



WATER RESOURCES MANAGEMENT PLAN

ANNUAL REVIEW 2018

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1 GENERAL

1.1 Introduction

The Water Act 2003 places a duty on all water companies to prepare a Water Resources Management Plan (WRMP). At each anniversary of this Plan the Company must review progress and send a statement to the Secretary of State.

Portsmouth Water published its Final Water Resources Management Plan in August 2014 and this is the third Annual Review. Guidance published in April 2016 sets out the content of the Annual Review and the submission procedure.

The Guidance specifically requires the review to include progress on actions agreed with the Agency and DEFRA when the Plan was finalised.

The guidance requires the Annual Review to provide an overall summary of the supply demand balance for the financial year. This document replaces Table 10B and the Environment Agency commentary previously provided in the 'June Return' to Ofwat.

1.2 Water Resources Zones

Portsmouth Water only included one Water Resources Zone in the Final Water Resources Management Plan 2014. The distribution system includes a spine main and strategic treated water storage. The system ensures that all of Portsmouth Water's customers experience the same level of service.



The Company's boundary has not changed but some customers on new housing estates are supplied by inset appointments. These inset appointees did not comment on Portsmouth Water's Final Water Resources Management Plan 2014 or on the Final Drought Plan 2013.

The Actual Deployable Output calculated for 2017/18 includes an additional long term outage at Source I for water quality reasons.

Deployable Output WRMP 14	245.8 MI/d
Source I Licence Reduction	-2.9 MI/d
Source I Long Term Outage	-1.5 MI/d
Source U Raw Water Reduction	-3.0 MI/d
Source G Raw Water Reduction	-2.0 MI/d
Actual Deployable Output (Average)	<u>236.4</u> MI/d

In the Peak Week of a Dry Year the Actual Deployable Output would have been:

Deployable Output WRMP 14	330.0 MI/d
Source I Licence Reduction	-5.9 MI/d
Source I Long Term Outage	-1.5 MI/d
Source U Raw Water Reduction	-3.9 MI/d
Source G Raw Water Reduction	-2.0 MI/d
Actual Deployable Output (Peak Week)	<u>316.7</u> MI/d

Actual Deployable Output is used in the table included in Section 10.

2.2 Actual Outage

Actual Outage is derived from 2017/18 data for short term incidents. Outages for longer than 90 days, such as Source I, are not included in this figure but are removed from Deployable Output. The actual outage for 2017/18 was:

Actual Outage (average)	11.2 MI/d
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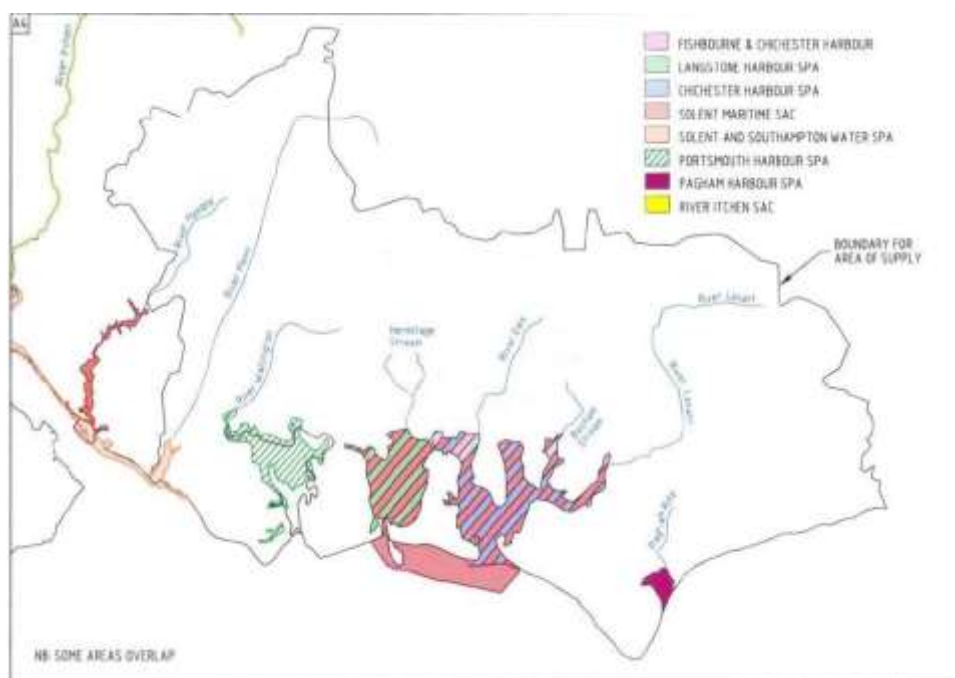
The actual outage for the peak week in 2017 was:

Actual outage (Peak Week)	1.3 MI/d
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2.3 Bulk Supplies

Portsmouth Water currently has a single bulk supply to Southern Water Services. This supplies water from our North Arundel Source to Whiteways Lodge and on to Southern Water's Pulborough Source. The system has a capacity of 15 MI/d with a sweetening flow of 1.0 MI/d required at all times. The original agreement, which expired in 2014, allowed for a peak supply of 15.0 MI/d and an average supply of 4.45 MI/d. The bulk supply was reviewed in 2016 and is now available on the basis of 15.0 MI/d being available at all times.

2.4 Sustainability Schemes



Portsmouth Water's area of supply includes numerous protected rivers, harbours and coastlines. The Company has complied with all previous sustainability reductions and voluntarily reduced abstraction licences.

The following sections set out what activities were included in the National Environmental Programme (NEP) which was completed in June 2017. This was significantly earlier than the legal requirement which was for completion by March 2021.

2.4.1 The River Ems Restoration Scheme

Portsmouth Water has completed a river restoration scheme on the River Ems. This scheme included revisions to the abstraction licence in relation to the volume and location of the river augmentation. The original restoration scheme, as proposed by the Environment Agency, was modified to reflect the ecology found on site. An off-line pond was de-silted to enhance water vole habitat and high flows were diverted to the main river to enhance the chalk stream habitat. With further downstream modifications this section should be suitable for migratory fish.

2.4.2 The River Hamble Restoration Scheme

The restoration brief for the River Hamble scheme was provided by the EA in February 2015. The original scheme included cattle fencing and channel modifications. Unfortunately the landowners did not want bankside fencing because of increased flood risks. Portsmouth Water provided a silt trap and hard surfaced cattle crossings to improve water quality instead. Additional work was carried out in 2017/18 and this involved the removal of an existing weir.

2.4.3 Titchfield Haven

In December 2015 Portsmouth Water renewed its time limited licence at Source F. This source is on the River Meon and abstraction may influence the harbour of Titchfield Haven. Although the Habitats Regulations Investigation concluded that there was no adverse effect on the harbour the EA imposed a new augmentation

clause on Source F based on the use of raw water from Source G. This reduction in deployable output is reflected in Section 2.1.

3 DEMAND

3.1 Demand Forecast

Portsmouth Water produced a range of demand forecasts for the Final Water Resources Management Plan 2014. 'Normal Year' forecasts are used for revenue forecasting and it is the 'Dry Year' forecast which is used for the supply demand balance. The population forecast was set in 2014 and will remain unchanged for each Annual Review. The only adjustment made is to the outturn household property numbers, which are extracted from the billing system for the mid-year point.

The 'Dry Year' forecast was based on separate micro components and this is consistent with the additional water that is used for personal washing, clothes washing and garden use in warmer weather. The peak week forecast assumes demand based on a return period of 1 in 20 years (5% risk of failure). Fifty years outturn data was "normalised" and then statistics were used to calculate the household consumption with a 5% risk of exceedance. Non-Household demand and leakage were then added to give the overall peak demand.

The Non-Household demand forecast was based on econometrics and the outturn data between 2007/8 and 2012/13. The outturn demand since 2013/14 has been very close to the forecast, with a gradual reduction in demand over time. Non-Household demand in 2017/18 was 32.9 MI/d after adjustments for meter under registration and the Maximum Likelihood Estimation technique (MLE).

3.2 Per Capita Consumption

Portsmouth Water use an individual household monitor to estimate unmeasured per capita consumption (PCC). In 2017/18 there were 918 properties which gave valid consumption data and this produced an occupancy adjusted per capita consumption of 156 l/h/d excluding supply pipe leakage.

Properties with consumptions above approximately 450 litres/head/day (l/h/d) were excluded from the calculations because they are either likely to be leaking or to have increased occupancy. Properties with consumptions below 75 l/h/d are likely to be holiday homes, or to have been occupied for only part of the year, and they have been excluded from the calculations.

The outturn per capita consumption for measured properties is derived from the billing system. For 2017/18 the overall measured PCC was 127 l/h/d. Measured customers are meter optants and new homes built since 2005. In 2017/18 measured per capita consumption was 18% lower, on average, than unmeasured per capita consumption.

Per capita consumption is subject to the MLE adjustment carried out as part of the overall supply demand balance. This is covered in more detail in Section 6.

3.3 Optional Metering

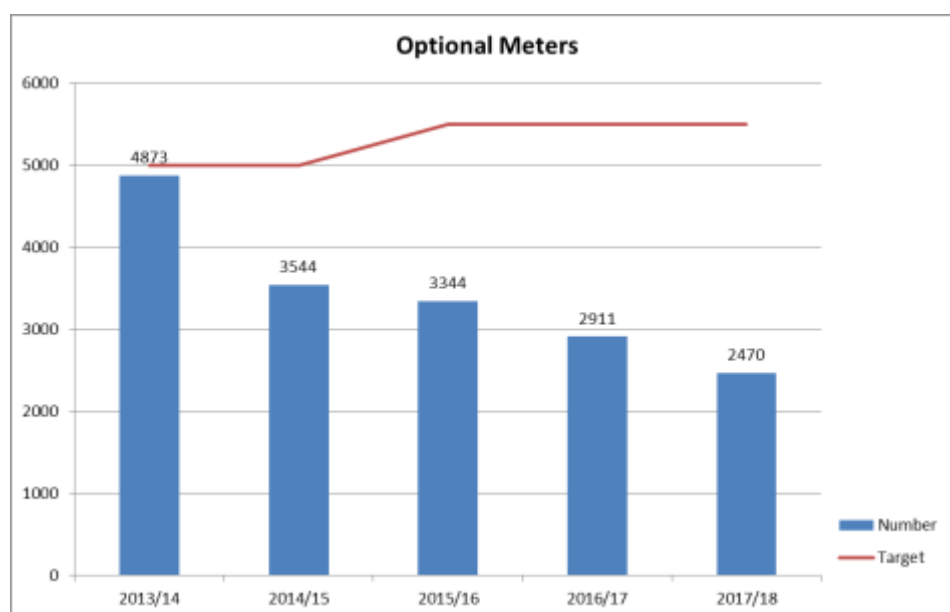
The Final Water Resources Management Plan 2014 does not contain any proposals to introduce compulsory metering. This is because Portsmouth Water's area of supply is not classified as 'Seriously Water Stressed' by the Environment Agency.

The baseline provision for metering was as follows:

		2013/14	2014/15	2015/16	2016/17	2017/18
Portsmouth Water Target	Meters	5,000	5,000	5,500	5,500	5500
Optional Meters Installed		4,873	3,544	3,344	3,154	2,470

Our Business Plan commitment was to promote metering to customers who would benefit from a financial point of view. The Company proposed to install 5,500 domestic meter options per year, but in 2017/18 only 2,470 customers chose to switch to a measured supply as part of the optional metering programme.

At March 2018, domestic meter penetration for the Company was 30% of household customers, an increase of 1 percentage point from last year. The Water Resources Management Plan assumes that 70% metering penetration will be achieved by 2039/40.



New houses constructed since April 2005 have been fitted with a meter and wall mounted boxes are now used. The household outturn figure for 2017/18 was 2,207 and this is close to the forecast included in the Water Resources Management Plan 2014.

3.4 Leakage

Portsmouth Water's leakage target for 2017/18 was 29.9 MI/d. The outturn leakage figure was 33.0 MI/d and this decreased to 32.9 MI/d following the MLE adjustment. 2017/18 was a challenging year for leakage control with cold weather and dry periods causing an increase in burst mains. Despite additional leakage control efforts the target for the year could not be reached. The three year rolling target was just above the target but the Company is still on track to meet the five year Business Plan objective. Work has continued to refine the data and introduce 'best practice' for the assessment of leakage. For the next WRMP the new leakage methodology will be used and this will add approximately 5 ml/d to the leakage total and reduce overall PCC by 2 %.

3.5 Water Efficiency

Portsmouth Water has an internal Water Efficiency Target of 0.29 MI/d per year based on a saving of 1 litre per property per day. The outturn figure for 2017/18 was 0.22 MI/d which was below the target.

	2013/14	2014/15	2015/16	2016/17	2017/18
Target	0.29	0.29	0.29	0.29	0.29
Savings Achieved	0.32	0.24	0.27	0.26	0.22

Measures, such as distributing water saving devices, made up the majority of the total with a smaller allowance for educational initiatives. Promotion of the Free Water Saving Pack provides the biggest saving and is run in conjunction with the "Save Water Save Money" website.

4 CLIMATE CHANGE

The Annual Review is based on outturn data and so is not affected by climate change forecasts.

5 HEADROOM

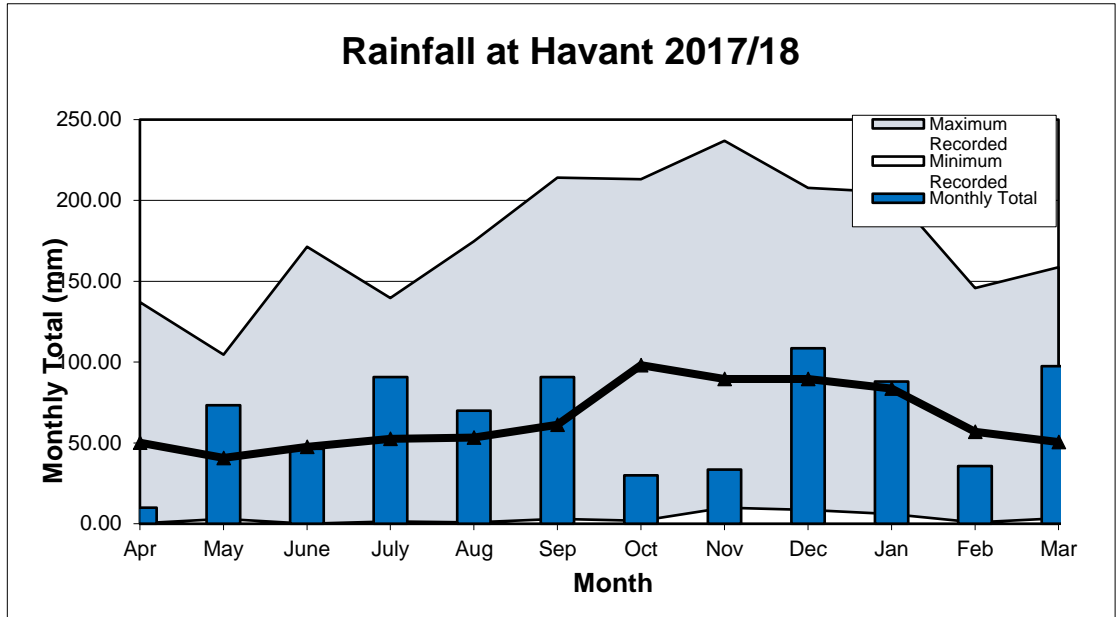
Portsmouth Water's current headroom methodology is set out in its Final Water Resources Management Plan 2014. It is a risk based methodology and the annual allowance for 2017/18 was 10.4 MI/d and the peak week allowance was 13.8 MI/d.

6 SUPPLY DEMAND BALANCE

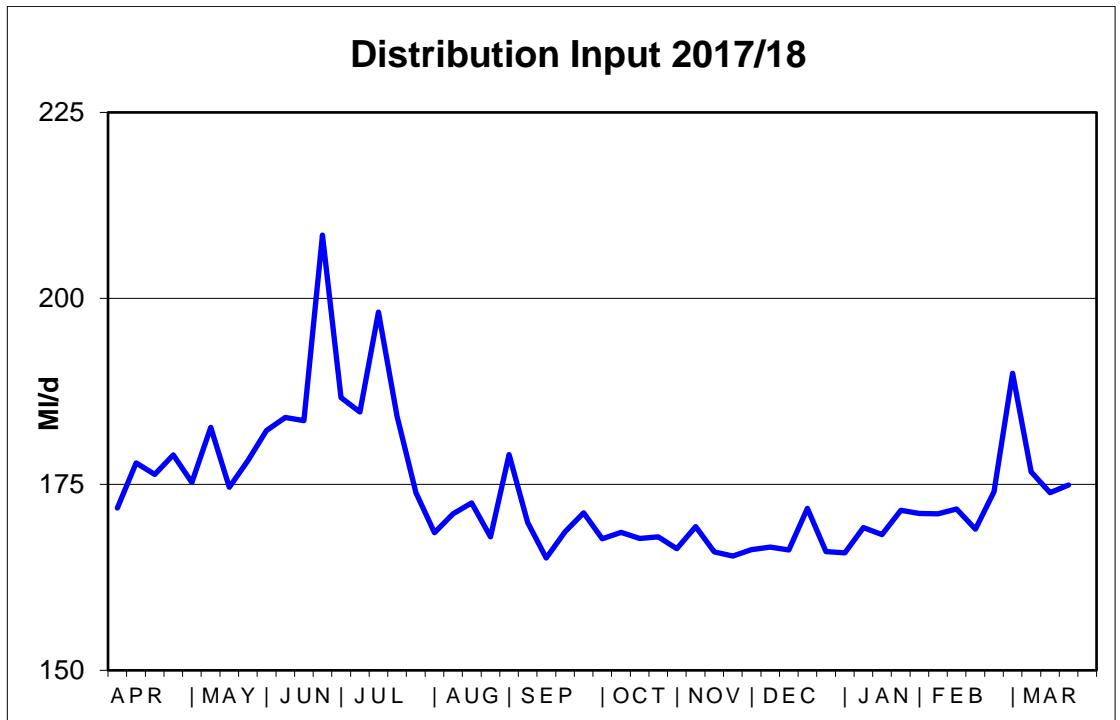
The Annual Review is based on outturn data with end of year water volumes and mid year property and population numbers.

6.1 Outturn Data

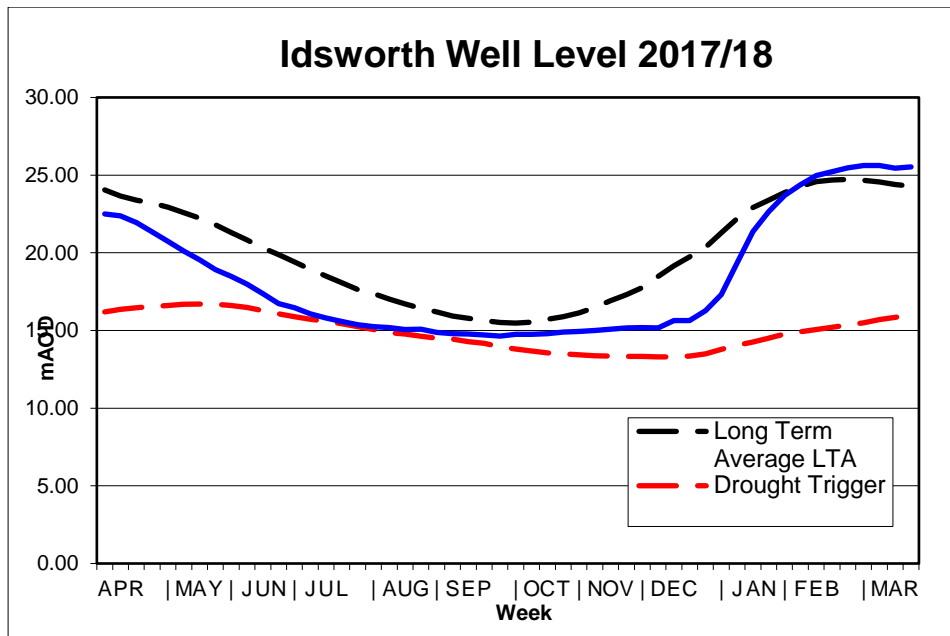
The weather during 2017/18 was unusual with a dry October and November and a dry February. Over the year rainfall was 100% of the long term average and rainfall in December, January and March was sufficient to ensure full groundwater recharge. The graph below shows recorded rainfall as a blue bar and the Long Term Average (LTA) rainfall as a black line.



The dry weather in May produced an early peak in demand but the wet July suppressed the summer peak. There was an unusual peak in March due to the cold weather and a large number of burst mains. The situation was brought under control quickly and overall demand for the year was higher than normal but not unusual with an average demand of 174.4 MI/d.



Groundwater levels are a good indicator of the water available to Portsmouth Water from the chalk aquifer. 2017/18 started with groundwater levels below the long term average and a dry April and June resulted in levels close to the initial drought trigger in July. Rainfall in July, August and September prevented a drought from developing. There was a strong recovery in groundwater levels due to rainfall in December and January.



The Bulk Supply to Southern Water normally runs with a “sweetening” flow of 1.0 MI/d. In 2017/18 the bulk supply ran significantly above this level for several periods equating to an annual average was 2.01 MI/d.

6.2 Water Balance Reconciliation

For the outturn year the “macro components” of demand, such as unmeasured demand and measured demand, do not add up exactly to the Distribution Input. The Annual Review process requires any imbalance to be “reconciled” using the Maximum Likelihood Estimation (MLE) methodology. A confidence grade is assigned to each volume depending on the source of the data and the accuracy of the readings.

The confidence grade is made up from two elements, reliability and accuracy, with reliability graded from A to D and accuracy from 1 to 4. Where an entry is zero our very small the accuracy is given as X

6.2.1 Unmeasured Household Demand

Unmeasured demand is estimated from per capita consumption (see Section 3.2) and population. This means that it cannot have a high confidence grade and the MLE calculation is based on $\pm 10\%$ so a grade of B3 is deemed appropriate. The outturn per capita consumption was 156 l/h/d and this reduced to 155 l/h/d following the reconciliation.

6.2.2 Measured Household Demand

Measured household demand is taken from the outturn billing data and there is an adjustment for meter under registration. The confidence grade is A2 and the MLE calculation uses $\pm 5\%$. The outturn measured per capita consumption was 128 l/h/d (see Section 3.2). This reduced to 127 l/h/d following the reconciliation. The

majority of measured households are meter optants who will on average be low users.

6.2.3 Unmeasured Non Household Demand

Unmeasured non-household demand is difficult to estimate and this year there is less data available from the billing system. A nominal per property consumption of 500 l/prop/d has been used to calculate the volume. An accuracy of $\pm 25\%$ has been set and this gives a confidence grade of B4. The volume of unmeasured demand is calculated to be 0.94 MI/d and this reduces to 0.92 MI/d after the reconciliation.

6.2.4 Measured Non-Household Demand

Measured non-household demand is taken from the independent MOSL database. With an accuracy of $\pm 5\%$, and a confidence grade of A2, the outturn water delivered figure of 33.21 MI/d decreases to 33.09 MI/d following the reconciliation. This is close to the non-household demand forecast included in the Final Water Resources Management Plan 2014. (see Section 3.1)

6.2.5 Distribution Losses

Distribution Losses are separated from Underground Supply Pipe Leakage (USPL). The leakage target is set for "Total Leakage" and leakage control does not make a distinction between distribution leaks and larger supply pipe leaks. The outturn figure for distribution losses was 24.80 MI/d and this decreased to 24.71 MI/d following the reconciliation.

An accuracy of $\pm 10\%$ gives a Confidence Grade of A3.

6.2.6 Distribution System Operational Use (DSOU)

Operational use is a small part of the overall water balance and has a low confidence grade of B4 due to the number of assumptions made. The calculated figure for 2017/18 was 0.52 MI/d and this reduced to 0.51 MI/d following the reconciliation.

6.2.7 Water Taken Unbilled

By definition water taken unbilled can only be an estimate. The figure for water taken legally unbilled is based on 1% of Distribution Input and it represents water used for fire-fighting practice. Water taken illegally unbilled is based on the assumption that 33 % of void properties are actually occupied but not paying for water. The estimated figure is 0.93 MI/d. With a confidence grade of B4 the outturn figure is reduced to 0.91 MI/d following reconciliation.

6.2.8 Distribution Input

The outturn figure for 2017/18 was based on meter readings from reservoirs and pumping stations and this represents more than 95% of the Company's area of supply. An accuracy of $\pm 5.0\%$ gives a Confidence Grade of A2. Distribution Input was increased by the MLE process from 174.19 MI/d to 174.44 MI/d.

6.2.9 Final Water Balance

The final water balance is made up from the various components of demand.

The error in the initial water balance was 1.34 MI/d and this represents 0.77% of the outturn distribution input. This is within acceptable band for the use of the MLE methodology which is $\pm 5\%$.

6.3 Annual Average Table

The annual average water balance components table sets out the supply and demand data for 2017/18. It also shows the customer information with property, population and occupancy numbers for mid-year. The supply/demand balance is provided in the following section on the security of supply index. (Section 6.5)

6.4 Peak Week Table

The peak week water balance components table gives the supply and demand data for the critical period in June 2017. The supply/demand balance is provided in the following section on the security of supply index. (Section 6.5.1).

Many of the components of the peak week demand can only be an estimate because they are not measured on a weekly basis. Data is available for Distribution Input, Leakage and the Bulk Supply. Several of the smaller items, such as DSOU and water taken illegally are assumed to be the same as the average data. The peak week occurred in June and the outturn volume was 209.94 MI/d. The average distribution input was 174.43 MI/d giving an overall peaking factor of 1.20.

If the measured household peaking factor is assumed to be 5% less than the unmeasured and the unmeasured non-household factor is assumed to be 15% less than the unmeasured then it is possible to estimate what the peaking factors might have been in the peak week:

Unmeasured Household	1.30
Measured Household	1.23
Unmeasured Non-Household	1.10
Measured Non-Household	1.10
Distribution Losses	1.00
Water Taken Unbilled	<u>1.00</u>
Overall Factor	<u>1.20</u>

This assumption gives an unmeasured PCC of 205 l/h/d and a measured PCC of 159 l/h/d during the peak week.

During the peak week the bulk supply transferred 2.21 MI/d to Southern Water in West Sussex.

6.5 Security of Supply Index (SOSI)

The Security of Supply Index was set up by Ofwat and was reported in the June Return for many years. It represents the supply/demand balance, and therefore security of supply, in a 'Dry Year'. If 2017/18 had been a 'dry year', with a 1 in 20 year return period, then the average SOSI would have been:

Deployable Output (2017/18)	236.4	MI/d
Outage Allowance	-9.3	MI/d
Process Losses	<u>-2.4</u>	MI/d
Water Available for Use (WAFU)	<u>224.7</u>	MI/d

Process Losses have reduced significantly in 2017/18 because of additional washwater recovery at Farlington and the transfer of the River Ems augmentation to raw water.

The report year distribution input figure was 174.4 MI/d but if it had been a 'Dry Year' then the WRMP 2014 forecast for 2017/18 indicates that demand would have been 180.9 MI/d.

Water Available for Use (WAFU)	224.7	MI/d
Dry Year Demand	-180.9	MI/d
Bulk Supply Demand	<u>-15.0</u>	MI/d
Available Headroom	<u>28.8</u>	MI/d

The target headroom in the WRMP 2014 for 2017/18 was 10.4 MI/d and this gives a surplus of 18.4 MI/d in a dry year. With a total population of 726,000 the SOSI for 2017/18 is 100 and the system is resilient.

6.5.1 Peak Demand

If 2017/18 has been a 'Dry Year' and the peak week had a return period of 1 in 20 then the following peak SOSI would have been calculated.

Actual Deployable Output (July 2017)	317.3	MI/d
Outage	-4.6	MI/d
Process Losses	<u>-2.4</u>	MI/d
Water Available for Use (WAFU)	<u>310.3</u>	MI/d

The outturn Distribution Input figure was 209.9 MI/d but the dry year forecast for 2016/17 peak week in the WRMP 2014 was 233.2 MI/d.

Water Available for Use (WAFU)	310.3	MI/d
Dry Year Peak Week Demand	-233.0	MI/d
Peak Week Bulk Supply	<u>-15.0</u>	MI/d
Available Headroom	<u>62.3</u>	MI/d

Target headroom in the WRMP 2014 at the peak week in 2017 was 13.8 MI/d and this gives a surplus of 48.5 MI/d. With a total population of 726,000 the SOSI for June 2017 was 100.

7 PROGRESS ON OPTIONS

The Final Water Resources Management Plan 2014 contained the following key feasible water resources options:

- Havant Thicket Winter Storage Review
- Bulk Supply from South East Water
- Relocating the Source A Abstraction
- Source J Licence
- Portsmouth Harbour Desalination
- Budds Farm Effluent Re-Use
- Compulsory Metering
- Water Efficiency

The Final Determination 2014 did not include any of these options because there was no overall supply/demand deficit.

As part of the development of the Water Resources Management Plan 2014 and the Business Plan 2014 Portsmouth Water reviewed the option selection process. An unconstrained list of options was developed and discussed with the Environment Agency and other Stakeholders. A Strategic Environmental Assessment (SEA) was carried out and the Environmental Report was included with the published Plan.

7.1 Havant Thicket Winter Storage Reservoir

Since the Final Water Resources Management Plan 2014 was published in August 2014 the Local Councils have confirmed the reservoir site as a “Strategic Location”. This does not pre-judge the Water Resources Management Plan process, but does preserve the site from other developments. The SEA process indicated that Havant Thicket Reservoir would have a low overall impact on the environment.

7.2 Source J Boreholes

The provision of additional boreholes at the existing Source J was included in the range of options for the Final Water Resources Management Plan 2014.

The WFD Investigation concluded that more water could be abstracted from the confined chalk at this location. The existing licence would have to be varied to include satellite boreholes but the licensed volume would not need to be increased.

7.3 Other Options

The Portsmouth Desalination Option was considered to have “significant” negative impacts on the environment but was included in the 2014 WRMP range of options..

Budds Farm Effluent re-use scheme was also considered to have “significant” impacts on the environment but was included in the 2014 WRMP range of options.

Compulsory metering is not possible in Portsmouth Water’s area of supply because the area is not classified as “Seriously Water Stressed” by the EA.

Water efficiency activity was included in the Business Plan and the ‘Normal Year’ demand forecast assumes a fall in overall per capita consumption from 147 l/h/d in 2015/16 to 144 l/h/d in 2019/20.

8 FORWARD LOOK

Portsmouth Water has completed work on the next Water Resources Management Plan. This work includes a re-assessment of Deployable Output with Deepest Advisable Pumped Water Level. Headroom and outage have been re-assessed and consultants have looked at drought scenarios and the impact of climate change.

Consultants have re-assessed the options included in the WRMP 2014 and the associated SEA and HRA. This work has involved stakeholder groups and a pre-consultation process. An unconstrained list of options was produced and this was refined into a feasible list of options for the WRMP 2019.

Population numbers have been derived from Government statistics and the associated property numbers checked against Local Authority Housing Forecasts.

The Draft WRMP was published on the 5th March 2018 with the Final WRMP due to be submitted in Autumn 2018.

Portsmouth Water is involved in the Water Resources in the South East modelling work and has taken account of the regional solutions proposed.

Portsmouth Water has varied all its abstraction licences and this means that they are fully compliant with all current environmental legislation and have a common format. Publication of the WINEP spreadsheet confirms that there are no further sustainability reductions required.

Portsmouth Water's WRMP 2014 contains information on multiple scenarios from the 'Dry Year' at 1 in 20 to the 'Severe Drought' at 1 in 200. The presentation of a range of resilience scenarios is a challenge and there is a need to agree on the critical scenario for each Company. Bulk supplies between companies will need to reflect the new 'Reference Level of Service'.

The implementation of Non-household competition makes it more difficult to forecast commercial demand. This is primarily because of two factors the direct link to the NHH customer has been lost and uploading of NHH meter reads by retailers into the market is often subject to delays and inaccuracies.

A series of six months strategic meetings are now taking place with EA Managers and quarterly meetings are taking place with local EA staff.

9 CONCLUSION

Portsmouth Water draws the following conclusions from the Annual Review 2018:

- 2017/18 was an unusual year with a dry Autumn and a wet Winter which resulted in rapid aquifer recharge.
- A surplus was retained at peak and average demand.
- The bulk supply agreement was renewed in 2016 and the average flow allowance increased to 15.0 MI/d.
- Total leakage of 32.9 MI/d was above the Portsmouth Water target for 2017/18 due in part to the high number of burst mains. Under the new leakage methodology the total leakage figure would be 37.1 MI/d.

10 TABLES

The EA tables are based on outturn data which has been adjusted using the MLE process to achieve a water balance. For this "Annual Review" tables have been provided for average or peak conditions. A full set of confidence grades has been included to help explain the MLE process and the accuracy of the "macro components" of demand.

Further table commentaries are provided to explain individual lines.

ANNUAL AVERAGE WATER BALANCE COMPONENTS

Row numbering	DESCRIPTION	UNITS	DP	Company Total	Confidence Grade
SUPPLY					
Resources					
1	Raw water abstracted	MI/d	2dp	179.58	A2
2	Raw water imported	MI/d	2dp	0.00	AX
3	Potable water imported	MI/d	2dp	0.00	AX
4	Raw Water Losses and Operational Use	MI/d	2dp	1.02	A2
5	Raw water exported	MI/d	2dp	0.00	AX
6	Non potable water supplied	MI/d	2dp	0.00	AX
7	Potable water exported	MI/d	2dp	2.01	A2
8	Deployable output	MI/d	2dp	236.40	B3
Process Losses					
9	Treatment works losses and operational use	MI/d	2dp	3.14	B3
10	Actual Outage	MI/d	2dp	11.20	B3
DEMAND					
11	Distribution input	MI/d	2dp	174.43	A2
Consumption					
12	Measured non household water delivered	MI/d	2dp	33.09	A2
13	Unmeasured non household water delivered	MI/d	2dp	0.92	B4
14	Measured household water delivered	MI/d	2dp	24.71	A2
15	Unmeasured household water delivered	MI/d	2dp	88.25	B3
16	Measured non household - consumption	MI/d	2dp	32.81	A2
17	Unmeasured non household - consumption	MI/d	2dp	0.87	B4
18	Measured household - consumption	MI/d	2dp	22.92	A2
19	Unmeasured household - consumption	MI/d	2dp	82.13	B3
20	Measured household - pcc	l/h/d	0dp	127	B2
21	Unmeasured household - pcc	l/h/d	0dp	155	B3
22	Average household - pcc	l/h/d	0dp	148	B3
23	Water taken unbilled	MI/d	2dp	2.58	B4
24	Distribution system operational use	MI/d	2dp	0.51	B3
Leakage					
25	Measured non household - uspl	MI/d	2dp	0.28	B3
26	Unmeasured non-household - uspl	MI/d	2dp	0.05	B3
27	Measured household - uspl	MI/d	2dp	1.79	B3
28	Unmeasured household - uspl	MI/d	2dp	6.12	B3
29	Void properties - uspl	MI/d	2dp	0.32	B4
30	Distribution Losses	MI/d	2dp	24.36	A3
31	Total leakage	MI/d	2dp	32.87	A3
32	Total leakage	l/prop/d	2dp	103.00	A3
CUSTOMERS					
Properties					
33	Unmeasured household - properties	000's	3dp	204.159	A2
34	Measured household - properties	000's	3dp	89.290	A2
35	Unmeasured non household - properties	000's	3dp	1.806	A2
36	Measured non household - properties	000's	3dp	13.816	A2
37	Void household - properties	000's	3dp	6.920	B3
38	Void non households - properties	000's	3dp	3.616	B3
39	Total properties	000's	3dp	319.61	A2
Population					
40	Unmeasured household - population	000's	3dp	531.426	B3
41	Measured household - population	000's	3dp	180.591	B3
42	Unmeasured non household population	000's	3dp	1.609	B3
43	Measured non household - population	000's	3dp	12.31	B3
44	Total population	000's	3dp	725.936	B3
Occupancy					
45	Unmeasured household - occupancy rate	h/pr	2dp	2.60	A2
46	Measured household - occupancy rate	h/pr	2dp	2.02	A2
Metering					
47	Total Household Metering penetration (excl. voids)	%	2dp	30.43%	A2
48	Total Household Metering penetration (incl. voids)	%	2dp	29.73%	A2

TABLE COMMENTARY**Annual Average Water Balance Components****Supply****Line 1 - Raw Water Abstracted**

2017/18 was a "normal" year with abstraction well below the dry year deployable output

Line 4 - Raw Water Losses

The seasonal augmentation of the River Ems has been converted to raw water. This is now shown as a raw water loss in the table rather than a process loss.

Line 6 - Potable Water Exported

Potable water exported represents the Bulk Supply to Southern Water in West Sussex. With the prospect of a dry summer it is possible that Southern Water took more than the sweetening flow to help conserve water in Weir Wood Reservoir.

Line 7 - Deployable Output

Deployable Output is calculated for "dry" conditions and has no direct link to the outturn year water balance. An allowance has been made for the recent licence variations at two sources and the conversion of one source to a raw water augmentation.

Process Losses**Line 9 - Treatment Works Operational Use**

The Treatment Works Operational Use volume is backwash water which is not recycled. This number has significantly reduced because the membranes at Farlington have been replaced with UV treatment.

Line 10 – Actual Outage

Actual Outage is derived from outturn data for 2017/18 only and this is not the same as the statistical approach included in the WRMP. Both approaches assumes that no outage events last longer than 90 days.

Demand**Line 11 - Distribution Input**

Distribution Input has been derived from the total measured flow minus the Bulk Supply to Southern Water.

Line 23 – Measured Non-household Consumption

Measured Non-Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 24 – Unmeasured Non-household Consumption

Unmeasured Non-Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 25 – Measured Household Consumption

Measured Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 26 – Unmeasured Household Consumption

Unmeasured Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 29 – Measured Household Per Capita Consumption

Overall Measured Household per capita consumption is lower than unmeasured household per capita consumption. This is due to the influence of meter optants who on average use less water and had a financial incentive to change to the measured tariff. Measured domestic properties had an outturn per capita consumption of 128 l/h/d based upon an occupancy of 2.02 and an underground supply pipe leakage allowance of 20 litre/property/day. This was reduced to 127 l/h/d by the MLE process.

Line 30 - Unmeasured Household Per Capita Consumption

The unmeasured per capita consumption is based on the Company's own Consumption Monitor and the main text explains that the results have been adjusted to exclude a number of properties with very low per capita consumptions. The outturn per capita consumption of 156 l/h/d is higher than last year but below the dry year forecast in the Water Resources Management Plan 2014.

All figures used in the per capita consumption calculation are assumed to be excluding supply pipe leakage but include an allowance of 2.9% for meter under-registration.

Line 31 - Average Household Per Capita Consumption

Average Household Per Capita Consumption has gone up this year due to the summer peak in demand. The overall trend is still downward with an aspiration to reach 138 l/h/d by 2030.

Line 32 - Water Taken Unbilled

This volume represents water taken illegally in properties that Portsmouth Water believes are "void" but are actually occupied. In addition, a small amount of water is taken legally unbilled for firefighting and fire practice. It is not possible to measure these volumes so estimates are used.

Line 33 - Distribution System Operational Use (DSOU)

Distribution System Operational Use represents water taken from hydrants for flushing to maintain water quality. DSOU has a low confidence grade (B3) because it is based on estimates.

Leakage

Line 34 – Measured Non-household Underground Supply Pipe Leakage

Measured Non-household USPL is based on an allowance of 20 l/prop/d.

Line 35 – Unmeasured Non-household Underground Supply Pipe Leakage

Unmeasured Non-household USPL is based on an allowance of 30 l/prop/d.

Line 36 – Measured Household Underground Supply Pipe Leakage

Measured Household USPL is based on an allowance of 20 l/prop/d.

Line 37 – Unmeasured Household Underground Supply Pipe Leakage

Unmeasured Household USPL is based on an allowance of 30 l/prop/d.

Line 38 – Void Property Underground Supply Pipe Leakage

Void Property USPL is based on an allowance of 30 l/prop/d.

Line 39 – Distribution Losses

Distribution losses are derived from the total leakage figure minus supply pipe leakage.

Line 40 - Total Leakage

Total Leakage has been adjusted to remove summer legitimate use and has been subjected to the MLE process. The figure of 32.9 MI/d is above the Ofwat target of 30.0 MI/d due to the cold weather in the Spring of 2018.

Line 41 – Leakage Per Property

Leakage per property is based on Total leakage divided by the total number of properties.

Properties

Line 43 – Unmeasured Household Properties

The property data shown is for the mid-year but it is based on end of year data from the billing system. The number is falling gradually as properties convert to the measured tariff.

Line 42 – Measured Household Properties

Measured Household Properties come from the billing system and are converted to mid-year for the water balance.

Line 46 – Unmeasured Non-household Properties

Unmeasured Household Properties come from MOSL and are converted to mid-year for the water balance.

Line 45 – Measured Non-household Properties

Measured Household Properties come from MOSL and are converted to mid-year for the water balance.

Line 44 – Void Household Properties

Void Household Properties are estimated from the billing system and converted to mid-year for the water balance.

Line 47 – Void Non-Household Properties

Void Non-Household Properties are estimated from the billing system and converted to mid-year for the water balance.

Line 48 Total Properties

This is the sum of the properties including voids.

Line 50 Unmeasured Household Population

Unmeasured Household population is calculated from unmeasured properties multiplied by an assumed occupancy rate of 2.6.

Line 49 Measured Household Population

Unmeasured Household population is calculated from measured properties multiplied by an assumed occupancy rate of 1.9 for meter optants and 2.2 for new houses.

Line 52 Unmeasured Non-household Population

Unmeasured Household population is calculated from unmeasured properties multiplied by an assumed occupancy rate of 0.9.

Line 51 Measured Non-household Population

Unmeasured Household population is calculated from measured properties multiplied by an assumed occupancy rate of 0.9.

Population

Line 53 – Total Population

Total population is calculated but matches this forecast included in the WRMP.

Occupancy

Line 55 – Unmeasured Household Occupancy

Unmeasured occupancy will vary from year to year and this reflects changing housing trends such as more young adults staying in the parental home.

Line 54 – Measured Household Occupancy

Measured occupancy will vary from year to year and this reflects changing housing trends such as more young adults staying in the parental home.

Metering

Line 57 – Total Household Meter Penetration (excl voids)

Meter penetration continues to increase as customers opt for a 'free' meter and new properties are added to the system.

Line 58 – Total Number of Household Meters Installed

This the sum of the meter optants and the new house meters.

PEAK WEEK WATER BALANCE COMPONENTS

Row numbering	DESCRIPTION	UNITS	DP	Company Total	Confidence Grade
SUPPLY					
Resources					
1	Raw water abstracted	MI/d	2dp	214.44	A2
2	Raw water imported	MI/d	2dp	0.00	AX
3	Potable water imported	MI/d	2dp	0.00	AX
4	Raw Water Losses and Operational Use	MI/d	2dp	0.00	AX
5	Raw water exported	MI/d	2dp	0.00	AX
6	Non potable water supplied	MI/d	2dp	0.00	AX
7	Potable water exported	MI/d	2dp	2.21	A2
8	Deployable output	MI/d	2dp	317.30	B3
Process Losses					
9	Treatment works losses and operational use	MI/d	2dp	2.29	B3
10	Actual Outage	MI/d	2dp	1.30	B3
DEMAND					
11	Distribution input	MI/d	2dp	209.94	A2
Consumption					
12	Measured non household water delivered	MI/d	2dp	36.48	A2
13	Unmeasured non household water delivered	MI/d	2dp	1.01	B4
14	Measured household water delivered	MI/d	2dp	30.45	A2
15	Unmeasured household water delivered	MI/d	2dp	114.85	B3
16	Measured non household - consumption	MI/d	2dp	36.20	A2
17	Unmeasured non household - consumption	MI/d	2dp	0.96	B4
18	Measured household - consumption	MI/d	2dp	28.66	A2
19	Unmeasured household - consumption	MI/d	2dp	108.73	B3
20	Measured household - pcc	l/h/d	0dp	159	B2
21	Unmeasured household - pcc	l/h/d	0dp	205	B3
22	Average household - pcc	l/h/d	0dp	193	B3
23	Water taken unbilled	MI/d	2dp	2.58	B4
24	Distribution system operational use	MI/d	2dp	0.51	B3
Leakage					
25	Measured non household - uspl	MI/d	2dp	0.28	B3
26	Unmeasured non-household - uspl	MI/d	2dp	0.05	B3
27	Measured household - uspl	MI/d	2dp	1.79	B3
28	Unmeasured household - uspl	MI/d	2dp	6.12	B3
29	Void properties - uspl	MI/d	2dp	0.32	B4
30	Distribution Losses	MI/d	2dp	24.36	A3
31	Total leakage	MI/d	2dp	32.87	A3
32	Total leakage	l/prop/d	2dp	103.00	A3
CUSTOMERS					
Properties					
33	Unmeasured household - properties	000's	3dp	204.159	A2
34	Measured household - properties	000's	3dp	89.29	A2
35	Unmeasured non household - properties	000's	3dp	1.806	A2
36	Measured non household - properties	000's	3dp	13.816	A2
37	Void household - properties	000's	3dp	6.920	B3
38	Void non households - properties	000's	3dp	3.616	B3
39	Total properties	000's	3dp	319.61	A2
Population					
40	Unmeasured household - population	000's	3dp	531.426	B3
41	Measured household - population	000's	3dp	180.591	B3
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45	Unmeasured household - occupancy rate	h/pr	2dp	2.60	A2
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Metering					
47	Total Household Metering penetration (excl. voids)	%	2dp	30.43%	A2
48	Total Household Metering penetration (incl. voids)	%	2dp	29.73%	A2

TABLE COMMENTARY**Peak Week Water Balance Components****Supply**Line 1 - Raw Water Abstracted

The Peak Week was in June and abstraction was greater than last year but below the 'Dry Year' estimate in the WRMP.

Line 4 - Raw Water Losses

The seasonal augmentation of the River Ems has not running in the Peak Week and the Raw Water Loss is zero.

Line 6 - Potable Water Exported

Potable water exported represents the Bulk Supply to Southern Water in West Sussex. Southern Water took more than the sweetening flow of 1.0 MI/d during the Peak Week.

Line 7 - Deployable Output

Deployable Output is calculated for "dry" conditions and has no direct link to the outturn year water balance. An allowance has been made for loss of supply at one source due to water quality problems, the recent licence variation at another source and the conversion of a third source to a raw water augmentation.

Process LossesLine 9 - Treatment Works Operational Use

The Treatment Works Operational Use volume is backwash water which is not recycled. This number has significantly reduced because the membranes at Farlington have been replaced with UV treatment.

Line 10 – Actual Outage

Actual Outage is derived from outturn data for the Peak Week in June 2017 and is not the same as the statistical figure included in the WRMP. Both approaches assumes that no outage events last longer than 90 days. For longer events the Deployable Output in Line 8 is reduced.

DemandLine 11 - Distribution Input

Distribution Input has been derived from the total measured flow minus the Bulk Supply to Southern Water for the peak seven day period.

Line 23 – Measured Non-household Consumption

Measured Non-Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 24 – Unmeasured Non-household Consumption

Unmeasured Non-Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 25 – Measured Household Consumption

Measured Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 26 – Unmeasured Household Consumption

Unmeasured Household Consumption is calculated by removing underground supply pipe (USPL) from the water delivered figure.

Line 29 – Measured Household Per Capita Consumption

Peak Week Measured Household per capita consumption is lower than the estimate included in the WRMP.

Line 30 - Unmeasured Household Per Capita Consumption

Peak Week Unmeasured per capita consumption is lower than the estimate included in the WRMP.

Line 31 - Average Household Per Capita Consumption

Peak Week Household Per Capita Consumption has gone up this year due to the summer peak in demand.

Line 32 - Water Taken Unbilled

This volume represents water taken illegally in properties that Portsmouth Water believes are "void" but are actually occupied. In addition, a small amount of water is taken legally unbilled for firefighting and fire practice. It is not possible to measure these volumes so estimates are used.

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Void Property USPL is based on an allowance of 30 l/prop/d.

Line 39 – Distribution Losses

Distribution losses are derived from the total leakage figure minus supply pipe leakage.

Line 40 - Total Leakage

Total Leakage has been adjusted to remove summer legitimate use and has been subjected to the MLE process. The figure of 32.9 MI/d is above the Ofwat target of 30.0 MI/d due to the cold weather in the Spring of 2018 and is the same as the average figure.

Line 41 – Leakage Per Property

Leakage per property is based on Total leakage divided by the total number of properties.

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Unmeasured Household population is calculated from unmeasured properties multiplied by an assumed occupancy rate of 0.9.

Line 51 Measured Non-household Population

Unmeasured Household population is calculated from measured properties multiplied by an assumed occupancy rate of 0.9.

Population

Line 53 – Total Population

Total population is calculated but matches this forecast included in the WRMP.

Occupancy

Line 55 – Unmeasured Household Occupancy

Unmeasured occupancy will vary from year to year and this reflects changing housing trends such as more young adults staying in the parental home.

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Metering

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Meter penetration continues to increase as customers opt for a 'free' meter and new properties are added to the system.

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This is the sum of meter optants and new property meters.

