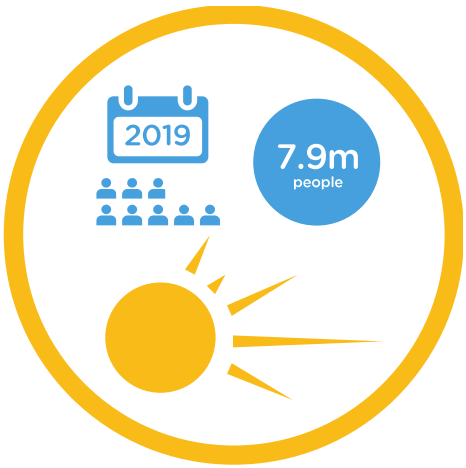
Section 6

Baseline water supply demand position



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Section 6.

Baseline water supply demand position

- In this section we provide the baseline water supply demand position for each of our six water resource zones (WRZs).
- An immediate and increasing supply demand deficit is evident in the London zone. Within 10 years, deficits appear in the near term in the Swindon and Oxfordshire (SWOX) and Guildford zones. Beyond 2050, deficits appear in the Slough, Wycombe and Aylesbury (SWA) and Kennet Valley zones. Henley remains in surplus throughout the planning period.
- The forecast deficits are primarily caused by a combination of population growth and climate change impacts.

A. Introduction

6.1 The baseline supply demand position is defined as:

> *"The resulting supply demand balance assuming no activity beyond the immediate AMP period other than that required to maintain leakage or that required by law."*

6.2 By comparing the profile of the unrestricted demand (Section 3: Current and future demand for water), against the available supply (Section 4: Current and future water supply), plus an allowance for uncertainty (Section 5: Allowing for risk and uncertainty), a baseline supply demand balance for each WRZ is created.

6.3 This highlights if there is a "planning problem" i.e. a forecast deficit in any zone before significant intervention from the company. We test this for both the dry year annual average (DYAA) and average day peak week (ADPW) conditions, where appropriate. It is possible that deficits exist under both conditions. In this situation, the condition showing the larger deficit takes precedence in terms of its resolution, although the plan must provide a solution to both.

6.4 This section, B to D, is structured as follows:

- Activity within the baseline scenario
- Summary baseline position
- What happens next?

B. Activity within the baseline scenario

6.5 It is assumed that water resource activity included in price limits for the period 2015-2020 is delivered as set out in Section 2: Water resources programme 2016-2020. Baseline activity beyond 2020 is restricted to the following components.

- Leakage levels are maintained at the central forecast position for 2020 (646[1] Ml/d)
- Optant metering programme continues at the current level (~16,000/year)
- Water efficiency continues to be promoted to our customers (saving 0.85 Ml/d per year).

6.6 The demand forecast assumes that no progressive metering or resource development activity is undertaken, beyond AMP6. It also assumes no reductions to our abstraction licences (Sustainability Reductions).

C. Baseline supply demand position

6.7 The baseline water supply demand position by zone is shown in Table 6-1 and summary graphs within the following sub-sections. A full breakdown of the components of the forecast can be found in the Water Resource Management Plan (WRMP) tables (Appendix A: rdWRMP19 tables).

6.8 We explain in Section 4: Current and future water supply, Appendix A: rdWRMP19 tables (Table 10) and Appendix I: Deployable output, that the baseline assessment for supply is on the basis of historical droughts in the 20th Century and hence is resilient to a 1:125 drought to Level 4, without drought permits. To be resilient to the Environment Agency's suggested reference level of a 1:200 drought, the reported deficit in London that would need to be addressed would increase by ~150 Ml/d.

6.9 Overall, the baseline forecasts remain broadly in line with those predicted in our WRMP14. The London WRZ has seen a reduction in the size of the deficit it faces, principally due to changes to the Lower Thames Operating Agreement. Despite this, the scale of the supply demand balance resolution challenge is still considerable. Extending the planning horizon has also revealed a notable long-term deficit in the SWA WRZ. This is caused primarily by population growth projections for the long-term.

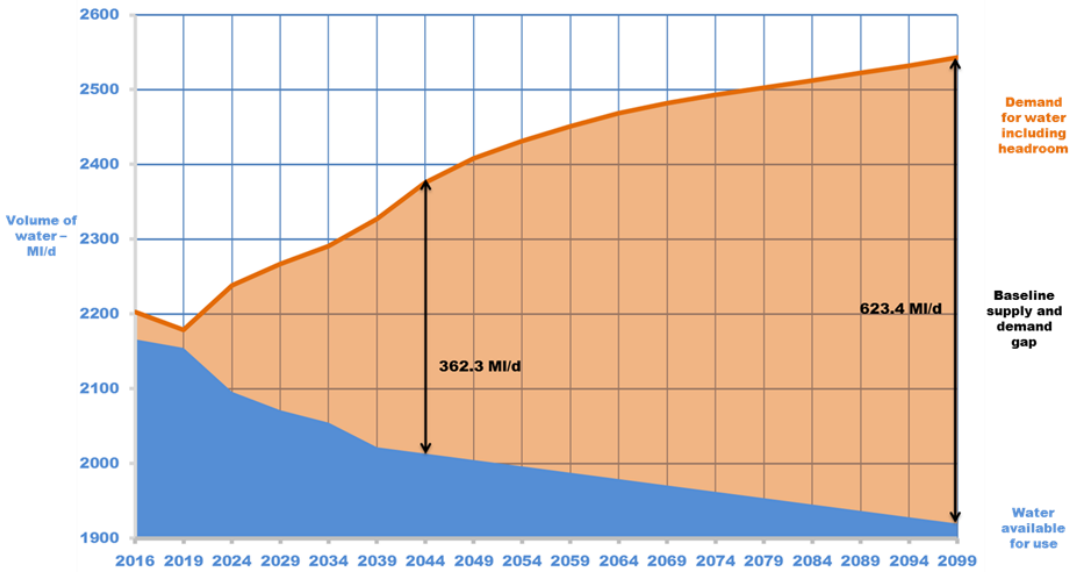
[1] AMP6 output in WRMP14 was 606 Ml/d. The extra 40 Ml/d is linked to a reporting methodology change, as explained in Section 2: Water resources programme 2016-2020.

Table 6-1: Baseline supply demand position by zone (compared with WRMP14)

WRZ	Item	Volume (Ml/d)					
		2019/20	2024/25	2029/30	2044/45	2074/75	2099/00
London (DYAA)	Demand	2057	2104	2130	2246	2363	2413
	Headroom	122	134	136	130	130	130
	Supply	2155	2096	2071	2013	1962	1920
	Balance	-24	-143	-195	-362	-531	-623
	(WRMP14)	-133	-213	-292			
SWOX (ADPW)	Demand	330	336	339	343	346	357
	Headroom	16	19	19	18	18	18
	Supply	355	353	352	350	346	343
	Balance	9	-2	-7	-11	-18	-31
	WRMP14	-1	-12	-21			
SWA (ADPW)	Demand	170	172	174	180	186	195
	Headroom	6	7	8	7	7	7
	Supply	190	183	182	182	181	181
	Balance	14	4	1	-6	-12	-21
	(WRMP14)	8	5	1			
Kennet Valley (ADPW)	Demand	122	125	126	129	130	136
	Headroom	6	7	7	6	6	6
	Supply	151	150	149	147	145	143
	Balance	23	18	16	12	8	1
	(WRMP14)	22	16	11			
Guildford (ADPW)	Demand	63	64	66	70	72	75
	Headroom	3	3	3	3	3	3
	Supply	68	68	68	65	65	65
	Balance	3	0	-2	-8	-10	-13
	(WRMP14)	0	-1	-2			
Henley (ADPW)	Demand	19	19	19	19	20	20
	Headroom	1	1	1	1	1	1
	Supply	26	26	26	26	26	26
	Balance	6	5	5	5	5	5
	(WRMP14)	5	4	4			

London

Figure 6-1: Baseline London supply demand summary (Ml/d) – dry year



6.10 Figure 6-1 highlights a significant supply demand deficit under dry year annual average conditions in the period 2016-2100. Growth in demand due to population growth outstrips any water demand management activity. Climate change, changes to bulk supplies (the end of an agreement with Essex and Suffolk Water to reduce our bulk supply to them) and increased third party abstraction from the River Thames, have an adverse impact on the amount of water available to supply.

6.11 The planning problem is therefore:

- A DYAA deficit of 326 Ml/d in 2044-45 and 587 Ml/d in 2099-2100.

6.12 Without corrective action, these deficits will result in a supply for London which is not secure. This means there is a greater probability that demand restrictions will be required in dry years than our stated levels of service. Demand management and resource options to close this gap have been addressed through our economic analysis process. The result of this analysis is presented in the final plan in Section 11: Preferred programme.

SWOX

Figure 6-2: Baseline SWOX supply demand summary (Ml/d) – dry year

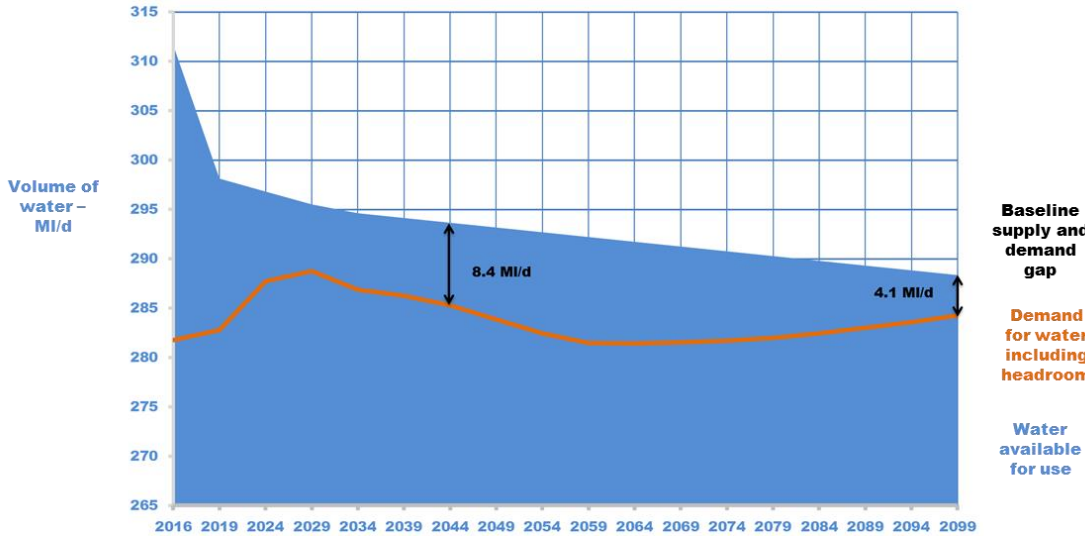
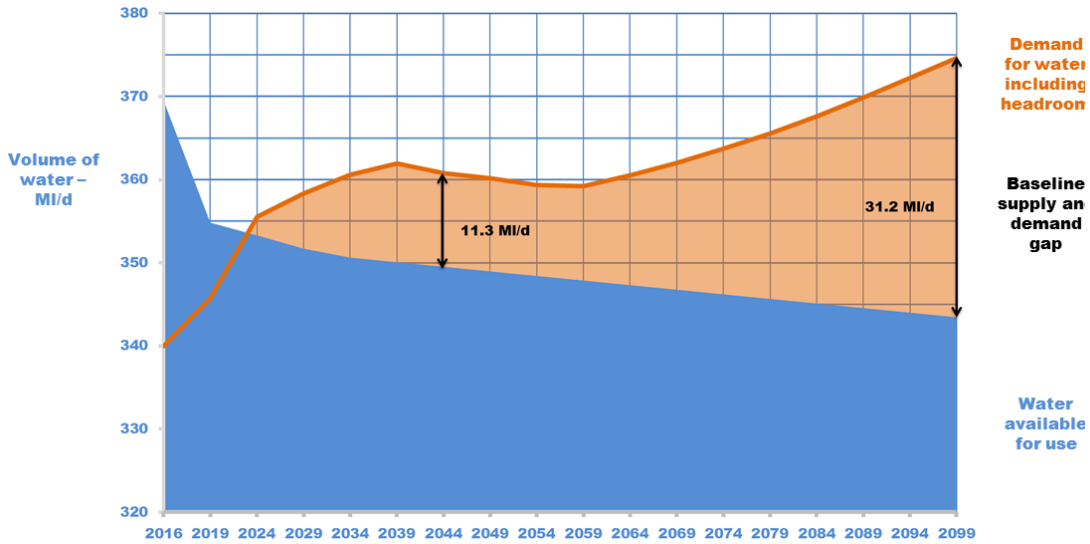


Figure 6-3: Baseline SWOX supply demand summary (Ml/d) – peak week



6.13 In the SWOX WRZ, a small surplus is forecast throughout the planning period under dry year annual average conditions (Figure 6-2). However, a supply demand deficit under peak week conditions is evident (Figure 6-3). The main investment driver is therefore peak conditions although, when developing a solution to the deficit, the dry year condition will also be resolved.

6.14 The planning problem is:

- An ADPW deficit in 2022-23, growing to 11 Ml/d by 2044-45 and 31 Ml/d 2099-2100.

6.15 Growth in demand due to population growth outstrips any water demand management activity. Also climate change affects the amount of water available to supply.

6.16 Without corrective action, these factors will result in a supply for SWOX which is not secure. This means there is a greater probability that demand restrictions will be required in dry years than stated in our levels of service. Demand management and resource options to close this gap have been addressed through our economic analysis process. The result of this analysis is presented in the final plan in Section 11: Preferred programme.

SWA

Figure 6-4: Baseline SWA supply demand summary (Ml/d) – dry year

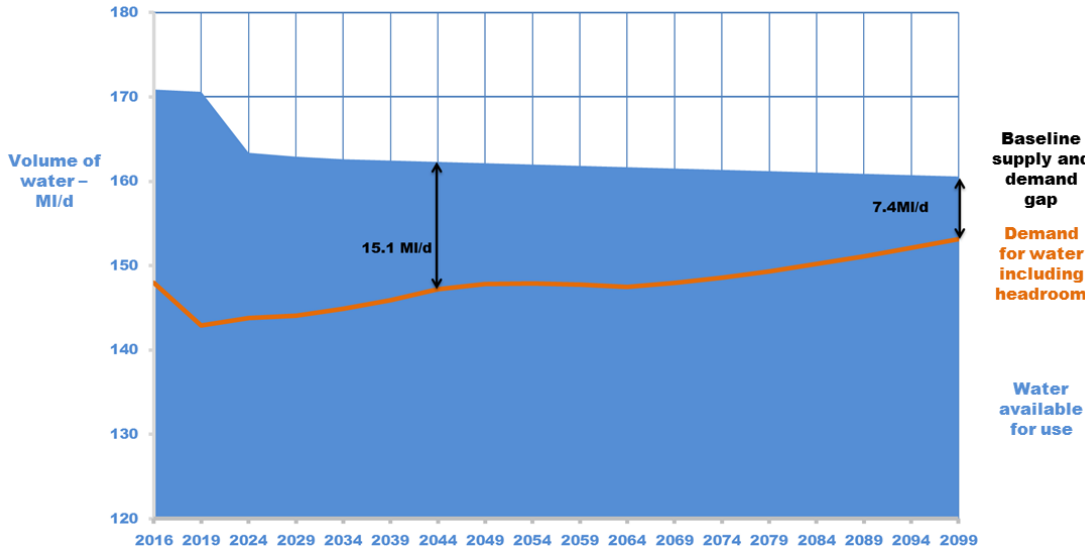
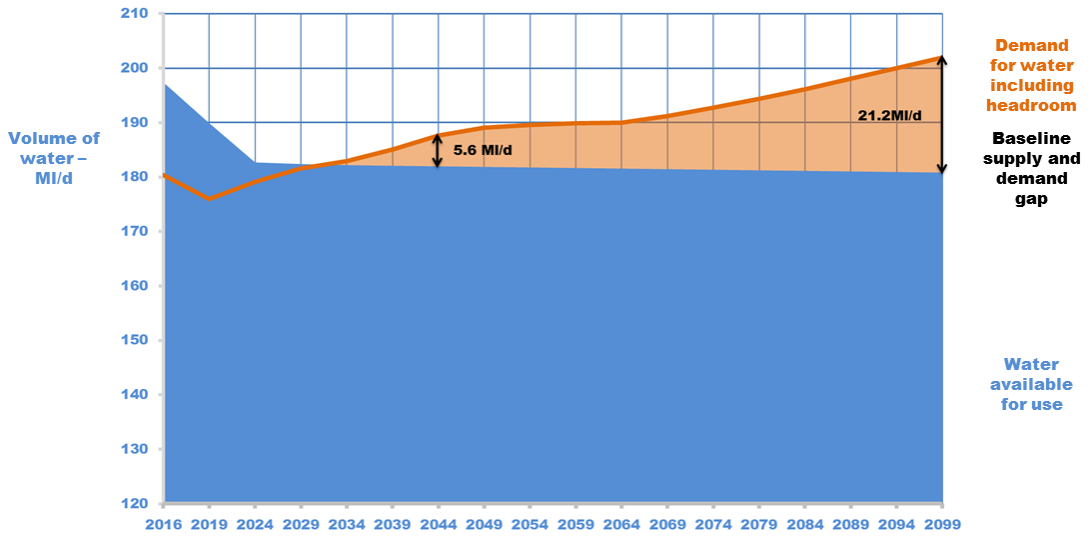


Figure 6-5: Baseline SWA supply demand summary (Ml/d) – peak week



6.17 In the SWA WRZ, a surplus is forecast throughout the planning period under dry year annual average conditions (Figure 6-4). However, a supply demand deficit under peak week conditions

is evident (Figure 6-5). In the medium to long-term, these deficits are primarily driven by the forecast growth in housing and population. The investment driver is therefore peak conditions.

6.18 The planning problem is:

- An ADPW deficit in 2033-34, growing to 6 Ml/d by 2044-45 and 21 Ml/d 2099-2100.

6.19 Growth in demand due to population growth outstrips any water demand management activity. Also climate change affects the amount of water available to supply.

6.20 Without corrective action, these factors will result in a supply for SWA which is not secure. This means there is a greater probability that demand restrictions will be required in dry years than stated in our levels of service. Demand management and resource options to close this gap have been addressed through our economic analysis process. The result of this analysis is presented in the final plan in Section 11: Preferred programme.

Kennet Valley

Figure 6-6: Baseline Kennet Valley supply demand summary (Ml/d) – dry year

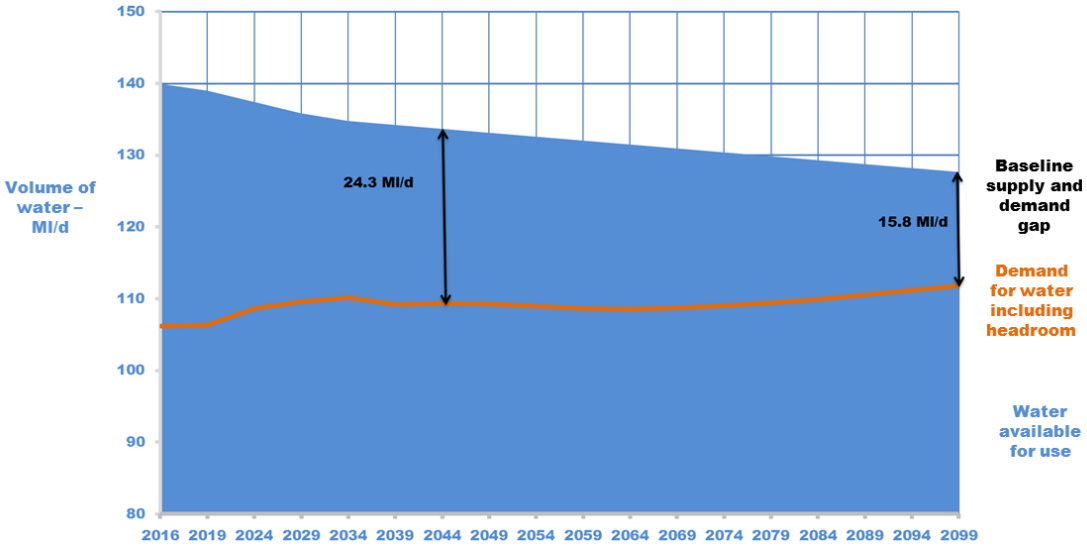
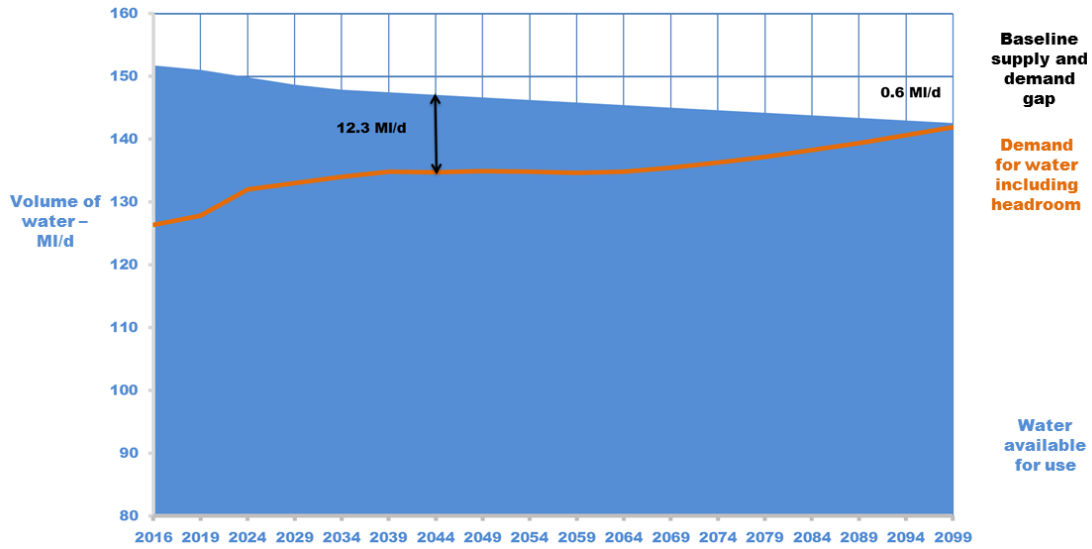


Figure 6-7: Baseline Kennet Valley supply demand summary (Ml/d) – peak week



6.21 No deficit exists in the Kennet Valley WRZ on average (Figure 6-6) or peak (Figure 6-7), based on the baseline supply demand balance throughout the planning period based on current forecasts. There is therefore no water planning problem to solve.

6.22 It may however, still be appropriate for interventions to be planned for in Henley, when catchment-wide and regional considerations are taken into account (see section D, below).

Guildford

Figure 6-8: Baseline Guildford supply demand summary (Ml/d) – dry year

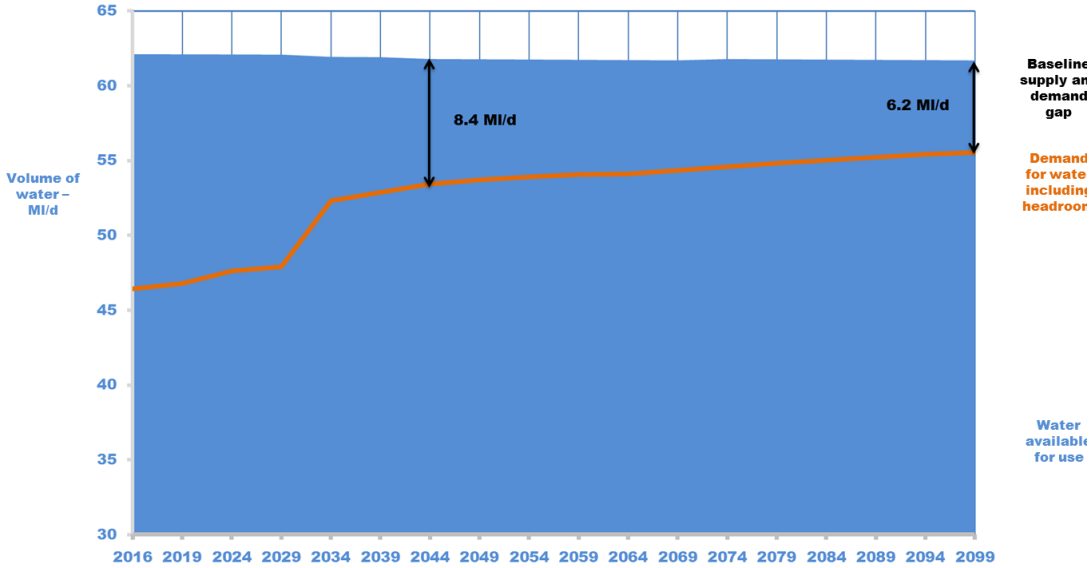
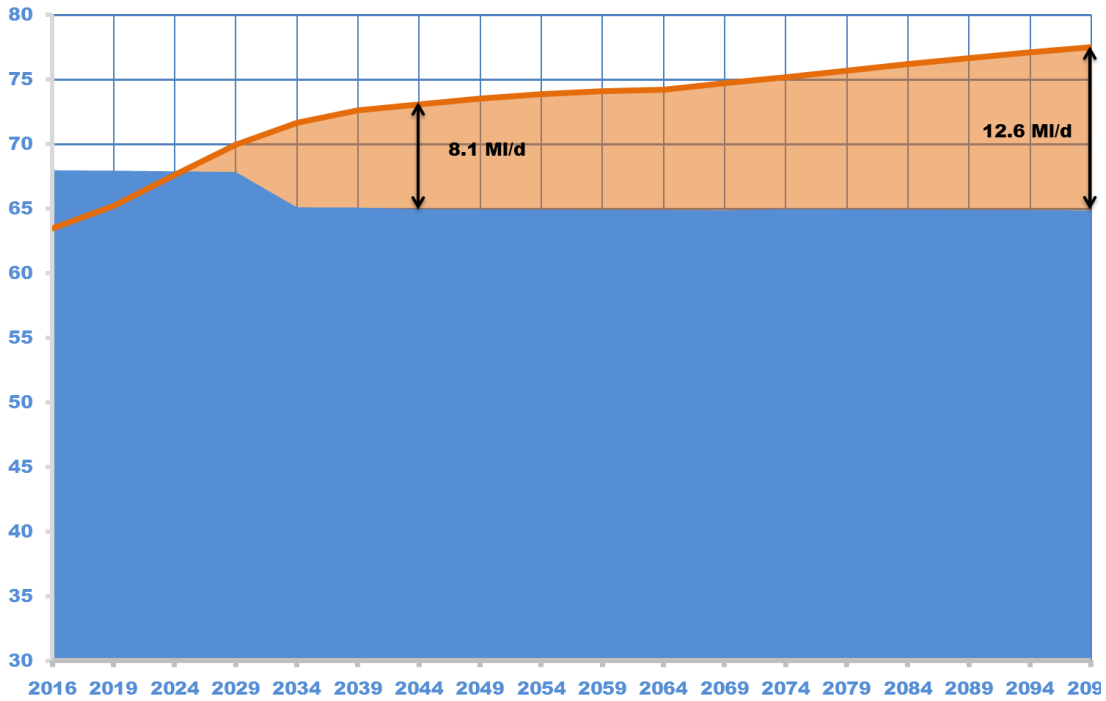


Figure 6-9: Baseline Guildford supply demand summary (Ml/d) – peak week



6.23 In a dry year, the Guildford WRZ is forecast to remain in surplus throughout the planning period (Figure 6-8). A supply demand deficit is however forecast under peak week conditions (Figure 6-9). The investment driver is therefore peak conditions, although when developing a solution to the deficit the dry year condition will also be resolved.

6.24 The planning problem is:

- An ADPW deficit in 2025-26, growing to 8 Ml/d by 2044-45 and 13 Ml/d 2099-2100.

6.25 Growth in demand due to population growth outstrips any water demand management activity. Additionally, the amount of water available to supply is reduced by increases in exports to neighbouring companies[2].

6.26 Without corrective action, this will result in a supply for Guildford which is not secure. This means there is a greater probability that demand restrictions will be required in dry years than stated in our levels of service. Demand management and resource options to close this gap have been addressed through our economic analysis process. The result of this analysis is presented in the final plan in Section 11: Preferred programme.

[2] Since submission of the draft WRMP19 in December 2017 Affinity Water has advised that it will not require an increase in the existing bulk supply. This amendment does not have a material impact on the draft plan and will be updated in the revised draft WRMP19.

Henley

Figure 6-10: Baseline Henley supply demand summary (Ml/d) – dry year

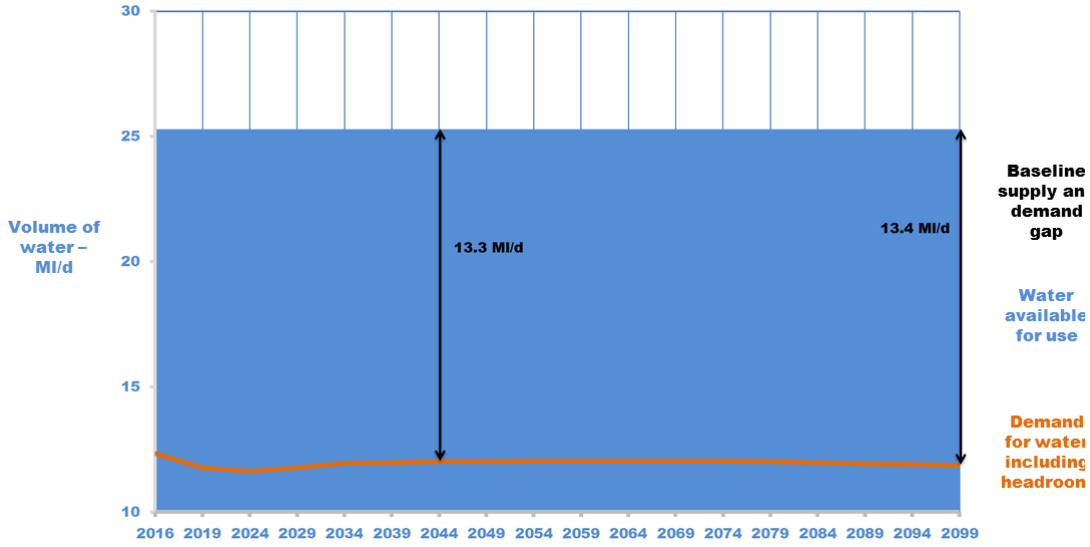
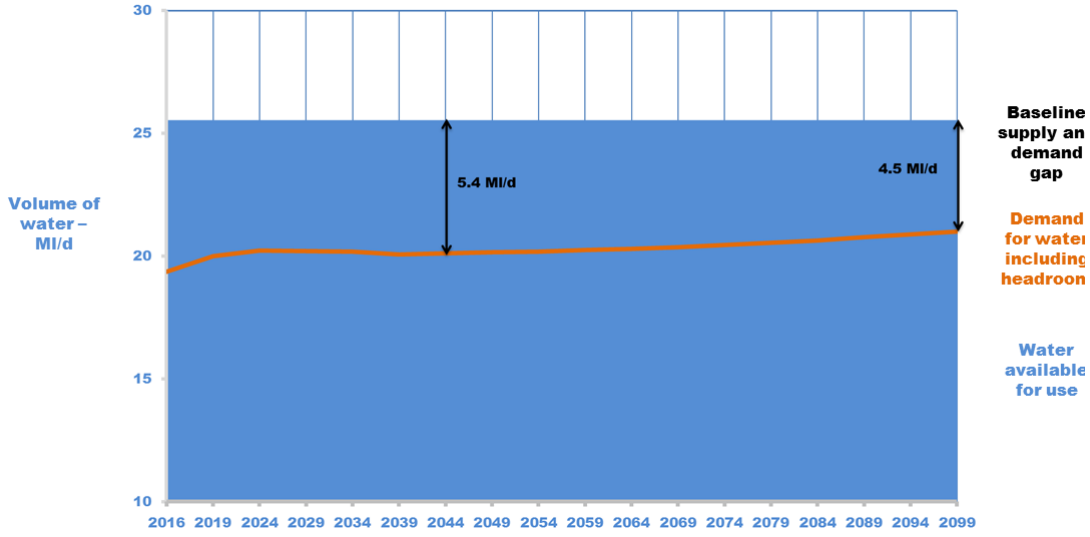


Figure 6-11: Baseline Henley supply demand summary (Ml/d) – peak week



6.27 No deficit exists in Henley WRZ on average (Figure 6-10) or peak (Figure 6-11), based on the baseline supply demand balance throughout the planning period based on current forecasts. There is therefore no water planning problem to solve.

6.28 It may however, still be appropriate for interventions to be planned for in Henley, when catchment-wide and regional considerations are taken into account (see section D, below).

D. What happens next?

6.29 Having understood the baseline water supply demand position, there are three possible paths to choose:

1) No further action. There is enough supply to meet demand, including target headroom, so no further action is required apart from continuation of existing baseline activity.
2) Remove the deficit. There is not enough supply to meet demand, including target headroom. Options to resolve the deficit should be investigated and the 'best' option(s) decided upon.
3) Wider considerations. There is enough supply to meet demand, including target headroom, however measures could be implemented to become more efficient, deliver environmental improvements, maintain a positive supply-demand balance, ensure equitable treatment of all our customers or to achieve company or stakeholder aspirations.

6.30 We have identified near-term deficits to resolve in London, SWOX and Guildford.

6.31 In SWA there are medium to long-term deficits. We consider that there may be wider benefits to be gained by addressing water supply demand issues in those zones earlier than needed by the baseline supply demand position. Intervention earlier than needed will ensure we make a positive contribution to sustainable development and we are flexible and robust to the range of future risks and uncertainties.

6.32 In Kennet Valley and Henley, despite the surplus throughout the planning period, we also consider that some intervention may be warranted to ensure equity across our supply area.

6.33 The potential options available to the company to address and resolve the deficits are considered in Section 7: Appraisal of water resource options and 8: Demand management options appraisal. The solutions (i.e. programmes of options) are compared with each other and tested for sensitivity in Section 10: Programme appraisal and a preferred 'best value' programme identified in Section 11: Preferred programme.