safety Plans



SECTION B – GUIDANCE ON SPECIFIC ISSUES

6. Introduction

6.1 WMU, NI Water and DWI are committed to achieving an integrated approach to drinking water protection in Northern Ireland that will deliver statutory requirements of both the WFD and the relevant parts of the drinking water regulations. This section of the guidance sets out how this may be achieved in the context of the Regulations. If the processes outlined in this document are followed in practice, the likelihood of achieving improvements in the quality of raw water used for drinking water abstraction purposes should be increased and help to secure safe, clean drinking water supplies for the long term.

7. Risk Assessments of Catchments

7.1 Regulation 30 requires NI Water to carry out a comprehensive risk assessment for each catchment, treatment works, and its connected supply system [from source to tap] covering all hazards and hazardous events. The intention of the risk assessment is to establish whether there is a significant risk of supplying water from those works and associated supply system that would constitute a potential danger to human health or be unwholesome.

7.2 The risk assessment should identify individual substances or parameters (e.g. nitrate, pesticides) in addition to the identification of generic risks (e.g. agricultural pollution). The risk assessment should also identify any parameter or substance that may represent new or emerging future risks to the supply system of clean drinking water i.e. the quality of the raw water in the catchment, the treatment process, the distribution and supply at consumers' taps.

7.3 For each current and future risk identified, NI Water should formulate an Action Plan of remedial measures required to mitigate the risk (See previous 2.3).

7.4 Information on the catchment element of NI Water's risk assessments, together with any other local evidence will be pivotal when identifying DWPAs (and associated Safeguard Zones) at risk of failing Article 7.3. This should ensure close alignment between NI Water, regulators and local partners in tackling risks to drinking water supplies identified in the raw water sources. NI Water should where it is appropriate to do so, be prepared to share the relevant findings on their risk assessments as part of ongoing engagement with NIEA, and other local partners.

7.6 There is an expectation that NI Water, in carrying out their risk assessments, will have liaised with all relevant stakeholders. In respect of the catchment element of the risk assessments, this should, as a minimum, include an initial exchange of information between the NI Water and WMU to understand the potential risks to the raw water sources and help inform the process of establishing DWPAs (and associated Safeguard Zones). Once local relationships have been established, regular dialogue on all areas associated with the actual or potential risks to the raw water quality should continue. NI Water should maintain the current lines of communication with NIEA in reporting of pollution and potential pollution events within its catchments.

7.7 DWI has issued specific guidance to NI Water in undertaking risk assessments 'Guidance to Northern Ireland Water on implementing Regulation 30 of the Water Supply (Water Quality) Regulations (Northern Ireland) 2017 [Risk Assessments][10].

8. Raw Water Monitoring

Point of monitoring

8.1 **Regulation 20** requires NI Water to identify every abstraction point from which water is drawn for drinking water quality purposes and to carry out monitoring of raw water to support their duties relating to treatment and risk assessment. As part of the requirements under Regulation 30 the DWI expects NI Water to document every licensed abstraction point irrespective of whether a source is used continuously, intermittently or as standby and emergency sources.

8.2 NI Water's raw water monitoring point should be capable of identifying parameters and substances that are representative of the risks to deterioration of the raw water quality and that could influence (now or in the future) treatment to meet the requirements of the DWD.

8.3 For the purpose of collecting samples of raw water, NI Water **may** use a sample point located at the treatment works end of any pipe or set of pipes conveying water from the abstraction point(s) (usually such a sample point is known as the combined inlet to the works). For the purposes of the monitoring of sources at risk only raw water from a single source or mixed water from sources of uniform quality is acceptable. If a single combined inlet sample point is not located so as to be representative of all the water that may enter the treatment works then NI Water will need to use more than one sample point i.e. sample each source of varying quality. Where there is any wastewater or washwater returns being made to the head of the works then any sample point used for Regulation 20 samples should be at an appropriate point before these returns. These may be located either at the individual abstraction point(s) or at the treatment works end of each pipe that conveys water from an abstraction point to the treatment works.

8.4 When selecting sample points, NI Water **must** ensure that they are located upstream of any treatment intended to modify water quality in respect of any parameter, substance, micro-organism or parasite. Treatment in this context includes blending where this is undertaken to modify the quality of water e.g. blending of high nitrate water with water from a low nitrate source. It also includes dosing to adjust the concentration of fluoride or alter the pH.

8.5 NI Water's regulatory raw water monitoring and sampling locations will be a substantial component of the DWPA monitoring network for the purposes of WISE reporting. The intention is that these would be representative of the raw water entering the treatment works to confirm any deteriorating trends in raw water quality that may impact on drinking water treatment. Where a DWPA is confirmed as 'at risk' of failing Article 7.3 of the Water Framework Directive, NIEA will then work with NI Water and other local parties to investigate the cause and put in place a safeguard zone and action plans, as appropriate. Where safeguard zones are required to be put in place then appropriate details on these should be included within NI Water's risk assessment reports and be made available to DWI.

[10] Guidance to Northern Ireland Water on implementing Regulation 30 of the Water Supply (Water Quality) Regulations (Northern Ireland) 2017 [Risk Assessments]

8.6 NI Water in determining risks within its catchments also take samples from different locations which feed into the catchment or impounding reservoir. The results from these sampling programmes should be shared with WMU to allow for a full assessment of the risks within DWPAs and water body to be determined.

8.7 It should be noted that in some situations, although NI Water raw water monitoring will be representative for drinking water supply purposes, they may not be representative of the water body for other WFD purposes. In these cases, WMU will take steps to implement any additional sampling necessary.

Parameters

8.8 The Regulations do not include a prescriptive list of the parameters that are required to be monitored. It is for NI Water to assess the risks within its catchments as part of its requirements under Regulation 30 and establish monitoring programmes accordingly. This assessment should include a review of all information available from a variety of sources including WMU.

8.9 The Regulations only require monitoring for parameters where they may be present in levels that may pose a risk to human health or may lead to the supply of an unwholesome water supply. Monitoring for Regulation 20 purposes should include substances that could be a precursor of the formation of compounds considered a potential risk to human health once in the water supply distribution systems e.g. colour which could lead to THM formation after treatment at a water treatment works.

8.10 The Regulations do not specifically cover monitoring [in surface waters] for priority substances and specific pollutants where a risk to Good Status exists - unless these substances are identified in the Regulation 30 risk assessments. However, NI Water should, as a minimum, consider the parameters listed in Annex X of the WFD, the Environmental Quality Standards for which are set out in the daughter directive known as the Priority Substances Directive (2008/105/EC) when establishing their sampling programme for individual catchments.

Frequency

8.11 Regulation 20 sets **minimum** frequencies for surface water [which provide more than 100m^3 a day as an average] which derive from the WFD and are set, as a minimum requirement for the purposes of informing the Regulation 30 risk assessments. For a population served of <10,000 then a minimum of 4 samples/year; for 10,000 to 30,000 minimum of 8 samples/year, and >30,000 minimum of 12 samples/year. If NI Water has assessed the risk as significant enough to require sampling greater than the minimum set within the regulations then NI Water should inform DWI and NIEA of the specific risk(s) and detail on the sampling programme.

8.12 The Regulations do not specify a minimum sampling frequency for raw waters from **groundwater sources**. NI Water is expected to take into consideration established practice for determination of sampling programmes to indicate changes or trends in raw water quality (in particular the technical guidance produced by UKTAG[11] that supports the implementation of the WFD. They should also take into account historical water quality trends and monitoring data available from other bodies (such as the WMU – Groundwater Team). As a minimum, it is expected the frequencies set for groundwater match those set for surface water.

[11] *UK Technical Advisory Group on the WFD 'UKTAG Task 12(a) Guidance on Monitoring Groundwater'*

8.13 The Regulations do not require uniformity of sampling throughout the year. NI Water may choose to monitor for certain parameters at different times of the year depending on when there is greatest risk of them occurring in the raw water e.g. certain pesticides may only be monitored in spring and autumn when rainfall is high. Where seasonal and other short-term effects are likely to be encountered, monitoring should be suitable for trend assessment and it may be appropriate for sampling to take place at the same time(s) each year.

Monitoring plan

8.14 The Regulations do not require NI Water to provide an annual monitoring plan for raw water monitoring to DWI. However, NI Water should on an annual basis share its monitoring plans in order to understand the extent to which the regulatory raw water monitoring for the Regulations meets the Article 7 WFD requirements. This would enable WMU to make arrangements for the implementation of its own sampling programme which will run in tandem with NI Water's.

9. Submission of Data to the DWI

9.1 DWI issues an annual Information Requirements Letter to NI Water with the requirement to provide DWI (by **31 March each year**) with all raw water monitoring data for each abstraction point used the previous year; and evidence that they have provided the information to WMU regarding Regulation 20. NI Water should ensure that they have in place local arrangements for the sharing of other [operational] data and information required for the assessment of risks as part of their Regulation 30 risk assessments.

10. Analysis (QA/QC Directive)

10.1 Given the generality of raw water monitoring activities that NI Water is required to undertake (i.e. parameters and frequencies as determined by risk assessment), the Regulations do not specify any analytical performance characteristics for raw water analysis to be undertaken. However in order to be appropriate for use under the WFD, monitoring is required to comply with the requirements of the UK transposition of the QA/QC[12] directive (2009/90/EC). Whilst these requirements are specific, unlike those for regulatory raw water monitoring by NI Water, in many cases the analytical methods in use in NI Water or contracted laboratories are likely to be as advanced as those used by WMU for their monitoring. NI Water should indicate, as part of its annual monitoring plan whether or not its raw water analysis meets the requirements of the QA/QC Directive. Where this is not the case then the results are unlikely to be appropriate for use under the WFD and further monitoring may need to be arranged by WMU.

[12] *Commission Directive 2009/90/EC of 31 July 2009 laying down, pursuant to Directive 2000/60/EC of the European Parliament and of the Council, technical specifications for chemical analysis and monitoring of water status*