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Wales**



**Environment  
Agency**

# Final Water Resources Planning Guideline

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These guidelines are being issued by the Environment Agency to water undertakers that are wholly or mainly in England, and by Natural Resources Wales to water undertakers that are wholly or mainly in Wales. They have been produced in collaboration with Defra, the Welsh Government, and Ofwat.

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# Section 1 - Planning for a secure supply of water

If you are a water company in England or Wales, you are legally required to supply water to people and businesses within your area. You must prepare and maintain a water resources management plan (WRMP) and you must set out how you intend to maintain the balance between water supply and demand. Your plan must take a long term view, setting a planning period that is appropriate to the risks of your company, but which covers at least the statutory minimum period of 25 years. The duty to prepare and maintain a WRMP is set out in Section 37A-37D of the Water Industry Act 1991. In producing the plan you:

- must take account of your legal requirements
- should follow the governments' policy expectations as set out in the 'guiding principles' covering your operating area:
  - Wholly or mainly in England
  - Wholly or mainly in Wales

You must produce or start preparing a revised WRMP in the following cases:

- if you've been asked to do so by the Secretary of State for the Environment, Food and Rural Affairs (if wholly or mainly in England) or by Welsh Ministers (if wholly or mainly in Wales)
- following the conclusion of your annual review if there has been a material change in your circumstances
- in any case, a new plan must be developed and published as a final plan no later than 5 years from the date when your plan (or revised plan) was last published.

A WRMP is complemented by your water company drought plan, which sets out the short-term operational steps you will take as a drought progresses to enhance available supplies, manage customer demand and minimise environmental impacts.

Through your WRMP and drought plan you will contribute to the delivery of Water Framework Directive objectives set out in river basin management plans (RBMPs) by:

- Setting out a secure and sustainable set of options to supply your customers with water over the long-term, negating the need for your company to make unplanned abstractions therefore helping to build sustainable and resilient catchments
- Showing how you will implement alternative supply or demand management options where current abstraction is identified as causing or at risk of causing environmental damage, including schemes to prevent deterioration in status, achieve protected area objectives or improve water body status (potential)
- Showing how your plans reduce leakage and operational use of water
- Demonstrating how you will fulfil your obligation to promote water efficiency and your plans for increased customer metering, thereby reducing abstraction and its impact on flows and groundwater levels
- Setting out how you will manage resources during a drought, including stating where and under what conditions you will seek drought permits / orders to take more water

You should seek funding for implementation of your WRMP through Ofwat's price review process.

This guideline is designed to help you write a plan that complies with all the relevant statutory requirements and government policy. If you decide to take a different approach you should clearly demonstrate how you are still fulfilling your obligations. Regulators are fully supportive of new approaches but will need time to understand different methods. It is vital that you engage with

regulators as early as possible as part of the new approach to 'WRMP methods discussion' to avoid unnecessary delays later in the process.

Supporting information on the details of the technical methods can be found in manuals produced by UK Water Industry Research ([UKWIR](#)) and the Environment Agency and/or Natural Resources Wales. Details of these can be found in the 'tables, checklists and supporting information section'.

# Section 2 - Process of forming and maintaining a water resources management plan

This section contains information on the steps required to develop and publish your water resources management plan (WRMP) from early engagement with regulators and customers through to publishing your final plan. Once published, you will need to report on the plan annually. You can find more information about how to do this on the annual review page.

## 2.1. The legal requirements

In preparing and publishing a WRMP you must take account of:

- Water Industry Act 1991, sections 37A - 37D and any secondary legislation made, and any ministerial directions given, under this legislation;
- Water Resources Management Plan Regulations 2007 (2007 regulations) and directions given by the Government.

In addition, you must take account of the following legislation as relevant to your plan:

- Strategic Environmental Assessment Directive
- Habitats and Wild Birds Directives
- Water Framework Directive (WFD)
- Drinking Water Directive
- Water Industry Act 1991
- Water Resources Act 1991
- Environment Act 1995
- Well-being and Future Generations (Wales) Act 2015
- Environment (Wales) Act 2016
- The Eels (England and Wales) Regulations 2009
- Wildlife and Countryside Act 1981
- Countryside and Rights of Way Act 2000
- Natural Environment and Rural Communities Act 2006

Your WRMP will have strong links with other plans. You must consider and explain how your WRMP links to:

- River basin management plans
- Water company business plan
- Your drought plan
- Environment Agency or Natural Resources Wales drought plans where relevant
- Flood risk management plans
- Local plans produced by local authorities

If your area is wholly or mainly in:

- England, you must send your draft and final WRMP to the Secretary of State. If your plan will also affect sites in Wales you must send it to the Welsh Ministers in addition to the Secretary of State.

- Wales, you must send your draft and final WRMP to the Welsh Ministers. If your plan will also affect sites in England you must send it to the Secretary of State in addition to the Welsh Ministers. In Wales, you must also carry out a Strategic Environment Assessment (SEA) and Habitats Regulations Assessment (HRA).

You will find details of timescales in relation to WRMP19 see Section 2.12 (Timescales) below.

## 2.2. Early engagement with regulators, customers and interested parties

You should engage early with your Board, regulators, customers and interested parties, especially if you are using new methods or if you are likely to have a complex plan. This reduces the risk of issues being identified at a later stage.

We recommend you use this early development phase to discuss the methods and approaches you will take, with the Environment Agency or Natural Resources Wales. This WRMP methods discussion will allow a structured dialogue between you and the regulators, which should reduce the need for changes later in the process. However, the regulators will not sign off any parts of your approach in advance of the consultation as we will need to assess the plan as a whole and offer impartial advice to government.

We expect you to use both the UKWIR 'Decision making process' framework and the 'Risk based planning' guidance to help you to:

- understand the problem you need to solve ('problem characterisation') and select an appropriate decision making (options appraisal) method for your problem
- decide on the approach to including risks in your plan and the methods that will be used for evaluating drought risk (risk composition)
- decide on supply, demand, outage and headroom methods appropriate for the chosen options appraisal method and risk composition

You should present the problem characterisation and provide a 'method statement' that clearly describes the methods you are proposing to use, at the pre-consultation phase. This will help to ensure you meet the requirement of the Direction to include in your plan a description of the appraisal methodologies you have used. You can use this as a basis of WRMP methods discussions with the Environment Agency and Natural Resources Wales.

## 2.3. Hold a pre-consultation

Before writing your draft plan, you must carry out pre-consultation discussions with the following statutory consultees:

- the Environment Agency and the Secretary of State if your plan will affect sites in England
- Natural Resources Wales and the Welsh Ministers if your plan will affect sites in Wales
- Ofwat
- any licensed water supplier that supplies water to premises in your area through your supply system

You should also carry out pre-consultation discussions with other consultees, for example:

- any water supplier affected by your supply system
- any water companies you have bulk supply or shared resource agreements with
- neighbouring water companies
- customer challenge groups or their equivalent
- River Basin Liaison Panels and local catchment partnerships
- any other groups your plan is likely to affect
- any potential water supplier, company or third party you may wish to trade with

- Consumer Council for Water
- Public Services Boards and other public service providers
- Natural England or Natural Resources Wales if the plan is likely to affect a designated site

Designated sites include:

- special areas of conservation (SACs, including candidate areas)
- special protection areas (SPAs, including potential areas)
- Ramsar sites (including proposed sites)
- sites of special scientific interest (SSSIs)
- national nature reserves (NNR)
- local nature reserves (LNR) (contact local councils)
- local wildlife sites (contact local councils or wildlife trusts)
- marine conservation zones (MCZs)
- landscapes including World Heritage sites, European Landscape Convention, National Parks, Areas of Outstanding Natural Beauty (AONB).

Customer and stakeholder engagement on your plan should, as far as possible, align with customer engagement on your business plan. This should mean that customer preferences identified as part of the WRMP process should be reflected in your business plan.

## 2.4. Write a draft plan

You should write a draft plan based on feedback from the pre-consultation stage. You should also follow any written directions you receive from the Secretary of State or the Welsh Ministers. These directions will be in advance of the submission of your draft plan. They will include a submission date and the minimum requirements that you should include in your plan. You may receive further directions through the process. For companies wholly or mainly in Wales, you must ensure your submitted plan complies with the requirements of the Welsh Language Act.

Suggested good practice for constructing your plan is to have an easy to read non-technical summary that helps bring together your WRMP and other linked plans such as your drought plan and your business plan. This would sit alongside a more detailed technical document that regulators and interested parties may wish to review to understand the options you have considered and the decisions you have made. You may also provide supporting information in appendices.

## 2.5. Send your draft plan

You must send your draft plan to the Secretary of State or the Welsh Ministers as outlined in section 2.1 and as instructed by the latest direction. This will specify the latest date by which you will need to make the submission. If applicable, Defra will provide you with instructions about sending electronic copies of your plan to the Secretary of State via a secure transfer site. If your plan affects sites in Wales, the Welsh Government will provide instructions for submitting electronic copies of your plan to them.

When you submit your draft plan to the Secretary of State or the Welsh Ministers for agreement to publish it for consultation you should submit a statement from your security manager, certifying that the plan has been reviewed and that it does not contain any information that would compromise national security interests. You must highlight the information you propose to redact or edit out in the published version, so that the Secretary of State or Welsh Ministers may confirm whether it is to be removed on grounds of national security.

In this statement you must also say whether the plan contains any information that may be considered to be commercially confidential. If you believe a draft plan shouldn't be published because it contains commercially sensitive information, you should tell the Secretary of State or the Welsh Ministers as soon as possible.

## 2.6. Publish and distribute your draft plan

You should wait to hear from the Secretary of State or the Welsh Ministers before publishing your draft plan. Once you've been instructed to publish, you must adhere to directions and the 2007 regulations with regards to the consultation and making draft plans available. You must send copies of the draft plan to all consultees listed in the 2007 regulations. You should send copies of the draft plan to all other organisations involved in the pre consultation discussions.

You must also publish a statement with the draft plan that:

- specifies whether you've left out any commercially confidential information
- tells people that they can make representations on the draft plan to the Secretary of State or the Welsh Ministers before the end of the period specified in the statement

As a matter of good practice you should consider:

- offering to explain the plan to established groups, known interested parties or companies within your area
- holding road shows or exhibitions
- conducting questionnaires using phone or in person surveys
- ensuring a summary is easy to read and in plain language
- using social media to highlight the consultation
- joint communications with other companies

These are only suggestions and the approach you take will depend on your circumstances and the issues you are facing in the future.

## 2.7. Carry out a public consultation on your draft plan

You have 26 weeks (unless specified differently in a new ministerial direction) to consult on your draft plan and produce a statement of response. It is your responsibility to decide how long you will take to carry out the consultation. Previously, the consultation period has been around 12 weeks. However, this will be dependent on your situation. You should allow enough time:

- for consultees to make comments on the plan – allow more time for more complex draft plans
- to produce a statement of response based on the comments you receive

You must state within your consultation that all responses should be sent to the Secretary of State, if you are wholly or mainly in England, or to the Welsh Ministers if you are wholly or mainly in Wales, using the email or postal addresses below:

<b>water.resources@defra.gsi.gov.uk</b>	<b>water@wales.gsi.gov.uk</b>
<b>Secretary of State for Environment, Food and Rural Affairs WRMP, c/o Water Resources Policy, Area 3D Nobel House 17 Smith Square London SW1P 3JR</b>	<b>Water Branch Welsh Government Cathays Park Cardiff CF10 3NQ</b>

The Secretary of State or the Welsh Ministers will send copies of all the responses on your plan to you.

## 2.8. Publish a statement of response

You must publish a statement of response after completing the public consultation. You must publish this within 26 weeks of publishing your draft plan for consultation (unless specified differently in a new ministerial direction).

Your statement of response must:

- show that you have considered the comments you have received
- set out any changes you have made to the draft plan and your reasons for making them
- say if you haven't made changes as a result of comments and explain why
- describe anything that has changed during the consultation period – for example the conclusion of any projects you had undertaken or external influences such as new sustainability changes

You should explain any significant changes that you want to make between the draft and final plans clearly and comprehensively in the statement of response. You should decide whether the statement of response alone allows your customers and partners to understand clearly and easily the changes you've made. If it doesn't, you may wish to publish a revised draft plan alongside it.

You will need to assess whether any changes in the WRMP will require changes in other plans such as your drought plan or business plan.

You must publish the statement of response as per the directions and the 2007 regulations, and tell anyone who has made comments that you have published it.

## 2.9. Send your draft final plan

Once completed you must send your statement of response to the Secretary of State or the Welsh Ministers (addresses above) along with your revised draft final WRMP if you have prepared one, any other information that they have requested or that you have been advised to send by the Environment Agency or Natural Resources Wales. You must notify the Secretary of State or Welsh Ministers of any further information that may be commercially confidential or which has been, or you consider should be, removed for reasons of national security.

The Secretary of State will send it to the Environment Agency for review and the Welsh Ministers will send it to Natural Resources Wales for review.

The Secretary of State or Welsh Ministers will review your draft plan, the representations made and statement of response, along with technical advice from the regulators and decide whether your plan can be published. They may ask you to complete further work before being published. If so, the Secretary of State or Welsh Ministers will send you the necessary instructions.

There may need to be a public hearing, inquiry or an examination in public if there are unresolved issues with your plan. The Secretary of State or the Welsh Ministers will decide if this step is needed and will inform you.

## 2.10. Publish your final plan

You cannot publish your final plan until you have received permission from the Secretary of State or the Welsh Ministers. Before publishing your final plan you must:

- follow any directions from the Secretary of State or the Welsh Ministers
- give yourself enough time to make final checks - this will depend on what kind of changes you need to make and whether you have received any written directions

You must publish the final plan as instructed through directions and the 2007 regulations. You should notify everyone who responded to your consultation and bring it to the attention of anyone else that it's likely to affect.

## 2.11. Revise and review your final plan

You must review your published plan every year and report to the Secretary of State or the Welsh Ministers on or before the anniversary of publication of the final WRMP. You should do this by following the Annual Review guidance.

You must consult with the Environment Agency and/or Natural Resources Wales on any material changes that you wish to make to your final plan (for example, implementation of new resources not mentioned in your plan). In some cases if the changes are deemed 'material' you may be required to amend and re-consult on your plan. Defra or the Welsh Government will advise you of the process if this is necessary.

## 2.12. Timescales

The following table describes possible timescales for submission of the next WRMP cycle for those companies wholly or mainly in England:

- Release of new Direction - Winter 2016/17
- Pre-consultation - Spring 2016 to Winter 2017
- Submission of draft WRMP for security checking – 1 December 2017
- Start of public consultation - January 2018
- Statement of response - July 2018
- Authorisation to publish WRMP - Subject to Secretary of State approval

For those companies supplying customers wholly or mainly in Wales, please refer to the Welsh Government. An indicative timetable is provided in the Welsh Government Guiding Principles.

# Section 3 - Technical methods

A water resources management plan (WRMP) must set out how you intend to maintain the balance between supply and demand for water during the planning period. The planning period should be appropriate to the risks of your company, but should cover at least the statutory minimum period of 25 years. WRMPs should ensure a secure and sustainable supply of water. Your plan should focus on efficiently delivering the outcomes that your customers want, while reflecting the value that society places on the environment.

When writing your WRMP, you will have to:

- calculate how much water you have available to supply your customers each year over your chosen planning period (Section 4 - Developing your supply forecast)
- calculate how much demand there will be for water each year over the same period (Section 5 - developing your demand forecast)
- allow for uncertainty in your calculations and forecasts (both supply and demand forecasts)
- compare supply with demand (including uncertainty) and see if there is a surplus (more supply than demand) or a deficit (less supply than demand). If there is a deficit you must identify options to increase supply or reduce demand so that you achieve a secure supply of water (Section 6 - Deciding on future options).
- consider how you will ensure that your current and future system will be resilient to a range of droughts and non-drought hazards across the planning period.
- provide all of this information at a water resource zone (WRZ) level and summarise it at a water company level (Water resources planning tables and Table instructions)

## 3.1. Developing your plan

Your plan should demonstrate that you have:

- complied with any statutory requirements; and had regard to the government policy
- an efficient, sustainable secure supply of water for each WRZ over your chosen planning period, which must be a minimum of 25 years
- forecast your customers' demand for water and your supply over your chosen planning period, including the impact of climate change
- a system that can cope with droughts of a magnitude and duration that you could reasonably expect to occur in your area over your chosen planning period. As a minimum, you should plan for the worst drought in your historic record
- considered contingencies for challenging but plausible droughts beyond the capabilities of your supply system (with relevant links to your drought plan) and whether this requires solutions to provide additional resilience. You should consider implications of resilience of your system to other pressures such as vulnerability to flooding.
- described how supply and demand drought interventions affect your supply and demand forecasts, linking your WRMP with your drought plan
- included any confirmed or likely sustainability changes provided by the Environment Agency or Natural Resources Wales
- fulfilled your Water Framework Directive (WFD) obligations, ensuring that your plan supports the environmental objectives in the river basin management plans, including preventing deterioration, achieving protected area objectives and achieving water body status objectives
- involved your customers, interested parties, statutory and non-statutory consultees and taken into account their views

- considered all the reasonable options for meeting any deficit, including cross-company and third party solutions
- if you are in surplus and your area is wholly or mainly in England you should provide evidence that you have contacted other water companies to say this water is available for trading
- provided an opportunity for neighbouring companies or third parties to bid into your plan if you are considering new options
- carried out a Habitats Regulations Assessment (HRA) and appropriate assessments if an option could affect any designated European site
- investigated whether a Strategic Environment Assessment (SEA) is required (if options are needed to balance a supply-demand deficit) and carried out an SEA if required. SEA is mandatory if you are wholly or mainly in Wales
- considered how your plan could contribute to the Well-being of Future Generations (Wales) Act 2015, if you supply customers in Wales or your plan affects sites in Wales
- worked with the Welsh Government and Natural Resources Wales to understand the implications of the Environment (Wales) Act and sustainable management of natural resources principles for the development of WRMPs, if you supply customers in Wales or your plan affects sites in Wales
- considered how the plan is compatible with and contributes to Biodiversity 2020 (England) or Nature Recovery Plan for Wales
- considered how your plan is compatible with Defra's long term ambitions for the environment
- considered all the relevant environmental and social costs and benefits (even if you did not need to carry out an SEA or HRA)
- considered the risks and uncertainty of any decisions, forecasts or calculations you have made demonstrating how your plan is flexible and adaptive so you can cope with outcomes that may be different to those you have planned for
- assurance from your Board that they are satisfied the plan represents the most cost effective and sustainable long term solution

### 3.2. Defining a water resource zone

Your plan should be built up of assessments undertaken at a water resource zone (WRZ) level. The WRZ describes an area within which the abstraction and distribution of supply to meet demand is largely self-contained (with the exception of agreed bulk transfers). You may divide your supply area into one or more WRZs.

Within a WRZ all parts of the supply system and demand centres (where water is needed) should be connected so that all customers in the WRZ should experience the same risk of supply failure and the same level of service for demand restrictions. There will be limitations to achieving these due to the specific characteristics of a distribution network but significant numbers of customers should not experience different risks of supply failure within a single WRZ.

If you operate wholly or mainly in England, you should define your WRZs using the Environment Agency's WRZ assessment methods (Water Resource Zone Integrity, 2016). If you operate wholly or mainly in Wales, you should discuss requirements with Natural Resources Wales. You should provide your reasoning and confirm it in the pre-consultation phase to the Environment Agency or Natural Resources Wales.

### 3.3. Problem characterisation

You should use the problem characterisation step of the UKWIR decisions making process guidance to identify the scale and complexity of your planning problem and the vulnerability to various strategic issues, risks and uncertainties. This allows the development of a proportional

response, in terms of the effort and cost devoted to adopting the selected decision making approach.

You should identify your solution(s) using the most appropriate method for your company. You should refer to UKWIR (2016) WRMP 2019 Methods – decision making process guidance

As a benchmark, you should also identify a preferred solution using the UKWIR (2002) Economics of Balancing Supply and Demand (EBSA). This will allow you to explain any differences in costs and benefits between your preferred solution and the solution generated from EBSA.

The alternative methods require different inputs and consider uncertainty in different ways. Your choice of decision making method will have implications for your whole plan. For example, Real Options Analysis explicitly considers uncertainty by constructing solutions for different possible scenarios. You should demonstrate that you have not double counted uncertainties.

### 3.4. Drought risk assessment

You should base your supply forecast on a design drought. As a minimum, you should assess your plan against the worst drought on record. In deciding on this design drought, we expect you to follow the 'UKWIR Risk based planning' guidance. There are three techniques that can be followed:

- conventional plan (risk composition 1 – based on the worst drought on record)
- resilience tested plan (risk composition 2 – consider a more challenging but plausible range of droughts)
- fully risk based plan (risk composition 3 – based on probability analysis of drought events not seen in the historic record)

You should include a drought resilience statement in your plan to reflect the hydrological risks that drought imposes on your supply system.

### 3.5. Planning scenarios

The WRMP is a strategic forecast to ensure you plan for a secure supply of water. The scenarios for both the demand and supply forecasts will test your system by looking at high demands and low supplies.

The data in your plan should be based on the dry year annual average (for demand) and a design drought (for supply). You should report data to WRZ level using the template spreadsheet provided and the tables' instructions, which explain how to fill this in. You may also choose to explain how you will deal with a period of peak strain known as the critical period. This could be, for example, if the zone has a period where holiday makers increase demand significantly during the summer or high leakage increases demand in the winter.

You should first understand your baseline position. This is a forecast of what would happen if you did not take any new supply or demand actions and did not implement any changes in your company policy or existing operations. Note that you should include the benefits of other non supply-demand balance solutions such as mains renewal and capital maintenance in your baseline position. You should include:

- a baseline supply forecast including your assessment of water available for use from current sources. This should be based on supplies that can be maintained through a design drought as appropriate for your company area. The dry year annual average demand and the design droughts should link with your drought plan.
- a baseline demand forecast covering what people and businesses need, what you expect to lose through leakage and what you may use in operating your system. This should be based on forecast dry year annual average demand, when demand for water is at its highest before water use restrictions are imposed.

- an allowance for uncertainty relating to your supply and demand forecasts depending on your chosen methods.

For your final plan you:

- must then decide whether you need to develop any options to manage or meet the forecast demand of your customers. Options can be any type of change to your existing policies (for example, relating to water efficiency and metering), operations (for example, to reduce leakage or production losses) or infrastructure (for example, developing new resources, increasing treatment capacity). Solutions developed as a result of testing your plan against a range of challenging but plausible droughts (see section 6.11 – testing your plan) could include ‘resilience solutions’ and could include the use of drought management measures such as drought permits and orders.
- must consider all available demand and supply side options as you develop your preferred programme. If you operate wholly or mainly in England, you should consider third party and collaborative options with other water companies particularly where they may provide opportunities to improve resilience at a regional level.
- should provide details of your preferred programme of solutions to restore your supply demand balance under a dry year annual average scenario (and a critical period scenario if applicable).

If you are in surplus, you may still wish to include options in your plan, especially if you are able to find more efficient ways to supply water, reduce demand and/or identify a need to improve your long term resilience.

You must be able to demonstrate that you have a plan which addresses any supply demand deficits in your resource zones during your planning period based on your dry year annual average demand (and if appropriate your critical period scenario) and ensures compliance with your statutory duties. You should clearly indicate if you have included resilience solutions for more challenging but plausible droughts beyond the capabilities of your final plan.

# Section 4 – Developing your supply forecast

You should show in your water resources management plan (WRMP) your supply of water in the base year and what it is likely to be throughout your planning period. Your supply will be the water that is available to supply customers in each of your resource zones. You should demonstrate that you understand how your sources respond to droughts, the current constraints and potential future changes to the water sources.

## 4.1. How to develop your supply forecast

You need to know how much water is reliably available to supply to your customers in each of your water resource zones (WRZs) through your design drought. You should be able to clearly demonstrate how your supply system responds to your design drought.

For more information see UKWIR's risk based planning report.

You must clearly justify your risk composition choice, particularly if you choose risk composition 1, and outline the risks and uncertainty involved (for example, in your behavioural modelling and source output analysis).

The amount of water that you decide you can reliably supply once you have done this analysis should be recorded within the WRP table.

You should clearly state how your drought plan and WRMP link in a format that your customers, regulators, government and interested stakeholders can understand, explaining:

- what your planned levels of service are and the effect they will have on your available supply
- what drought measures will be required, when and why, as part of the levels of service
- for water companies operating wholly or mainly in England, you should not include the benefit of drought measures as part of your baseline supply forecast, for example you should exclude drought permits
- For water companies operating wholly or mainly in Wales, you should refer to the UKWIR Risk based planning methodology when deciding which drought measures to include in your baseline supply forecasts. It is expected that when planning for historic drought within your baseline, you should not include the benefit of drought permits or orders. When planning for more extreme events (once an event reaches 1 in 200 years severity) you may decide to include the benefits of drought permits and orders in your baseline supply forecasts. You should only consider drought permits or orders that have no significant environmental impacts associated with them, and where you have the experience and confidence that they will be able to implement the measure during a drought.
- any contingencies you have for challenging but plausible droughts beyond the capabilities of your current supply system

You don't need to say what you would do during a civil emergency as this should be covered by your emergency plan.

We expect you to discuss your approach with the Environment Agency and/or Natural Resources Wales (as appropriate) as early as possible.

You can find out more about the individual components that make up your supply forecast and how they should be defined in the water resources planning tables' instructions.

Future supplies will be subject to many pressures such as:

- the impact of climate change

- changes to your abstraction licences to ensure sustainability
- changes to your abstraction licences due to regulatory development (for example abstraction reform)
- issues arising from pollution or contamination of sources
- issues arising from development and new infrastructure
- changes in contractual arrangements for example with transfers of water between companies

You should take account of these when developing your supply forecast and clearly communicate any assumptions you have made.

## 4.2. What should be included in your water supply forecast?

If you abstract water to supply your WRZ you should produce a breakdown of your supply forecast setting out:

- the deployable output
- future changes to deployable output from sustainability changes, climate change and any other changes you may be aware of
- transfers and any future inputs from a third parties
- short term losses of supply and source vulnerability known as outage
- any operational use of water or loss of water through the abstraction – treatment process
- the final supply forecast that combines all the above elements into Water Available For Use (WAFU)

If you have identified a critical period scenario you should provide a supply forecast for it in addition to the dry year annual average scenario. You should also explain your decision to include a critical period.

If your WRZ receives all of its water via transfers or third parties, your supply forecast should only reflect your contractual arrangements. However, you should confirm that the supplier company has made the necessary assessments to meet the statutory and policy obligations (for example climate change assessments), that it will be able to supply you with water during your design drought, and that you can meet your level of service.

## 4.3. What should be covered in your deployable output assessment?

If your source of water is not solely provided by a transfer, you should assess and report your deployable output (DO). DO is the output of a commissioned source or group of sources for the design drought you have chosen as constrained by:

- hydrological yield
- licensed quantities
- environment (represented through licence constraints)
- pumping plant and/or well/aquifer properties
- raw water mains and/or aqueducts
- transfer and/or output main
- treatment
- water quality

You should consider the risks of non-renewal for time limited licences which are due to expire during the period covered by the plan. You should check that these licences are sustainable and that their use will not cause deterioration.

You should clearly explain how your DO will also be affected by your demand side drought restrictions (level of service).

You should clearly explain which factor(s) constrain DO. To calculate your DO, you should use:

- UKWIR (2014) Handbook of source yield methodologies
- UKWIR (2016) WRMP19 Methods - Risk based planning methods

Given the complex nature of this work, we encourage you to talk to the Environment Agency and/or Natural Resources Wales as soon as you can when developing your plan.

#### 4.4. Your role in achieving sustainable abstraction

You have a duty to have regard to the river basin management plan (RBMP) when carrying out your functions. You must ensure that your plan supports the achievement of WFD obligations and RBMP objectives. Specifically you must ensure your planned abstractions will:

- prevent deterioration in water body status (or potential) compared to the baseline status reported in the 2015 RBMP. However, if deterioration has occurred in the water body during the first RBMP cycle there may be a need to restore sustainable abstraction.
- support the achievement of protected area objectives
- support the achievement of the environmental objectives in the 2015 plans and where relevant
- ensure a new activity or new physical modification does not prevent the future achievement of good status for a water body

You must assess all your abstractions to ensure compliance with the environmental objectives in the RBMPs and any other legally binding environmental objective (eg those for non-Natura 2000 SSSIs). You must assess both planned changes to abstraction within existing licence quantities and any increase to fully licensed quantities. The Environment Agency or Natural Resources Wales can assist by providing information on water bodies deemed at risk of deterioration. For:

- Time limited licences in England - you will need to review your time limited licences (TLL) before they expire and assess any risk to replacement on existing terms. When you apply for a replacement licence you will need to show that it meets the 3 licence tests of need, efficiency and sustainability, including that the licence supports the achievement of the environmental objectives in the 2015 RBMPs.
- Time limited licences in Wales - you should discuss your review of TLL with Natural Resources Wales.
- Permanent licences - you will need to show how you will manage the risk of deterioration due to use of your permanent licences. If there is a risk of deterioration, you should discuss possible mitigation measures with the Environment Agency or Natural Resources Wales.
- Bulk transfers – if you are a supplier, it is your responsibility to take account of the impact of the abstraction on the water body objectives, including deterioration risk, when considering new or changed bulk transfers.
- Heavily modified or artificial water bodies – you should determine the appropriate mitigation measures to ensure the water body will reach the ecological potential objectives in the 2015 RBMPs and assess any effect on your supply forecast. You should contact the Environment Agency or Natural Resources Wales for further guidance on this process.

You should determine any changes needed to your abstractions to ensure RBMP objectives are met. The Environment Agency or Natural Resources Wales will seek to agree the changes needed with you. The Environment Agency or Natural Resources Wales will formally notify the water companies and Ofwat of these changes through the PR19 water industry National Environment Programme (NEP).

If the changes required to your licences to meet the environmental objectives in the RBMP would cause a threat to security of supply, and there are no alternatives, then you may need to explore

whether Article 4.7 defence applies. Similarly, if you propose a new option that is likely to result in failure to achieve water body objectives, you will need to consider whether Article 4.7 defence applies. If so, you would need to provide evidence in your WRMP justifying why Article 4.7 should be considered, including how all the conditions of Article 4.7 are met. You would also need to provide evidence that the conditions of Articles 4.8 and 4.9 are also met. The evidence must be of sufficient quality to justify the exemption in the next update to the river basin management plans in 2021.

You should complete all investigations and options appraisals in your PR14 water industry NEP for AMP6 by the agreed dates and include any options needed to manage any sustainability changes in your plan.

The Environment Agency or Natural Resources Wales will identify measures to improve fish passage under the Eels (England and Wales) Regulations and to protect raw drinking water supplies in the NEP. You should assess any effect these measures will have on your supply forecast.

### **Invasive non-native species (INNS)**

Aquatic and riparian INNS have significant adverse social, economic and environmental impacts, and can cause the ecological status of WFD water bodies to deteriorate or not achieve their ecological objectives. You must review whether your current abstraction operations and/or future solutions will risk spreading Invasive non-native species (INNS) and propose measures to manage that risk. INNS could be spread by:

- new or existing transfers of raw water between water bodies within your network, between water companies or other parties
- removal or alterations of existing impoundments, that increase the ability of species to move upstream for example, fish-passes and by-pass channels

You may need to contact the Environment Agency or National Resources Wales to discuss these issues on a case by case basis.

For more details on INNS and their impacts, visit the non-native species secretariat website <http://www.nonnativespecies.org/home/index.cfm>

## **4.5. How do you include changes to your abstraction licences in your plan**

You should work closely with the Environment Agency or Natural Resources Wales to identify and investigate any changes required to your licences to ensure they are sustainable. These may be needed to meet the requirements of the RBMP or other drivers, such as the Wildlife and Countryside Act 1981. You should discuss appropriate timescales to implement sustainability changes with the Environment Agency or Natural Resources Wales to ensure you achieve an efficient, sustainable and secure supply of water that protects the environment effectively. You must consider and plan for permanent licence changes needed to address the most seriously damaging abstractions early in the planning period.

The Environment Agency or Natural Resources Wales will formally notify you of the confirmed and likely sustainability changes that you should include in your draft and final WRMPs, and any unconfirmed sustainability changes.

You should work out the impact of any confirmed and likely sustainability changes on your deployable output and assess the impact of unconfirmed sustainability changes on your plan through scenario testing. You should not include any uncertainty about sustainability changes within your plan.

## 4.6. Abstraction reform – Evidence needs

### Catchments currently managed by the Environment Agency

You should not plan for any changes to DO as a result of abstraction reform. The expectation is that at the time of reform abstraction licences will be sustainable, or a plan will be in place to make them sustainable.

On transition, new permits will be issued based on current licence quantities and conditions. As no new licence controls will be imposed, this will not impact your deployable output. If licenced volumes pose a risk of deterioration to the environment they will be transitioned taking account of your:

- Legal obligations
- Emergency requirements
- Historical usage patterns

If a licensed volume is required for emergency purposes, it will only be available for those purposes. You should clearly state which sources are used for emergency purposes and what you define an emergency purpose as. Should you believe abstraction reform would affect your supply, you should discuss with the Environment Agency.

### Catchments currently managed by Natural Resources Wales

All licences will be reviewed at the point of transition. Natural Resources Wales intends to make volumetric changes where unused licensed volumes can no longer be justified and/or where a licence poses a risk to the environment.

Water companies will need to provide evidence to justify retaining any of their daily and annual licensed volumes at transition as:

- Licensed volumes that are part of your deployable output (dry year annual average and/or critical period);
- Licensed volumes that are used operationally (e.g. to reduce costs by using low cost ground water or to retain year to year flexibility) providing records of this use; or
- Licensed volumes that are retained for emergency purposes e.g. in a drought;
- Licensed volumes that are set out in your (or another water company's) feasible options list;
- Adequate infrastructure is in place or will be provided within the life time of the plan; and
- Licensed volumes that are a direct abstraction from a reservoir.

Any licensed volumes not justified as above, will be removed at transition to the new system.

In respect of environmental deterioration, as part of the WRMP process all water company licenced volumes that pose a risk of deterioration under the WFD will be identified. Any licensed volumes that can only be justified to be retained on the basis of emergency use, and that pose a risk of deterioration, will be issued at transition but with conditions that constrain their use to emergencies and do not allow trading of volumes.

Any licensed volumes that are not removed at transition but are considered to potentially pose a risk of deterioration will be investigated under the WFD and WRMP frameworks in the normal manner.

### Cross Border catchments

How licences within the three cross border catchments (Rivers Dee, Wye and Severn) will be transitioned is still being determined. Water companies taking water directly or indirectly from any of these catchments are advised to include information in their plans that justifies retention of any unused volumes associated with those licences.

## 4.7. Climate change

You must assess the impact of climate change on your plan and report the likely implications for deployable output as set out in direction. Climate change may have an impact on deployable output so you should assess the implications it will have on:

- river flows and groundwater recharge
- any future supply options (during the options appraisal process)

To determine the likely impact, you should use:

- Environment Agency (2013) Climate change approaches in water resources planning – Overview of new methods

You should demonstrate that you have followed these approaches by:

- clearly stating the vulnerability to climate change
- describing the risk and vulnerability to the range of climate change impacts on your sources
- stating why you have chosen a particular method and assumptions when presenting the results
- stating whether you have accounted for climate change within your headroom assessment and reported it separately from the other components of headroom

You should report the impacts of climate change on your supply by:

- including information within your plan and reporting data in the correct sections of the water resources planning tables
- explaining how you have incorporated climate change within headroom
- presenting basic climate vulnerability assessments at a resource zone level
- justifying your choice of method to assess climate change. This may vary between resource zones

## 4.8. Water transfers

You should clearly explain all existing raw and potable water imports and exports both internally between WRZs and externally between you and your neighbouring companies. You should provide details in the relevant sections of the water resources planning tables. You should provide information on the:

- agreed limits between supplier and recipient companies
- total volume available for each year of your plan (excluding any water that cannot be transferred due to operational or infrastructure constraints)
- variations related to contractual arrangements such as decreases in transfers due to drought
- direction of flow and whether it can be changed
- water quality of water being transferred and the impacts on the receiving area water quality (even within a water resource zone)

## 4.9. Drinking water quality

You must include how your plan will support the objectives for drinking water protected areas. By supporting these objectives, this may have benefits of increasing deployable output. You should ensure that:

- under the water treatment regime applied, the drinking water produced meets the standards of the Drinking Water Directive plus any UK requirements to make sure that drinking water is safe to drink

- the necessary protection is in place to prevent deterioration in the water quality in the protected area, with a view to reducing the level of treatment required.

You will need to:

- describe treatment works losses and operational use within each WRZ and show how these have been calculated.
- where appropriate, provide diagrams and other supporting evidence for complex major works that can be used in pre-consultation discussions with the Environment Agency or Natural Resources Wales. We do not expect that these will be published within the plan given potential security concerns
- consider options to reduce losses where there is a supply demand balance deficit or it makes sense to do so
- consider catchment options to reduce the treatment process while still complying with the requirements of any drinking water regulations
- consider measures to protect your supply against long term risks of pollution
- ensure all sources for use in WRMP and drought plans have been correctly identified and necessary protection given. For example the Environment Agency or Natural Resources Wales has delineated source protection zones around your groundwater abstractions
- ensure you have been consistent in your approach across all WRZs.

You must ensure you comply with section 68(1) of the Water Industry Act 1991 that covers your duty to supply wholesome water. Wholesomeness requirements are set out in the Water Supply (Water Quality) Regulations 2000 (in England) and the Water Supply (Water Quality) Regulations 2001 (in Wales), and associated amendments. These duties must be reviewed when you include any type of transfers of potable water. Further guidance is provided:

- Information Letter 1/2014 on Metaldehyde and other pesticides  
<http://dwi.defra.gov.uk/stakeholders/information-letters/2014/01-2014.pdf>
- DWI PR14 Guidance - Water Resource Planning here:  
<http://dwi.defra.gov.uk/stakeholders/price-review-process/PR14-guidance-wrmp.pdf>
- Information Letter 1/2012 on Regulation 15 Compliance Arrangements here:  
<http://dwi.defra.gov.uk/stakeholders/information-letters/2012/06-2012.pdf>

## 4.10. Outage

You will need to include an assessment of the risk of temporary or short term losses of supply, termed outage, in your supply assessment.

You should determine how you will incorporate the outage allowance in your WRMP. You should use the following guidance:

- UKWIR (1995) Outage allowances for water resources planning
- UKWIR (2016) WRMP19 methods – Risk based planning

You should describe details in your plan and provide figures in the corresponding sections of the water resources planning tables. You should consider options to reduce outage where there is a supply demand balance deficit or it makes sense to do so.

## 4.11. Water available for use

You need to clearly state the total water available for use in each WRZ taking account of any changes to deployable output, transfers, operational use and outage.

# Section 5 - Developing your demand forecast

You should demonstrate in your water resources management plan (WRMP) the demand for water in your base year and what it is likely to be across your planning period. Your demand will be the sum of both losses from your system and consumption by customers. You can find out more about the components of demand in the tables instructions. You should demonstrate that you understand how your customers use water and their expectations about managing demand for water including leaks.

Your demand forecast should be presented as a dry year annual average scenario and, if applicable, a critical period scenario. This should be based on demands during a year when demand for water is at its highest before water use restrictions are imposed.

You should use the following guidance to develop your dry year annual average and critical period forecasts, respectively:

- UKWIR (2016) WRMP19 Methods – Household Consumption Forecasting
- UKWIR (2016) Population, household property and occupancy forecasting
- UKWIR (2006) Peak water demand forecasting methodology

You should produce a baseline and, if needed, a final plan demand forecast for your entire planning period. These forecasts should include your estimates of demand from:

- household customers
- non-household customers
- water leaks from your network of pipes and that of your customers
- any other losses or uses of water such as water taken unbilled

Future demands will be subject to many influences and these include:

- population changes, including changes in occupancy
- changes in water use behaviour (in both household and non-household customers)
- metering
- increasing water efficiency and sustainable water use practices
- changing design standards of devices that use water (eg more efficient washing machines)
- changes in technology and practices for leakage detection and repair
- climate change
- weather patterns

You should take account of these and any other influences you consider relevant when developing your demand forecast and clearly demonstrate and justify any assumptions you have made.

## 5.1. What should be covered in your demand forecasts?

Your demand forecast will need to include:

- baseline dry year annual average – you should adjust the baseline demand forecast to take account of forecast climate change impacts, population growth, changes in household size, changes in property numbers and your company's existing demand management policy
- baseline critical period (if applicable) – you will need to decide what drives your highest critical period demand, eg seasonal changes in population or winter leakage

- final plan dry year annual average – you should adjust the final demand forecast to include solutions that have been identified through your option appraisal
- final plan critical period (if applicable)

You should clearly describe the assumptions and supporting information you have used to develop your plan. You are encouraged to discuss these with the Environment Agency or Natural Resources Wales as early as possible. As a minimum you should:

- clearly describe the assumptions behind the baseline and final plan forecasts
- explain how the current best estimates of demand have been reconciled with other parts of the water balance
- describe the method used to develop the demand forecasts
- confirm the use of dry year annual average unrestricted demand in developing your demand forecast

## 5.2. Forecast household demand

Your household demand forecast should demonstrate how you have:

- forecast population and property numbers (you should include any assumptions you have made relating to these figures)
- estimated future demand and shown you understand what is driving any changes

## 5.3. Forecast population, properties and occupancy

For companies supplying customers wholly or mainly in England you will need to base your forecast population and property figures on local plans published by the local council or unitary authority. All local councils are at different stages of publication of local plans. You can find the latest list at:

- [http://www.planningportal.gov.uk/uploads/pins/local\\_plans/LPA\\_Core\\_Strategy\\_Progress.pdf](http://www.planningportal.gov.uk/uploads/pins/local_plans/LPA_Core_Strategy_Progress.pdf)
- [http://www.planningportal.gov.uk/uploads/pins/local\\_plans/LPA\\_Core\\_Strategy\\_Progress.xls](http://www.planningportal.gov.uk/uploads/pins/local_plans/LPA_Core_Strategy_Progress.xls)

Local plans are likely to cover the first 10-15 years of the planning period. You will need to check the duration of and timescale for producing plans with your local council. In some cases you may need to use your own property forecasts.

If your local council has:

- a published adopted plan that is not being revised, you must take account of the planned property forecast. You will need to ensure your planned property forecast and resulting supply does not constrain the planned growth by local councils. If you adjust the planned property forecast and select a higher number you will need to justify why you have selected a higher forecast and provide evidence.
- published a draft plan but it has not yet been adopted you must take account and use this as the base of your forecast. You should discuss with your local council whether it expects to make changes to the forecast for the adopted plan
- not started or published a draft plan you should use alternative methods such as household projections from Department of Communities and Local Government or derive your own analysis using methodologies outlined in UKWIR (2016) Population, household property and occupancy forecasting.

For companies supplying customers wholly or mainly in Wales you will need to base your forecast population and property figures on the latest local authority population and property projections published by the Welsh Government. The projections are trend based and use the Office of National Statistics (ONS) population estimates as their base. You can find the Welsh Government's latest local authority population and property projections at:

- <http://gov.wales/statistics-and-research/local-authority-population-projections/?lang=en>

- <http://gov.wales/statistics-and-research/household-projections/?lang=en>

When looking at the projected population of Wales as a whole, the national population projection for Wales produced by ONS should be used instead of adding up the local authority population projections. You should also engage with the local planning authorities in Wales to consider the local development plans in your supply area to inform your analysis of the uncertainties in your forecast population and property figures.

All companies should:

- Clearly describe the assumptions and supporting information used to develop population, property and occupancy forecasts. You should demonstrate you have incorporated local council information (particularly in relation to their published adopted local plans) in England.
- explain the methods you have used to forecast property figures after the planning period used by local councils (for example from years 15 to 25 in the planning period).
- demonstrate how you have included other sources of information and amended your forecast accordingly
- clearly describe any limitations in your forecast
- demonstrate that you understand the uncertainty associated with your forecasts

You should clearly explain the assumptions, risks and uncertainties associated with the results.

If you are using a planning period beyond 25 years and are basing decisions on this forecast, you should explain the range of uncertainties this long range forecast will have and how your plan will adapt to these.

You should:

- explain the assumptions about how you have derived unaccounted population
- describe how you have allocated populations to the geographically different WRZs (eg using neighbourhood plans or census data to further subdivide the populations)
- take account of local council local plans and supporting neighbourhood plans to understand future demands

## 5.4. Forecasting your customers' demand for water

You should select demand forecasting methods appropriate to the data available and the supply-demand situation in individual water resource zones. You should consider using the problem characterisation as described in the UKWIR 'Decision making process' framework (UKWIR, to be published in early 2016).

You should have an up to date source of information about your customers to help you produce a robust demand forecast. This is particularly relevant if you are likely to propose new supply or demand options. To help determine future forecasts you should understand current behaviours and attitudes to water use and report this through use of micro-components in the water resources planning tables.

Guidance on demand forecasting is available here:

- UKWIR (2016) WRMP19 Methods – Household Demand Forecasting
- UKWIR (2016) WRMP19 methods – Risk based planning
- UKWIR (2016) Integration of behavioural change into demand forecasting and water efficiency practices
- UKWIR (2012) Customer behaviour and water use - A good practice manual and roadmap for household consumption forecasting

You should state why you have chosen a particular method together with the assumptions you have made and the uncertainty associated with your demand forecasts. You should also show how the uncertainty has been allowed for in the rest of the plan and the options considered.

You should produce a forecast demand for the dry year annual average and critical period (if required) scenarios and present the data in corresponding tables for total consumption, per capita consumption and a break down into micro-components. You will find information on how to do this in the instructions for the water resources planning tables.

## 5.5. Forecasting your non-household consumption

You should produce a forecast for non-household demand. This is the demand for water being used for non-domestic purposes (eg businesses and industrial processes) and for the population living in communal establishments (eg hospitals, prisons and educational establishments). Your decision on what to include in your forecasts of non-household use should be based on principal use in line with Ofwat's [proposed guidance](#) on assessing whether non-household customers in England and Wales are eligible to switch their water and wastewater retailer. You should be clear about the types of property you have classed as household and non-household in your demand forecasts.

From April 2017, all business customers and public sector, charitable and not-for-profit organisations in areas of England and Wales served by water undertakers that are wholly or mainly in England, will be able to choose their water supplier (retailer). You (the incumbent water supplier or wholesaler) are still responsible for delivering the water to the customer, and must continue to plan for non-household customer demand in your area. The general duty to promote the efficient use of water under section 93A of the Water Industry Act 1991 applies to both the wholesaler and the retailer.

For non-household customers served by water undertakers that are wholly or mainly in Wales, the scope of the retail market will remain as it is at present, reflecting the policy position of the Welsh Government. Therefore, only non-household customers who meet the 50 megalitres per annum threshold requirement will be able to choose a different supplier for water retail services.

You should consult any retailers within your area in the preparation of your WRMP and the retailer should give you any information that you reasonably request to prepare or revise your plan.

You should work together with retailers to share information. You should make sure that:

- your WRMP has an estimated demand forecast for non-households
- you have described how you have derived the figures and assumptions you have made
- you have described the makeup of non-household demand in different sectors either by using the service and non-service split (identifying key sectors) or by using Standard Industrial Classification (SIC) categories published by the Office for National Statistics
- there is a clear explanation of the existing water efficiency initiatives planned by both the wholesaler and retailer and you include any forecast savings data in your baseline forecast
- you provide a final planning forecast where additional non household water efficiency is selected as an option to manage the supply demand balance
- the planned level of service provided to customers is clear
- you have assessed the demand for water from new customers swapping from non-public water supply (eg agricultural demands for water for different types of crops and changes in the power generation sector)

## 5.6. Forecasting leakage

Your demand forecast must estimate baseline leakage over your planning period. You should determine your base year leakage either by:

- using your current reported actual leakage (using the current method of the rolling average of the previous 3 years) or
- estimating your leakage using methods outlined in UKWIR (2011) Managing Leakage

You should include any existing policies and the impacts of any planned non-supply demand balance actions that may reduce leakage (eg mains relining for drinking water quality purposes) in your leakage forecast.

In your final plan forecast you should ensure that you have followed the current government policy and assessed all options to reduce leakage further, alongside other feasible options. You may wish to include any additional reasons for reducing leakage, if you can demonstrate:

- you already have support from your customers
- you have future leakage reduction ambitions but do not necessarily know how to achieve these. If this is the case you should demonstrate that you are actively investigating how to achieve these ambitions

You should consider the value that your customers place on reducing leakage and the benefits this will bring to your customers' willingness to participate in demand management as well as other benefits to the environment.

## 5.7. Other components of demand

You should provide details about how other components of demand (eg water taken unbilled) have been calculated, demonstrate what assumptions you have made when calculating them and what data sources you have based your calculations on.

## 5.8. Metering

Government's policy on metering in England is long established. For companies operating wholly or mainly in England you should follow the requirements set out in the legislation for the provision of information and appraisal of household metering and report it in the relevant water resources planning tables.

You should consider how appropriate the use of different tariffs is to your company and you should assess this as part of any options appraisal.

For companies operating wholly or mainly in Wales, your baseline demand forecast should include the impact of customers opting for a meter and metering new builds. In your final plan forecast you should ensure you have followed the current government policy and assessed options for further metering beyond the baseline. You should provide details in the relevant sections of the water resources planning tables.

## 5.9. Impacts of climate change

The impact of climate change on water consumption is uncertain. You can make an allowance in your plan for the impact of climate change on the demand for water although the expected impact is likely to be no more than 1% in most cases and should not be more than 3% unless you can robustly demonstrate an exception. You should provide details of the allowance and the assumptions you make. You should refer to:

- UKWIR (2009) Assessment of the significance to water resource management plans of the UK climate projections 2009
- UKWIR (2013) Impact of Climate Change on Water Demand

## 5.10. Allowing for uncertainty

You should use the most up-to-date technology, methods and data available to produce your supply and demand forecasts. However, there is uncertainty in all forecasts. Therefore you should

analyse and quantify the variability and uncertainty that are built into your calculations for the dry year annual average demand and critical period (if applicable) scenarios.

You may assess individual components of uncertainty and variability using risk-based planning techniques, through your decision making tool or assess uncertainty separately from individual components using the target headroom approach. The following documents set out different approaches to assessing uncertainty:

- UKWIR (2016) WRMP19 Methods – Risk Based Planning
- UKWIR (2016) WRMP19 Methods – Decision Making Process
- UKWIR (2002) An Improved Methodology for Assessing Headroom
- UKWIR (1998) A Practical Method for Converting Uncertainty into Headroom

If you use the older target headroom guidance you should justify why it is appropriate.

If you use risk-based planning tools or a decision making tool to assess uncertainty and variability you may not need to calculate target headroom, or you may need to exclude some target headroom components. If so, you will need to explain the methods and assumptions you have used and demonstrate that you have not double counted or omitted uncertainties.

If you use target headroom to provide a buffer for uncertainties, you need to consider the appropriate level of risk for your plan. If target headroom is too large it may drive unnecessary expenditure, if too little you may be unable to meet your planned level of service. You should also accept a higher level of risk further into future than in the early years (first 5 years) because as time progresses the uncertainties for which headroom allows will reduce and you will be able to adapt to any changes.

You should provide a clear justification of the assumptions and information used to assess your uncertainties. You should assess the relative contributions clearly showing which uncertainties have the biggest impact in each WRZ. You should communicate this in a clear manner for customers and interested parties to understand easily. You should consider options for reducing uncertainty during the planning period.

You may include an allowance for uncertainty related to non-replacement of TLL on current terms. This should be based on your assessment of the environmental risks. You should not include any allowance for uncertainty related to sustainability changes to permanent licences, as the Environment Agency or Natural Resources Wales will work with you to ensure that these do not impact your security of supply.

# Section 6 - Deciding on future options

Once you have developed a baseline forecast for water supply and demand (including target headroom, if appropriate) you should determine if there is a deficit at any point during the planning period. If there is, you should assess options to remove it and present your preferred solution as a final plan. Even if there is no deficit, you should consider options to improve your service to customers, provide long-term best value, benefit the environment or collaborate with other water companies on strategic options.

You must produce a final water resources management plan (WRMP) with no dry year annual average or critical period scenario deficits in any of your water resource zones (WRZs) over the final planning period.

## 6.1. Considerations when choosing future solutions

We expect you to consider all the most appropriate solutions for your system taking into account:

- government policy
- customers' preferences
- costs and benefits (both monetary and non-monetary)
- impact on the environment
- long-term best value

You may also consider options, even if you are not in deficit, because you need to:

- align your operations closer to government policy
- respond to customer preferences
- become more efficient
- optimise long term solutions between companies
- reduce the impact of your operations on the environment
- increase the resilience of your system to drought or other threats
- develop resources for sharing and export (depending on need)
- investigate synergies with meeting demand of sectors outside public water supply
- work with others to improve the quality of water upstream of your abstractions requirements.

RBMP environmental objectives are a constraint on your options to secure a sustainable supply of water. You should screen possible options for solving a supply-demand planning deficit to ensure that they will not have unacceptable environmental impacts that cannot be overcome. You must ensure that feasible options support the achievement of the RBMP environmental objectives.

You will need to assess any additional supply options against the RBMP measures and objectives for each water body and to ensure that your obligations to avoid future deterioration are met.

You will need to assess whether the options in your plan are subject to Strategic Environmental Assessment and Habitats Regulations Assessment, and that you have complied with any other statutory requirements and legal directions. You may wish to refer to:

- UKWIR (2012) Strategic Environmental Assessment and Habitats Regulations Assessment – guidance for water resources management
- [Office of the Deputy Prime Minister \(2005\) A Practical Guide to the Strategic Environmental Assessment Directive](#)
- Welsh Government, [Strategic Environmental Assessment in Wales](#)

## 6.2. Resilience options

In your plan you should consider and explain whether you require solutions to increase resilience. Resilience options are options that address vulnerabilities that are not addressed by your planned level of service.

As set out in Section 4 - Developing your supply forecast section, you should have chosen a design drought to test your system, which may have identified resilience risks. You may also wish to test your plan to ensure it is resilient to shocks and trends other than drought. UKWIR's 'Resilience planning: Good practice guide summary report' provides a useful long list of hazards. You should consider whether your plan is resilient to non-drought hazards and consider whether it is appropriate that any of these risks would affect resilience sufficiently to be considered in your water resources management plan.

As a result of these assessments and/or your drought planning you may have identified areas where resilience needs to be increased to meet customer and stakeholder expectations and/or government policy.

Where appropriate you should consider options to increase resilience as part of your supply-demand options appraisal even though the resilience solutions may not provide any benefits to your final plan available headroom. Alternatively, it may be appropriate to justify these options separately. If so, you should justify the costs and benefits of the option or options in the context of your WRMP, drought plan and any wider resilience planning. You should complete an options appraisal to a similar standard as the non-resilience options appraisal and describe the option, its dependencies and timings in a similar level of detail to options in your feasible list, as set out in section 6.7. You must also take into account the objectives of the RBMP as set out in section 6.11.

Ultimately you should consider the costs and benefits of different levels of resilience and ensure that there is clear customer support for the preferred level and the option(s) selected to achieve them. This is consistent with Ofwat's resilience principles and will be critical in building a business case for any additional resilience expenditure in PR19. Your plan should demonstrate how your proposed measures will increase the resilience of your supply.

The 'Performance of water supply systems during extreme drought' report provides an example of good practice and how the results of a resilience assessment can be clearly communicated to customers and stakeholders.

You should consider the following supporting information:

- Defra (2016) Creating a great place for living: enabling resilience in the water sector
- UKWIR (2013) Resilience planning: good practice guide – including the list of hazards
- Ofwat (2015) Towards resilience
- Cabinet Office (2011) Natural hazards and infrastructure
- Environment Agency, Defra, UKWIR (2015) – Performance of water supply systems during extreme drought

Cabinet Office guidance identifies four key components of resilience Resistance; Reliability; Redundancy; Response and Recovery; that apply to a greater or lesser extent to infrastructure sectors. It suggests organisations should select most appropriate responses from these in order to deliver cost effective and proportionate risk management.

At the time of writing Water UK is undertaking a project titled 'Water Resources Long Term Planning Framework'. This is due to deliver at the end of July 2016. You are expected to review the outputs of this project and consider what it means for your company and the range of resilience solutions you have considered. You should also consider how applicable regional solutions are to your company that have been identified through Water Resources in the South East (WRSE) and Water Resources in East Anglian (WREA).

### 6.3. Third party options

You are encouraged to engage with third parties who could provide solutions to you at a lower cost than your own solutions. This could include upstream services such as the provision of water, leakage detection and demand management options.

Any solution being delivered by a third party will be subject the same rules and legislation as you are. We would expect you to have reached an agreement in principle if including the option in your plan. The same tests and checks will be carried out whether you develop the solution in-house or via a third party. For example, a third party providing a new source of water that requires a new abstraction will be subject to all the same legislation, tests and certainty as if you had identified the source. However you will be responsible for identifying and scrutinising third party solutions. The regulators will focus on the final outcome of what your plan is delivering.

Third party options could include a variety of options. Some examples are provided below:

- Transfer of water between water companies;
- A water efficiency scheme provided by a third party;
- A water trade with a non-water company;
- A provision by a third party of reclaimed water.

Where a water company includes an option to transfer water from a water resource zone of a water company that is wholly or mainly in Wales, it should discuss these options with Welsh Ministers and Natural Resources Wales.

### 6.4. Upstream competition

Upstream market reforms will not apply to you if your supply area is wholly or mainly in Wales.

The upstream end of the supply chain relates to the supply of raw or treated water into a company's network or the removal of waste water or sewage for treatment. Once implemented in England, the reforms will enable new entrants to provide upstream services without being obliged to also provide retail services, thus introducing more potential for competition.

In the water sector this will take the form of a bilateral market, whereby wholesale providers of resource negotiate directly with water retailers as the retail non-household market develops in line with the Water Act 2014. This will be supported by an appropriate access pricing framework.

A regulated market is not expected before development of your plan for publishing in 2019. Ofwat and Defra will confirm tools and timescales.

### 6.5. Assessing solutions for your plan

You should refer to UKWIR (2016) WRMP 2019 Methods – decision making process guidance.

You should follow the steps of options appraisal:

- Stage 1 – Collate and review your planning information and supply-demand balance (using previous WRMP and known changes to supply-demand balance, etc)
- Stage 2 – Produce a list of unconstrained options
- Stage 3 – Undertake a problem characterisation and evaluate strategic needs and complexity
- Stage 4 – Decide on your modelling method
- Stage 5 – Identify and define data inputs to model(s)
- Stage 6 – Undertake decision making (options appraisal) modelling
- Stage 7 – Stress testing and sensitivity analysis
- Stage 8 – Produce a final planning forecast. This should include a EBSD bench mark if using a different method to select options.

The problem characterisation takes you through an assessment of potential concerns. Where this process suggests low levels of concern, then the current EBSD approaches should be sufficient. Any specific complexities can be examined through the UKWIR guidance on Risk Based Planning Methods (2016) (to assist in derivation of deployable output, incorporation of uncertainty etc.) and through appropriate sensitivity analysis. The current EBSD approach should therefore be maintained as a benchmark such that companies, regulators and customers know what the least cost plan could be.

The final planning forecast should represent your preferred or best value solution (best value refers to the best value solution or plan for water company customers and the environment over the long term). This may not be the least cost solution and through sensitivity analysis and/or the application of extended decision making tools, the company will develop an understanding of the other criteria (other than least cost) that are important to the plan.

## 6.6. Unconstrained list

Regardless of the methods you use, you should compile a list of all possible options that could reasonably be used in your plan. This unconstrained list should be developed from a generic list of options. In addition you should include drought measures. The UKWIR WR27 water resources tools project produced a comprehensive list of water management options to consider that builds on the original list provided in the earlier Economics of Balancing Supply and Demand report. You are encouraged to use these lists as a base to which you can add or subtract.

An unconstrained option may not be completely free from restrictions such as environmental or planning issues but should be technically feasible.

If you operate wholly or mainly in England you are expected to identify whether third parties or neighbouring water companies could provide viable solutions or if there are opportunities for collaboration to develop supply or demand solutions. Third party options should be considered in the widest sense: a transfer of water between water companies is one example; others could include a water efficiency scheme provided by a third party; a water trade with a non-water company; or a provision by a third party of reclaimed water. This is optional for companies operating wholly or mainly in Wales. You should use the time either before or during your pre-consultation phase to discover these opportunities so you can appraise them against your own criteria. Options for identifying and inviting third parties include (but are not limited to) contacting neighbouring water companies and/or other abstractors; or advertising. It is up to you to determine the most appropriate method for your circumstances.

In your plan you should show evidence that:

- third parties have been able to propose options for appraisal;
- you have appraised third party options
- you have used a set of consistent screening criteria
- you have provided a clear explanation why third party options have not made it to the feasible options list (if appropriate)

## 6.7. Feasible list

You should identify feasible options from the unconstrained list to investigate further. The feasible list is a subset of the unconstrained list. It is a set of options that you consider to be suitable to take forward for assessment as part of your preferred programme of options. As such, it should not include options with unalterable constraints that make them unsuitable for promotion (eg unacceptable environmental impacts that cannot be overcome or options which have a high risk of failure). We expect you to discuss your feasible options with the Environment Agency and/or Natural Resources Wales (as appropriate) as early as possible.

You have the flexibility to decide on the most appropriate method for your situation. However you are expected to show your feasible list of options to describe how you have decided on your final preferred or best value solution.

You should clearly show the criteria you have used to select feasible options and, for unselected options, the reason(s) for not selecting them. You should find a balance in your feasible list between having a manageable number of options and having the greatest choice for assessment. The feasible list should include sufficient options to allow real choices when assessing the preferred programme.

For each of your feasible options (including third party options) you should provide:

- a description of the option including (for supply options) an appropriate schematic map and/or conceptual diagram showing the source of supply, the main operational features, the areas over which the option is to be implemented, and any links or dependencies to other options
- a description of how the option being described differs from baseline activities (for leakage reduction, water efficiency or metering options)
- a profile of the yield (based on the capacity of the solution) or water saved over 80 years
- an assessment of transfers of water, or commissioning of new sources, that increase the risk of non-compliance, such as by discolouration, nitrates or pesticides, should not be permitted until steps to mitigate those risks are in place
- an assessment of your customers' support for the option
- an estimate of the time needed to investigate and implement the option, including the earliest start date
- an assessment of the risks and uncertainty associated with the option, including the likelihood and impact of reduced yield due to climate change, environmental constraints or customer behaviour (for demand options)
- an assessment of the flexibility of the option to adapt to future uncertainty
- an explanation of whether the option depends on an existing scheme or a proposed option, or is mutually exclusive with another option
- any factors or constraints specific to the option
- a description of how the option will be utilised and impact on costs
- an assessment of the environmental impacts of the option, including the impacts on RBMP objectives
- a Habitats Regulations Assessment (HRA) if an option could affect any designated European site
- An assessment of the costs and benefits.

The cost and benefit information for each option should include:

- a profile of the costs over 80 years, split into capital (including maintenance and replacement costs); operating (both fixed and variable costs) and financing costs. Financing costs should be calculated as a stream of annual costs over the life of the option, using an assumed 3.6% average cost of capital (the "vanilla" real wholesale WACC in PR14). The NPV of all costs should then be calculated using the Treasury Test Discount rate as set out in the HM Treasury "Green Book" (Appraisal and Evaluation in Central Government, HM Treasury 2003). This is 3.5% for years 0-30 of the appraisal period, 3.0% for years 31-75, and 2.5% for years 76-125 (see Table 6.1 of the "Green Book" if longer periods are required).
- the Average Incremental Cost (AIC) of the option based on the NPV of maximum capacity costs and outputs.
- the environmental and social impacts of the option. You should either provide a profile of monetised environmental and social (including carbon) costs and benefits and the AISC, or provide an assessment of non-monetised environmental and social impacts, or both. This should include both costs and benefits/negative and positive impacts (such as improved resilience).

- any supplementary costs required to distribute the new supply (for supply options) – this might include new or upgraded mains and associated assets (eg service reservoirs and/or pumping stations) but excluding local infrastructure enhancements
- an assessment of whole life costs of treatment, pumping, storage, networks, maintenance and operation. Routine operational matters to be considered should include:
  - control measures necessary to mitigate the impact of the option on optimisation of phosphoric acid dosing, pH and colour for plumbosolvency control;
  - fluoridation practices;
  - other chemical stabilisation processes;
  - aesthetic impacts on consumers, and
  - control of disinfection by-products

## 6.8. Environmental and social impacts

As stated in section 6.7, you should assess the environmental and social impacts of each of your feasible options. In doing so, you should:

- Use a method that is proportionate to the size of the problem.

You should use the ‘building blocks’ approach, making a qualitative, quantitative then monetary assessment if necessary. We expect water companies to explain and justify which method they have used.

- Consider using an Ecosystem Services approach to environmental valuation.

You should consider using an Ecosystem Services approach to environmental valuation as this would help to promote a consistent and integrated approach to environmental valuation across water environment planning. This consistency supports accountability and transparency, and helps with stakeholder engagement.

- Use the best available evidence and develop new evidence if needed.

It is important that the decisions you make are robust, and therefore they need to be supported by appropriate evidence. You should explain their chosen source of evidence and why it is the most appropriate. Your assessments should take account of ‘local’ factors and be spatially sensitive. It is likely that the value that is placed on an ecosystem service varies geographically. You should make sure your assessment takes this into account, particularly if you are not developing evidence specifically for the purpose of the assessment, e.g. if you are using values transferred from another appraisal. To further support the decisions you make and the data you use, some form of sensitivity testing is also recommended.

- Make sure your appraisal process is transparent

You should include a clear explanation and audit trail from raw data to the final appraisal recommendations and results. Others should be able to understand the ‘appraisal story’ and the data that has been used. The data may be considered transferable (e.g. to other policy areas or to other geographical regions) in some cases for use in other appraisals.

## 6.9. Solutions driven by changes to existing abstraction licences

You should also discuss the costs and benefits of sustainability changes with the Environment Agency or Natural Resources Wales. The solutions to the following sustainability changes should be considered as part of the whole WRMP options appraisal:

- to meet the objectives and requirements of the Habitats Directive, Wildlife and Countryside Act and to prevent deterioration in the status (or potential) of Water Framework Directive water bodies should be cost-effective (cost-effective means the solution that meets the objective with the lowest overall costs (including non-monetised costs) should be implemented)

- to improve the status (or potential) of Water Framework Directive water bodies should be cost-beneficial (cost beneficial means a solution should only be implemented if benefits exceed costs) and should not be disproportionately costly
- to meet other drivers must be cost-beneficial taking account of the need for customer support

The Environment Agency and Natural Resources Wales will work with you to understand the cost-effectiveness of individual sustainability change solution proposals.

## 6.10. Deciding on a solution

You may use a variety of methods to evaluate your water resources situation and decide on the best solution(s). Previously the method used to select your preferred programme of final options was the Economics of Balancing Supply and Demand (EBS). This method is still the default and will be appropriate in many cases either alone or used as a benchmark alongside alternative methods to demonstrate that the final plan is best value.

If you face a future with a wide range of uncertainties, other methods may provide better overall solutions. The UKWIR Decision making process guidance describes alternative decision making tools. It will develop a decision making framework and supporting methods which you should use.

Your decision making process should be clear and transparent. Customers, interested parties and regulators should be able to understand how and why you have decided on your solution and why you have discounted other solutions. Whichever decision making method you choose, the final options set should be justified economically, socially and environmentally, and you should provide clearly reasoned justification for how the decision on a preferred solution set has been reached.

You should consider:

- whether future changes may make the solution redundant (eg stranded assets)
- the ability of the solution to cover a range of possible futures and provide resilience, particularly if the impact of regional or cross sector demand might lead you to a different conclusion
- whether the benefits of implementing the solution are greater than the costs (solutions that are not intended to resolve a deficit should still be cost beneficial and have the support of customers for these to be included in price limits)

You should ensure you have clearly tested your plan using Strategic Environment Assessment and Habitats Regulations Assessment, where applicable.

If you identify an option in your final plan that involves sharing resources with another water company or a third party, such as a farmer, you will need to provide details of how the option will operate; how it will be funded; when legal agreements will be in place; what happens during a drought; and who will have ultimate rights to the water.

## 6.11. Water Framework Directive

You must take account of the requirements of the WFD, including the legally binding environmental objectives in the river basin management plans (see section 4.4), when considering your proposed solution(s). You should consider solutions that promote the requirements of Article 7 of WFD (that seeks, as a minimum, to prevent deterioration of water with the aim of reducing the treatment needed to produce drinking water) and look to work in partnership with others. You should review solutions that have been identified in RBMP and this may require partnership working with others in the catchment to achieve the solution.

WFD promotes increased awareness of catchment processes and challenges the established dependence on a 'treatment-led approach' for the supply of European Drinking Water Directive (DWD) compliant potable water. In particular, Article 7 promotes a 'prevention-led approach' to DWD compliance, based on pollution prevention at source to reduce treatment.

You should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option. In addition, you should ensure that any options do not prevent the achievement of good status (or potential). You should talk to the Environment Agency or Natural Resources Wales about any intended actions that may cause deterioration of status (or potential) or prevent the achievement of the water body status objectives in the river basin management plans or for new modifications the achievement of good status (or potential). You should do this as soon as possible before developing your plan and you should make a clear statement in your plan about any potential impacts.

Your plans should include targeted and cost-effective implementation of restoration measures required at the catchment scale, either working solely or in partnership with other catchment based organisations. Given the uncertainty over the level of confidence you should consider the principles of adaptive management, with associated pre and post project monitoring.

## 6.12. Testing your plan

Your WRMP should provide a stable basis for you to make decisions and plan for the future. However, the future is uncertain. Hence, you should clearly describe the factors that could have the biggest influence on your plan. You should undertake scenario testing to demonstrate:

- the resilience of your plan to a range of risks (if you haven't already, test your plan against a range of challenging but plausible droughts as well as other hazards)
- you have considered the main risks when developing your plan and the possible timings of these impacts
- the plan is robust to minor changes to supply and demand forecasts in the near future and moderate changes as the plan progresses

You should use scenario testing to help validate your preferred plan or to assess whether alternative options would be more appropriate. Scenario testing could help to:

- justify a flexible or fixed approach
- demonstrate when important decisions should be made
- identify what you should monitor to manage risk
- identify alternatives or how the plan may change in the future in response to new evidence

You should make sure you have not over planned for a worst case scenario that is unlikely.

Would you like to find out more about the Environment Agency or Natural Resources Wales or about your environment?

Then call on

Environment Agency – 03708 506 506 (Monday to Friday, 8am to 6pm)

Natural Resources Wales - 0300 0653000 (Monday to Friday, 9am to 5pm)

Email

[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)

[enquiries@naturalresourceswales.gov.uk](mailto:enquiries@naturalresourceswales.gov.uk)

Or visit our website

[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

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