20 April 2017

Trust in water

Water resources market information guidance

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About this document

This draft Direction relates to market information for water resources ('Water resources market information guidance'). It sets out the proposed information we will require companies to publish for the purpose of supporting the development and operation of a market in the provision, management and development of water resources, demand management or leakage services. We expect companies to use a spreadsheet template we have prepared for this publication.

This final water resources market information guidance (or 'guidance') will be issued under Condition M1 (Information Remedies) of the conditions of the appointments ('licences') of each of the 17 largest water companies[1] in England and Wales (see Table 1 of the Consultation document).

Condition M1 is a new requirement for water companies to publish or make available information specified by Ofwat in relation to water resources and bioresources. It also provides the details of the information which companies will be required to provide or publish, will be set out in guidance that will only be issued or revised after consultation with the companies concerned.

[1] For the purpose of this document, a reference to a water company, incumbent company or company, means a company holding an appointment as a water and/or sewerage undertaker under the Water Industry Act 1991.

Contents

1. Introduction

1.1 Background

In 2015-16 we carried out analysis and consulted on a regulatory approach designed to promote markets in water resources. We noted that third parties interested in identifying new opportunities for water resources, demand management or leakage services face 'search costs' as well as information barriers compared to incumbent water companies. This means that trading is below its optimal level, and taking steps to reduce identified barriers (such as creating greater transparency) could lead to significant benefits to customers, companies, investors and the environment.

Market information will support the effective optimisation of water resources, including demand management and leakage services, across England and Wales. It will enable and encourage potential third parties to identify and put forward opportunities to supply water resources or provide demand management or leakage services.

As a starting point we want companies to provide greater visibility and accessibility to existing information. This includes key assumptions and economic data that underpin incumbents' water resources planning and investment processes. The information we have identified draws on, but is wider than, the information that companies use to inform their water resources planning and investment processes.

The decision to introduce market information requirements was made in 'Water 2020: Our regulatory approach for water and wastewater in England and Wales', May 2016. This policy decision was enabled by new Condition M1.

1.2 Purpose and scope

The objectives of the market information requirements are to enable third parties, who can either be other incumbents or independent third parties, to:

- identify opportunities to provide new water resources; and
- identify and provide demand management and leakage services.

To reflect these objectives the scope of the information requirements is limited to:

- that which would be reasonable and appropriate to support the development and operation of these markets; and

- that we reasonably consider would not be contrary to the interests of national security or would not seriously and prejudicially affect the interests of any person (as set out in Condition M1). The information is limited to the regulated activities of the 17 largest water companies in England and Wales.

This document sets out the market information requirements and covers the:

- assurance requirements
- publication of information
- market information requirements.

2. Assurance requirements

The assurance that companies apply to their market information needs to be appropriate and proportionate to data that will be used to enable third parties, including water companies, to identify opportunities to provide new water resources, demand management and leakage services.

We want water companies to publish information that stakeholders can have trust and confidence in, easily understand and navigate.

The ultimate responsibility for assurance lies with companies' boards. Companies need to appropriately assure their information to give stakeholders trust and confidence in what they publish, including this market information. We expect companies to have processes in place to ensure this information can be trusted.

Requirements to provide market information are within the scope of our company monitoring framework (CMF) process. We expect companies to include this information in their Risks, Strengths and Weakness exercises when developing their audit plans. If we find that a company's published market information is unreliable or inaccurate we will consider this alongside the quality of the other information that it has provided to decide which category its assurance processes should fall into, through our CMF annual assessment.

Under the CMF process, we could in the future choose to undertake a targeted review of the published market information.

3. Publication of information

In this section we set out the:

- format of the data
- timing of the initial publication of the market information
- timing of updates to the market information
- process for changing the information requirements.

3.1 Format of the data

The data tables should be published for each water resources zone (WRZ) using an Ofwat prepared spreadsheet template (in Excel format) which aligns with the tables below. Each table is represented by a separate tab for each WRZ. A WRZ is the largest area of a company's supply system where all customers have the same water supply risk and is the level at which water resources are planned.

In line with water resources management plans (WRMPs), as a minimum, the information must be made available for each of the 25 years in the company WRMP. Companies that have chosen to plan over a longer period should extend the information to present the data for each year of their chosen planning horizon.

We note that each WRZ may have different critical periods that have supply-demand balance issues that need addressing. Where a company provides WRMP data tables for the dry year annual average and dry year critical period scenario, it will need to complete two spreadsheets per WRZ: one for the dry year scenario and one for the critical period scenario. Where the company only calculates the dry year planning scenario for the WRMP, only one spreadsheet will be required for each WRZ.

The spreadsheet includes a cover sheet where the following summary information should be defined:

- company name
- WRZ name
- date the spreadsheet was first published and last updated
- contact details so that third parties wanting to discuss commercial opportunities arising from this information can easily contact the company
- brief description of level of data assurance

The spreadsheet also includes a change log. This should be used by companies to summarise what changes they have made from one version of their data publication to the next. This will help stakeholders easily understand where new market opportunities may arise and understand changes to the information. The change log should include:

- date of change
- reason for change
- description of values changed

Alongside the spreadsheet companies should also publish a WRZ boundary file that can be imported to a Geographical Information System (GIS) (such as an ESRI Shapefile).

Both the spreadsheets and GIS data must be published on a clearly named page on company websites. To ensure easy accessibility, information must be referenced on the same page as the company's WRMP. Each company must also provide Ofwat with a link to where its data is published. We will provide a link to each company's data on our website.

3.2 The timing of initial publication of market information

We are asking companies to publish market information at the same time as their next WRMP (WRMP19) is issued for public consultation to stimulate third party engagement:

- January/February 2018 - Companies wholly or mainly in England publish their water resources market information alongside their draft WRMP19
- March 2018 – Companies wholly or mainly in Wales publish their water resources market information alongside their draft WRMP19.

3.3 The timing of updates to the market information

For water resources, companies will need to ensure the market information contained in the draft WRMPs is updated. Subject to approval by the Secretary of State and Welsh Ministers companies will be publishing their final WRMPs in September 2018 (England) and February 2019 (Wales). We propose that the market information should be updated in line with the final WRMP within one month of it being published.

WRMPs are prepared every 5 years. It is a statutory requirement for companies to produce an annual review during this period. We propose that the market information is updated within one month of any change to the WRMP as a result of an annual or interim review. In addition to the update of market information as part of the WRMP process, we expect companies to provide updates to the market information on an ongoing basis to capture key changes to the supply-demand balance due to operational or programme changes. For example this would include, but not be limited to, updated information on:

- year of first deficit
- size of deficit (in 25yrs)
- baseline supply-demand balance
- final plan supply-demand balance
- planned scheme start date
- preferred options
- scheme benefit on full implementation
- scheme costs

This will provide greater transparency which will enable third party providers to more effectively identify trading opportunities.

At the beginning of the next 5 year cycle of WRMPs, we would expect the market information to receive a full update when a company's draft plan is published for consultation in line with the timetable set out above.

3.4 The process for changing information requirements

As the markets develop the information requirement may also need to change. For example, as the market evolves, we may on the one hand consider that publication (or provision to us) of some of the information specified in the draft guidance may not be necessary, but on the other hand we may consider that there may be a need for other information to be revealed.

One area where markets may develop is through the action of a broker or brokers. If this happens it is likely that brokers' will develop their own data sets, which may change the dynamic of the market and hence the information required.

We propose to keep market information requirements under review with the expectations that requirements will evolve as markets develop.

4. The market information requirements

The aim of requiring companies to publish the market information is to provide greater visibility and accessibility to existing information, with key drivers identified alongside clear explanations of the published data. This will complement information we already publish, for example our bulk supply register which records incumbent's water trades.

Our data requirements are structured around geographic data and eight data tables:

- **Geographic data** - Companies should publish GIS shapefile (ESRI or equivalent) for each WRZ. This file can be used for geographical mapping of the WRZ boundaries.
- **Table 1: Key market information** - A high level summary of information about the area and location of the WRZ, the current water resources, a summary of the supply-demand balance problem (if any), a summary of treatment capacities and constraints, and any other considerations that may impact solutions. Note this table is predominately based on data outside or supporting the WRMP process. In contrast the other seven tables link to existing WRMP19 data tables.
- **Table 2: Baseline supply forecast** - A more detailed overview of the baseline supply situation for the WRZ. This gives a breakdown of supply availability forecasts for the company's planning period. Supplies include water available from reservoirs, rivers or groundwater (boreholes) whilst also accounting for treatment and transport constraints. These baseline forecasts assume no new investments or interventions by the company.
- **Table 3: Baseline demand forecast** - A more detailed overview of the baseline demand situation for the WRZ. This gives a breakdown of demand forecasts for the company's planning period. Demand includes the amount of water required to supply customers whilst also meeting other demands (e.g. leakage) as part of this activity. These baseline forecasts assume no new investments or interventions by the company.
- **Table 4: Baseline supply demand balance** - A more detailed overview of the baseline supply-demand balance for the WRZ. This takes the demand forecasts from the supply forecasts to calculate whether a zone is in a surplus or a deficit over the planning period. This baseline forecast assumes no new investments or interventions by the company.
- **Table 5: Final plan supply forecast** - A detailed overview of the final plan supply situation for the WRZ. This gives a breakdown of the final plan supply availability forecasts for the company's planning period. These final forecasts

are based on the company's preferred options (new investments and interventions) being completed.

- **Table 6: Final plan demand forecast** - A detailed overview of the final plan demand situation for the WRZ. This gives a breakdown of the final plan demand forecasts for the company's planning period. These final forecasts are based on the company's preferred options (new investments and interventions) being completed.
- **Table 7: Final plan supply demand balance** - A detailed overview of the final plan supply-demand balance for the WRZ. This takes the final plan demand forecasts from the final plan supply forecasts to calculate whether a zone will be in a surplus or a deficit over the planning period. This final plan forecast is based on the company's preferred options (new investments and interventions) being completed.
- **Table 8: Final plan option costs** - A cost breakdown of the feasible options included in the company's WRMP to solve a planning period deficit. An option is feasible if it has passed through the companies screening process and is technically workable. These may be to increase available supply or reduce forecast demand (both would benefit the supply-demand balance). The costs are broken down into components such as capital costs (Capex) and operating costs (Opex) provided as a discounted total for the life of the solution (Net Present Value). Also, included is the incremental cost of providing these solutions reported as a cost (pence) per additional unit of water delivered or saved (m^3).

We set out below our eight data tables and for each piece of data provide:

- WRMP19 table reference (where applicable – note that these references will change in future planning cycles, where a comparable figure exists in future cycles companies should ensure they report numbers consistent with the latest measure, if not the WRMP19 approach should be used)
- the units
- a plain English definition of technical terms to ensure the information is accessible to third parties
- rationale for including the data in the requirement

As noted above the information should be published, for each WRZ, in each relevant planning period, using an Ofwat prepared spreadsheet template.

Table 1: Key market information

Data requirement	WRMP19 reference	Units	Non-technical definition	Rationale
Water Resource Zone location	N/A	Region / Counties	The water resource zone (WRZ) is the largest area of a company's supply system where all customers have the same water supply risk. This is the level that water resources are managed and new investment planned by the companies through the water resource management plan (WRMP) process. The information should be presented as both a text description and as a boundary file that can be imported to a Geographical Information System (GIS) (such as an ESRI Shapefile).	Allows an understanding of the geographical spread and location of the area in which the water resource or service might be needed. This allows users to prioritise WRZs based on their location (where this is important to the service).
Total number of sources	N/A	Number	A numeric count of the number of raw water sources for the WRZ location. The total for all of the WRZs should be the same as set out in the company's Annual Performance Review (APR).	Provides information about the number of raw water sources used to serve the WRZ. It may be more feasible to introduce new sources in a zone which already has multiple sources. Alternatively the offer of a new source in zone currently reliant on a single source may improve supply resilience.
Own source allocation: groundwater	N/A	% of demand met (distribution input)	The ratio of demand met (distribution input – flow entering the distribution network) from groundwater sources to total demand met. Aquifer recharge is the artificial replenishment	Provides a hydrological overview of the zone. Groundwater and surface water sources are resilient to different

(including aquifer recharge)			of groundwater. The total across all zones should be the same as reported in the company APR.	events. Having access to both may be important to the incumbent company. Groundwater and surface water may require different treatment. This together with the geographic availability of the various sources may pose challenges or opportunities depending on the incumbent company's ability to treat the different types of water.
Own source allocation: reservoir (pumped and impounding)	N/A	% of demand met (distribution input)	The ratio of demand met (distribution input – flow entering the distribution network to meet demand) from reservoir sources to total demand. The total across all zones should be the same as reported in the company APR.	
Own source allocation: direct river abstraction	N/A	% of demand met (distribution input)	The ratio of demand met (distribution input – flow entering the distribution network to meet demand) from direct river sources to total demand. The total across all zones should be the same as reported in the company APR.	
External source allocation (trading – imports)	N/A	% of demand met (distribution input)	The ratio of demand met (distribution input – flow entering the distribution network to meet demand) from external sources (third party imports) to total demand.	Provides a hydrological overview of the zone and the relative reliance on external sources.
Critical planning period	N/A	Period	The critical planning period as reported in the WRMP. This is the period that best highlights the pinch points in the company's system. The duration of critical period for the supply system should be reported e.g. Dry Year Annual Average (DYAA), or Dry Year Critical Period (DYCP) (defined as week, month, etc.). Where different problems are posed by alternative critical periods – the data tables should be presented for all scenarios.	Indicates the length of time over which solutions may be required. Short term solutions may benefit a shorter critical period problem more than a longer period.

Level of service (Temporary Use Ban)	N/A	1 in X year	The level of service is the commitment made by each company to all of its customers, based on an understanding of their priorities (e.g. frequency that hosepipe bans are acceptable), following engagement with them. There will be a variation of level of service provided by each company generally based on customer priorities, geography and inherent water resources. The Temporary Use Ban allows for restrictions on a customer's water usage for activities such as using hosepipes to water gardens. The level of service (average planned frequency) for Temporary Use Ban is a commitment made by companies based on an understanding of customers' priorities.	Provides an understanding of the frequency of drought that the company is planning towards and therefore how frequently solutions may be needed.
Level of service – (Drought order for non-essential use ban)	N/A	1 in X year	The level of service (average planned frequency) for Drought order for non-essential use. This restricts customers' water usage further for activities such as cleaning the outside of buildings. An ordinary drought order can be applied for by either water companies or the Environment Agency/Natural Resources Wales in a drought situation.	Provides an understanding of the frequency of drought that the company is planning towards and therefore how frequently solutions may be needed.
Level of service – Emergency drought order (reducing demand): rota cuts and standpipes	N/A	1 in X year	The level of service (average planned frequency) for an emergency drought order (restricting demand): rota cuts and standpipes as agreed with the company's customers. Emergency drought orders go further than ordinary drought orders as they enable a water company to have complete discretion on the uses of water that may be prohibited or	Provides an understanding of the frequency of drought that the company is planning towards and therefore how frequently solutions may be needed.

			limited, and to authorise supply by stand-pipes or water tanks.	
Summary key cause of supply constraint	N/A	Hydrological / Licence / Capacity	The limiting factor for the WRZs supply forecast. Supply can be constrained by the amount available from the environment (hydrological / source yield constraint), the amount available via an abstraction licence (licence constraint), or the amount available as defined by a constraining asset such as a pump or pipe capacity (asset constraint).	Summarises whether a certain type of solution has the potential to solve the WRZs problem, or if linked solutions are needed for a solution to work.eg extra yield will not solve a zones problem on its own if it is constrained by an asset capacity (asset enhancement will also need considering).
Drought plan option benefits	Table 10 – Drought Plan links	Ml/d	The benefit that the company believes drought plan actions can contribute to the supply demand balance. These actions are normally short term operational ones that can have a small supply benefit. They are implemented based on hydrological triggers (river flows/reservoir levels) in the company drought plans.	Provides information as to how much emergency resource is available (if any) beyond the planned supply-demand balance.
Year of first zonal deficit (if any)	N/A	Year	Defines the timing of the problem. This is based on the baseline supply-demand balance (supply forecast minus demand forecast including target headroom allowance – see below). The first year that there is a net water deficit according to the company's baseline plan	Provides information about how soon any solutions will be implemented or are needed.

Zone deficit summary	N/A	High (>10%) / Medium (5-10%) / Low (<5%)	Defines the scale of the problem. Relative measure of the zonal deficit from the baseline supply-demand forecast (supply forecast minus demand forecast allowing for target headroom). The maximum forecast deficit (if any) for the first 25 years of the company's planning period as a percentage of demand (distribution input).	Provides a summary of the zone's problem in terms of the scale of water availability risk.
Other planning considerations and constraints	N/A	Text	Any further considerations or constraints that may influence the choice of solutions for the WRZ. These could be source, treatment or transport considerations. Water quality constraints in terms of treatment processes (where this is beyond normal) e.g. proportion of treatment capacity that cannot treat river water, or that cannot treat certain water quality parameters. Treatment capacity/infrastructure capacity constraints – where additional source yield may need to be supplemented with additional investment.	Provides a summary of where solutions may or may not be suitable, or where other activities need enhancement to make a certain solution work.
Treatment works details	N/A	Text	Anonymised list of treatment works supplying this WRZ which have maximum design capacities greater than 10Ml/d, this should focus on the larger treatment works within the zone where spare capacity will be relatively larger and more proportionate. This list will detail the maximum treatment design capacity, spare capacity (average for critical planning scenario – e.g. year or week), treatment works type (e.g. surface water or groundwater), treatment type and constraints. These should be provided for year 1 of the	Indication of where water resource can be provided without additional treatment requirements (both quality and capacity)

			planning period and then updated to represent the current position. e.g. Works 1 – 50Ml/d – 5Ml/d – surface water – Full treatment Works 2 – 15Ml/d – 2Ml/d – groundwater – Ultraviolet treatment	

Table 2: Baseline supply forecast

Data requirement	WRMP19 reference	Units	Non-technical definition	Rationale
Deployable output (DO) forecast (supply)	Table 2: Baseline supply Row: 7BL	Ml/d	This information is for the baseline forecast before any of the adjustments due to changes or losses. This gives a measure of water supply available at treatment works outlet based on planned level of service and critical period in the current situation. Deployable output is a building block in determining water supplies available for use and is defined as the output for specified conditions for a water resources system as constrained by; hydrological (source) yield; licensed quantities; abstraction assets; raw water transfer assets; treatment; water quality; and levels of service.	Provides an understanding of the total water available from the treatment works outflow over the planning period to better understand the supply-demand balance and any deficit.
Change in deployable output (supply) forecast	Table 2: Baseline supply Row: 8.1BL	Ml/d	The forecast reductions in the baseline deployable output (supplies) over the planning period caused by climate change. Climate change is likely to impact the frequency and	This provides information as to the scale of the forecast climate change reductions in supplies. These forecasts

due to climate change			severity of more extreme events which impact the amount available for supply.	can be very uncertain and may be driving the supply demand balance deficit.
Deployable output (supply) forecast reductions to restore sustainable abstraction (abstraction licence reductions)	Table 2: Baseline supply Row: 8.2BL	Ml/d	Some catchments are reaching the limit of sustainable abstraction or even are over abstracted. Abstraction reductions (to lower levels than current under licence) may be required to protect conservation sites or to deliver Water Framework Directive (WFD) objectives. These are forecast as reductions in deployable output (supply) from the baseline forecast.	This provides information as to the scale of forecast abstraction reductions in supplies. These deployable output reduction forecasts can be uncertain and may be driving the supply demand balance deficit.
Total other changes to deployable output (supply) forecast (e.g. nitrates)	Table 2: Baseline supply Row: 8.3BL	Ml/d	Reductions in deployable output (supply) forecast as a result of other causes. These can include operational decline or loss of raw water source due to long term pollution, or other water quality issues.	This provides information as to the scale of abstraction reductions through other causes. This may be driving the supply demand balance deficit. The actual cause of supply reductions may offer opportunities for certain types of solution.
Raw water losses, treatment works losses and operational use	Table 2: Baseline supply Row: 9BL	Ml/d	The water losses as part of the raw water distribution and water treatment activities. Raw water distribution losses can be from pipes, mains, aqueducts, open channels, break pressure tanks and small reservoirs. Raw water operational use can include loss from regular washing-out of mains. Treatment works losses are made up of both continuous and intermittent over-flows.	Provides another component of the supply demand balance and the scale of efficiency of company raw water transport and water treatment activities. Certain solutions may be tailored to benefit these types of inefficiencies

			Treatment works operational use includes water lost as a result of the treatment process, i.e. net loss that excludes water returned to source water This may be calculated as the difference between total water abstracted and total distribution input (flow leaving treatment works to meet demand), or may consist of measured values of each component.	such as leakage reduction and treatment optimisation.
Outage allowance	Table 2: Baseline supply Row: 10BL	Ml/d	Supplies from treatment works and abstraction assets are not always available, this is known as outage. They will be temporarily unavailable due to both planned and unplanned maintenance. Generally outage only considers reductions in output for periods less than 3 months, outage for longer than 3 months in most cases will be reflected as a reduction in base deployable output. The outage allowance forecast is based on asset outages within the zone that may result in a reduction in the amount of water available from treatment works. This forecast represents the baseline position before any new investment or interventions.	Provides another component of the supply demand balance and the scale of asset health/reliability of company activities.

Table 3: Baseline demand forecast

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Measured (metered) non	Table 3: Baseline demand	Ml/d	Non-households are those properties that are not used as dwellings. Measured refers to properties that are metered	Although a relatively small component of the total demand

household – consumption	Row: 23BL		which affects how much water is used by customers and provides a better forecast of overall water usage (when compared to unmeasured). This provides a forecast of the total water usage (consumption) of the properties that fall into this category. This figure applies to billed measured non-household properties and excludes underground supply pipe leakage. This forecast represents the baseline position before any new investment or interventions.	forecast, an understanding of the total usage from billed non-household properties and any trends will enable the effective targeting of sources and services.
Unmeasured (unmetered) non household – consumption	Table 3: Baseline demand Row: 24BL	Ml/d	Unmeasured refers to properties that are not metered which affects how much water is used by customers and creates some more uncertainty in this sub-component of overall water usage (when compared to measured). This provides a forecast of the water usage (consumption) of the properties that fall into this category. This figure applies to unmeasured non-household properties and excludes underground supply pipe leakage. This forecast represents the baseline position before any new investment or interventions.	Although a relatively small component of the total demand forecast an understanding of the total usage from unmeasured non-household properties and any trends will enable the effective targeting of sources and services.
Measured (metered) household – consumption	Table 3: Baseline demand Row: 25BL	Ml/d	Households are those properties that are used as dwellings. Measured refers to properties that are metered which affects how much water is used by customers and provides a better forecast of overall water usage (when compared to unmeasured). This provides a forecast of the	A larger component of the total demand forecast providing an understanding of the total usage from billed household properties and any trends will enable the effective

			water usage (consumption) of the properties that fall into this category. This figure applies to billed measured household properties and excludes underground supply pipe leakage. This forecast represents the baseline position before any new investment or interventions.	targeting of sources and services (especially those that will work for household properties)
Unmeasured (unmetered) household - consumption	Table 3: Baseline demand Row: 26BL	Ml/d	Unmeasured refers to properties that are not metered which affects how much water is used by customers and creates some more uncertainty in this sub-component of overall water usage (when compared to measured). This provides a forecast of the water usage (consumption) of the properties that fall into this category. This figure applies to unmeasured household properties and excludes underground supply pipe leakage. This forecast represents the baseline position before any new investment or interventions.	A larger component of the total demand forecast providing an understanding of the total usage from unmeasured household properties and any trends will enable the effective targeting of sources and services (especially those that will work for household properties)
Measured (metered) household – per capita consumption (PCC)	Table 3: Baseline demand Row: 29BL	l/h/d	Average amount of water used by each customer that lives in a measured (metered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d) This forecast represents the baseline position before any new investment or interventions.	Per capita consumption has been used by the industry as an indicator of a person's usage for many years. There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services.

Unmeasured (unmetered) household – per capita consumption (PCC)	Table 3: Baseline demand Row: 30BL	l/h/d	Average amount of water used by each customer that lives in an unmeasured (unmetered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d) This forecast represents the baseline position before any new investment or interventions.	There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services.
Average household – per capita consumption (PCC)	Table 3: Baseline demand Row: 31BL	l/h/d	Average amount of water used by each customer that lives in a (metered or unmetered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d) This forecast represents the baseline position before any new investment or interventions.	There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services.
Total leakage (total volume per day)	Table 3: Baseline demand Row: 40BL	Ml/d	Total losses through the underground distribution system (pipe network) and (customer's) supply pipes. This should be consistent with the annual data return but should be based on the proportion that this zone contributes to the company's total leakage. The total zonal leakage is expressed as a total volume lost per day (Ml/d) This forecast represents the baseline position before any new investment or interventions.	Leakage is another relatively large component of the total demand forecast. This information provides the relative scale of its contribution to the zone. This information will identify opportunities to provide services such as leakage detection and reduction.

Total leakage (flow per property)	Table 3: Baseline demand Row: 41BL	l/prop/day	Total losses through the underground distribution system and (customer's) supply pipes. This should be consistent with the annual data return but should be based on the proportion that this zone contributes to the company's total leakage. The total zonal leakage is expressed as a volume (in litres) lost per property per day (l/prop/day). This forecast represents the baseline position before any new investment or interventions.	Leakage is another relatively large component of the total demand forecast. This information provides the relative scale of its contribution to the zone in terms of leakage per property. Geographically spread networks with a smaller customer density may have higher rates per property. This information will identify opportunities to provide services such as leakage detection and reduction.
Measured (metered) properties (excl voids)	Table 3: Baseline demand Row: 45BL	000s	This is the total number of metered properties that the company has on its database (household and non-household). Void properties (voids) are defined as the household properties, within the zone, which are connected for a water service but do not receive a bill, as there are no occupants. These are forecasted going forward based on growth projections.	The total number of metered properties gives an indication of the scale of metering (which affects customer usage and demand forecasting accuracy). This can help identify opportunities in offering services in terms of metering, water efficiency and leakage
Total properties – measured and unmeasured (incl. voids)	Table 3: Baseline demand Row: 48BL	000s	All properties that the company has on its database (in the zone. This is a total of all the household and non-household properties (both metered and unmetered). This includes void properties.	An indication of the number of properties and the predicted change in numbers of properties over the planning period. Particular services

			These are forecasted going forward based on growth projections.	may be of interest in areas of high property growth.
Total population	Table 3: Baseline demand Row: 53BL	000s	The total number of people living in the zone. The starting population is typically derived from census data or from the Office of National Statistics (ONS). Future forecasts of population are based on Government predictions using the ONS and local authority plans.	An indication of the population and predicted change in population over the planning period. Particular services may be of interest in areas of high population growth.
Measured (metered) household – Average occupancy rate (excl voids)	Table 3: Baseline demand Row: 54BL	h/prop	Occupancy rate (people living in each property) for metered (measured) households. Measured as people (head) per property (h/prop)	Household occupancy rates are expected to change across the UK. Availability of housing stock, longer life expectancy and population growth are all having an impact on occupancy rates. This aids the understanding of occupancy rates for metered households for the zone. This may help target services.
Unmeasured (unmetered) household - Average occupancy rate	Table 3: Baseline demand Row: 55BL	h/prop	Occupancy rate (people living in each property) for unmetered (unmeasured) households. Measured as people (head) per property (h/prop)	This aids the understanding of occupancy rates for unmetered households for the zone. This may help target services.

Total household metering penetration (incl. voids)	Table 3: Baseline demand Row: 57BL	%	The proportion of total household properties that receive bills based on metered consumption. The company will estimate the change year on year based on its current metering strategy and rates. This forecast represents the baseline position before any new investment or interventions.	The current level of metering penetration and the rate of predictive change will present opportunities to help target the provision of services

Table 4: Baseline supply demand balance

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Distribution input (demand)	Table 4: Baseline supply demand balance Row: 11BL	Ml/d	The amount of water entering the distribution system (network) at the point of production e.g. water treatment works (to meet demands). This should be the average for the planning scenario. This is the baseline forecast which is the situation before any new investment or interventions. Calculated as a sum of water delivered (both household and non-household and measured and unmeasured), water taken unbilled, distribution system operational use, void properties and distribution losses.	Provides an understanding of the average demand over the planning period to better understand the supply-demand balance and any deficit. Coupled with geographical area and demographic data, this is useful to help prioritise the targeting of services.
Water Available For Use (WAFU) - own sources	Table 4: Baseline supply demand balance Row: 12BL	Ml/d	Baseline deployable output (supply) forecast less reductions in supplies (allowable outages, sustainability changes, raw water losses, and treatment works losses). Provides an estimate for average reliable supplies across the zone from the company's own sources.	Provides an understanding of the total company only supply forecast over the planning period to better understand the supply-demand balance and any deficit.

			This is the baseline position before any new investment or interventions.	
Total Water Available For Use (WAFU) – including transfers	Table 4: Baseline supply demand balance Row: 13BL	Ml/d	Water Available For Use (including transfers) accounts for transfers (imports and exports) from third parties. This is essentially the final supply forecast having accounted for all supply components. This is the baseline position before any new investment or interventions.	Provides an understanding of the total supply forecast and significance of imports/exports over the planning period to better understand the supply-demand balance and any deficit.
Target Headroom (uncertainty)	Table 4: Baseline supply demand balance Row: 16BL	Ml/d	The uncertainty 'headroom' is required between the supply and demand forecasts to ensure the zone is balanced or in a surplus. If the difference between supply and demand is less than the target headroom then the zone is in deficit (i.e. actual headroom is less than target headroom).	Provides an understanding of the total uncertainty over the planning period to better understand the supply-demand balance and any deficit. Provides information on the scale of uncertainties and whether any forecast deficit is within the uncertainty range and therefore at risk of not materialising.
Supply Demand Balance	Table 4: Baseline supply demand balance Row: 18BL	Ml/d	The difference between total water available for use (WAFU) and total demand forecast also accounting for target headroom. The supply demand balance calculation accounts for total water available for use (supply), target headroom (uncertainty) and distribution input (demand). This is the baseline position before any new investment or interventions.	This forecast provides information on the scale and timing of the problem in the zone. This will assist the prioritisation of zones for the provision of solutions.

Table 5: Final plan supply forecast

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Deployable output forecast (supply)	Table 7: Final planning water supply Row: 7FP	Ml/d	This gives a measure of water supply available (at treatment works outlet based on planned level of service and critical period) in the current situation. Deployable output is a building block in determining water supplies available for use and is defined as the output for specified conditions for a water resources system as constrained by; hydrological (source) yield; licensed quantities; abstraction assets; raw water transfer assets; treatment; water quality; and levels of service. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	Provides an understanding of the supply available from the treatment works outflow over the planning period to better understand the supply-demand balance and any deficit. The difference between baseline and final shows where supply options (if any) are having an impact on the forecast.
Raw water losses, treatment works losses and operational use	Table 7: Final planning water supply Row: 9FP	Ml/d	The water losses as part of the raw water distribution and water treatment activities. Raw water distribution can include losses from pipes, mains, aqueducts, open channels, break pressure tanks and small reservoirs. Raw water operational use can include loss from regular washing-out of mains due to sediment build up and poor quality of source water. Treatment works losses are made up of structural water loss and both continuous and intermittent over-flows. Treatment works operational use includes water lost as	Provides another component of the supply demand balance and the scale of efficiency of company raw water transport and water treatment activities. Certain solutions may be tailored to benefit these types of inefficiencies such as leakage reduction and treatment optimisation.

			a result of the treatment process, i.e. net loss that excludes water returned to source water. This may be calculated as the difference between total water abstracted and total distribution input (flow leaving treatment works to meet demand), or may consist of measured values of each component. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions)	The difference between baseline and final shows where options (if any) are having an impact on the forecast.
Outage allowance	Table 7: Final planning water supply Row: 10FP	Ml/d	Supplies via treatment works and abstraction assets are not always available. They will be temporarily unavailable due to both planned and unplanned maintenance. Generally outage only considers reductions in output for periods less than 3 months, outage for longer than 3 months in most cases will be reflected as a reduction in base deployable output. The outage allowance forecast is based on asset outages within the water resource zone that result in a reduction the amount of water available from treatment works. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions)	Provides another component of the supply demand balance and the scale of asset health/reliability of company activities. Difference between baseline and final shows where options (if any) are having an impact on the forecast.

Table 6: Final plan demand forecast

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Measured (metered) non household – consumption	Table 8: Final planning water demand Row: 23FP	Ml/d	This provides a forecast of the water usage (consumption) of the properties that fall into metered non-household category. This figure applies to billed measured non-household properties and excludes underground supply pipe leakage. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	Although a relatively small component of the total demand forecast, an understanding of the total usage from billed non-household properties and any trends will enable the effective targeting of sources and services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Unmeasured (unmetered) non household – consumption	Table 8: Final planning water demand Row: 24FP	Ml/d	This provides a forecast of the water usage (consumption) of the properties that fall into the unmetered non-household category. This figure applies to unmeasured non-household properties and excludes underground supply pipe leakage. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	Although a relatively small component of the total demand forecast an understanding of the total usage from unmeasured non-household properties and any trends will enable the effective targeting of sources and services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Measured (metered)	Table 8: Final planning water demand	Ml/d	This provides a forecast of the water usage (consumption) of the properties that fall into the metered household category.	A larger component of the total demand forecast providing an understanding of the total usage from

household – consumption	Row: 25FP		This figure applies to billed measured household properties and excludes underground supply pipe leakage. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	billed household properties and any trends will enable the effective targeting of sources and services (especially those that will work for household properties). The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Unmeasured (unmetered) household - consumption	Table 8: Final planning water demand Row: 26FP	Ml/d	This provides a forecast of the water usage (consumption) of the properties that fall into the unmetered household category. This figure applies to unmeasured household properties and excludes underground supply pipe leakage. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	A larger component of the total demand forecast providing an understanding of the total usage from unmeasured household properties and any trends will enable the effective targeting of sources and services (especially those that will work for household properties). The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Measured (metered) household – per capita	Table 8: Final planning water demand Row: 29FP	l/h/d	Average amount of water used by each customer that lives in a measured (metered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d).	There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services.

consumption (PCC)			This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Unmeasured (unmetered) household – per capita consumption (PCC)	Table 8: Final planning water demand Row: 30FP	l/h/d	Average amount of water used by each customer that lives in an unmeasured (unmetered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d) This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions)	There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Average household – per capita consumption (PCC)	Table 8: Final planning water demand Row: 31FP	l/h/d	Average amount of water used by each customer that lives in a (metered or unmetered) household property in the zone. Measured in flow used (litres) per person (head) per day (l/h/d). This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	There are benefits in reducing the per capita consumption. This information will enable the identification of opportunities to provide services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Total leakage (total volume per day)	Table 8: Final planning water demand Row: 40FP	Ml/d	Total losses through the underground distribution system (pipe network) and (customer's) supply pipes. This should be consistent with the annual data return but should be based on the proportion that this zone contributes to the company's total leakage.	Leakage is another relatively large component of the total demand forecast. This information provides the relative scale of its contribution to the zone.

			The total zonal leakage is expressed as a total volume lost per day (Ml/d). This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	This information will identify opportunities to provide services such as leakage detection and reduction. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Total leakage (flow per property)	Table 8: Final planning water demand Row: 41FP	l/prop/day	Total losses through the underground distribution system and (customer's) supply pipes. This should be consistent with the annual data return but should be based on the proportion that this zone contributes to the company's total leakage. The total zonal leakage is expressed as a volume (in litres) lost per property per day (l/prop/day). This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions)	Leakage is another relatively large component of the total demand forecast. This information provides the relative scale of its contribution to the zone in terms of leakage per property. Geographically spread networks with a smaller customer density may have higher rates per property. This information will identify opportunities to provide services such as leakage detection and reduction. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Measured (metered) properties (excl voids)	Table 8: Final planning water demand Row: 45FP	000s	This is the total number of metered properties that the company has on its database (household and non-household).	The total number of metered properties gives an indication of the scale of metering (which affects customer usage and demand

			Void properties (voids) are defined as the household properties, within the zone, which are connected for a water service but do not receive a bill, as there are no occupants. These are forecasted going forward based on growth projections. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	forecasting accuracy). This can help identify opportunities in offering services in terms of metering, water efficiency and leakage The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Total household metering penetration (incl. voids)	Table 8: Final planning water demand Row: 57FP	%	The forecast proportion of total household properties that receive bills based on metered consumption. The company will estimate the change year on year based on current metering strategy and rates. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	The forecast level of metering penetration and the rate of predictive change will present opportunities to help target the provision of services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.

Table 7: Final plan supply demand balance

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Distribution input (demand)	Table 9: Final planning supply demand balance Row: 11FP	Ml/d	The amount of water entering the distribution system (network) at the point of production e.g. water treatment works (to meet demands). This should be the average for the planning scenario.	Provides an understanding of the average demand over the planning period to better understand the supply-demand balance and any deficit.

			This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions). Calculated as a sum of water delivered (both household and non-household and measured and unmeasured), water taken unbilled, distribution system operational use, void properties and distribution losses.	Coupled with geographical area and demographic data is useful to help prioritise the targeting of services. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Water Available For Use (WAFU) - own sources	Table 9: Final planning supply demand balance Row: 12FP	Ml/d	Final plan deployable output (supply) forecast less reductions in supplies (allowable outages, sustainability changes, raw water losses, and treatment works losses). Provides the final planning estimate for average reliable supplies across the zone. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	Provides an understanding of the total company only supply forecast over the planning period to better understand the supply-demand balance and any deficit. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.
Total Water Available For Use (WAFU) – including transfers	Table 9: Final planning supply demand balance Row: 13FP	Ml/d	Water Available For Use (including transfers) accounts for transfers (imports and exports) from third parties. This is essentially the final supply forecast having accounted for all supply components. This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions).	Provides an understanding of the total supply forecast and significance of imports/exports over the planning period to better understand the supply-demand balance and any deficit. The difference between baseline and final shows where preferred options (if any) are having an impact on the forecast.

Target Headroom (uncertainty)	Table 9: Final planning supply demand balance Row: 16FP	Ml/d	The uncertainty 'headroom' is required between the supply and demand forecasts to ensure the zone is balanced or in a surplus. If the difference between supply and demand is less than the target headroom then the zone is in deficit (i.e. actual headroom is less than target headroom).	Provides an understanding of the total uncertainty over the planning period to better understand the supply-demand balance and any deficit. Provides information on the scale of uncertainties and whether any forecast deficit is within the uncertainty range and therefore at risk of not materialising.
Supply Demand Balance	Table 9: Final planning supply demand balance Row: 18FP	Ml/d	The difference between total water available for use (WAFU) and total demand forecast also accounting for target headroom. The supply demand balance calculation accounts for total water available for use (supply), target headroom (uncertainty) and distribution input (demand). This forecast is for the final plan and assumes delivery of the preferred options (new investments and interventions)	This forecast provides information on the scale and timing of the problem in the zone. This will assist the prioritisation of zones for the provision of solutions. This is the balance after the proposed new investment and interventions are completed – this should show a surplus throughput the planning period.

Table 8: Feasible option cost information

Data requirement	WRMP19 Reference	Units	Non-technical definition	Rationale
Option name	Table 5: Feasible options	Text	Name of scheme for referencing.	Easy identifier for each scheme.

	Column C			
Option reference number	Table 5: Feasible options Column D	Text	Reference number used in WRMP tables	To ensure clarity in discussions – particularly if several options may have various sub-options
Type of option	Table 5: Feasible options Column E	Text	Type of benefit the scheme delivers, e.g. Options to reduce outage, Options to increase raw imports, etc.	Category of scheme type to provide a simple overview of type of scheme
Preferred option	Table 5: Feasible options Column F	Yes/No	Defines whether the option that was considered was chosen for the companies' short list of feasible options, or whether it is part of the preferred (final) plan and will form part of the companies water resources programme.	Identifies if the scheme was chosen as part of the preferred plan or was on the longer feasible list of options.
Planned scheme start date	Table 5: Feasible options Column G	Year	First year that the scheme delivers full benefit (additional resource or demand saving) if in the preferred plan. This will be the planned delivery of the scheme as part of the company's delivery programme and should be updated accordingly.	Provides an up to date understanding of the timing of company's preferred options.
Option benefit – additional resources or demand saved (based on full implementation)	Table 5: Feasible options Column I	Ml/d	Zonal benefit (in terms of additional supply – water available for use, or demand savings) of the option at full implementation.	An indication of the maximum scale of the option benefit which can be compared against the zones' need.
Total planning period option	Table 5: Feasible options Column J	Ml	The total volume (mega litres) of benefit gained from the option over the whole planning period. The benefit volume is then discounted over the planning period	An indication of the total planning period benefit which can be compared against the zones' need.

benefit (Net Present Value)			using the discount rate to provide a Net Present Value (NPV) of the benefit.	
Total planning period capital cost of option (CAPEX NPV)	Table 5: Feasible options Column K	£000s	The total capital cost (CAPEX) spent to deliver the option over the planning period. This is then discounted over the planning period using the discount rate to provide a NPV of the total cost.	An understanding of the capital costs together with the other components of the total option costs allows the identification of potential efficiencies and alternative services.
Total planning period operating cost of option (OPEX NPV)	Table 5: Feasible options Column L	£000s	The total operating cost (OPEX) spent to deliver the option over the planning period. This is then discounted over the planning period using the discount rate to provide a NPV of the total cost.	An understanding of the operating costs together with the other components of the total option costs allows the identification of potential efficiencies and alternative services.
Total planning period operating saving cost of option (OPEX saving NPV)	Table 5: Feasible options Column M	£000s	The total operating cost saving made through the delivery / operation of the option over the planning period. This is then discounted over the planning period using the discount rate to provide a NPV of the total cost.	An understanding of the operating savings together with the other components of the total option costs allows the identification of potential efficiencies and alternative services.
Total planning period carbon costs (Carbon NPV)	Table 5: Feasible options Column N	£000s	The total carbon cost (carbon generated through building and operating the option translated into financial terms) spent to deliver the option over the planning period. Two carbon prices have been developed: a traded price of carbon for emissions covered by the EU Emissions Trading Scheme (includes grid electricity use); and a non-traded price of carbon for emissions outside of the EU ETS. Companies use the appropriate	An understanding of the carbon costs together with the other components of the total option costs allows the identification of potential efficiencies and alternative services.

			carbon price depending on the origin of the fixed emissions (e.g. construction) and variable emissions (e.g. operational use). This is then discounted over the planning period using the discount rate to provide a NPV of the total carbon cost.	
Total planning period social and environmental costs (NPV)	Table 5: Feasible options Column O	£000s	The total social and environmental costs (both positive and negative) translated into financial terms to deliver and operate the option over the planning period.	An understanding of the social and environmental costs together with the other components of the total option costs allows the identification of potential efficiencies and alternative services.
Total planning period option cost (NPV)	Table 5: Feasible options Column P	£000s	The total overall cost for the delivery and operation of the option over the planning period. This is then discounted using the discount rate to provide a NPV of the total cost.	An understanding of the total option costs allows the identification of potential efficiencies and alternative services.
Average Incremental Cost (AIC)	Table 5: Feasible options Column Q	p/m^3	Average incremental cost of option delivery and operation over the planning period. The extra cost (pence) per volume of water gained (m^3) for the option.	An understanding of the total option cost-benefit allows the identification of potential efficiencies and alternative services.
Average Incremental Social & Environmental Cost (AISC)	Table 5: Feasible options Column R	p/m^3	Average incremental cost (including environmental and social costs) of option delivery and operation over the planning period. The extra cost (pence) per volume gained (m^3) for the option.	An understanding of the total option cost-benefit (including social and environmental factors) allows the identification of potential efficiencies and alternative services.

Scope Confidence	Table 5: Feasible options Column S	Score 1 to 5	Measure of the confidence the company has in the scope (scheme type / benefits). For the purposes of long-term planning, companies initially develop schemes in outline and assign costs on that basis. As a result there is some uncertainty associated with that information. A score of 1 is an indication of low confidence whilst a 5 indicates relative high confidence.	Some options may be less certain than others in terms of scheme scope and benefit delivery.
Cost Confidence	Table 5: Feasible options Column T	Score 1 to 5	Measure of the confidence the company has in the costs. For the purposes of long-term planning, companies initially develop schemes in outline and assign costs on that basis. As a result there is some uncertainty associated with that information. As a company develops its plans to the feasible options stage, there is an expectation that the robustness of estimates of costs improve so that there is sufficient confidence in the company‘s ability to implement its preferred solution as described. A score of 1 is an indication of low confidence whilst a 5 indicates relative high confidence.	Some options may be less certain than others in terms of scheme cost